

STURMEY
ARCHER

MASTER CATALOGUE

STURMEY ARCHER

GEARS · BRAKES · LIGHTING EQUIPMENT

STURMEY - ARCHER GEARS LTD · NOTTINGHAM · ENGLAND

VARIABLE GEARS

HUB BRAKES

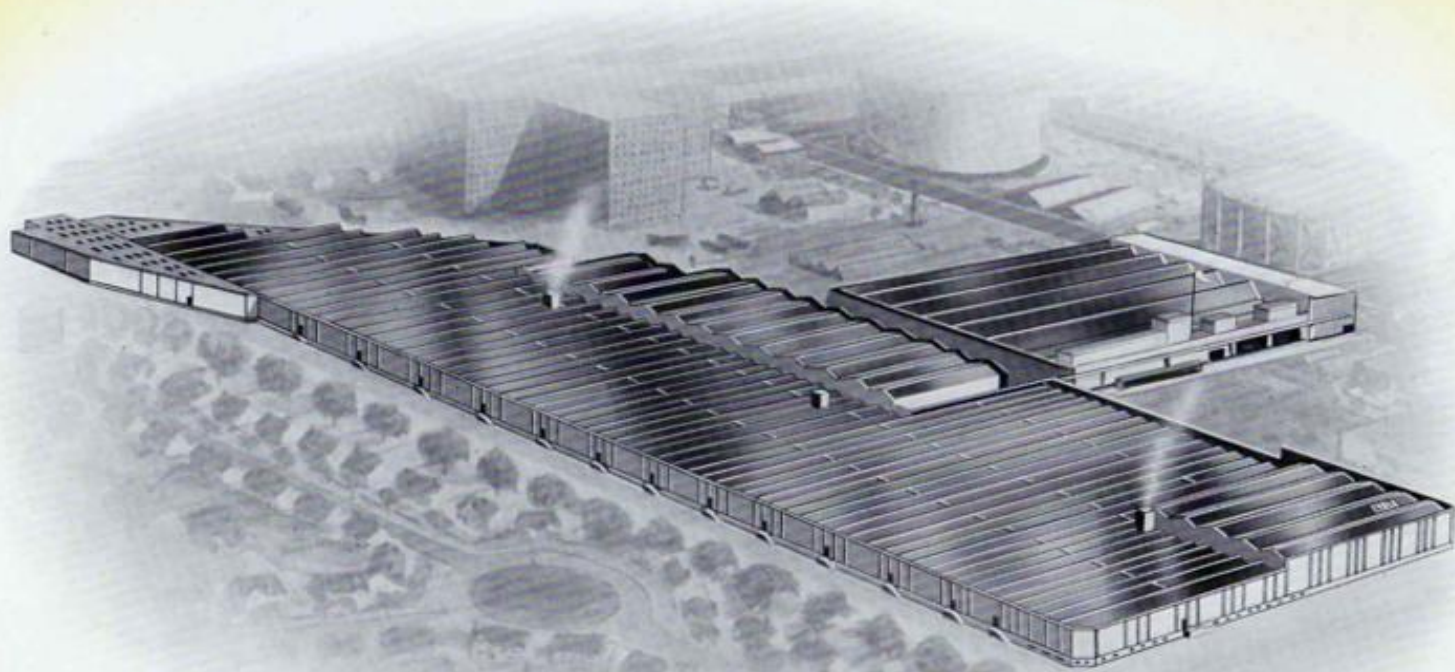
LIGHTING

DISCONTINUED
MODELS

PRICES

SERVICE

THE NEW HOME OF STURMEY-ARCHER GEARS LIMITED



20 ACRE FACTORY · ORSTON DRIVE · NOTTINGHAM

FOREWORD

IN over half a century of unbroken pioneering and service to the cycle trade of the world, Sturmey-Archer has advanced to unchallenged leadership in the design, development and production of cycle hub gears, combined with brakes and lighting equipment.

The introduction of the latest and finest three-speed wide-ratio hub in the world—the 'SW'—is an appropriate moment to publish this catalogue, which is a complete book of reference for the retail trade.

The catalogue contains, first of all, a general description of all hubs and ancillary equipment now in production; then come the corresponding price lists; and finally a comprehensive service section which covers not only the hubs and equipment being manufactured today but also discontinued models which the trader may be called upon to service.

This is essentially a practical publication. It contains no theoretical explanation of epicyclic gearing or the principles underlying the generation of electricity. Such knowledge is not necessary for the use and maintenance of variable gear hubs and 'Dynohub' hub lighting equipment. Only elementary knowledge of mechanics and electric wiring is called for.

The catalogue will demonstrate the inherent simplicity of all Sturmey-Archer products. In design they are ingenious and their construction is precision engineering of the highest quality but there is nothing complicated in operation nor in their maintenance or servicing.

The Company's advertising slogan that 'No bicycle is complete without a Sturmey-Archer three- or four-speed gear' is rapidly being accepted as a fact of cycling life and the master catalogue of the Company's products now offered to the trade is conceived to help the prosecution of sales development, profitable to manufacturer and trader alike, of the completely equipped bicycle.

Sturmey-Archer is grateful for, and proud of, the support of cycle traders great and small the world over and this catalogue is dedicated to them for their faith and co-operation in the past, the present and, we hope, the future.

The Sturmev-Archer Management Team . . .



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Chairman and Managing Director



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Home Sales Dept.



R. J. BAKEWELL
General Sales Manager



D. S. ROBINSON, O.B.E.
Director



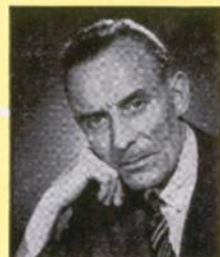
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Marsh Green Road, Exeter. Telephone 54477-54726

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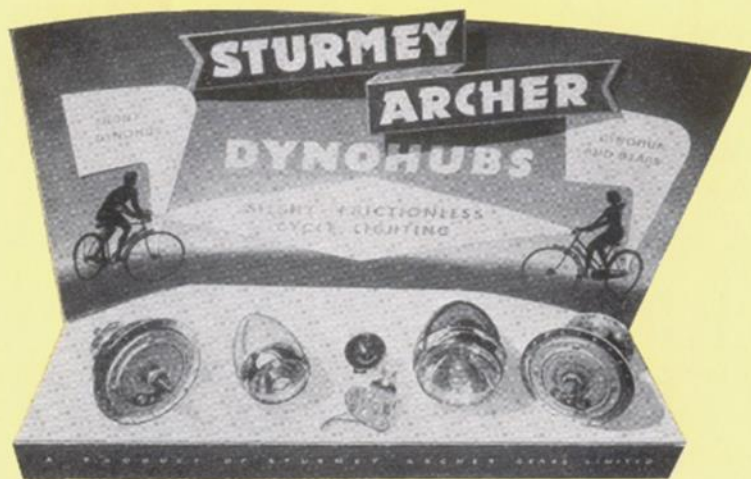
DEALER AIDS



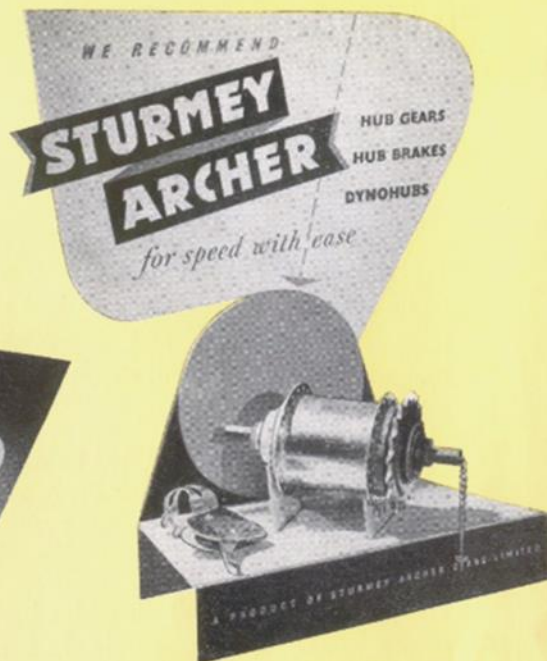
GENERAL GEAR POSTER This Poster measures 19" x 14" and makes an attractive Window piece.

WHEELCARDS These cards are available for all types of Sturmev-Archer products. Displayed on the wheel of a Bicycle they prove valuable selling aids.

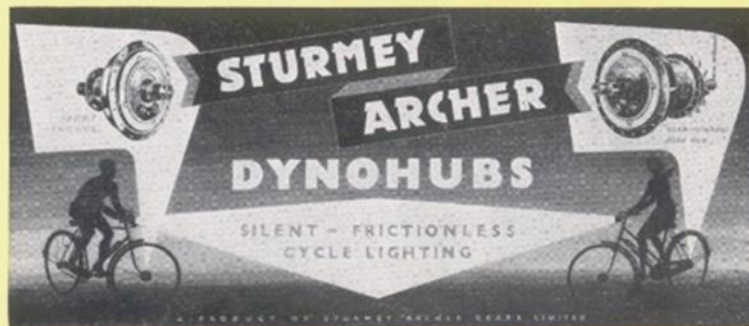
It is a policy of Sturmev-Archer Gears Limited to assist all Dealers in selling the Company's products and to this end a wide selection of leaflets, posters, display cradles, window transparencies and wheelcards is available on application to your nearest Wholesale Depot or direct from Head Office.



'DYNOHUB' CRADLES This display piece shows the range of Gear and 'Dynohub' Hub lighting units (AG or FG, GH6) together with the Sports and Roadster Headlamps, Rear lamp and Trigger Control. Size when assembled 15½" high x 24½" long x 10" deep. Also available are 'Dynohub' Window Bills shown bottom right—size 13" x 29".



GENERAL HUB CRADLE This display piece shows any Three- or Four-speed variable Hub gear together with the appropriate Trigger Control. The size when assembled 18½" x 10½". **ALSO AVAILABLE IS THE SW GEAR CRADLE** and the general Hub Window Transparency both of which are similar to the above.



HOW TO USE THIS CATALOGUE

THIS CATALOGUE provides in one volume a complete and easy reference guide on the sale and service of Sturmev-Archer Gears, Brakes and Lighting Equipment.

It is in loose-leaf form to enable new data to be inserted, when necessary, into the appropriate sections and out-of-date material to be withdrawn, thereby maintaining a current catalogue.

Each main section is identified by means of a colour code and full details of contents are given on the right-hand side of this page.

Hubs which combine a gear with a brake or a gear with a lighting unit are listed under Brakes and Lighting Equipment respectively.

The Service Section has been compiled in a logical sequence to enable any aspect of service to be located easily and with particular reference to individual hubs.

Models no longer in current production are illustrated in the Discontinued Models Section. Should any current model(s) be discontinued, the respective sheet(s) should be removed from their colour section and placed in the GREY Discontinued Models Section.

3-speed and 4-speed gears

SW, AM, 3-SPEED TRIGGER.
FW, FM, 4-SPEED TRIGGER.

Brake Hubs

SB, TCW, BF, BR, CABLE AND ROD CONTROLS.

Lighting Equipment

GH6, SG, FG, HEADLAMPS, REAR LAMP.
DBU, FLEX WIRE TABLE.

Discontinued Models

AW, AB, AG, AC, ASC, FC.

Prices

SPARES WITH INTERCHANGEABILITY, TOOLS AND HUB PRICES.

Service

1 FITTING AND ADJUSTMENT	pages	1-6
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STURMEY
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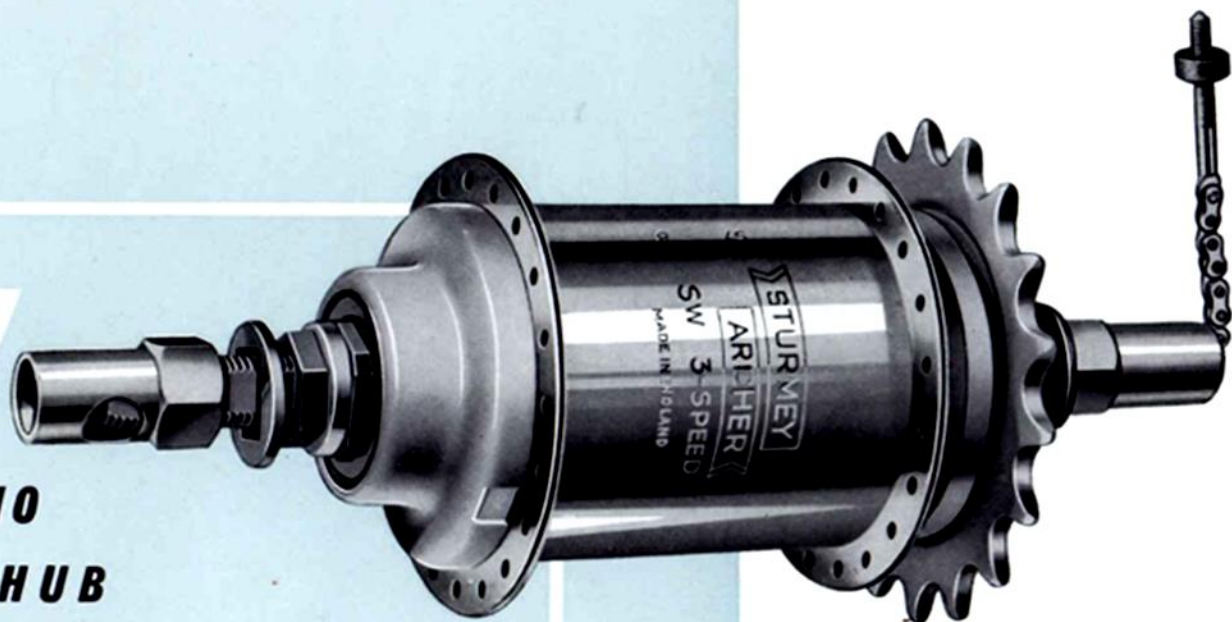
*3- and
4-Speed
Hubs*

VARIABLE GEARS

SW

WIDE-RATIO 3-SPEED HUB

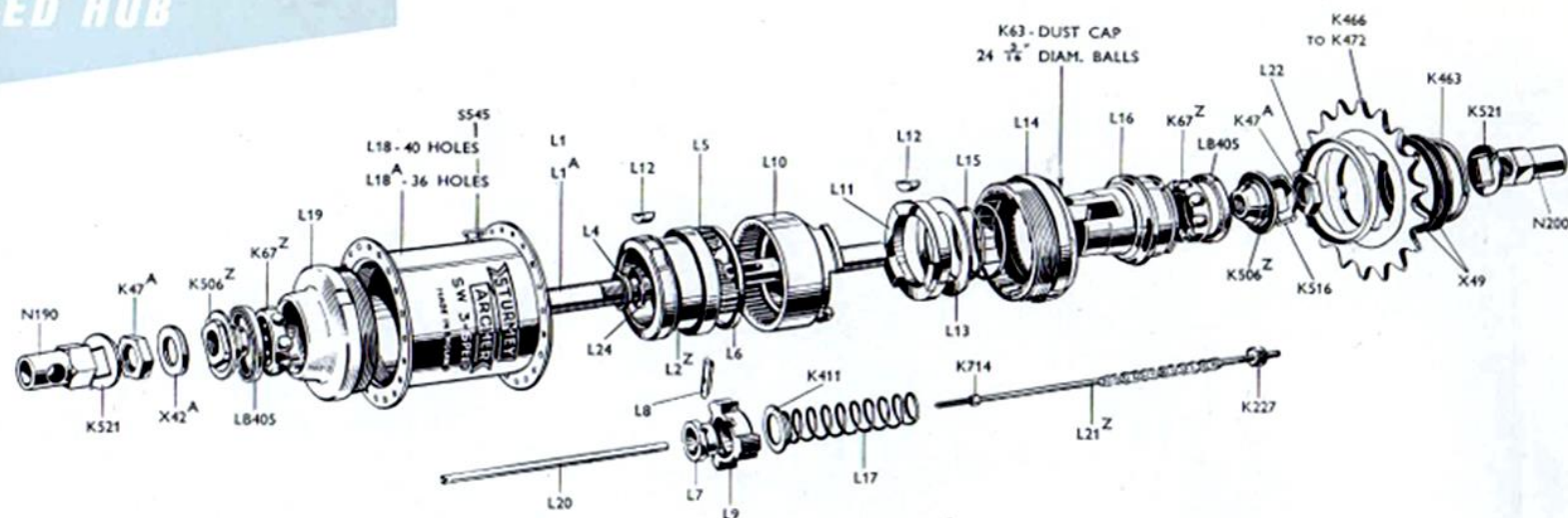
by **STURMEY**
ARCHER



SW Wide-Ratio 3-Speed Hub.
Revolutionary! Fewer working parts than any other wide-ratio 3-speed hub and 4 oz. lighter than its predecessor. Smaller and neater in every way with an increase of 38.4% and a decrease of 27.7% from normal. An outstanding contribution to the well-being of the everyday cyclist.

FOR DETAILS OF PARTS SEE OVER

SW Wide-Ratio 3-SPEED HUB



CODE No.

DESCRIPTION

L1	Axle, 6" long
L1A	Axle, 6 1/4" long
L2Z	Planet Cage
L4	Planet Cage Fixing Plate
L24	Planet Cage Bearing Plate
L5	Planet Pinion
L6	Pinion Retaining Ring
L7	Clutch Sleeve
L8	Axle Key
L9	Sliding Clutch
K411	Thrust Washer
L10	Gear Ring
L11	Gear Ring Pawl Ring
L12	Pawl
L13	Pawl Retaining Washer
L14	R.H. Ball Ring
329	Ball Bearings, 3/16" diam. (per set of 24)
K63	Inner Dust Cap
L15	Thrust Spring
L16	Driver
K67Z	Ball Cage with 8 1/4" diam. balls
LB405	Outer Dust Cap
L17	Clutch Spring
K506Z	Axle Cone with Dust Cap
K516	R.H. Cone Locking Washer
L18	Shell, 40 holes

CODE No.

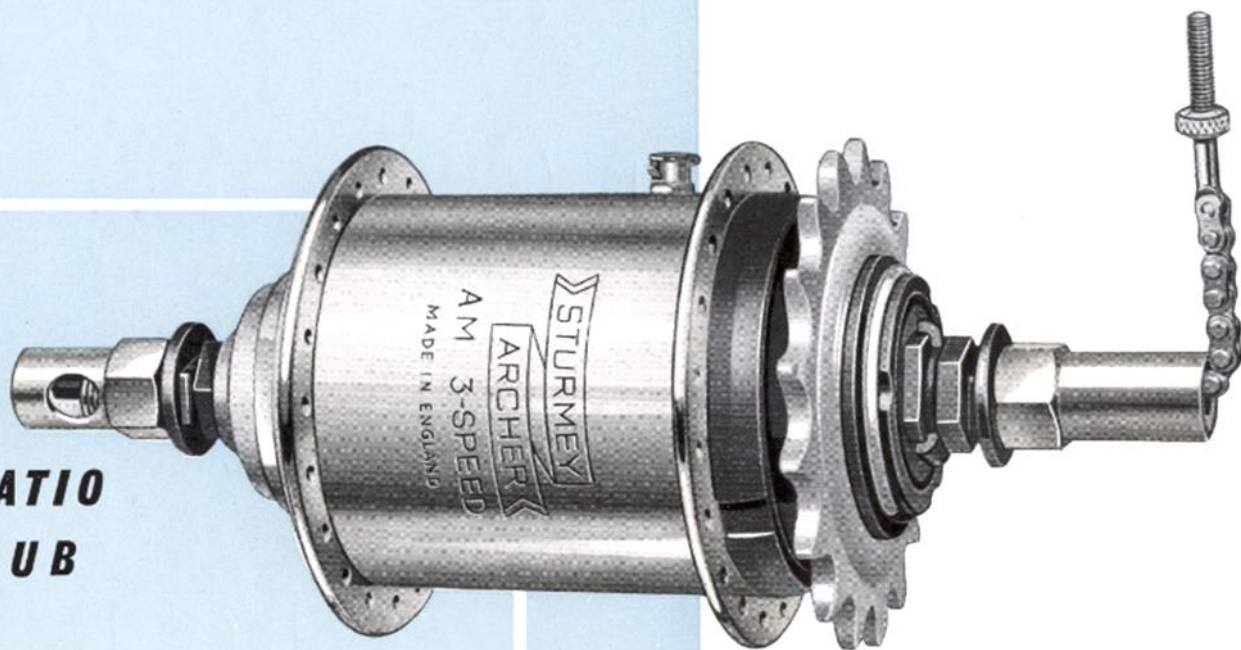
DESCRIPTION

L18A	Shell, 36 holes
S545	Lubricator
L19	L.H. Ball Cup
L20	Indicator—suits both axle lengths
L21Z	Coupling complete
K714	Collar for Coupling
K227	Connection Locknut
X42A	Axle Spacing Washer
K47A	Cone Locknut
K521	Axle Locking Washer
N190	L.H. Axle Nut
N200	R.H. Axle Nut
L22	Sprocket Dust Cap
K466	Sprocket, 16 teeth
K467	Sprocket, 17 teeth
K468	Sprocket, 18 teeth
K469	Sprocket, 19 teeth
K470	Sprocket, 20 teeth
K472	Sprocket, 22 teeth
K468A	Sprocket, 18 teeth for 3/16" wide chain
K469A	Sprocket, 19 teeth for 3/16" wide chain
X49	Sprocket Spacing Washer
K463	Circlip
K48	Lip Washer. <i>Not illustrated.</i> Alternative to K521
X42	Axle Spacing Washer (3/16" thick). <i>Alternative. Not illustrated</i>

AM

**MEDIUM-RATIO
3-SPEED HUB**

by **STURMEY
ARCHER**

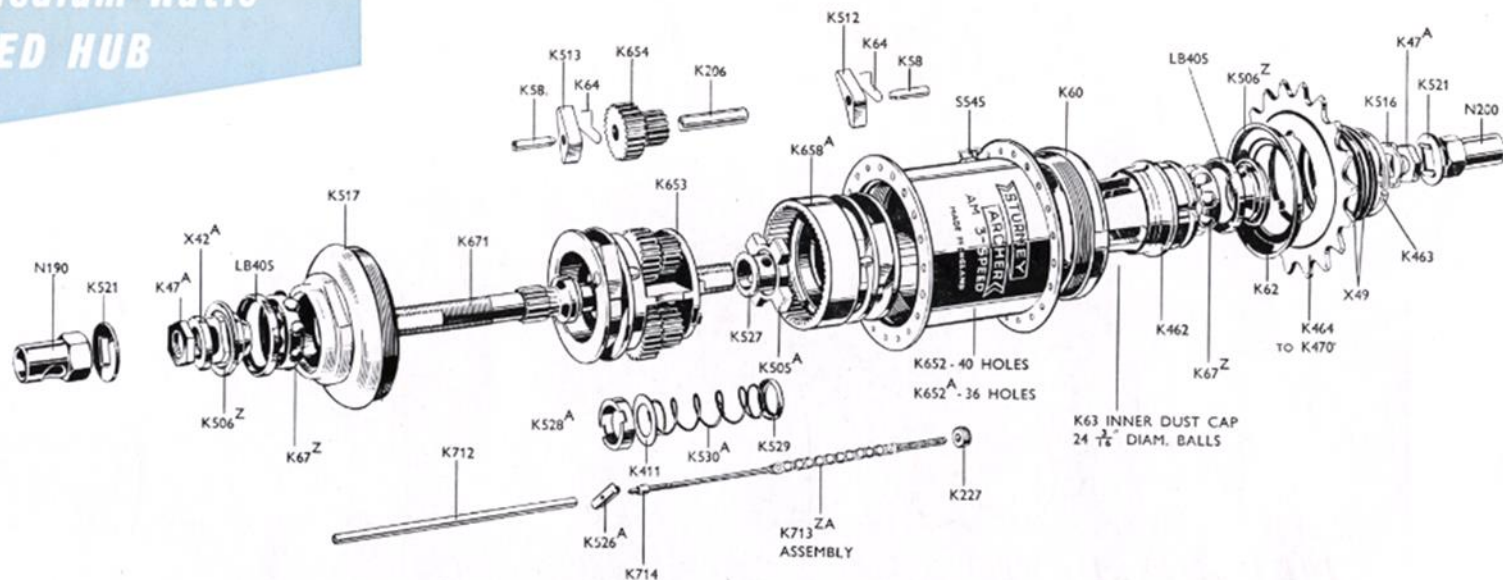


FOR DETAILS OF PARTS SEE OVER



AM Medium-Ratio 3-Speed Hub.
15.55% increase 13.46% decrease from normal.
Ideally suitable for Sports Machines.

AM Medium-Ratio 3-SPEED HUB



CODE No.

DESCRIPTION

K671	Axle, 5 $\frac{1}{4}$ " long
K653	Planet Cage
K527	Clutch Sleeve
K505A	Sliding Clutch
K526A	Axle Key
K528A	Thrust Ring
K654	Planet Pinion
K206	Pinion Pin
K658A	Gear Ring
K512	Gear Ring Pawl
K64	Pawl Spring
K58	Pawl Pin
K60	R.H. Ball Ring
329	Ball Bearings $\frac{3}{16}$ " diam. (per set of 24)
K63	Inner Dust Cap
K411	Thrust Washer
K530A	Clutch Spring
K529	Clutch Spring Cap
K462	Driver
K67Z	Ball Cage with 8 $\frac{1}{4}$ " diam. balls
LB405	Outer Dust Cap
K506Z	Axle Cone with Dust Cap
K516	R.H. Cone Locking Washer
K513	Low Gear Pawl
K652	Shell, 40 holes
K652A	Shell, 36 holes

CODE No.

DESCRIPTION

S545	Lubricator
K517	L.H. Ball Cup
K712	Indicator
K713ZA	Coupling complete
K713Z	Coupling complete, quick-release type. <i>Not illustrated</i>
K740AZ	Quick-release Connection. <i>Not illustrated</i>
K714	Indicator Collar
K228	Ball Ring—alternative to K60 for 14T or 15T sprockets
K230Z	Ball Cage with $\frac{3}{16}$ " diam. balls (only used with K228)
K227	Connection Locknut
X42A	Axle Spacing Washer
K47A	Cone Locknut
K521	Axle Locking Washer
N190	L.H. Axle Nut
N200	R.H. Axle Nut
K62	Sprocket Dust Cap
K229	Sprocket Dust Cap (used with K228 Ball Ring only)
K464	Sprocket, 14 teeth
K465	Sprocket, 15 teeth
K466	Sprocket, 16 teeth
K467	Sprocket, 17 teeth
K468	Sprocket, 18 teeth
K469	Sprocket, 19 teeth
K470	Sprocket, 20 teeth
X49	Sprocket Spacing Washer
K463	Circlip

TRIGGER

3-SPEED CONTROL

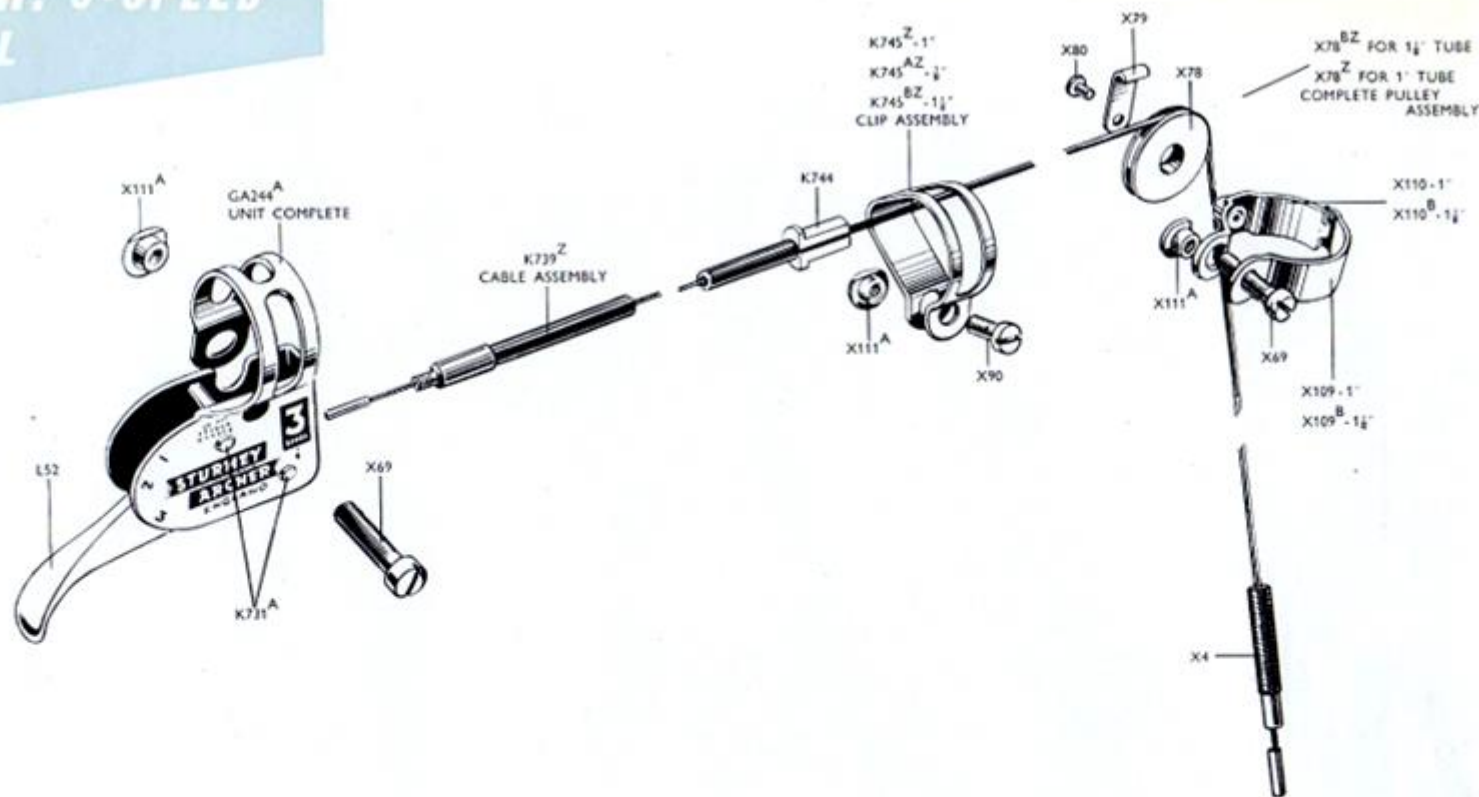
by **STURMEY**
ARCHER



The Sturmeley-Archer patent 'Flick' 3-Speed Trigger Control provides instantaneous change of gear by the flick of a finger. This control has recently been redesigned and is even smaller, neater and lighter than its predecessor.

FOR DETAILS OF PARTS SEE OVER

TRIGGER: 3-SPEED CONTROL



**Small Type
(illustrated)
CODE No.**

GC3B
GA244B
L52
K730A
L53Z
K731A
L55
L56
X69
X111A
K739Z
K744

DESCRIPTION

Trigger control complete—less Pulley
Trigger Unit complete
Trigger Lever only
Pin for Trigger Lever
Ratchet Plate
Pivot Pin
Trigger Pawl
Trigger Spring
Clip Screw
Clip Nut
Trigger Wire Assembly—Give length of
both Inner Wire and Outer Cable
Fulcrum Sleeve

**Old Type
'A' Range
CODE No.**

GC3A
GA244A
K747
K730A
K736Z
K731A
K722
K738
X69
X111A
K739Z
K744

**Small Type
(illustrated)
CODE No.**

K745Z
K745AZ
K745BZ
X90
X78Z
X78BZ
X69
X78
X79
X80
X110B
X109B

DESCRIPTION

Fulcrum Clip complete for 1" bar
Fulcrum Clip complete for 1/2" bar
Fulcrum Clip complete for 1 1/4" bar
Clip Screw
Pulley complete for 1" tubing only
Pulley complete for 1 1/4" tube (standard)
Clip Screw
Pulley Wheel only
Pulley Arm
Pulley Arm Screw
Clip with Pulley Stud for 1 1/4" tube
Half Clip for 1 1/4" tube

**Old Type
'A' Range
CODE No.**

K745Z
K745AZ
K745BZ
X90
X78Z
X78BZ
X69
X78
X79
X80
X110B
X109B

FOUR-SPEED HUBS

THE FOUR-SPEED HUB GEAR represents a unique technical achievement, acclaimed by cyclists throughout the world, and was formally recognized by the award to Sturmey-Archer of the Cyclists' Touring Club 1939 Plaque 'as being the greatest improvement in cycle design or equipment during the year'.

In four-speed hubs the additional gear is lower than the 'low' gear obtained with the normal three-speed and it is, therefore, called the bottom gear. This combination virtually offers the advantages of two 'normal' gears.

The FW standard wide-ratio four-speed hub is designed to give maximum return for minimum effort and is an excellent unit for Roadster and Touring machines.

The FM four-speed medium-ratio hub with three fairly close ratios is the finest all-round Clubman's gear and provides the complete answer for fast touring.

The FG hub which combines the FW gear with a 'Dynohub' hub lighting unit is described in the 'Lighting Equipment' section of the catalogue.

The FC four-speed close-ratio hub which is no longer in production is referred to in the 'Discontinued Models' section.

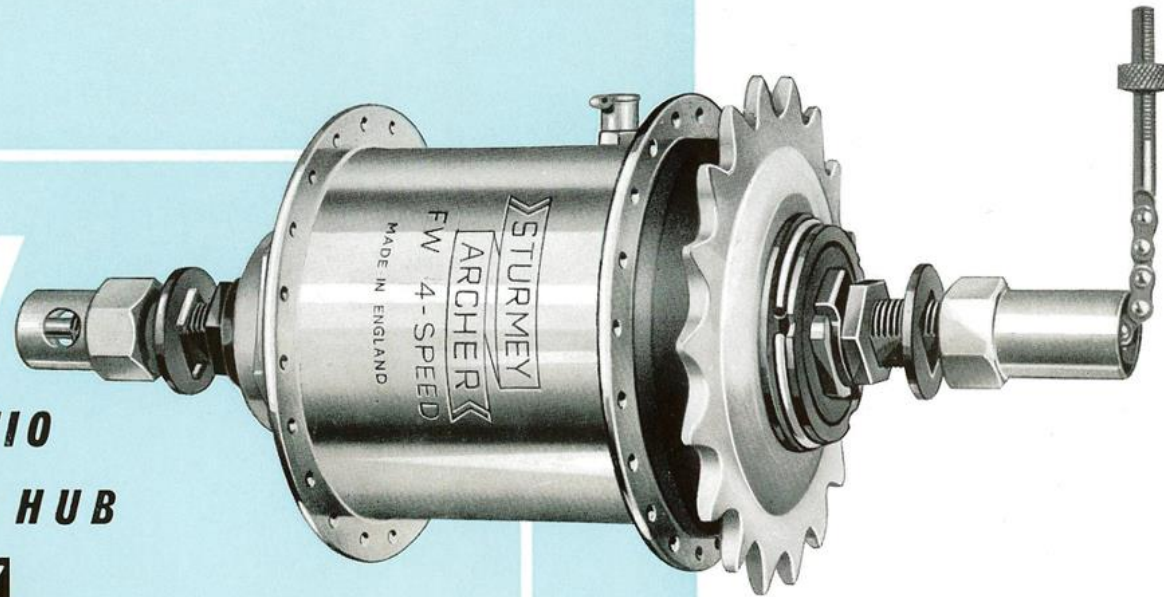


The Cyclists' Touring Club saw fit in 1939 to award its plaque to STURMEY-ARCHER GEARS LTD., for their 4-Speed Hub, considered to be the greatest improvement in Cycle Equipment during that year.

FW

**WIDE-RATIO
4-SPEED HUB**

by **STURMEY
ARCHER**

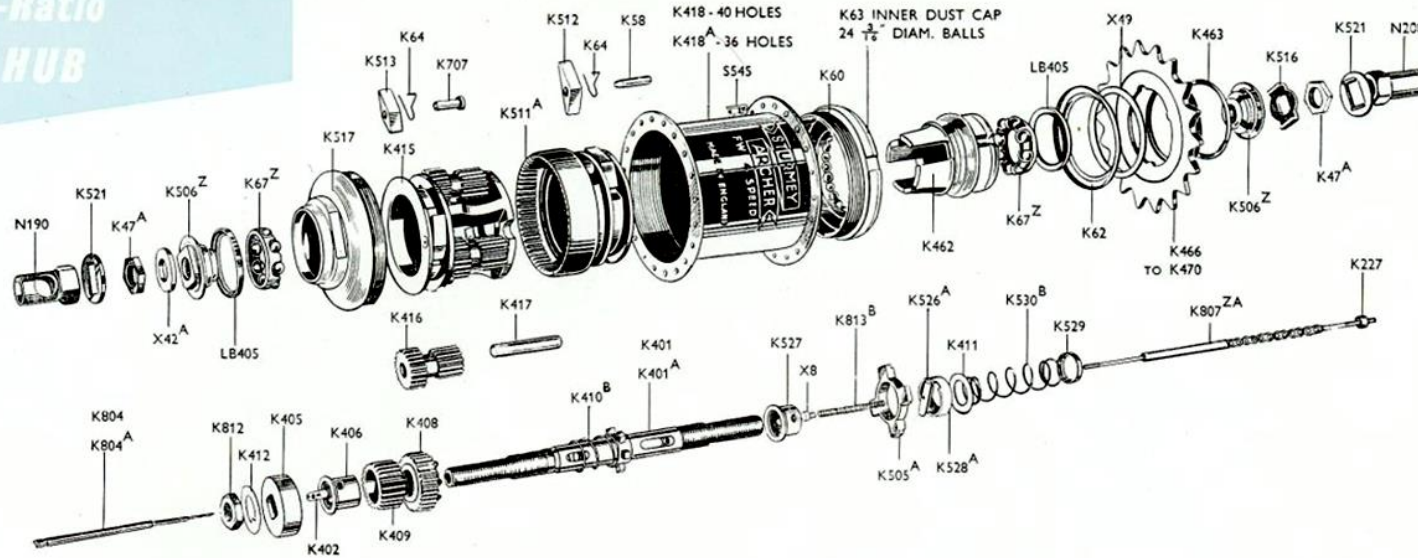


FW Wide Ratio 4-Speed Hub.

The great advantage of this hub against the corresponding 3-speed lies in the fact that there are two normal gears. Ratios give 26.6% increase, 21.1% and 33.3% decrease from normal.

FOR DETAILS OF PARTS SEE OVER

FW Wide-Ratio 4-SPEED HUB



CODE No.

DESCRIPTION

K401	Axle, 5 $\frac{3}{4}$ " long
K401A	Axle, 6 $\frac{1}{4}$ " long
K410B	Low Gear Spring
K408	Primary Sun Pinion
K409	Secondary Sun Pinion
K406	Pinion Sleeve
K402	Low Gear Key
K405	Dog Ring
K412	Locking Washer
K812	Locknut
K415	Planet Cage
K513	Low Gear Pawl
K707	Low Gear Pawl Pin
K64	Pawl Spring
K416	Planet Pinion
K417	Pinion Pin
K804	Indicator for short axle
K804A	Indicator for long axle
X8	Collar for Compensator Spring
K813B	Compensator Spring
K527	Clutch Sleeve
K505A	Sliding Clutch
K526A	Axle Key
K807ZA	Coupling complete
K227	Connection Locknut
K528A	Thrust Ring
K530B	Clutch Spring
K529	Spring Cap
K511A	Gear Ring

CODE No.

DESCRIPTION

K512	Gear Ring Pawl
K58	Pawl Pin
K60	R.H. Ball Ring
329	Ball Bearings, $\frac{3}{8}$ " diam. (per set of 24)
K63	Inner Dust Cap
K462	Driver
K67Z	Ball Cage with 8 $\frac{1}{4}$ " balls
LB405	Outer Dust Cap
K506Z	Axle Cone with Dust Cap
K516	R.H. Cone Locking Washer
K418	Shell, 40 holes
K418A	Shell, 36 holes
S545	Lubricator
K517	L.H. Ball Cup
K411	Thrust Washer
X42A	Axle Spacing Washer ($\frac{1}{8}$ " thick)
K47A	Cone Locknut
K521	Axle Locking Washer
N190	L.H. Axle Nut
N200	R.H. Axle Nut
K62	Sprocket Dust Cap
K466	Sprocket, 16 teeth
K467	Sprocket, 17 teeth
K468	Sprocket, 18 teeth
K469	Sprocket, 19 teeth
K470	Sprocket, 20 teeth
X49	Sprocket Spacing Washer
K463	Circlip

FM

**MEDIUM-RATIO
4-SPEED HUB**

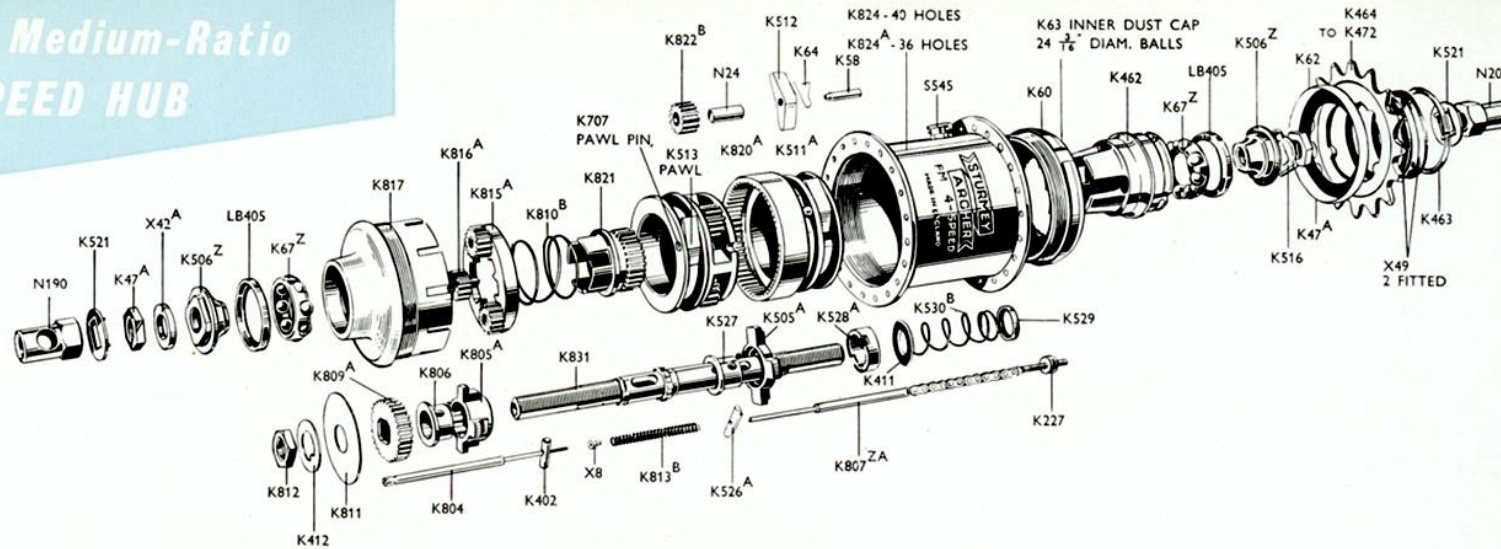
by **STURMEY**
ARCHER



FM Medium-Ratio 4-Speed Hub.
12.5% increase,
14.3% and 33.3% decrease from normal.
Unquestionably the best all round Club gear.

FOR DETAILS OF PARTS SEE OVER

FM Medium-Ratio 4-SPEED HUB



CODE No.

DESCRIPTION

K831	Axle, 5 $\frac{1}{4}$ " long
K805A	Low Gear Dog
K806	Dog Sleeve
K402	Low Gear Key
K809A	Secondary Sun Pinion
K811	Locating Plate
K412	Locking Washer
K812	Locknut
K815A	Secondary Planet Cage
K816A	Secondary Planet Pinion
K810B	Low Gear Spring
K821	Primary Sun Pinion
K820A	Planet Cage
K513	Low Gear Pawl
K707	Low Gear Pawl Pin
K64	Pawl Spring
K822B	Planet Pinion
N24	Pinion Pin
K804	Indicator
X8	Collar for Compensator Spring
K813B	Compensator Spring
K527	Clutch Sleeve
K505A	Sliding Clutch
K526A	Axle Key
K807ZA	Coupling complete
K807Z	Coupling complete, quick-release type. <i>Not illustrated</i>
K227	Connection Locknut
K528A	Thrust Ring
K411	Thrust Washer
K530B	Clutch Spring
K529	Spring Cap
K511A	Gear Ring

CODE No.

DESCRIPTION

K512	Gear Ring Pawl
K58	Pawl Pin
K60	R.H. Ball Ring
329	Ball Bearings, $\frac{3}{16}$ " diam. (per set of 24)
K63	Inner Dust Cap
K67Z	Ball Cage with 8 $\frac{1}{4}$ " diam. balls
LB405	Outer Dust Cap
K506Z	Axle Cone with Dust Cap
K516	R.H. Cone Locking Washer
K824	Shell, 40 holes
K824A	Shell, 36 holes
S545	Lubricator
K817	Ball Cup
K228	R.H. Ball Ring
K230Z	Ball Cage with balls
X42A	Axle Spacing Washer $\frac{1}{8}$ " thick
K47A	Cone Locknut
K521	Axle Locking Washer
N190	L.H. Axle Nut
N200	R.H. Axle Nut
K62	Sprocket Dust Cap
K464	Sprocket, 14 teeth
K465	Sprocket, 15 teeth
K466	Sprocket, 16 teeth
K467	Sprocket, 17 teeth
K468	Sprocket, 18 teeth
K469	Sprocket, 19 teeth
K470	Sprocket, 20 teeth
K472	Sprocket, 22 teeth
X49	Sprocket Spacing Washer
K463	Circlip
K229	Sprocket Dust Cap when K228 used. <i>Not illustrated</i>

TRIGGER

4-SPEED CONTROL

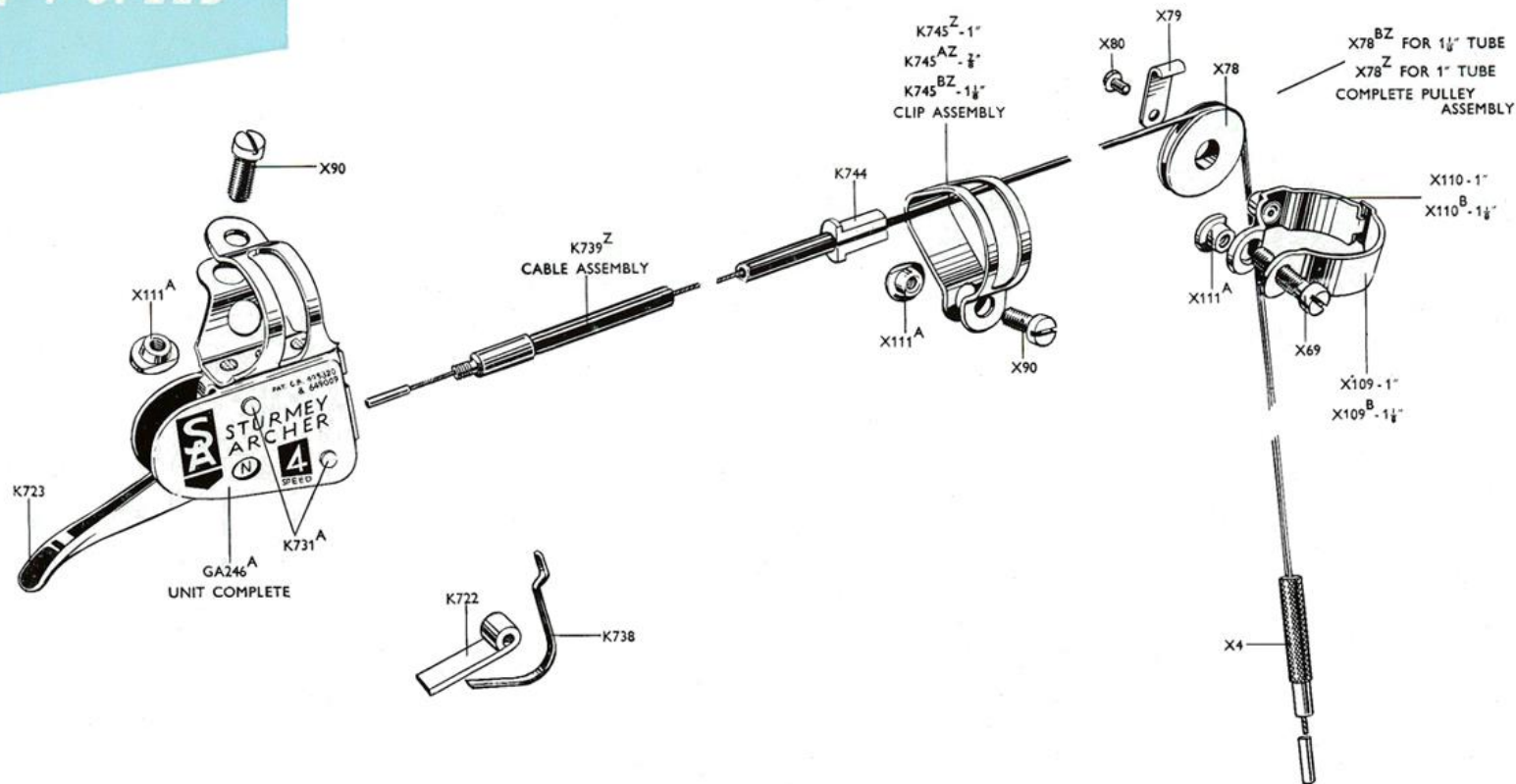
by **STURMEY**
ARCHER



Specially produced for use with our range of 4-Speed Gear Hubs this control is easy to operate and provides instantaneous change of gear.

FOR DETAILS OF PARTS SEE OVER

TRIGGER: 4-SPEED CONTROL



CODE No.

DESCRIPTION

GC4A	Trigger control complete—less Pulley
GA246A	Trigger Unit complete
K723	Trigger Lever only
K730A	Pin for Trigger Lever. <i>Not illustrated</i>
K736Z	Ratchet Plate. <i>Not illustrated</i>
K731A	Pivot Pin
K722	Trigger Pawl
K738	Trigger Spring
X69	Clip Screw
X111A	Clip Nut
K739Z	Trigger Wire Assembly—Give length of both Inner Wire and Outer Cable
K744	Fulcrum Sleeve

CODE No.

DESCRIPTION

K745Z	Fulcrum Clip complete for 1" bar
K745AZ	Fulcrum Clip complete for $\frac{7}{8}$ " bar
K745BZ	Fulcrum Clip complete for $1\frac{1}{8}$ " bar
X90	Clip Screw
X78Z	Pulley complete for 1" tubing only
X78BZ	Pulley complete for $1\frac{1}{8}$ " tube (standard)
X69	Clip Screw
X78	Pulley Wheel only
X79	Pulley Arm
X80	Pulley Arm Screw
X110B	Clip with Pulley Stud for $1\frac{1}{8}$ " tube
X109B	Half Clip for $1\frac{1}{8}$ " tube

STURMEY
ARCHER

HUB BRAKES

*Hub
Brakes*

HUB BRAKES

ALTHOUGH THE NAME 'STURMEY-ARCHER' is synonymous with the variable hub gear, it must not be overlooked that no company offers a finer range of internal expanding brakes.

Front and rear single-speed brake hubs, operated by rod or cable control, have been steadily gaining acceptance throughout the world for many years, adding materially to the safety of the cycling public.

The internal expanding brake is also combined with a three-speed gear (SB, which was formerly AB). There is in addition available a three-speed gear with coaster hub, known as the 'TCW'.

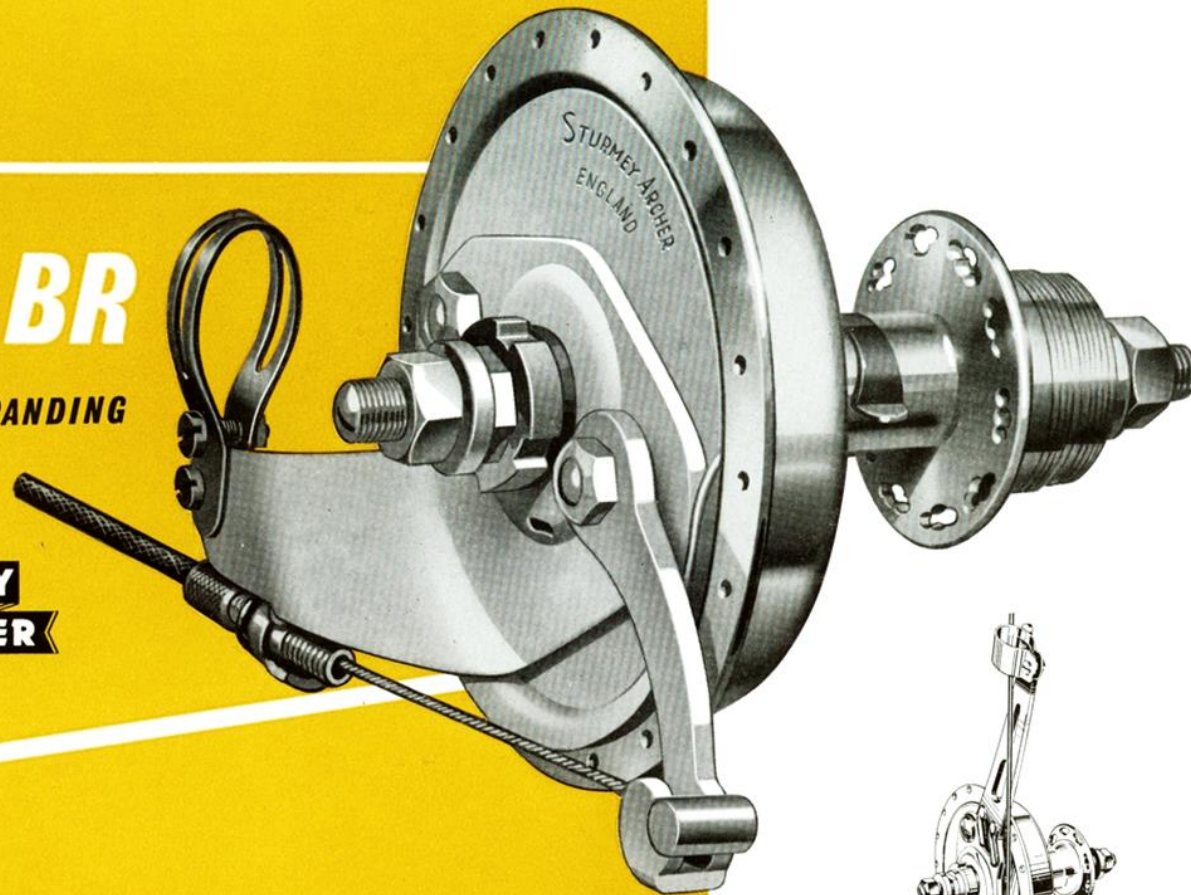
Whilst the conversion from conventional to Sturmey-Archer hub braking equipment, with or without gear, is expensive to the cyclist, the extra cost to him of this equipment when he buys his bicycle originally is a comparatively small but a most worthwhile investment, which the retailer is well advised to foster.

BF AND BR

INTERNAL EXPANDING

BRAKE HUBS

by **STURMEY**
ARCHER

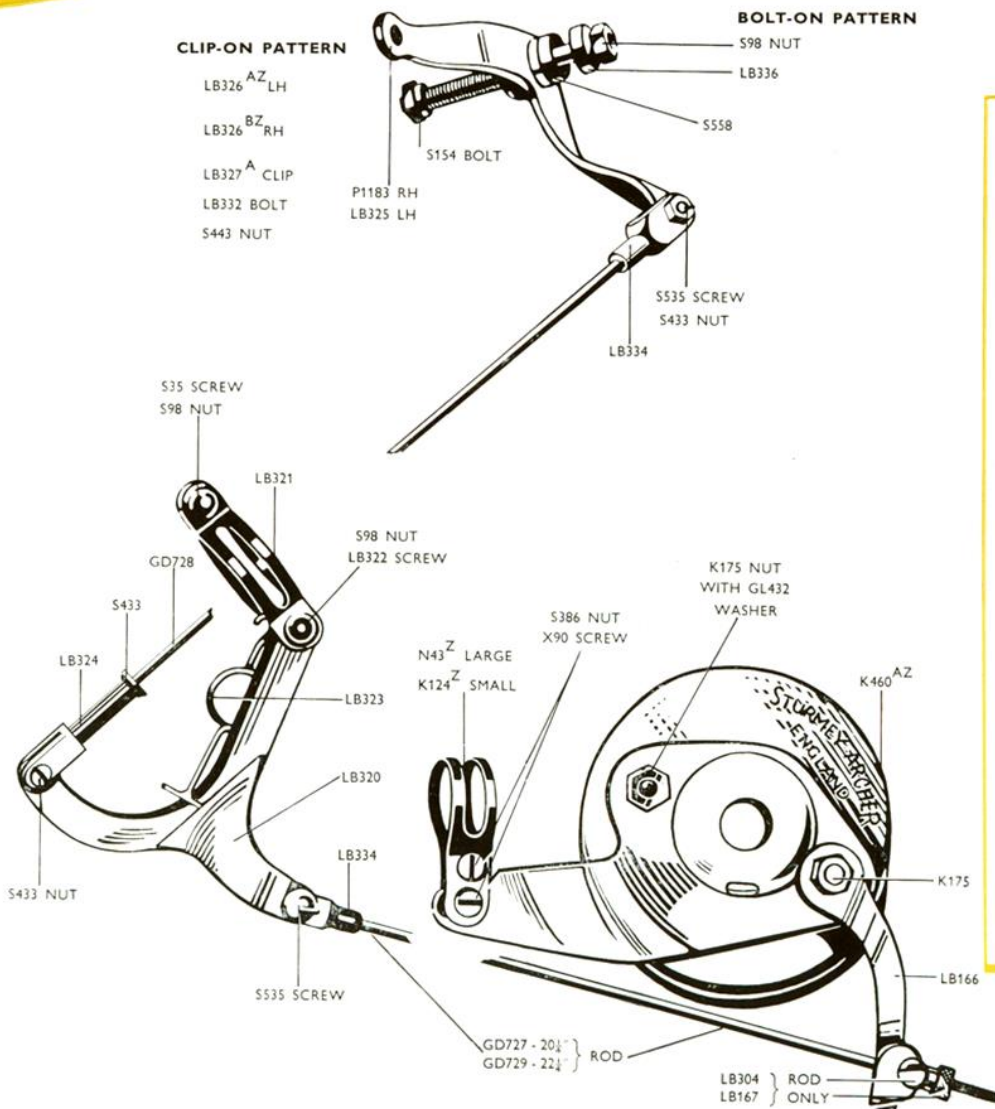


BF and BR

The BR is a Rear Single-Speed Hub with an internal expanding brake fitted with either cable or rod control. The BF is a Front-Brake Hub with internal expanding brake and fitted with either cable or rod control.

FOR DETAILS OF PARTS SEE OVER

ROD-BRAKE CONTROLS — REAR



REAR

FOR REAR HUB BRAKE:

Code No.	Description
BC3BR	Rear Rod fittings, Bolt-on Bell-crank, right-hand operated
BC3BL	Rear Rod fittings, Bolt-on Bell-crank, left-hand operated
BC3CR	Rear Rod fittings, Clip-on Bell-crank, right-hand operated
BC3CL	Rear Rod fittings, Clip-on Bell-crank, left-hand operated

BOLT-ON BELL-CRANK FITTINGS:

Code No.	Description
P1183	Right-hand Bell-crank
LB325	Left-hand Bell-crank
S154	Fulcrum Bolt
S558	Bush for Bell-crank
LB336	Washer
S98	Securing Nut

CLIP-ON BELL CRANK FITTINGS:

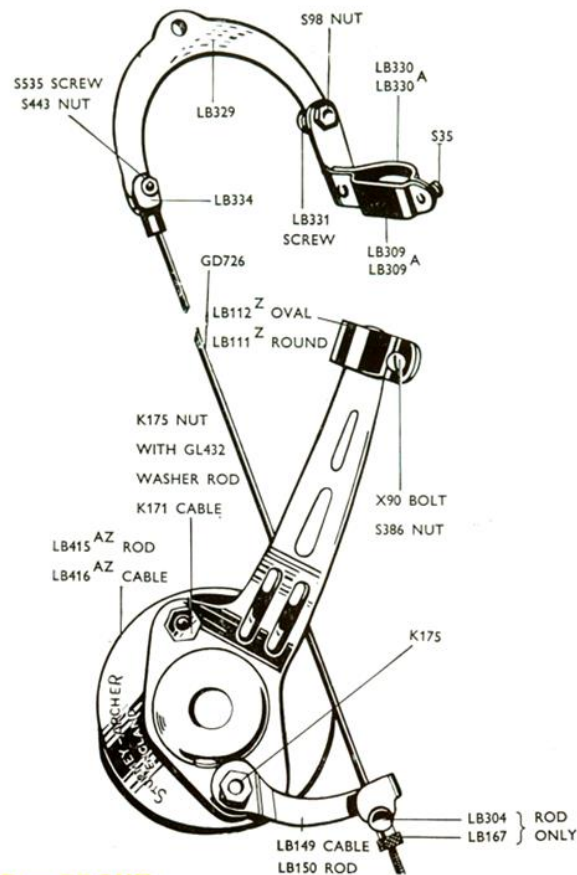
Code No.	Description
LB326AZ	Left-hand Bell-crank with fulcrum
LB326BZ	Right-hand Bell-crank with fulcrum
LB327A	Fulcrum Clip
LB332	Fulcrum Bolt
S443	Fulcrum Nut

Not illustrated

ROD FITTINGS

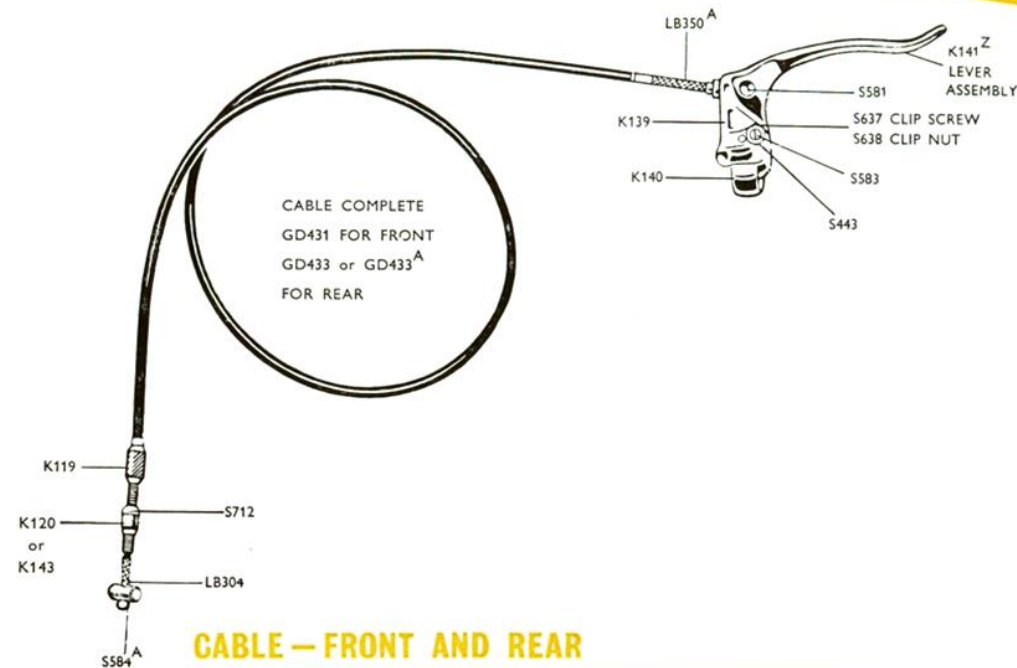
Code No.	Description
GD728	Down Tube Rod complete with connection each end
GD727	Bottom Rod complete with front connection (20 $\frac{1}{4}$ " rod)
GD729	Bottom Rod complete with front connection (22 $\frac{1}{4}$ " rod)
S535	Connection Screw
S433	Connection Nut
LB320	Brake Link
LB321	Brake Link Half-clip
LB323	Brake Link Spring
LB322	Swivel Bolt
S35	Brake Link Clip Screw
S98	Clip Screw Nut
LB304	Swivel Pin for Cam Lever
LB167	Adjusting Nut
LB334	Short Rod Connection
LB324	Long Rod Connection

BRAKE CONTROLS { **ROD - FRONT**
CABLE - FRONT
AND REAR



ROD - FRONT

CODE No.	DESCRIPTION
BC2	Front Rod fittings complete from Stirrup to Hub
LB329	Front Brake Stirrup
LB309	Inner Clip for 'D' or Duplex Forks
LB309A	Inner Clip for Oval Forks
LB330	Outer Clip for 'D' or Oval Forks
LB330A	Outer Clip for Duplex Forks only.
S35	Clip Screw
LB331	Fulcrum Screw
S98	Nut for Fulcrum Bolt
LB334	Rod Connection
S535	Connection Screw
S433	Connection Nut
GD 726	Brake Rod with top connection
LB304	Swivel Pin
LB167	Adjusting Nut

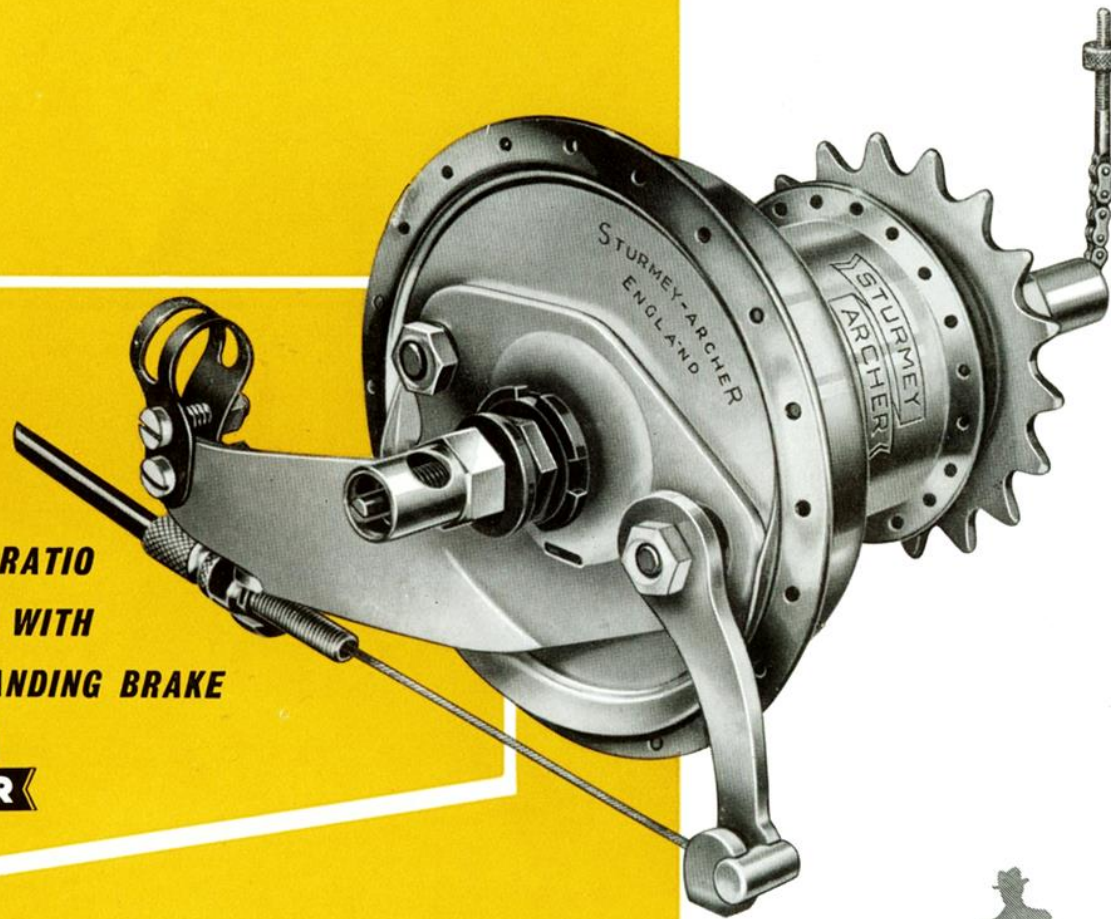


CABLE - FRONT AND REAR

CODE No.	DESCRIPTION
BC1F	Brake Control complete for Front Hub
BC1R	Brake Control complete for Rear Hub
K141Z	Brake Lever complete
K139	Lever Fulcrum
S583	Fulcrum Bolt
S443	Fulcrum Nut
K140	Fulcrum Clip
S637	Clip Screw
S638	Clip Nut
LB350A	Cable Guide
S581	Wire Nipple
GD431	Front Brake Cable complete
GD433	Rear Brake Cable complete to 1956 only
GD433A	Rear Brake Cable from 1957
K119	Cable Adjuster
K120	Adjuster Nut (Rear Cables to 1956 only) and all front cables
K143	Cable Adjuster for Rear Cables from 1957
S712	Locknut
LB304	Swivel for Cam Lever
S584A	Nipple (hub end)

SB

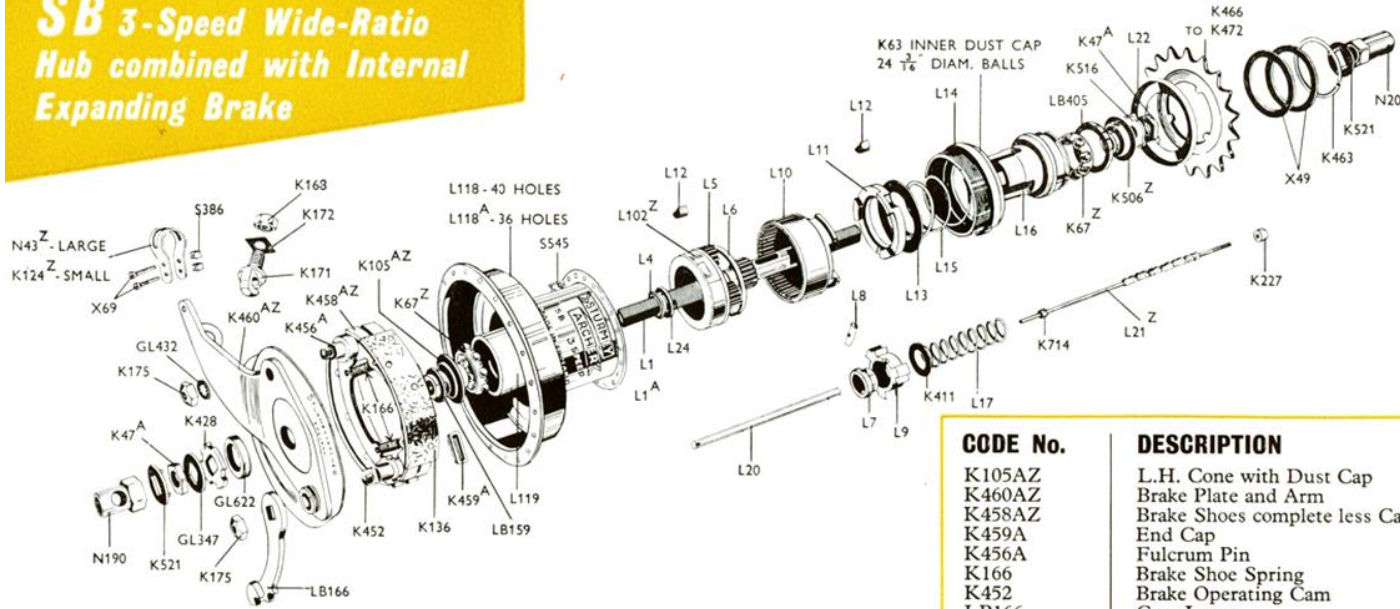
**3-SPEED WIDE-RATIO
HUB COMBINED WITH
INTERNAL EXPANDING BRAKE
by STURMEY
ARCHER**



SB The new Wide-Ratio 3-Speed Gear combined with internal expanding brake, fitted with either cable or rod control. Ratios - 38.4% increase, 27.7% decrease from normal.

FOR DETAILS OF PARTS SEE OVER

SB 3-Speed Wide-Ratio Hub combined with Internal Expanding Brake



CODE No.

DESCRIPTION

L1	Axle, 6" long
L1A	Axle, 6 1/4" long
L102Z	Planet Cage
L24	Planet Cage Bearing Plate
L4	Planet Cage Fixing Plate
L5	Planet Pinion
L6	Pinion Retaining Ring
L7	Clutch Sleeve
L8	Axle Key
L9	Sliding Clutch
K411	Thrust Washer
L10	Gear Ring
L11	Gear Ring Pawl Ring
L12	Pawl
L13	Pawl Retaining Washer
L14	R.H. Ball Ring
329	Ball Bearings, 3/16" diam. (per set of 24)
K63	Inner Dust Cap
L15	Thrust Spring
L16	Driver
K67Z	Ball Cage with 8 1/4" diam. balls
LB405	Outer Dust Cap
L17	Clutch Spring
K529	Clutch Spring Cap
K506Z	R.H. Cone with Dust Cap
K516	R.H. Cone Locking Washer
L118	Shell, 40 holes
L118A	Shell, 36 holes
S545	Lubricator
L119	L.H. Ball Cup

CODE No.

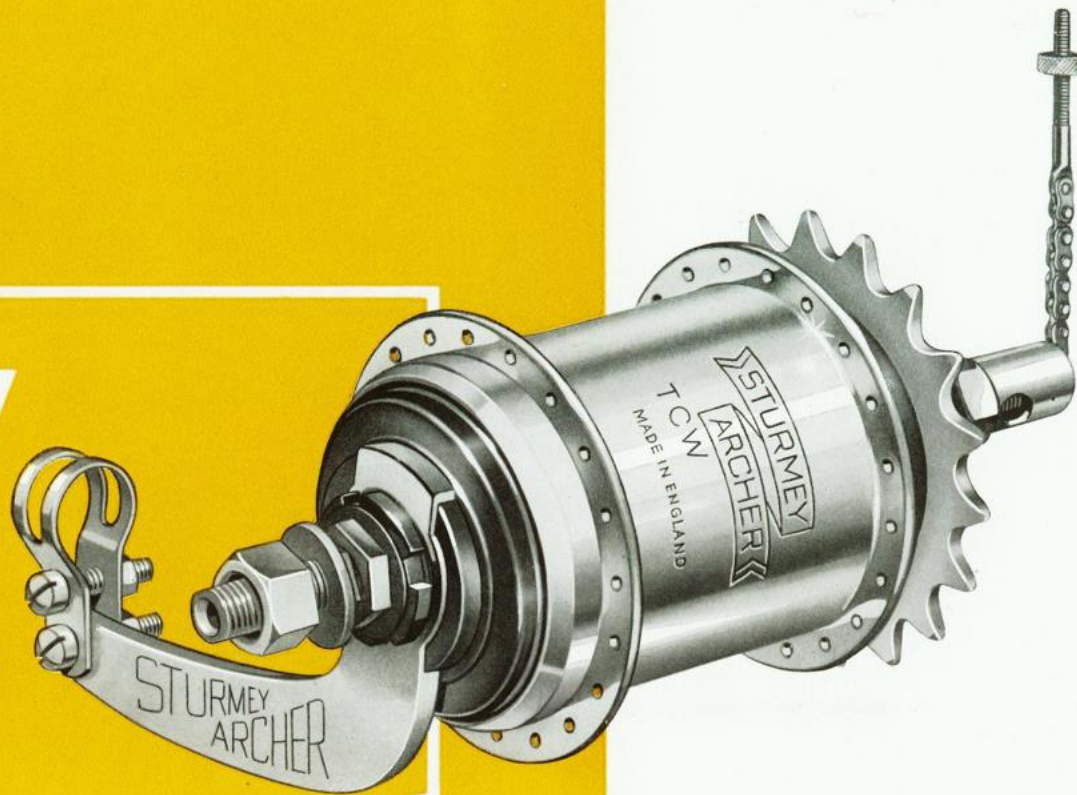
DESCRIPTION

K105AZ	L.H. Cone with Dust Cap
K460AZ	Brake Plate and Arm
K458AZ	Brake Shoes complete less Cam (Pin type)
K459A	End Cap
K456A	Fulcrum Pin
K166	Brake Shoe Spring
K452	Brake Operating Cam
LB166	Cam Lever
K175	Fixing Nut
GL432	Lock Washer
K136	Brake Linings with Rivets (per pair)
K171	Wire Guide
K172	Lock Washer
K168	Guide Nut
L20	Indicator—suits both lengths of axle
L21Z	Coupling complete
K714	Collar for Indicator
K227	Connection Locknut
GL622	Spacing Washer
K428	Notched Cone Adjuster
GL347	Lock Washer
K47A	Cone Locknut
K521	Axle Lock Washer
N190	L.H. Axle Nut
N200	R.H. Axle Nut
X42	Spacing Washer, 1/16" thick
L22	Sprocket Dust Cap
K466	Sprocket, 16 teeth
K467	Sprocket, 17 teeth
K468	Sprocket, 18 teeth
K468A	Sprocket, 18 teeth for 3/16" wide chain
K469	Sprocket, 19 teeth
K469A	Sprocket, 19 teeth for 3/16" wide chain
K470	Sprocket, 20 teeth
K472	Sprocket, 22 teeth
X49	Sprocket Spacing Washer
K463	Cirelip
N43Z	Brake Arm Clip complete for oval tubing
K124Z	Brake Arm Clip complete for round tubing
X69	Clip Screw
S386	Clip Nut

TCW

**COMBINED
3-SPEED GEAR
COASTER BRAKE**

by **STURMEY
ARCHER**



TCW Combined 3-Speed Gear and Coaster Brake.
The TCW combines in one shell the famous
AW Wide-Ratio 3-Speed Gear and a most powerful
Coaster Brake. Ratios - 33-3% increase,
25% decrease from normal.

FOR DETAILS OF PARTS SEE OVER

STURMEY

ARCHER

LIGHTING

*Lighting
Equipment*

CYCLE LIGHTING EQUIPMENT

THE 'DYNOHUB' HUB LIGHTING SET provides cycle lighting at its very best. Each set consists of a generator, headlamp, rear lamp, and connecting flexes. A dry battery unit (DBU) can be incorporated, to give light when the cycle is stationary.

The generator has no mechanical losses whatever and electrically is highly efficient, giving an output of 6 volts ·34 amps at average riding speed. Other than the existing wheel bearings, it is entirely without mechanical friction or wearing parts and the effort to propel, therefore, is negligible. Troublesome contact brushes are not fitted and electrical current is continually and automatically generated without any external hand adjustments. Being gearless it is absolutely silent and its position within the hub protects it completely from damage.

Voltage regulation is such that adequate lighting is given at low speeds and there is no undue rise in voltage at high speeds, so guarding against the burning-out of bulbs.

With attractive lamps of modern design the 'Dynohub' hub lighting set is truly named—'THE WORLD'S FINEST CYCLE LIGHT'.

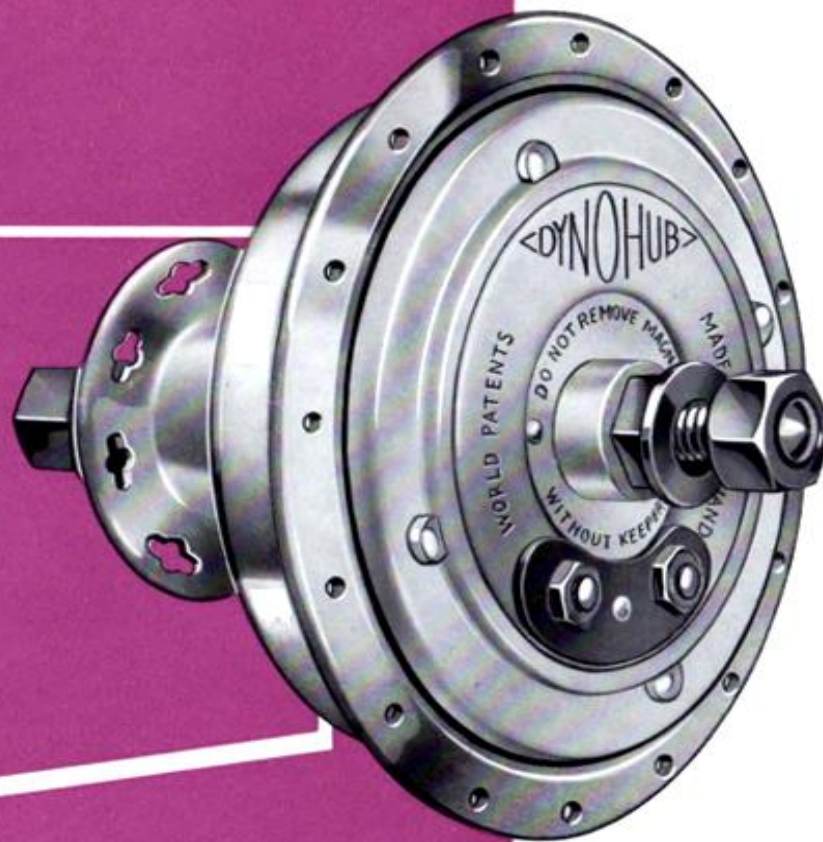
Three types of 'Dynohub' hub units are in current production. The GH6 model is a front hub with a dynamo incorporated. The SG unit combines in the rear hub an SW three-speed gear mechanism and dynamo. Similarly the FG model is a rear hub with an FW four-speed gear combined with a dynamo. By combining the gear and dynamo in one unit in this way there is a substantial saving in weight.

The AG hub (incorporating an AW three-speed gear and dynamo) is no longer in production but is described in the 'Discontinued Models' section of the catalogue.

GH6

**6V. 'DYNOHUB' HUB
LIGHTING UNIT**

by **STURMEY
ARCHER**

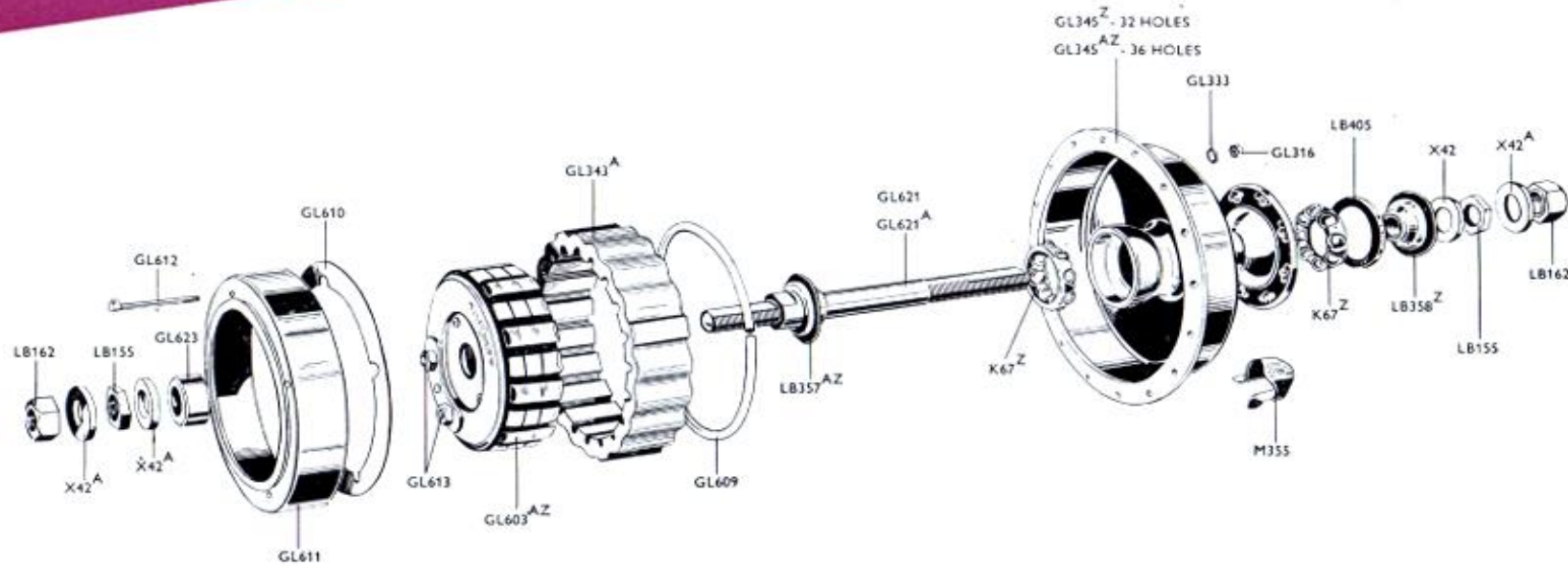


**GH6 Patent 6-volt 'Dynohub'
Front Hub Lighting Set.**

Like all our lighting sets it is
mechanically frictionless and trouble free.

FOR DETAILS OF PARTS SEE OVER

GH6 6V. 'Dynohub' Hub LIGHTING UNIT



CODE

GL345Z
GL345AZ
M355
LB405
K67Z
GL621
GL621A
LB358Z
LB357AZ
GL603AZ
GL613
GL343A

DESCRIPTION

Shell, 32 holes
Shell, 36 holes
Lubricator
Dust Cap
Ball Cage with 8 $\frac{1}{8}$ " diam. balls
Spindle, 5" long
Spindle, 4 $\frac{1}{2}$ " long
R.H. Cone with Dust Cap
L.H. Cone with Dust Cap
Armature complete
Terminal Nut
Magnet

CODE

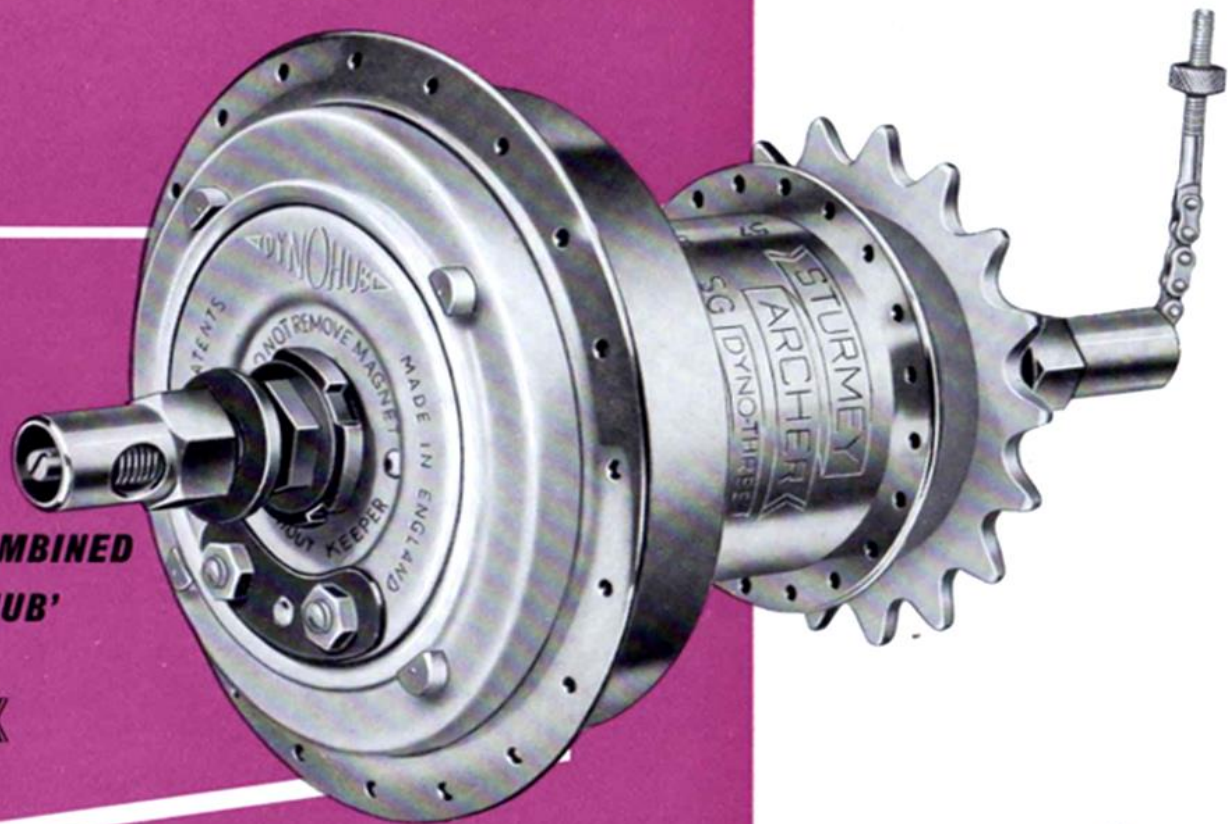
GL609
GL610
GL611
GL612
GL316
GL333
GL623
X42A
X42
LB155
LB155A
LB162

DESCRIPTION

Magnet Spacing Ring
Patent Number Disc
Magnet Cover Plate
Magnet Fixing Screw
Nut for Magnet Fixing Screw
Lock Washer
Spacing Cup
Axle Spacing Washer ($\frac{1}{8}$ " thick)
Axle Spacing Washer ($\frac{1}{16}$ " thick)
Cone Locknut
Cone Locknut with spigot. *Not illustrated*
Axle Nut

SG

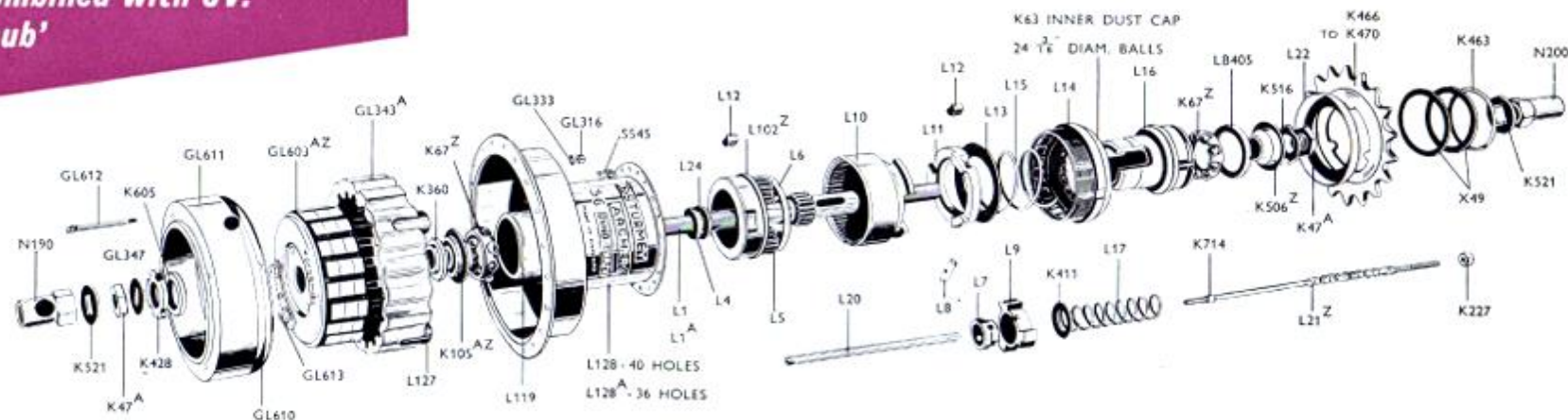
**WIDE-RATIO
3-SPEED HUB COMBINED
WITH 6V. 'DYNOHUB'
by STURMEY
ARCHER**



SG The new Wide-Ratio 3-Speed Hub, combined with patent 6-volt 'Dynohub' hub lighting set. There is a great saving in weight by this combination. Ratios - 38.4% increase, 27.7% decrease from normal.

FOR DETAILS OF PARTS SEE OVER

**SG Wide-Ratio 3-Speed
Hub combined with 6V.
'Dynohub'**



CODE No.

DESCRIPTION

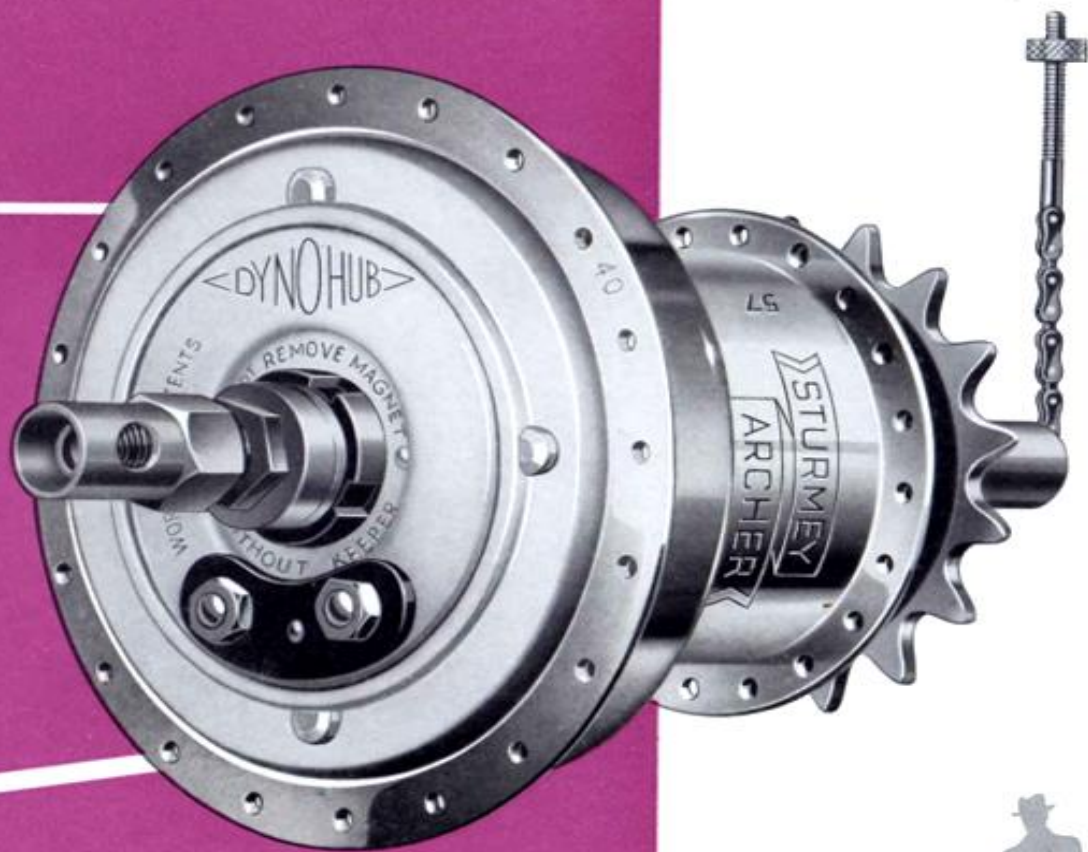
L1	Axle, 6" long
L1A	Axle, 6 1/2" long
L102Z	Planet Cage
L24	Planet Cage Bearing Plate
L4	Planet Cage Fixing Plate
L5	Planet Pinion
L6	Pinion Retaining Ring
L7	Clutch Sleeve
L8	Axle Key
L9	Sliding Clutch
K411	Thrust Washer
L10	Gear Ring
L11	Gear Ring Pawl Ring
L12	Pawl
L13	Pawl Retaining Washer
L14	R.H. Ball Ring
329	Ball Bearings, 1/8" diam. (per set of 24)
K63	Inner Dust Cap
L15	Thrust Spring
L16	Driver
K67Z	Ball Cage with 8 1/4" diam. balls
LB405	Outer Dust Cap
L17	Clutch Spring
K506Z	R.H. Cone with Dust Cap
K516	R.H. Cone Locking Washer
L128	Shell, 40 holes
L128A	Shell, 36 holes
S545	Lubricator
L119	L.H. Ball Cup
K105AZ	L.H. Cone with Dust Cap
K360	Packing Washer
GL603AZ	Armature complete

CODE No.

DESCRIPTION

GL613	Terminal Nut
GL343A	Magnet
L127	Magnet Spacing Piece
GL610	Patent Number Disc
GL611	Magnet Cover Plate
GL612	Magnet Fixing Screw
GL316	Magnet Fixing Screw Nut
GL333	Lock Washer
L20	Indicator—suits both lengths of axle
L21Z	Coupling complete
K714	Indicator Collar
K227	Connection Locknut
K605	Spacing Washer
K428	Notched Cone Adjuster
GL347	Locking Washer
X42	Spacing Washer (1/16" thick). <i>Not illustrated</i>
K47A	Cone Locknut
K521	Axle Lock Washer
K48	Lip Washer—Alternative to K521. <i>Not illustrated</i>
N190	L.H. Axle Nut
N200	R.H. Axle Nut
X42A	Axle Spacing Washer—alternative to X42. <i>Not illustrated</i>
L22	Sprocket Dust Cap
K466	Sprocket, 16 teeth
K467	Sprocket, 17 teeth
K468	Sprocket, 18 teeth
K469	Sprocket, 19 teeth
K470	Sprocket, 20 teeth
X49	Sprocket Spacing Washer
K463	Circclip
K468A	Sprocket, 18 teeth for 1/8" wide chain
K469A	Sprocket, 19 teeth for 1/8" wide chain

FG
WIDE-RATIO
4-SPEED
'DYNOHUB'
by **STURMEY**
ARCHER

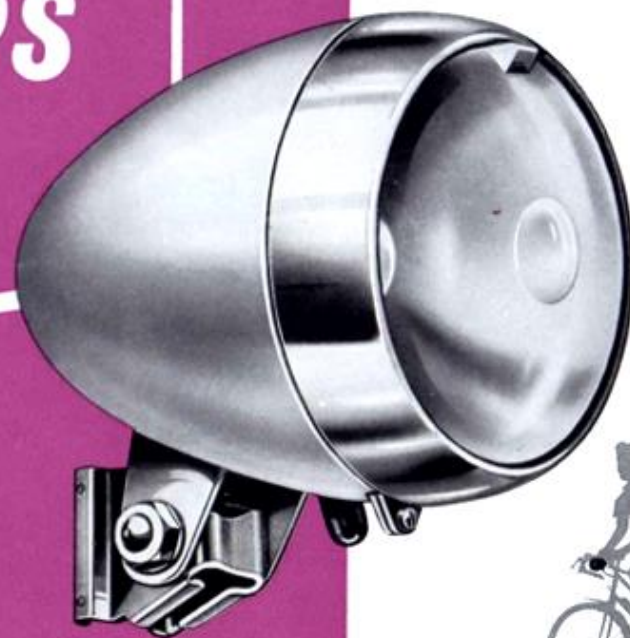
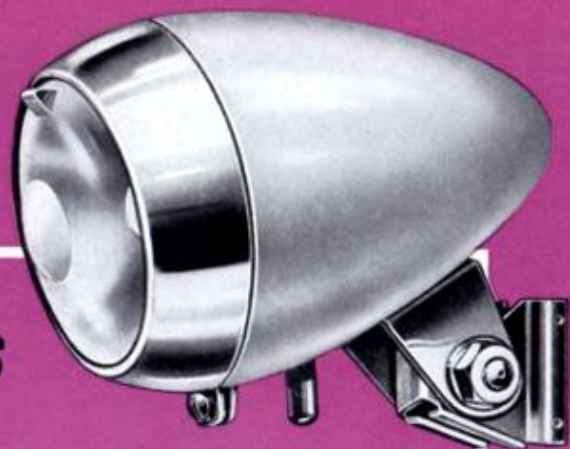


FG Wide-Ratio 4-Speed Hub combined with patent 6-volt 'Dynohub' hub lighting set. There is a great saving in weight by this combination. Ratios - 26.6% increase, 21.1% and 33.3% decrease from normal.

FOR DETAILS OF PARTS SEE OVER

SPORTS
HEADLAMPS

by **STURMEY** **ROADSTER**
ARCHER

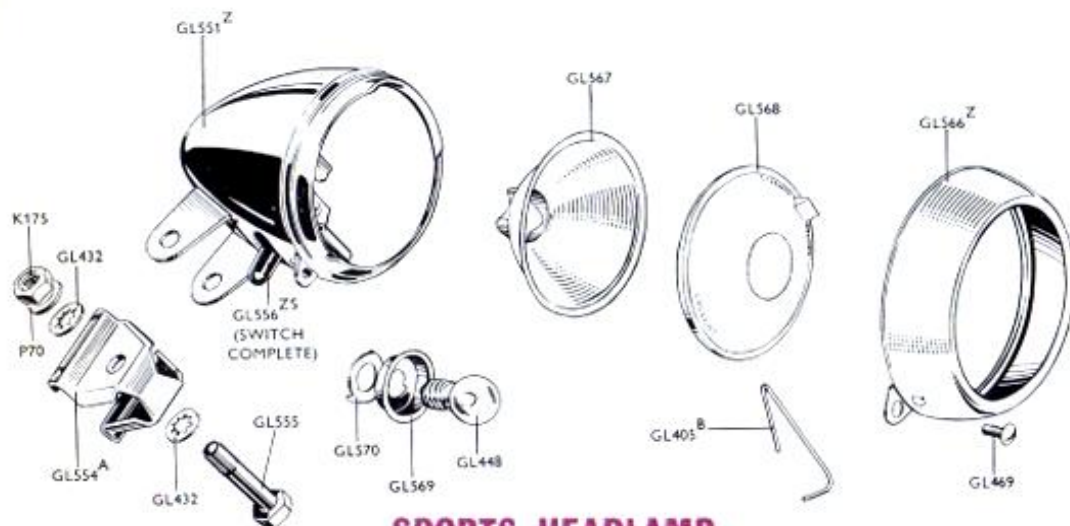
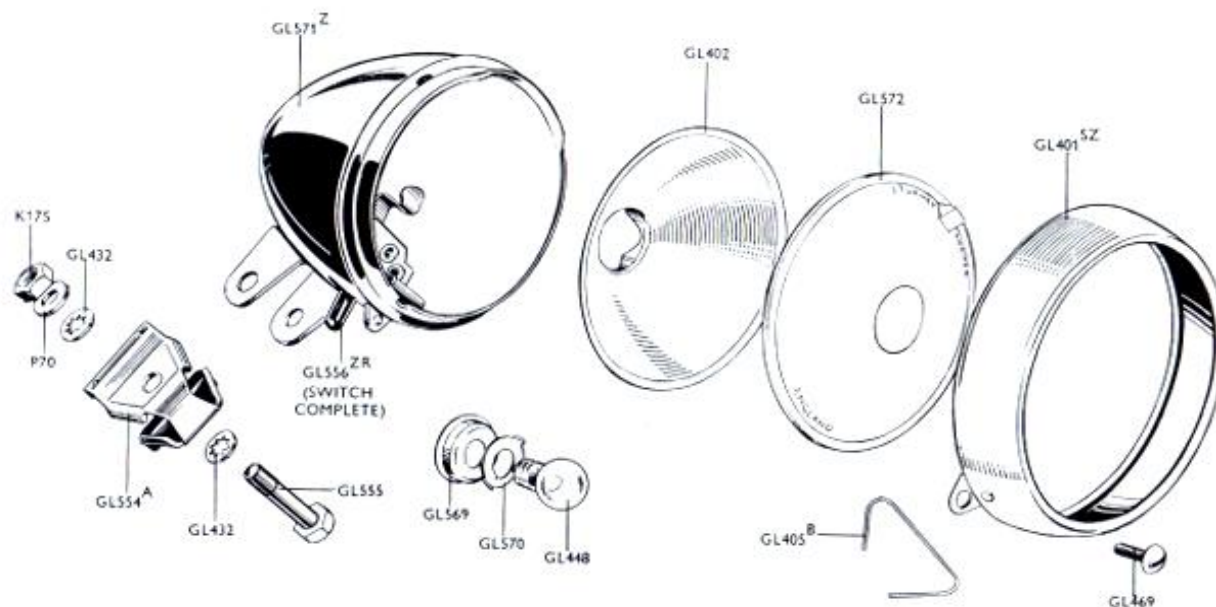


Fully enclosed and of pleasing shape the Roadster Headlamp is available in either black or silver finish and the Sports Headlamp in silver finish. Both lamps are fitted with chrome rim.

FOR DETAILS OF PARTS SEE OVER

HEADLAMPS: ROADSTER AND SPORTS

ROADSTER HEADLAMP



SPORTS HEADLAMP

Large Headlamp TYPE 'R'

R625

GL571Z
GL556ZR
GL401SZ
GL572
GL402
GL405B
GL569
GL570
GL469
GL448
GL554A
GL555
GL432
P70
K175

Small Headlamp TYPE 'S'

S625

GL551Z
GL556ZS
GL566Z
GL568
GL567
GL405B
GL569
GL570
GL469
GL448
GL554A
GL555
GL432
P70
K175

DESCRIPTION

Headlamp complete—state colour

Headlamp Body complete—state colour
Switch complete
Headlamp Rim
Headlamp Lens
Reflector
Reflector Securing Spring
Bulb Holder
Bulb Holder Lockring
Rim Securing Screw
Bulb, 6v 25 amp.
Lamp Bracket Adaptor
Headlamp Fixing Bolt
Spring Washer
Washer
Fixing Nut

REAR LAMP

by **STURMEY**
ARCHER

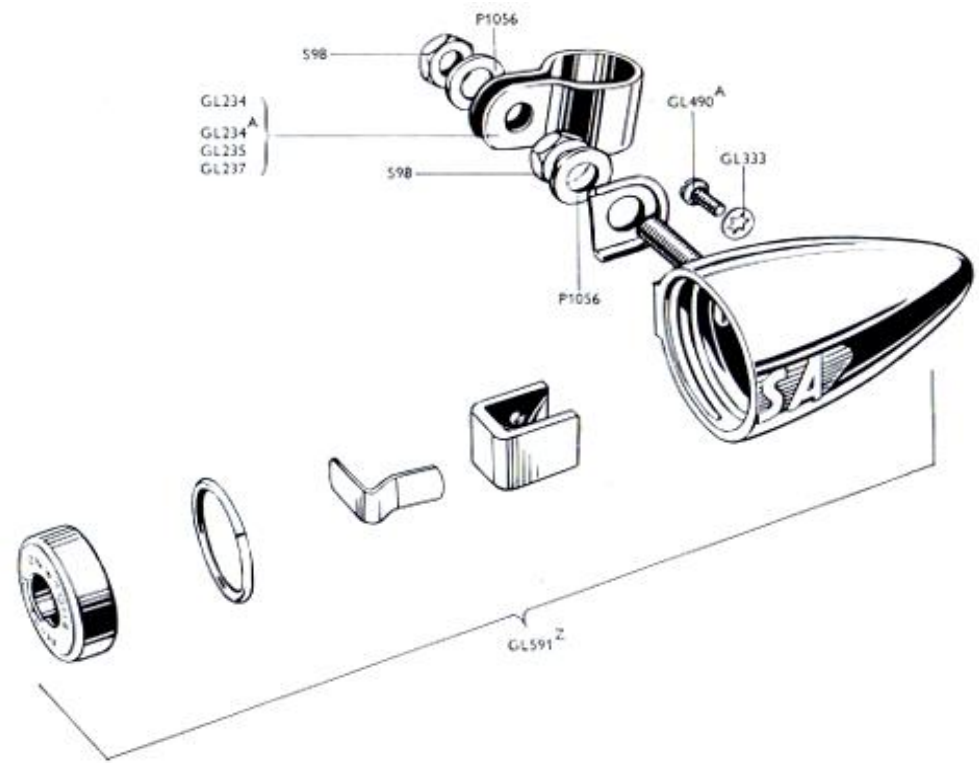
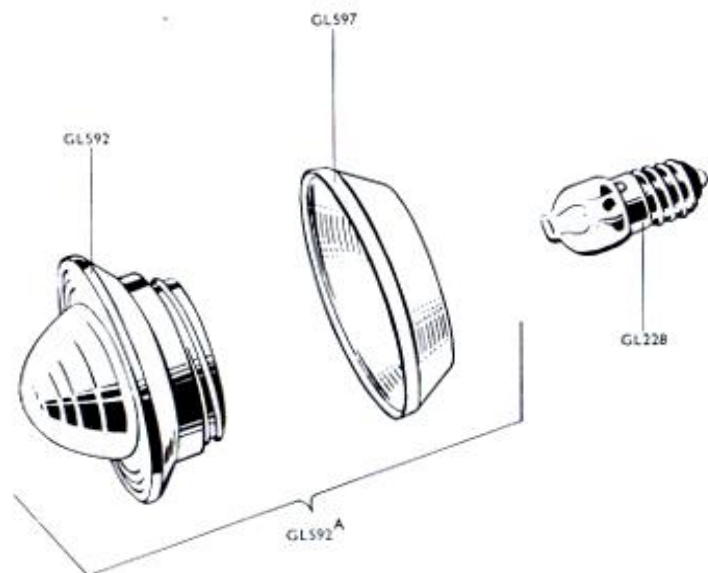


FOR DETAILS OF PARTS SEE OVER



The Rear Lamp is all plastic—gives a wide range of visibility—unique in its simplicity and appearance and designed to comply with the new lighting regulations.

REAR LAMP



CODE No.	DESCRIPTION
M6D	Tail Lamp complete with clip for 'D' tubing
M6R	Tail Lamp complete with clip for oval tubing
M6S	Tail Lamp complete with clip for $\frac{1}{2}$ " round tubing
M6T	Tail Lamp complete with clip for $\frac{3}{8}$ " round tubing
GL234	Tail Lamp Clip, $\frac{1}{2}$ " round
GL234A	Tail Lamp Clip, $\frac{3}{8}$ " round
GL235	Tail Lamp Clip, oval
GL237	Tail Lamp Clip, 'D'
P1056	Clip Washer
S98	Clip Fixing Nut
GL490A	Tail Lamp Terminal Screw
GL333	Spring Washer
GL228	Bulb, 6v .04 amp.
GL592A	Tail Lamp Dome
GL597	Dome Cover
GL591Z	Tail Lamp Body complete less Clip and Bulb

DRY BATTERY UNIT

by **STURMEY
ARCHER**

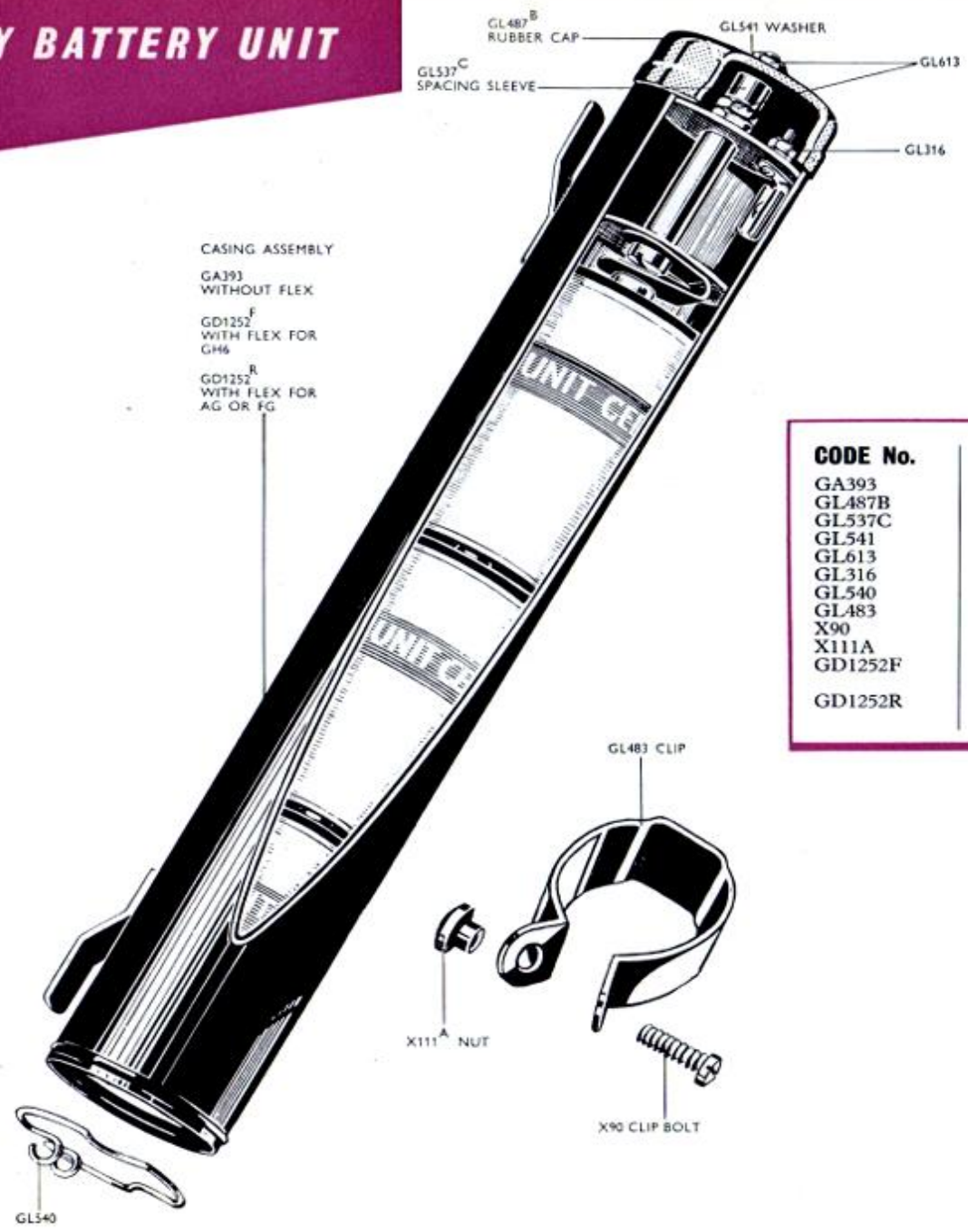


FOR DETAILS OF PARTS SEE OVER



The Dry Battery Unit is available
with any Sturmev-Archer lighting set.
By means of three batteries,
it provides a light when stationary.

DRY BATTERY UNIT



CASING ASSEMBLY
 GA393
 WITHOUT FLEX
 GD1252^F
 WITH FLEX FOR
 GH6
 GD1252^R
 WITH FLEX FOR
 AG OR FG

CODE No.

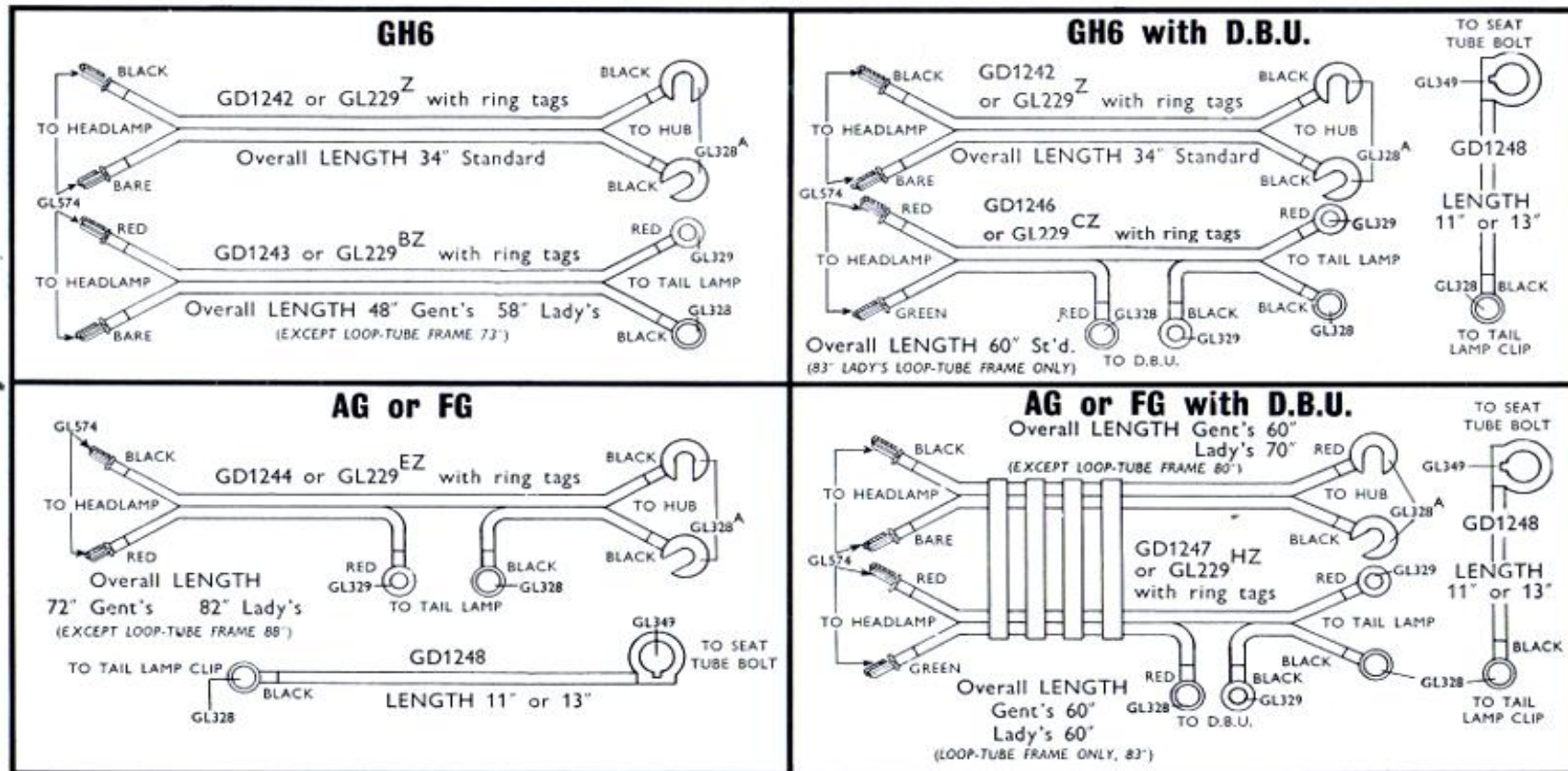
DESCRIPTION

GA393	Battery casing complete less flex	
GL487B	Rubber Cap	
GL537C	Spacing Sleeve	
GL541	Securing Washer	
GL613	Fixing Nut	
GL316	Terminal Nut	
GL540	Spring Ring	
GL483	Frame Clip	
X90	Clip Bolt	
X111A	Clip Nut	
GD1252F	Dry Battery Unit complete with flex for GH6 hub	} Less Batteries
GD1252R	Dry Battery Unit complete with flex for AG or FG	



GL540

FLEX WIRES DETAILS



CODE No. with Plug-in Ferrules for Switch	CODE No. with Ring Tags for Switch (old type Lamp)	DESCRIPTION
GD1242	GL229Z	Flex Wire from Hub to Headlamp
GD1243	GL229BZ	Flex Wire from Headlamp to Tail Lamp
GD1244	GL229EZ	Flex Wire, Headlamp to Tail Lamp and Hub
GD1246	GL229CZ	Flex Wire, Headlamp to DBU and Tail Lamp
GD1247	GL229HZ	Wiring Assembly for AG or FG with DBU
GD1248	GD1248	Earth Wire from Tail Lamp to Seat Lug

CODE No.	DESCRIPTION
GL328	Wire Tag for 2BA—Ring type
GL328A	Wire Tag for 2 BA—Hook type
GL329	Wire Tag for 6 BA—Ring type
GL349	Wire Tag for Seat Bolt
GL574	Plug-in Ferrule for switch connection

STURMEY
ARCHER

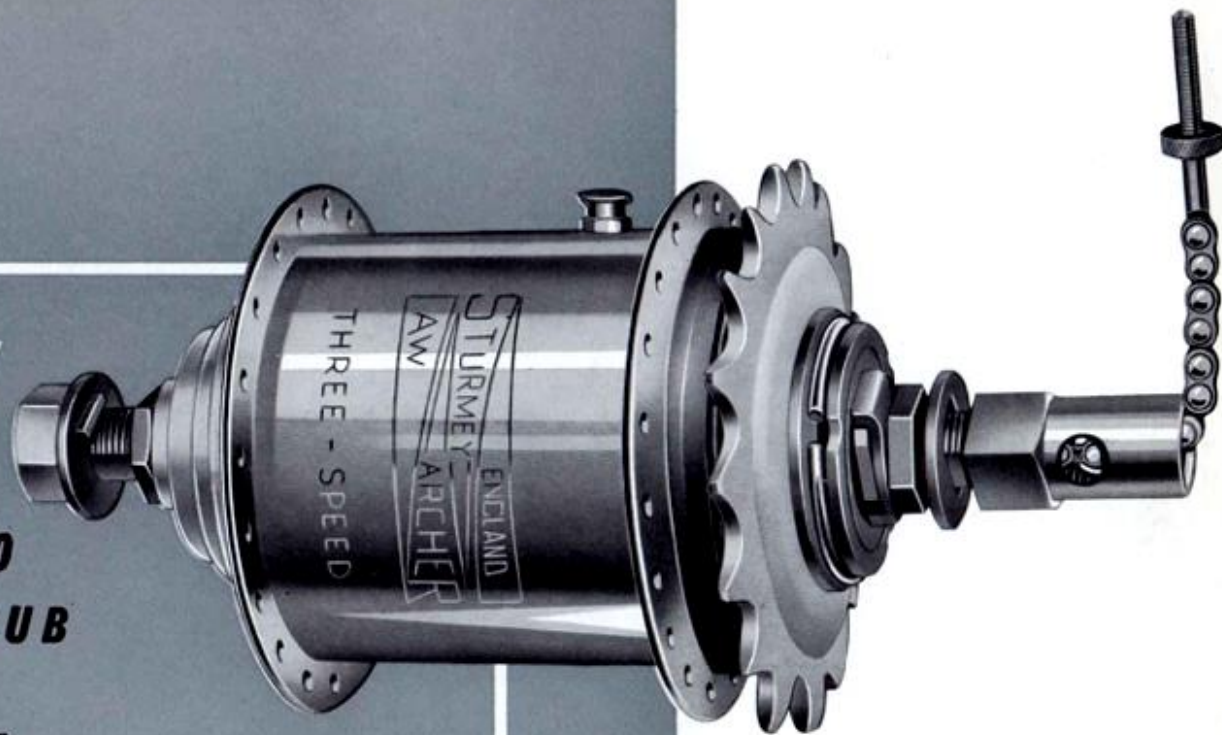
DISCONTINUED
MODELS

*Discontinued
Models*

AW

**WIDE-RATIO
3-SPEED HUB**

by **STURMEY
ARCHER**



AW Wide-Ratio 3-Speed.
Hub 33.3% increase,
25% decrease from normal.
Specially suitable for roadster machines

FOR DETAILS OF PARTS SEE OVER

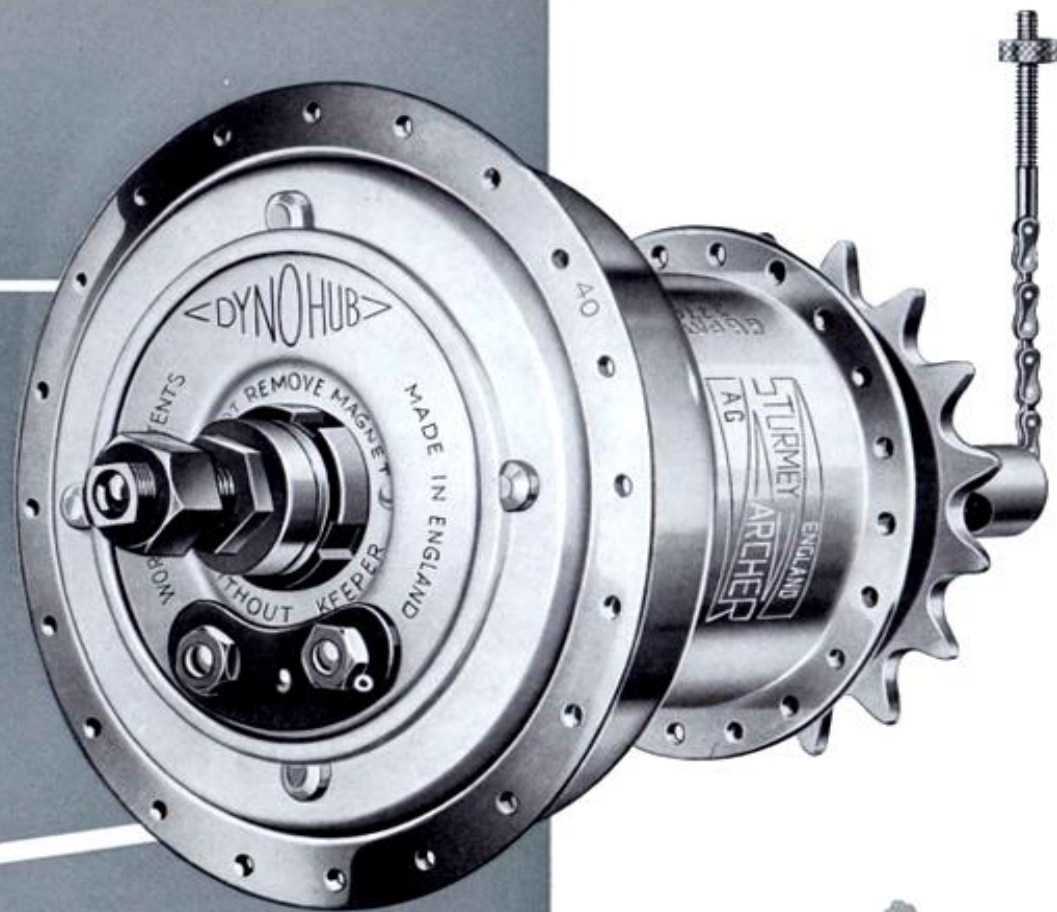
AG

WIDE-RATIO

3-SPEED HUB COMBINED

WITH 6V. 'DYNOHUB'

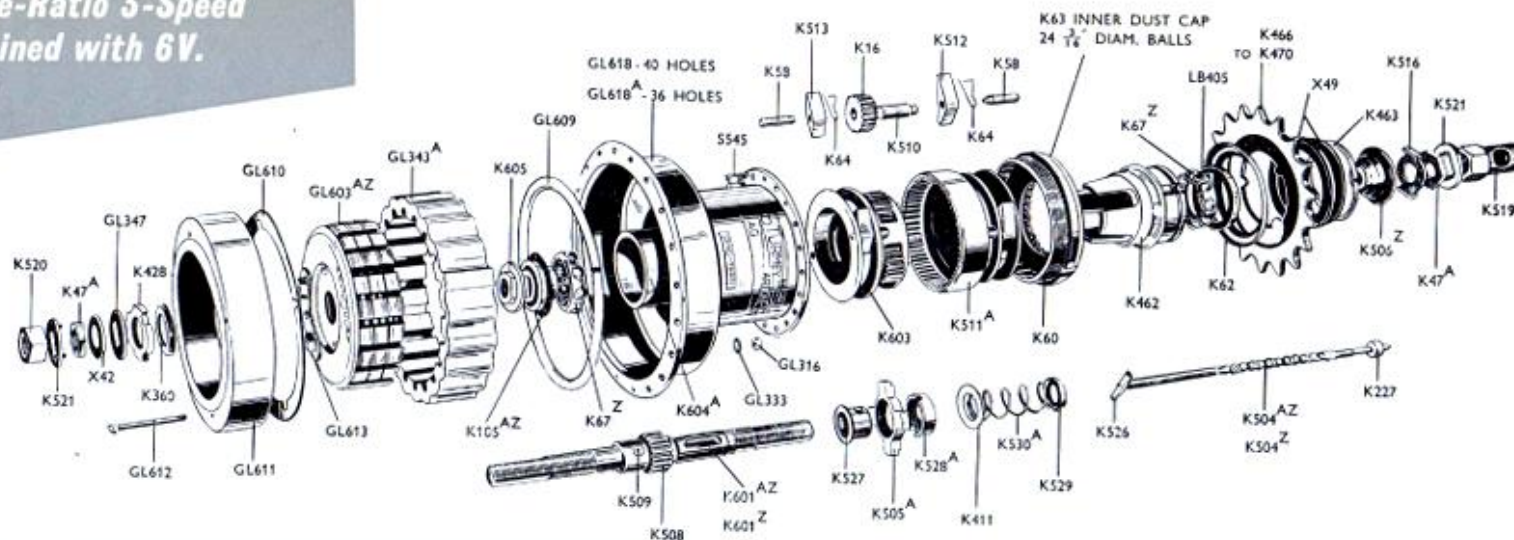
by **STURMEY**
ARCHER



AG Wide-Ratio 3-Speed Hub, combined
patent 6v. 'Dynohub' lighting unit.
Ratios - 33-3% increase, 25% decrease
from normal.

FOR DETAILS OF PARTS SEE OVER

**AG Wide-Ratio 3-Speed
Hub combined with 6V.
'Dynohub'**



CODE No.

DESCRIPTION

K601AZ	Axle complete with Sun Pinion (6 $\frac{1}{2}$ " long)
K601Z	Axle complete with Sun Pinion (5 $\frac{1}{2}$ " long)
K508	Sun Pinion only
K509	Dowel
K603	Planet Cage
K527	Clutch Sleeve
K505A	Sliding Clutch
K526	Axle Key
K528A	Thrust Ring
K16	Planet Pinion
K510	Pinion Pin
K511A	Gear Ring
K512	Gear Ring Pawl
K64	Pawl Spring
K58	Pawl Pin
K60	R.H. Ball Ring
329	$\frac{3}{16}$ " diam. Ball Bearings (per set of 24)
K63	Inner Dust Cap
K411	Thrust Washer
K530A	Clutch Spring
K529	Clutch Spring Cap
K462	Driver
K67Z	Ball Cage with 8 $\frac{1}{4}$ " diam. balls
LB405	Outer Dust Cap
K506Z	R.H. Cone with Dust Cap
K516	R.H. Cone Locking Washer
K513	Low Gear Pawl
GL618	Shell, 40 holes
GL618A	Shell, 36 holes
S545	Lubricator
K604A	L.H. Ball Cup
K105AZ	L.H. Cone with dust Cap
K605	Spacing Washer

CODE No.

DESCRIPTION

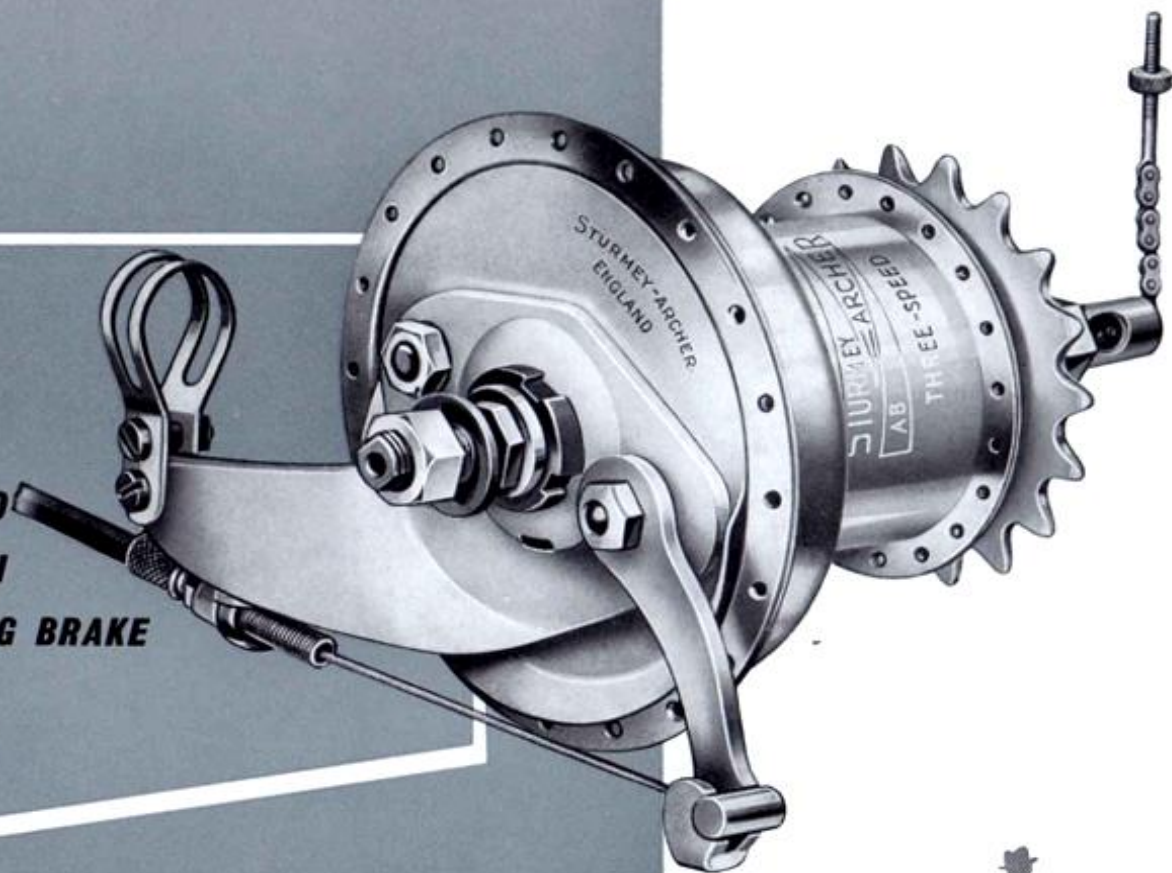
K504Z	Indicator complete for short axle
K504AZ	Indicator complete for long axle
K227	Connection Locknut
GL603AZ	Armature complete
GL613	Terminal Nut
GL343A	Magnet
GL609	Magnet Spacing Ring
GL610	Patent Number Disc
GL611	Magnet Cover Plate
GL612	Magnet Fixing Screw
GL316	Nut for Magnet Fixing Screw
GL333	Lock Washer
K360	Spacing Washer
K428	Notched Cone Adjuster
GL347	Locking Washer
X42	Spacing Washer ($\frac{1}{8}$ " thick)
K47A	Cone Locknut
K521	Axle Locking Washer
K519	R.H. Axle Nut
K520	L.H. Axle Nut
K62	Sprocket Dust Cap
K466	Sprocket, 16 teeth
K467	Sprocket, 17 teeth
K468	Sprocket, 18 teeth
K468A	Sprocket, 18 teeth for $\frac{3}{16}$ " wide chain
K469	Sprocket, 19 teeth
K469A	Sprocket, 19 teeth for $\frac{3}{16}$ " wide chain
K470	Sprocket, 20 teeth
K472	Sprocket, 22 teeth
X49	Sprocket Spacing Washer
K463	Circlip
X42A	Axle Spacing Washer ($\frac{1}{8}$ " thick)
K48	Lip Washer

} Alternatives—
Not illustrated

AB

**3-SPEED WIDE-RATIO
HUB COMBINED WITH
INTERNAL EXPANDING BRAKE**

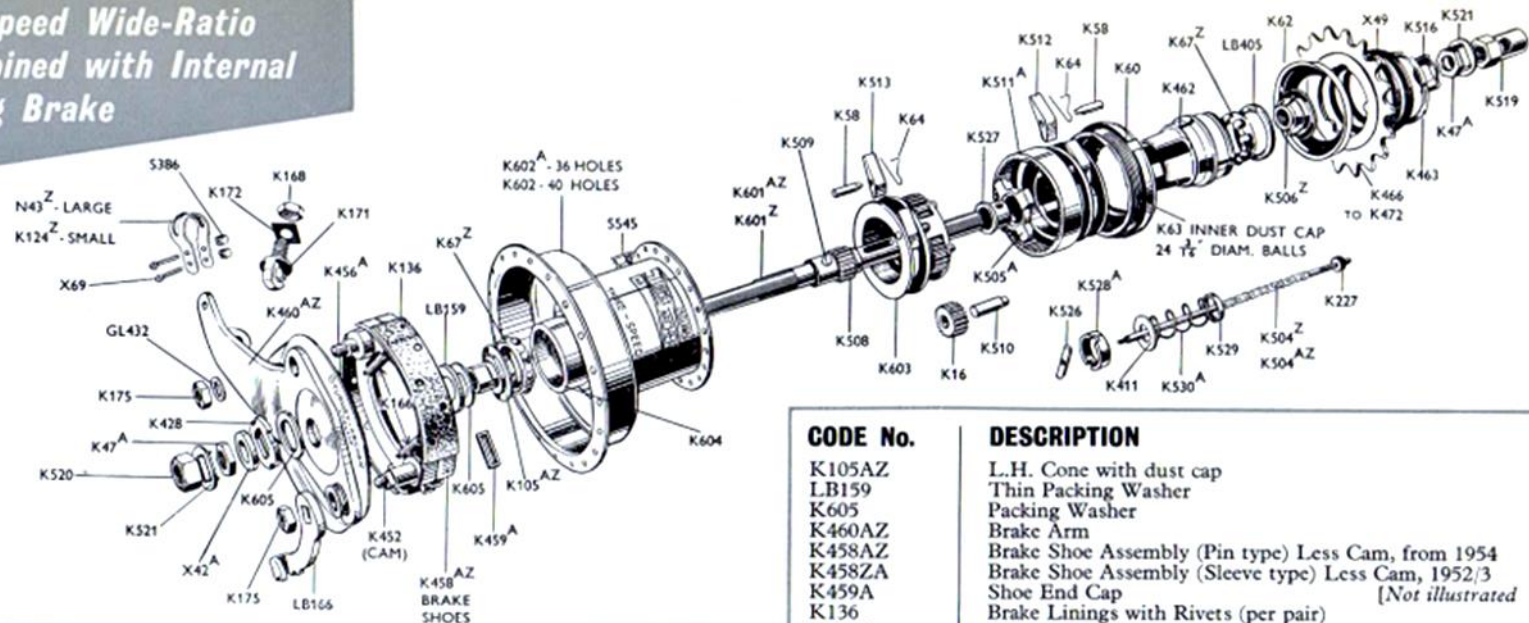
by **STURMEY
ARCHER**



AB Wide-Ratio 3-Speed Hub incorporating hand operated internal expanding brake. Fitted with either cable or rod control. Ratios - 33-3% increase, 25% decrease from normal.

FOR DETAILS OF PARTS SEE OVER

AB 3-Speed Wide-Ratio Hub combined with Internal Expanding Brake



CODE No.

CODE No.	DESCRIPTION
K601AZ	Axle complete with Sun Pinion, 6 $\frac{1}{2}$ " long
K601Z	Axle with Sun Pinion, 5 $\frac{1}{4}$ " long
K508	Sun Pinion only
K509	Dowel for Sun Pinion
K603	Planet Cage
K527	Clutch Sleeve
K505A	Sliding Clutch
K526	Axle Key
K528A	Thrust Ring
K411	Thrust Washer
K16	Planet Pinion
K510	Pinion Pin
K511A	Gear Ring
K512	Gear Ring Pawl
K64	Pawl Spring
K58	Pawl Pin
K60	R.H. Ball Ring
329	Ball Bearings $\frac{3}{16}$ " diam. (per set of 24)
K63	Inner Dust Cap
K530A	Clutch Spring
K529	Clutch Spring Cap
K462	Driver
K67Z	Ball Cage with $\frac{1}{2}$ " diam. balls
LB405	Outer Dust Cap
K506Z	R.H. Cone with dust cap
K516	Lock Washer for R.H. Cone
K513	Low Gear Pawl
K602	Shell, 40 holes
K602A	Shell, 36 holes
S545	Lubricator
K604	L.H. Ball Cup

CODE No.

CODE No.	DESCRIPTION
K105AZ	L.H. Cone with dust cap
LB159	Thin Packing Washer
K605	Packing Washer
K460AZ	Brake Arm
K458AZ	Brake Shoe Assembly (Pin type) Less Cam, from 1954
K458ZA	Brake Shoe Assembly (Sleeve type) Less Cam, 1952/3
K459A	Shoe End Cap
K136	Brake Linings with Rivets (per pair) [Not illustrated]
K456A	Fulcrum Pin
K166	Brake Shoe Spring
K452	Cam
K456	Fulcrum Sleeve, 1952/3 only. Not illustrated
GL432	Locking Washer
LB166	Cam Lever
K175	Cam Lever Nut
K171	Wire Guide
K172	Lock Washer
K168	Guide Nut
K504AZ	Indicator for long axle (K601AZ)
K504Z	Indicator for short axle (K601Z)
K227	Connection Locknut
K428	Notched Adjusting Washer
X42A	Spacing Washer ($\frac{1}{8}$ " thick)
K47A	Cone Locknut
K521	Axle Washer
K519	R.H. Axle Nut
K520	L.H. Axle Nut
K62	Sprocket Dust Cap
K466	Sprocket, 16 teeth
K467	Sprocket, 17 teeth
K468	Sprocket, 18 teeth
K468A	Sprocket, 18 teeth for $\frac{3}{16}$ " wide chain
K469	Sprocket, 19 teeth
K469A	Sprocket, 19 teeth for $\frac{3}{16}$ " wide chain
K470	Sprocket, 20 teeth
K472	Sprocket, 22 teeth
X49	Sprocket Spacing Washer ($\frac{1}{16}$ " thick)
K463	Circlip
N43Z	Brake Arm Clip complete, for oval or D tubing
K124Z	Brake Arm Clip complete for round tubing
X69	Clip Screw
S386	Clip Nut

AC

**ULTRA CLOSE-RATIO
3-SPEED HUB**

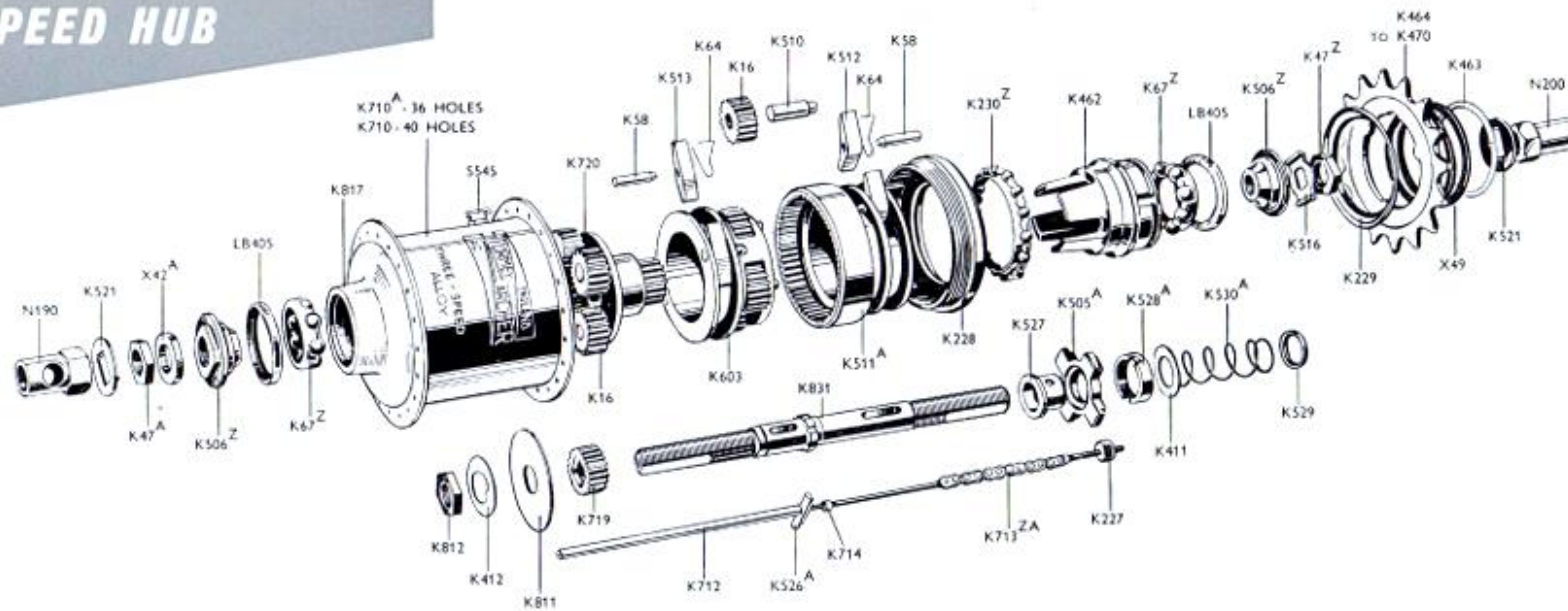
by **STURMEY
ARCHER**



AC Ultra Close-Ratio 3-Speed Hub.
6.66% increase and 7.7% decrease from normal.
The time trial gear.

FOR DETAILS OF PARTS SEE OVER

AG Ultra Close-Ratio 3-SPEED HUB



CODE No.

DESCRIPTION

K831	Axle, 5 $\frac{1}{4}$ " long
K720	Compound Cage
K603	Planet Cage
K513	Low Gear Pawl
K58	Pawl Pin
K64	Pawl Spring
K16	Planet Pinion
K510	Pinion Pin
K527	Clutch Sleeve
K505A	Sliding Clutch
K526A	Axle Key
K528A	Thrust Ring
K411	Thrust Washer
K530A	Clutch Spring
K529	Spring Cap
K511A	Gear Ring
K512	Gear Ring Pawl
K228	R.H. Ball Ring
K230Z	Ball Cage with 24 $\frac{3}{16}$ " balls
K462	Driver
K67Z	Ball Cage with 8 $\frac{1}{4}$ " balls
LB405	Outer Dust Cap
K506Z	Axle Cone with Dust Cap
K516	R.H. Cone Locking Washer
K719	Secondary Sun Pinion
K811	Locating Plate
K412	Locking Washer

CODE No.

DESCRIPTION

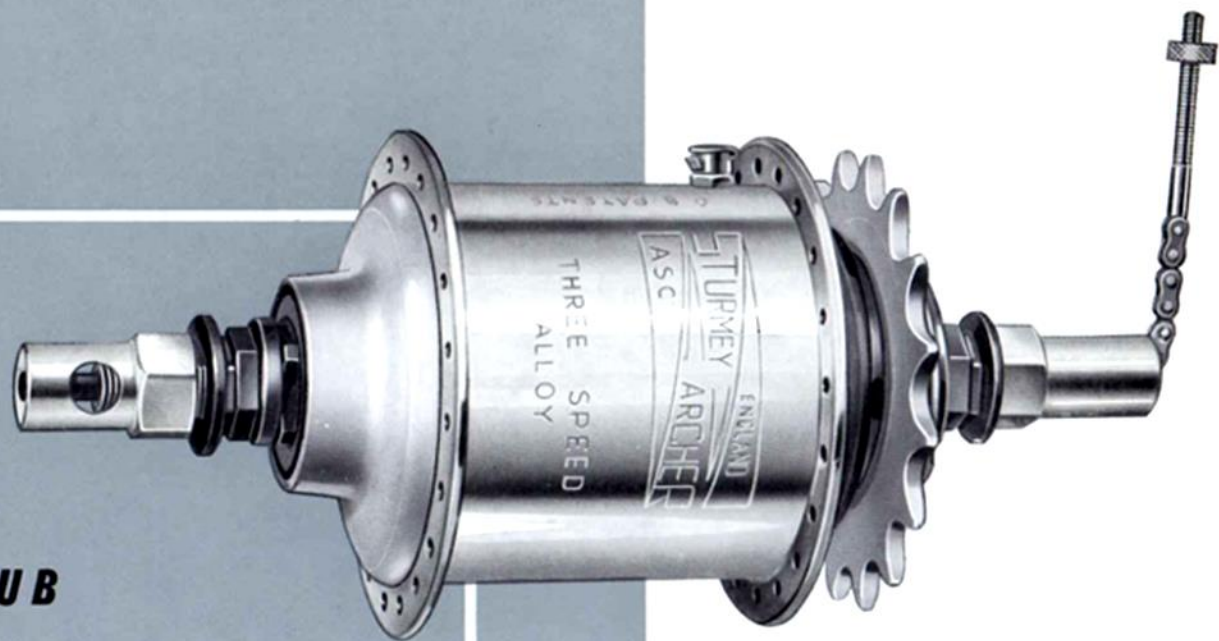
K812	Locknut
K710	Shell, 40 holes
K710A	Shell, 36 holes
S545	Lubricator
K817	L.H. Ball Cup
K712	Indicator
K713ZA	Coupling complete
K713Z	Coupling complete, quick-release type. <i>Not illustrated</i>
K740AZ	Quick-release Connection. <i>Not illustrated</i>
K714	Indicator Collar
K227	Connection Locknut
X42A	Axle Spacing Washer
K47A	Cone Locknut
K21	Axle Lock Washer
N.90	L.H. Axle Nut
N200	R.H. Axle Nut
K229	Sprocket Dust Cap
K464	Sprocket, 14 teeth
K465	Sprocket, 15 teeth
K466	Sprocket, 16 teeth
K467	Sprocket, 17 teeth
K468	Sprocket, 18 teeth
K469	Sprocket, 19 teeth
K470	Sprocket, 20 teeth
X49	Sprocket Spacing Washer
K463	Circlip

ASC

FIXED

3-SPEED HUB

by **STURMEY**
ARCHER

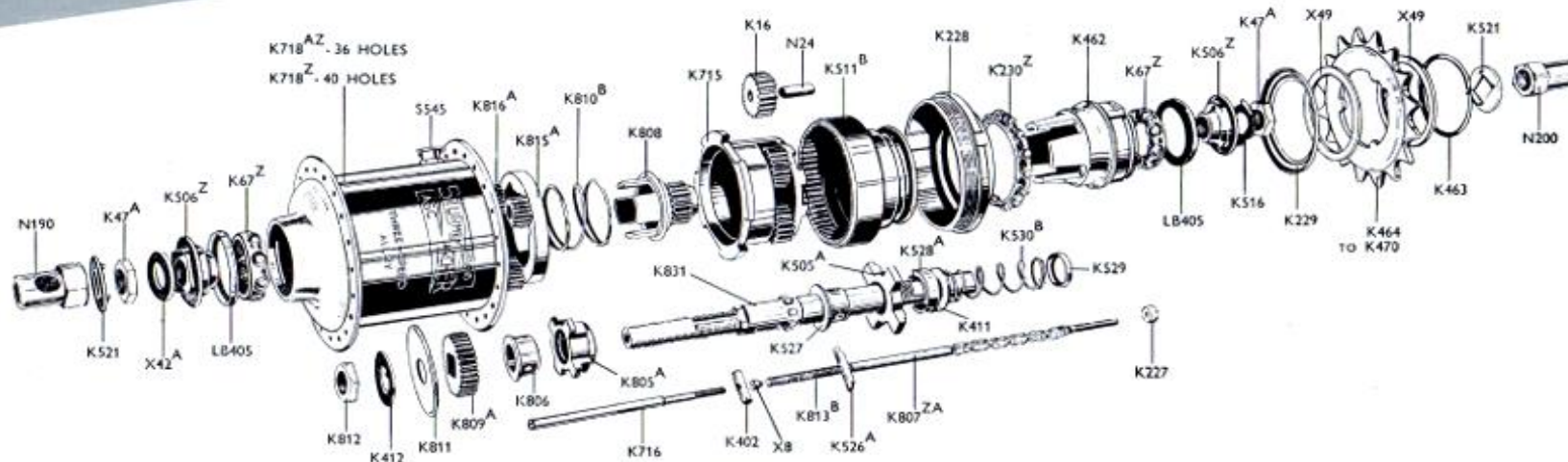


FOR DETAILS OF PARTS SEE OVER



ASC Fixed 3-Speed Hub.
10% and 25% decrease from direct drive.

ASC Fixed 3-SPEED HUB



CODE No.

DESCRIPTION

K831	Axle, 5 $\frac{1}{4}$ " long
K805A	Low Gear Dog
K806	Dog Sleeve
K402	Low Gear Key
K809A	Secondary Sun Pinion
K811	Locating Plate
K412	Locking Washer
K812	Locknut
K815A	Secondary Planet Cage
K816A	Secondary Planet Pinion
K810B	Low Gear Spring
K808	Primary Sun Pinion
K715	Planet Cage
K16	Planet Pinion
N24	Pinion Pin
K716	Indicator
X8	Collar for Compensator Spring
K813B	Compensator Spring
K527	Clutch Sleeve
K505A	Sliding Clutch
K526A	Axle Key
K807ZA	Coupling complete
K807Z	Coupling complete, quick-release type. <i>Not illustrated</i>
K740AZ	Quick Release Connection. <i>Not illustrated</i>
K528A	Thrust Ring
K411	Thrust Washer
K530B	Clutch Spring

CODE No.

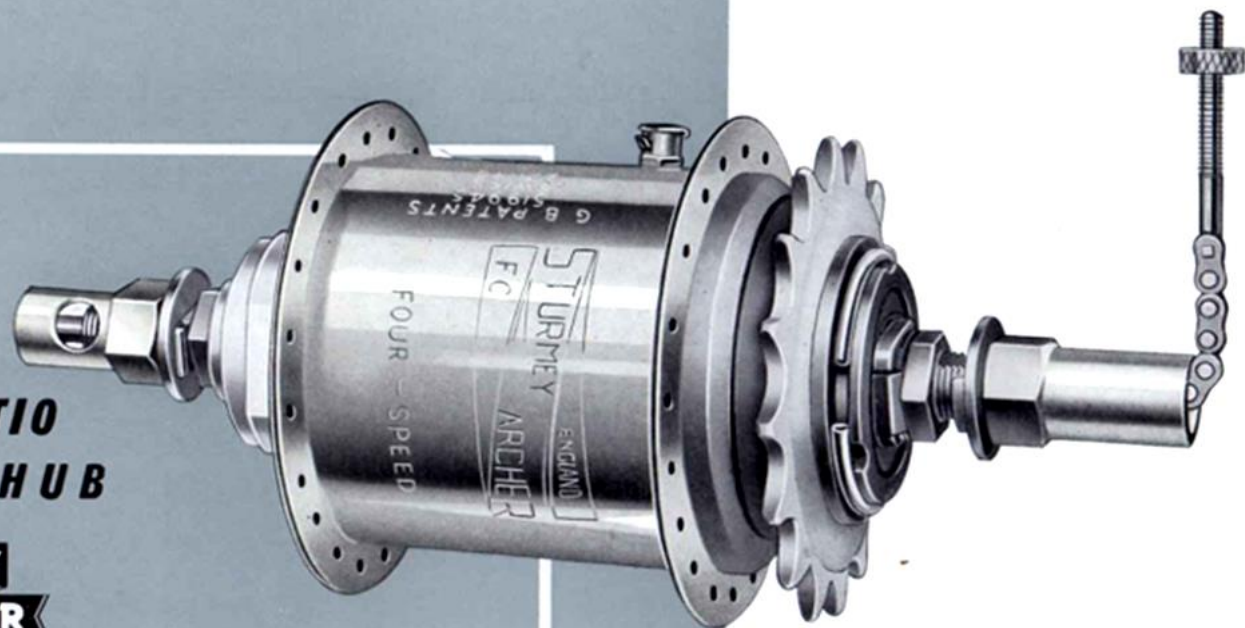
DESCRIPTION

K529	Spring Cap
K511B	Gear Ring
K228	R.H. Ball Ring
K230Z	Ball Cage with $\frac{3}{16}$ " ball bearings
K462	Driver
K67Z	Ball Cage with 8 $\frac{1}{4}$ " balls
LB405	Outer Dust Cap
K506Z	Axle Cone with Dust Cap
K516	R.H. Cone Locking Washer
K718Z	Shell, 40 holes, with Ball Cup
K718AZ	Shell, 36 holes, with Ball Cup
K227	Connection Locknut
X42A	Axle Spacing Washer
K47A	Cone Locknut
K521	Axle Locking Washer
N190	L.H. Axle Nut
N200	R.H. Axle Nut
K229	Sprocket, Dust Cap
K464	Sprocket, 14 teeth
K465	Sprocket, 15 teeth
K466	Sprocket, 16 teeth
K467	Sprocket, 17 teeth
K468	Sprocket, 18 teeth
K469	Sprocket, 19 teeth
K470	Sprocket, 20 teeth
X49	Sprocket Spacing Washer
K463	Circlip

FC

**CLOSE-RATIO
4-SPEED HUB**

by **STURMEY
ARCHER**

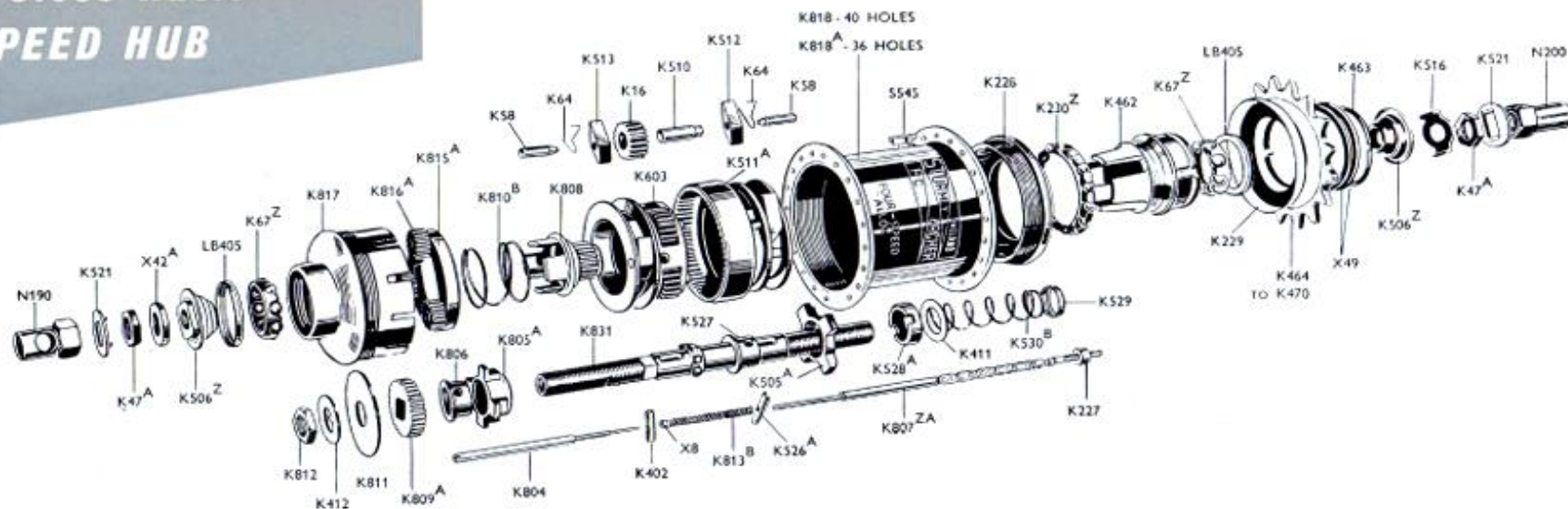


FC Close Ratio 4-Speed Hub.

9.1% increase, 10% and 25% decrease from normal.
Specially designed for massed start races.

FOR DETAILS OF PARTS SEE OVER

FC Close-Ratio 4-SPEED HUB



CODE No.

DESCRIPTION

K831	Axle, 5 $\frac{1}{2}$ " long
K805A	Low Gear Dog
K806	Dog Sleeve
K402	Low Gear Key
K809A	Secondary Sun Pinion
K811	Locating Plate
K412	Locking Washer
K812	Locknut
K815A	Secondary Planet Cage
K816A	Secondary Planet Pinion
K810B	Low Gear Spring
K808	Primary Sun Pinion
K603	Planet Cage
K513	Low Gear Pawl
K58	Pawl Pin
K64	Pawl Spring
K16	Planet Pinion
K510	Pinion Pin
K804	Indicator
X8	Collar for Compensator Spring
K813B	Compensator Spring
K527	Clutch Sleeve
K505A	Sliding Clutch
K526A	Axle Key
K807ZA	Coupling complete
K807Z	Coupling complete, quick-release type. <i>Not illustrated</i>
K740AZ	Quick-release Connection. <i>Not illustrated</i>
K528A	Thrust Ring
K411	Thrust Washer
K530B	Clutch Spring

CODE No.

DESCRIPTION

K529	Clutch Spring Cap
K511A	Gear Ring
K512	Gear Ring Pawl
K228	R.H. Ball Ring
K230Z	Ball Cage with $\frac{3}{8}$ " diam. balls
K462	Driver
K67Z	Ball Cage with 8 $\frac{1}{4}$ " diam. balls
LB405	Outer Dust Cap
K506Z	Axle Cone with Dust Cap
K516	R.H. Cone Locking Washer
K818	Shell, 40 holes
K818A	Shell, 36 holes
S545	Lubricator
K817	L.H. Ball Cup
K227	Connection Locknut
X42A	Axle Spacing Washer
K47A	Cone Locknut
K521	Axle Locking Washer
N190	L.H. Axle Nut
N200	R.H. Axle Nut
K229	Sprocket Dust Cap
K464	Sprocket, 14 teeth
K465	Sprocket, 15 teeth
K466	Sprocket, 16 teeth
K467	Sprocket, 17 teeth
K468	Sprocket, 18 teeth
K469	Sprocket, 19 teeth
K470	Sprocket, 20 teeth
X49	Sprocket Spacing Washer
K463	Circlip

STURMEY

ARCHER

Service

SERVICE

The **FITTING AND ADJUSTMENT** OF STURMEY-ARCHER EQUIPMENT

CYCLE FRAME

Before fitting a Sturmey-Archer variable gear hub to any cycle frame make sure that the chainstay ends are parallel. If they are not, the hub axle will be strained when the nuts are tightened, and the internal mechanism may be seriously damaged.

HUB WIDTH

The over-all width of Sturmey-Archer rear hubs over the cone locknuts, as supplied from the Works, is $4\frac{1}{16}$ ". If necessary, it can be reduced to $4\frac{1}{16}$ " by removing the spacing washer on the left-hand side and the cone locknut on the right-hand side. Unless the same amount is removed from both sides the chain line will be affected.

CHAIN LINE

The chain line is the distance from the centre line of the bicycle to the centre line of the teeth on the sprocket and is best measured as follows:

1. First see that the hub has the necessary spacing washers and locknuts to make up the proper width for the fork ends to which it is to be fitted.
 2. Measure the distance over the cone locknuts and divide it by two.
 3. Measure the distance from the outside of the right-hand cone locknut to the centre of the sprocket teeth and deduct it from the figure obtained in 2 above. The result is the chain line measurement.
- With the hub, as supplied from the Works, it is possible to obtain any chain line between $1\frac{1}{2}$ " and $1\frac{3}{4}$ " in $\frac{1}{16}$ " steps as follows:
- $1\frac{1}{2}$ ". With the dished face of the sprocket facing inwards, and both washers outside of the sprocket.
 - $1\frac{5}{16}$ ". With the dished face of the sprocket facing inwards and one washer each side of the sprocket.
 - $1\frac{3}{8}$ ". With the dished face of the sprocket facing outwards and both washers outside.
 - $1\frac{7}{16}$ ". With the dished face of the sprocket facing outwards, one washer inside the sprocket and one outside.
 - $1\frac{3}{4}$ ". With the dished face of the sprocket facing outwards and both washers inside the sprocket.

The dust cap behind the sprocket must always be fitted centrally to avoid rubbing against the right-hand ball ring, otherwise the hub may run noisily.

SPROCKETS

Modern sprockets, as fitted to all Sturmey-Archer hubs, have three small semi-circular splines, corresponding to grooves in the driver, and these splines are secured in position by a spring ring (circlip) which clips into a narrow groove cut round the outside of the driver boss. The sprocket slides into position, with two $\frac{1}{16}$ " spacing washers which are always used, and the circlip is then sprung into the groove. (By varying the position of the washers and the dishing of the sprocket, the chain line may be modified as previously explained.)

To remove a sprocket, prise off the circlip with a thin screwdriver at the spline groove nearest the gap in the circlip, so that the spacing washers and sprocket may be lifted off.

For all hubs, sprockets are supplied in sizes from 16-tooth to 20-tooth as well as 22-tooth for $\frac{1}{2}$ " by $\frac{1}{8}$ " chains, and 18-tooth and 19-tooth for $\frac{1}{2}$ " by $\frac{3}{16}$ " chains. For the 'A' range of sports hubs 14-tooth and 15-tooth sprockets can also be used providing that the K228 right-hand ball ring and K229 dust cap are fitted.

The screwed driver (K507) and the 12-splined driver (K657) are no longer available. Hubs in which they were used must be converted by fitting the (K462) 3-splined driver and sprocket as a complete unit (including spacing washers and circlip).

GEAR RANGES

Gear ranges may be raised by changing the sprocket for a smaller one or lowered by changing the sprocket for a larger one. The effect of the change may be calculated by multiplying each existing gear by the number of teeth on the original sprocket and dividing the result by the number of teeth on the proposed new sprocket. For example, a gear of 66.4 obtained with an 18-tooth sprocket becomes 74.7 when a 16-tooth sprocket is fitted.

$$\left(\frac{66.4 \times 18}{16} = 74.7 \right)$$

HUB GEAR CONTROLS

The gear-control mechanism of Sturmey-Archer hubs is either a trigger control or else a small lever in a quadrant, connected by means of a wire cable to the indicator coupling which protrudes from the hub itself.

Before 1953 the type of *trigger control* known as the GC2 was used for both three- and four-speed gears. It can be recognized by the words '3- or 4-speed' on the medallion, and by the cable guide or ferrule which is part of the control wire and unscrews from the casing. Later models of that type (also known as the GC2) have a small window in the outside casing, through which letters on the control lever, showing the gear in use, are seen.

Since 1953 separate models have been supplied for three-speed (the GC3A) and four-speed hubs (GC4A). They are similar to the earlier GC2 except that the number of steps on the control lever is different and, of course, the medallions show whether they are designed for three-speed or four-speeds. The latest type of GC4A have the numbers 1, 2, 3, 4, stamped on the outer edge of the medallion, to indicate the gear position.

The latest and slightly smaller three-speed control known as the GC3B has the numbers 1, 2, 3, stamped on the outer edge of the medallion, to indicate the gear positions. It also has a rather shorter lever and a different pawl spring and pawl.

The GC2A control, for *ASC hubs only*, has the same pawl, pawl spring, and lever as the GC2, but the *other internal parts are not interchangeable*. It can be recognized by the letters 'ASC' on the medallion.

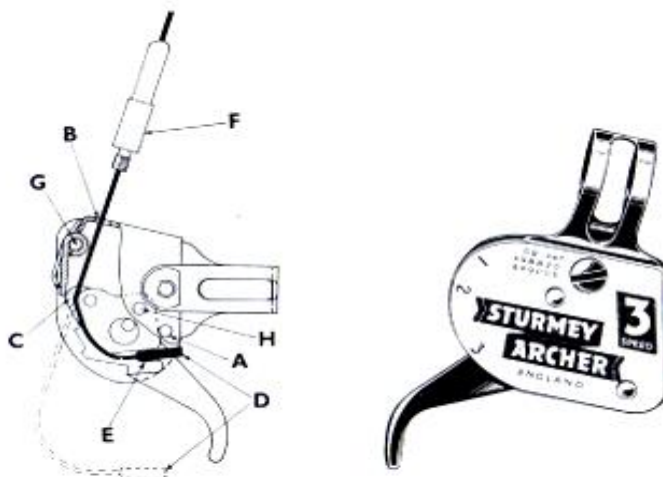
To remove the wire from a trigger control

The control itself need not be detached from the handlebar, if the lever can be pulled far enough back to allow the cable nipple to pass between the pawl and the ratchet plate.

1. Detach the inner wire from the indicator chain at the hub.
2. Detach the outer casing from the fulcrum clip and pull the cable ferrule (F) upwards until the screw thread engages with that of the control casing at B, and then unscrew the ferrule.
3. Pull the lever right back beyond the bottom gear position to stop A, and push the inner wire through to detach the nipple from the ratchet plate.
4. Pull the wire out between the pawl and the ratchet plate at C and through threaded hole B.

To fit a wire to the trigger control

1. Pull the lever right back beyond the bottom gear position to stop A.
2. Insert the wire through the threaded hole B and between the pawl and the ratchet plate at C.



3. Fit wire nipple (D) into notch E.
4. Screw cable ferrule (F) into control casing at B until it rotates freely.
5. Keeping tension on the wire, push the lever forward into the top-gear position.
6. Control is now ready for re-connection to hub.

The *pawl and pawl spring* are designed so that they cannot drop out if the control wire breaks or when it is being removed or replaced. Normally, they should not need to be renewed and so they are not easily detachable. If a new part has to be fitted, both rivets (G and H) must be removed and the complete trigger mechanism withdrawn. New rivets will have to be used when the new part has been fitted.

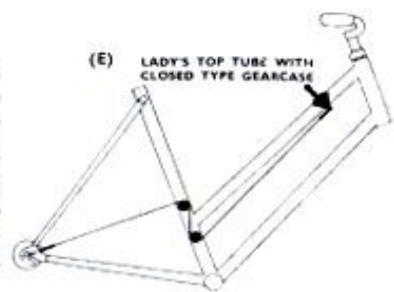
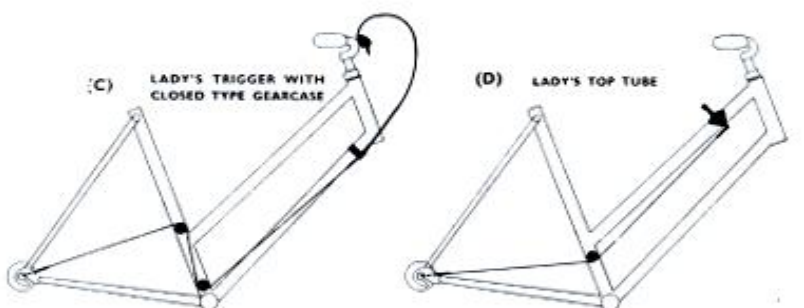
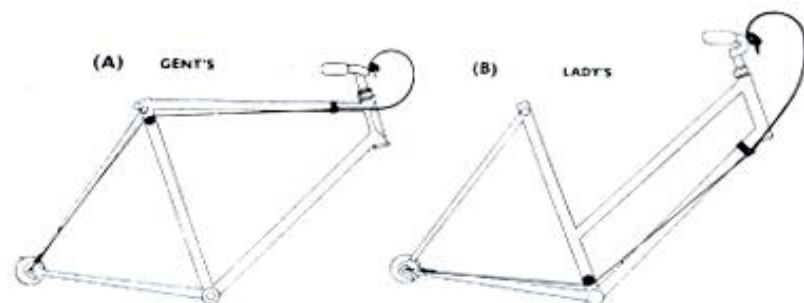
HUB GEAR CONTROLS

1. *Trigger Control.* The outer cable should be long enough to allow full movement of the handlebar but otherwise it should be kept as short as possible, because it tends to compress in low gears, and any length over 21½" may adversely affect the gear adjustment.

Control wires are supplied in various lengths but the general standard for handlebar controls is a 54½" inner wire with a 17½" outer cable which is suitable for most frame sizes. Longer wires, up to 58½" and outer cables up to 21½", are available for special cases, and shorter wires can be supplied for very small frames.

Diagrams A and B show the best method of arranging the control wire on diamond and open frames. If the open frame is fitted with a gear-case, however, an extra guide pulley may be needed as shown in diagram C.

2. *Top Tube Control.* The wire should run parallel to the tube to which the quadrant is fitted. If the tube is curved the wire should be parallel to the section of tube to which the control is fitted. The wire lengths offered for Top Tube controls are 32", 34" and 36".



For Top Tube controls on diamond frames, the quadrant should be attached in the position shown for the fulcrum in diagram A. On open frames where a gearcase is fitted, the method is shown in diagram E, but it is less efficient and should not be used if the method shown in diagram D is possible.

There should be no difficulty in joining up the control wire to the indicator chain except with the AW, AB, AG and TCW hubs. In these cases the indicator must be screwed up fully but not over-tightened. The effect of over-tightening is shown in the illustration. The indicator must be unscrewed to line up; it should be noted particularly that it need never be unscrewed more than half a turn. Unscrewing more than half a turn will detrimentally affect gear engagement. This only applies on AW, AB, AG and TCW hubs because in all other types the indicator rod is free to revolve and line itself up automatically.



BRAKE HUB CONTROLS

It is very important that the brake-arm clips are fitted as tightly as possible to the cycle frame or the fork. It is also important that the brake plate should not be strained when a rear-wheel brake is being connected to the anchor clip, which must be fixed so that it engages easily. The arm of a front hub should be a tight fit in its clip.

Brakes on machines that have been laid up for some time should be cleaned and one or two drops of oil should then be applied between the cam lever and the brake plate, to prevent sticking, but care should be taken to see that no oil penetrates into the brake drum.

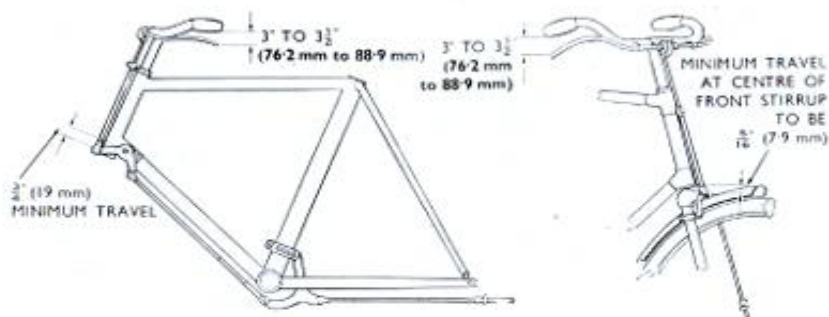
All rear-wheel brake hubs have axles with flattened ends, to prevent them from turning in the frame slots. This is especially important with combined brake-and-variable-gear hubs, for which special lip washers are provided, to engage in the frame slots.

To allow ample room for movement of the rod operating a rear-wheel brake, there should be half an inch of clearance between the brake link and the bottom bracket.

In the case of the front hub brakes it is not possible to interchange rod and cable control without exchanging the brake arms, but all rear hubs use the same brake arm for either rod or cable control.

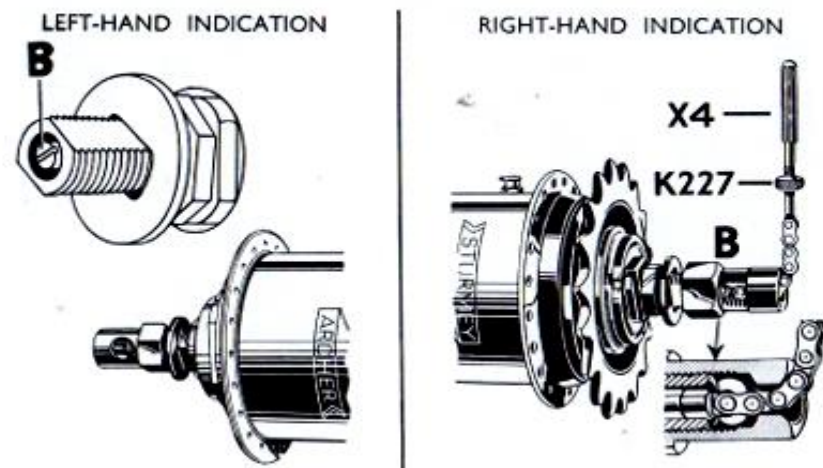
Handlebar fittings for rod-operated brake hubs must provide the minimum movement as shown in the diagrams overleaf, at the stirrup (for front-wheel brakes) and at the bell crank (for rear-wheel brakes). Hubs are supplied with fittings up to and including those parts, but the handlebar fittings and brake tubes are supplied by the cycle manufacturers. When a cycle is being converted from rim brakes to hub

brakes, a longer tab may be required for the roller lever operating the rear brake in order to provide the minimum movement required.



HUB GEAR INDICATOR ADJUSTMENT

The indicator rod of three-speed hubs should be adjusted when the control lever is in the normal gear position, i.e., No. 2. The small locknut above the chain is first slackened off and then the knurled wire connection is rotated so as to bring the rod into the required position. With SW, SB, SG, AM, ASC and AC hubs the required position has been obtained when the end of the indicator rod is level with the end of the axle on the left-hand side of the hub. With AW, AB, AG and TCW hubs it is brought into position by bringing the outer shoulder of the indicator rod level with the end of the axle on the right-hand (sprocket) side. (See B in illustrations.)



For four-speed hubs, FW, FM, FC and FG, adjustment is made when the control lever is in the low gear, i.e., No. 2 position (the one next to the bottom gear position). The locknut is slackened off and the knurled wire connection is revolved to bring the end of the indicator rod level with the end of the axle on the left-hand side. (See B in illustration.)

In all cases the locknut must be tightened again after adjustment. If the knurled wire connection cannot be turned enough to give the required adjustment of the indicator rod, the position of the fulcrum (in the case of trigger controls), or the quadrant (in the case of top tube controls) should be moved along the top tube in the required direction, so that the final adjustment may be made on the wire connection as described. At the first sign of the gear slipping in any position, the indicator adjustment must be checked.

HUB BEARING ADJUSTMENT

The hub bearings are adjusted by means of the cone on the left-hand side (opposite side to the sprocket) which automatically adjusts all the hub bearings. It should be adjusted so that there is a barely perceptible sideways movement of the wheel rim.

With brake hubs the left-hand cone projects through the brake plate and is fitted with a slotted adjustment washer. With a rear 'Dynohub' the left-hand cone projects through the armature and is fitted with a slotted adjustment washer. Turning the washer adjusts the cone, which must be locked again with the locknut after adjustment.

When a dynamo is incorporated in the hub the pull of the magnet disguises the adjustment and if this point is not kept in mind the wheel may be over-tightened and the ball races damaged. The position of the armature terminals should be carefully located before the cone locknut is finally tightened.

For all hubs fitted to roadster cycles, the terminals should be parallel to one of the flats on the end of the axle but with forward drop-out lugs they should be turned clockwise through 30° away from a position parallel with the flats.

GH6 lighting sets should have the terminals parallel with the axle flats. The notched washer has not been fitted to GH6 hubs since 1954 when the adjusting cone was transferred to the side away from the 'Dynohub'.

Before spinning a wheel to test the output of the 'Dynohub', ensure that the axle nuts are tight, otherwise the terminals may foul the front fork and be damaged if the axle revolves.

The right-hand cone (on the sprocket side) is fixed in position when the hub is assembled and must not be disturbed for wheel adjustment in the normal way. When re-assembling the hub after dismantling for inspection or repair, the right-hand cone should be screwed home until it is finger-tight, then unscrewed half a turn and finally locked with the

special lockwasher and locknut. On no account should it be unscrewed more than half a turn as this will upset the setting of the gears. Wheel adjustment is then made in the normal way with the left-hand cone. If the right-hand cone races are being inspected without removing the internals from the hub shell, the left-hand cone must first be screwed well back so that it does not interfere with the re-setting of the right-hand cone.

HUB (BRAKE) ADJUSTMENT

When brakes are new they may have to be adjusted frequently (until the shoes have become properly bedded in). With cable-operated brakes the small locknut (A in the diagram) is first slackened off and then the knurled adjuster (B in diagram) is tightened until the brake shoes are felt to be rubbing on the inner surface of the hub shell. The adjuster is then slackened just enough to allow the wheel to revolve without friction, and the locknut is tightened up again.



With rod-operated brakes the adjuster (C in the diagram) is turned until the brake shoes rub on the inside of the drum, and then slackened off just enough to allow the wheel to revolve without friction. The adjuster is self-locking.

This is the only point at which the brake should be adjusted. The handlebar brake tubes are only provided to allow up-and-down adjustment of the handlebars.

HEADLAMPS S625 and R625

Two types of headlamp are available.

1. Type S with 2" diameter dome for sports models in silver finish only.
2. Type R with 3½" diameter dome for roadster models in black and silver finish.

Both are fitted to the lamp bracket by means of a single clamping bolt. The angle of the lamp may be adjusted but first the clamping bolt should be loosened.

The front of the lamp is detachable by unscrewing the small screw at the bottom of the lamp rim and this will give access to the bulb and switch sockets. The switch itself is riveted at the base of the lamp body and the switch lever has three positions, which, viewed from the riding position, are: Battery—left, 'Dynohub'—right, Off—central. When a Dry Battery Unit is not fitted, the left-hand position may be used as 'Off' and the switch treated as an ordinary two-way switch.

The bulb-holder is a push fit into the base of the reflector, and a lock-ring is provided to secure the bulb which allows it to be focused. Correctly adjusted, the bulb need not be touched again except to re-focus or replace with a new bulb.

REAR LAMP M6

The rear lamp is fixed to the rear stay by a suitable clip. Four types of clip are available to fit ⅝" diameter round, ½" diameter round, and oval or 'D'-shaped tubing. Prior to the present lighting regulations a 1½" diameter dome was fitted but the current dome is 1½", behind which is fitted a loose metal backing piece which can be fitted into the existing size lamp body. The dome is unscrewed to give access to the bulb.

BULBS

Head: 6v. .25 amp. Symbol No. GL448. } Correct bulbs
Rear: 6v. .04 amp. Symbol No. GL228.- } must be used.

DRY BATTERY UNIT (DBU) GA393

The Dry Battery Unit is fitted to the seat tube. The unit takes three 1½ volt dry cells which are fitted from the lower end of the unit and secured in position with a spring ring which fits into a groove inside the base of the container. This groove forms the earth connection for the spring ring and must be kept clean. It is suggested that the groove and spring ring be smeared with vaseline as a precaution against corrosion. Batteries are not re-chargeable and should be replaced with new cells when exhausted or removed from the container to avoid corrosion on the inside surface of the container. If the batteries are removed without replacing with new ones the 'Dynohub' lighting will still function normally but the parking light will not function. The most common type of batteries used are Drydex T20, Ever Ready U2 or Ray-O-Vac, but any similar size battery is suitable.

There are two terminals fitted in the head of the battery container and as these are of different sizes the wires cannot be wrongly connected. The battery cap is of rubber with a small hole in the top through which the centre terminal passes. The sides of the battery cap should be pulled well down over the flex wires to prevent rain or mud penetrating

into the container and the cap should be secured in position by means of a plated washer (GL541) and terminal nut (GL613).

WIRING

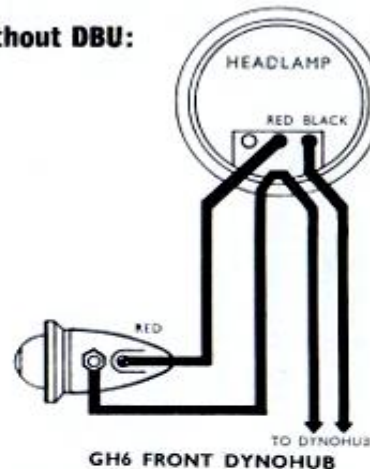
Wiring connections are inside lamp; wires enter the lamp through a hole in the fixing bracket. To reach the connections the lamp front must be removed.

(1) For GH6 front 'Dynohub' without DBU:

Headlamp End. Black wire to upper right-hand switch connection. Red wire to centre switch connection. Two bare wires to lower switch connection.

'Dynohub'. Two hook connections to hub terminals.

Rear Lamp. Black wire (large tag) to clip screw. Red wire (small tag) to recessed screw.



(2) For GH6 front 'Dynohub' with DBU:

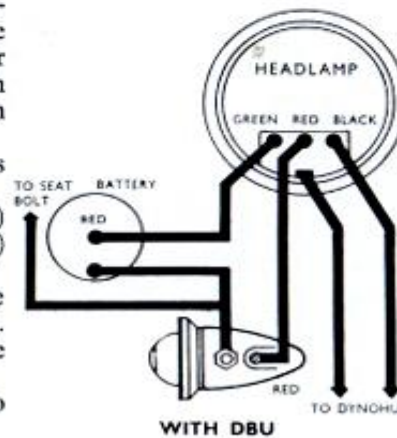
Headlamp End. Black wire to upper right-hand switch connection. Bare wire to lower centre connection. Red wire to upper centre switch connection. Green wire to upper left-hand switch connection.

'Dynohub'. Two hook connections to hub terminals.

Rear Lamp. Black wire (large tag) to clip screw. Red wire (small tag) to recessed screw.

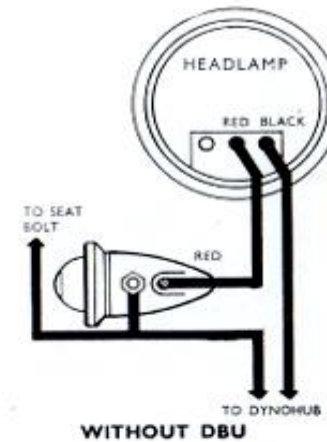
Battery Container. Red wire (large tag) to centre terminal. Black wire (small tag) to side terminal.

Earth Wire. Rear lamp clip to seat bolt.



(3) For SG, AG or FG rear 'Dynohub' without DBU:

One hub connection to upper right-hand switch connection. Upper centre connection to rear lamp recessed screw. Other hub connection to rear lamp clip screw. Earth wire—Rear lamp clip screw to seat bolt.



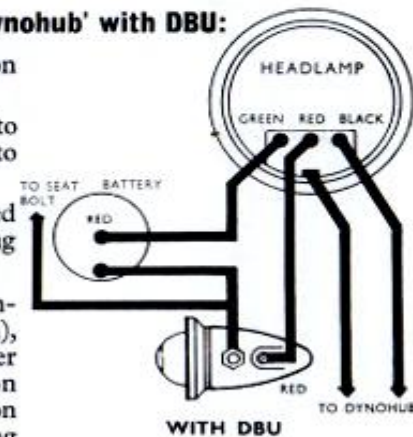
(4) For SG, AG or FG rear 'Dynohub' with DBU:

'Dyno-hub'. Two large hook-on tags to the two hub terminals.

Rear Lamp. Small tag (red) to recessed screw, large tag (black) to clip screw.

Battery Cap. Large tag (red sleeve) to centre terminal, small tag (black sleeve) to other terminal.

Headlamp. (1st pair) Bare connection to base connection (earth), the other connection to upper right-hand switch connection (black). (2nd pair) Red connection to centre connection, the remaining connection (green) to upper left-hand switch connection. (Any surplus wire should be coiled inside Headlamp.) Earth wire—Rear lamp clip screw to seat bolt.



N.B.—All illustrations show switch plate as seen in headlamp with front removed.

The **USE AND MAINTENANCE** OF STURMEY-ARCHER EQUIPMENT

Sturmey-Archer hubs have been designed and built to give a life-time of trouble-free service on the understanding that regular attention is given to correct care and maintenance as outlined below.

CHANGING GEAR

In use, Sturmey-Archer variable gear hubs are the easiest, cleanest and most convenient means of making a change of gear. The change may be made while the cycle is in motion or when it is stationary, which is a great advantage to cyclists riding in traffic where stops and gear changes are frequent.

If the change is made while the bicycle is moving, the rider should continue to pedal but gently ease the pressure on the pedals as he makes the change which should be carried out smartly.

Should it be necessary to change gear whilst stationary, the weight of the foot should be allowed to rest on higher pedal during change, so that internal gears will rotate and engage easily.

ADJUSTMENT

See previous section of this catalogue under the headings of :

	<i>page</i>
Hub Gear Indicator Adjustment	4
Hub Bearing Adjustment	4
Hub (Brake) Adjustment	5

LUBRICATION

Only thin good quality oil should be used for the lubrication of Sturmey-Archer hubs. Thick oils or grease must not be used, but when a hub is dismantled a small amount of grease or vaseline may be put on the ball races only.

The ideal rule for lubrication should be 'a little but often'. Two or three drops of oil every week will maintain the hub in first class running order. *A new hub should always be oiled before use* because the oil put in at the factory may have evaporated in the interval between leaving the factory and being put to use on the road.

TCW (tricoaster) hubs need more oil than other hubs because in their case the oil is used not only for lubrication but also to dissipate heat generated by the brake.

Internal expanding brake hubs have a drainage hole in the brake plate to allow surplus oil to drain away. If this is not kept clear oil will seep through to the linings and reduce the efficiency of the brake.

Since 'Dynohub' hub lighting sets have no bearings of their own, the only lubrication needed is for the hub bearings and gear mechanism. Oil will not harm the dynamo, so there is no risk of damage in oiling the hub.

The moving parts of the trigger unit need an occasional drop of oil to ensure easy action, but as surplus oil will attract dirt, oiling at this point should be done carefully and sparingly.

Occasionally the outer casing of the control cable should be removed from the fulcrum clip so that the inner wire may be exposed and lubricated.

FAULT-FINDING CHARTS

FOR STURMEY-ARCHER EQUIPMENT

If a Sturmey-Archer variable gear hub is not working satisfactorily, first of all check the indicator adjustment, as explained in the chapter on 'The Fitting and Adjustment of Sturmey-Archer Hubs'. If the trouble is sluggishness or stiffness in the gear-change, the cause may be lack of lubrication, so oil the hub and the control mechanism before continuing with the investigation.

If the hub is correctly adjusted and adequately lubricated but still does not work properly, look for the trouble in the following tables, where you will also find the cause and cure. If the cure is re-adjustment of the hub, refer to the chapter on 'The Fitting and Adjustment of Sturmey-Archer Hubs'. If new parts have to be fitted, consult the lists of spare parts and prices.

FAULT-FINDING CHART FOR SW, SB and SG HUBS

<i>Symptom</i>	<i>Fault</i>	<i>Remedy</i>
Slipping in low gear.	1. Planet Cage Pawls and/or L.H. Ball Cup teeth worn.	1. Replace.
Clicking in low gear.	1. Faulty Indicator adjustment.	1. Re-adjust.
Slipping in normal gear only.	1. Gear Ring Splines and/or Clutch Dogs rounded off.	1. Replace.
Slipping in high gear.	1. Planet Cage Pins and/or Clutch Dogs rounded off.	1. Replace.
Slipping in both normal and high gears.	1. Gear Ring Pawls and R.H. Ball Ring teeth worn. 2. Pawl Ring and Gear Ring Dogs worn.	1. Replace. 2. Replace.
Hub runs stiffly.	1. L.H. Cone too tight. 2. R.H. Cone not correctly set. (See Assembly Notes.) 3. Chainstays not parallel. 4. Cycle Chain too tight. 5. Dust Caps rubbing. 6. Corrosion through wrong oil or lack of oil. 7. Too many balls in Ball Ring.	1. Adjust. 2. Adjust. 3. Correct. 4. Adjust. 5. Replace. 6. Clean and re-oil. 7. Reduce to only 24 balls.
Sluggish Gear Change.	1. Bent Axle. 2. Worn Toggle Chain. 3. Guide Pulley out of line. 4. Frayed or corroded Control Wire. 5. Flick Trigger Unit not oiled.	1. Replace. 2. Replace. 3. Set correctly. 4. Replace. 5. Oil working parts.

FAULT-FINDING CHART FOR AW, AB, TCW and AG HUBS

<i>Symptom</i>	<i>Fault</i>	<i>Remedy</i>
No low gear (1st).	<ol style="list-style-type: none"> 1. Low gear pawls upside down or pointing in wrong direction. 2. Sliding clutch thrust collar not seating over axle key. 3. Incorrect axle spring. 	<ol style="list-style-type: none"> 1. Re-assemble pawls correctly. 2. Fit thrust collar correctly. 3. Fit correct axle spring.
Slipping in low gear (1st).	<ol style="list-style-type: none"> 1. Sliding clutch 'nosed' off, due to bad adjustment. 2. Indicator not screwed home fully. 3. R.H. cone wrongly adjusted. 4. Bad trigger cable ends or kinks in trigger wire. 5. Twisted indicator chain through over-tightening. 	<ol style="list-style-type: none"> 1. Fit new sliding clutch and adjust correctly. 2. Screw indicator home. 3. Re-adjust R.H. cone. 4. Fit new control cable. 5. Replace or refit as required.
Fluctuating between low gear (1st) and normal gear (2nd).	<ol style="list-style-type: none"> 1. Faulty or worn gear ring pawls. 	<ol style="list-style-type: none"> 1. Change both gear ring pawls.
Slipping in normal gear (2nd).	<ol style="list-style-type: none"> 1. Gear ring dogs and/or sliding clutch 'nosed' off due to bad adjustment. 2. Indicator not screwed home fully. 	<ol style="list-style-type: none"> 1. Fit new gear ring and/or sliding clutch. 2. Screw indicator home.
Slipping in top gear (3rd).	<ol style="list-style-type: none"> 1. Pinion pins or sliding clutch badly worn due to bad adjustment. 2. Very weak or distorted axle spring. 3. Incorrect R.H. cone adjustment. 4. Grit between clutch sleeve and axle. 	<ol style="list-style-type: none"> 1. Fit necessary new parts, and check adjustment. 2. Fit new spring. 3. Re-adjust. 4. Clean away grit.
Hub runs stiffly. Drag on pedals when free-wheeling.	<ol style="list-style-type: none"> 1. Too many balls in ball ring. 2. Cones excessively tight. 3. Chainstay ends not parallel. 4. Corrosion due to inferior oil or lack of lubrication. 5. Distorted dust caps. 	<ol style="list-style-type: none"> 1. 24 balls only should be fitted. 2. Re-adjust cones. 3. Correct chainstay ends. It is essential that the ends are parallel, otherwise the axle will be strained when the nuts are tightened and the internals may be seriously affected. 4. Clean hub thoroughly and use only a good quality thin oil. 5. Check dust caps and replace those showing distortion, or signs of binding.
Sluggish gear change.	<ol style="list-style-type: none"> 1. Distorted axle spring. 2. Bent axle. 3. Worn toggle chain link. 4. Guide pulley out of line so that wire tends to ride up side of pulley flange. 5. Lack of lubrication of 'Flick' control, or frayed control wire. 	<ol style="list-style-type: none"> 1. Replace spring. 2. Replace axle. 3. Replace indicator and chain. 4. Correct alignment of pulley on frame. 5. Lubricate control or replace wire.

FAULT-FINDING CHART FOR FW, FC, FM, FG, ASC, AC and AM HUBS

<i>Symptom</i>	<i>Fault</i>	<i>Remedy</i>
No bottom gear.	<ol style="list-style-type: none"> 1. Thrust collar not seated correctly on axle key. 2. Low gear pawls upside down or reversed. 3. Bottom gear pawls stuck down (FG only). 	<ol style="list-style-type: none"> 1. Fit thrust collar correctly. 2. Re-assemble low gear pawls (not ASC). 3. Remove, clean, and lubricate.
Difficulty in engaging bottom gear. NOTE.—This must not be confused with the fact that a stronger pull on the control wire is necessary to engage low gear than for high and middle gears.	<ol style="list-style-type: none"> 1. Compensator spring bent and binding in the axle bore. 2. No lubricant on wire inside trigger cable. 3. Faulty coiling or distorted low gear spring. 4. Axle key bent. 	<ol style="list-style-type: none"> 1. Fit new spring (not AM or AC). 2. Lubricate 3. Fit new set of springs (not AM or AC). 4. Fit new key.
Slips in bottom gear.	<ol style="list-style-type: none"> 1. Bad trigger cable ends or kinks in trigger wire. 2. Compensator spring bent. 3. Faulty coiling of low gear spring. 4. Incorrectly fitted pawl springs. 5. Worn dogs on axle and inside low gear dog clutch (FM, FC, ASC) only. 	<ol style="list-style-type: none"> 1. Fit new control cable. 2. Fit new spring which should not be less than $1\frac{1}{8}$" over-all (not AM or AC). 3. Fit new set of springs (not AM or AC). 4. Fit pawl springs correctly. 5. Fit new axle and low gear dog.
Slips in 2nd gear in 4-speeds.	<ol style="list-style-type: none"> 1. Compensator spring set too short. 	<ol style="list-style-type: none"> 1. Fit new set of springs.
Alternates between bottom or low gear and normal.	<ol style="list-style-type: none"> 1. Faulty gear ring pawls. 	<ol style="list-style-type: none"> 1. Fit new pawls (not ASC).
Slips in low and top gears.	<ol style="list-style-type: none"> 1. Dog ring locknut loose (FW and FG only). 2. Secondary sun pinion locknut loose (FM, FC, ASC and AC only). 3. Weak low gear spring (FW only). 4. Dog ring teeth worn (FW only). 	<ol style="list-style-type: none"> 1. Examine dog ring teeth for damage. Tighten locknut. 2. Tighten locknut. 3. Fit new set of springs (K410B). 4. Fit new dog ring.
Slips in normal gear.	<ol style="list-style-type: none"> 1. Gear ring and sliding clutch worn due to bad adjustment. 	<ol style="list-style-type: none"> 1. Fit new parts, and check clutch spring.
Slips in top gear.	<ol style="list-style-type: none"> 1. Planet cage dogs and clutch worn due to bad adjustment or very weak clutch spring. 2. Incorrect R.H. cone adjustment. 3. Tight clutch spring or dirt clogging spring action. 	<ol style="list-style-type: none"> 1. Fit new parts, check clutch spring and re-adjust. 2. Re-adjust correctly. 3. Clean hub and/or fit new set of springs.
Hub runs stiffly. Drag on pedals when free-wheeling.	<ol style="list-style-type: none"> 1. Planet pinions not 'timed' correctly. 2. Too many balls fitted in ball ring. 3. Bad cone adjustment. 	<ol style="list-style-type: none"> 1. Re-time pinions. (See page 47 (FW, FG and AM only).) 2. Fit 24 balls only. 3. Re-adjust both cones.

FAULT-FINDING CHART FOR FW, FC, FM, FG, ASC, AC and AM HUBS—cont.

<i>Symptom</i>	<i>Fault</i>	<i>Remedy</i>
Hub runs stiffly. Drag on pedals when free-wheeling.— <i>cont.</i>	4. Chainstay ends not parallel. 5. Corrosion due to inferior oil or lack of lubrication or dirty internals. 6. Distorted dust caps. NOTE.—The gear internals are rotated during free-wheeling in FM, FC, and AC hubs; therefore, providing cones are properly adjusted, a slight pull on the pedals and possibly rotation during free-wheeling is in order.	4. Correct chainstay ends. It is essential that the ends are parallel, otherwise the axle will be strained when the nuts are tightened and the internals may be seriously affected. 5. Clean hub thoroughly and use only a good quality thin oil. 6. Check dust caps and replace those showing distortion or signs of binding.
No gear at all.	1. Indicator rod broken or very nearly unscrewed. 2. Pawls stuck by incorrect oil.	1. Fit indicator rod and re-adjust (not AM or AC). 2. Lubricate.
Sluggish gear change.	1. Distorted axle spring. 2. Bent axle. 3. Worn toggle chain link. 4. Guide pulley out of line so that wire tends to ride up side of pulley flange. 5. Lack of lubrication of 'Flick' control or frayed control wire.	1. Fit new set of springs. 2. Replace axle. 3. Replace indicator and chain. 4. Correct alignment of pulley on frame. 5. Lubricate control or replace wire.

FAULT-FINDING CHART FOR HUB BRAKES

<i>Symptom</i>	<i>Fault</i>	<i>Remedy</i>
Inefficient brake	1. Oil-soaked or Greasy linings. 2. Incorrect adjustment. 3. Worn linings—rivet heads protruding and contacting drum surface.	1. Fit new linings. 2. Re-adjust. See notes on fitting and adjustment. 3. Fit new linings.
Squealing brake.	1. Loose brake-arm clip. 2. Lining not tapered off at front edge causing vibration. 3. Loose rivets in linings.	1. Secure clip properly. 2. Fit linings correctly. 3. Secure rivets firmly.
Jerky brake.	1. Hub drum pulled out of shape during wheel building.	1. Re-true wheel or re-build as necessary.
Knocking or clicking noise.	1. Loose hub shell rivets. 2. Scored brake drum surface.	1. Fit new hub shell. 2. Fit new hub shell.

FAULT-FINDING CHART FOR LIGHTING UNITS

To test whether 'Dynohub' is generating, remove wires from armature terminals, re-tighten terminal nuts and connect a bulb known to be in good condition across the armature terminals; then spin wheel smartly. If bulb does not light satisfactorily, the armature may be faulty.

Connect one lead from a test meter to one of the armature terminals and touch the other lead on any of the armature laminations. If any reading is obtained, this indicates a short circuit between armature winding and the body. Test each armature terminal in turn.

Electrical Faults:

<i>Fault</i>	<i>Cause</i>	<i>Remedy</i>
Total failure.	<ol style="list-style-type: none"> 1. Faulty armature. 2. Broken wire in twin flex. 3. Burnt out bulb or broken filament. 4. Incorrect wiring connections. 	<ol style="list-style-type: none"> 1. Return armature for repair under Service Replacement scheme. 2. Test each wire for continuity. 3. Test each bulb with battery known to be in good condition or test for continuity of filament. 4. Check wiring against appropriate diagrams.
Low output. (Dim lights.)	<ol style="list-style-type: none"> 1. Magnet de-magnetized. 2. Bulbs which have been in use for a long time may not be 100 per cent efficient. 3. Incorrect bulbs. 4. Incorrect wiring connections. 5. Corroded Connections. 	<ol style="list-style-type: none"> 1. Return magnet to works for re-magnetizing. This can only be done at Works and unless keeper ring or armature is sent with magnet, a keeper will have to be supplied in order to return magnet. 2. Test bulbs with battery against new ones. 3. Check bulb ratings and see that they are correct. 4. Check wiring against appropriate diagram. 5. Inspect all Terminal and wire tags.
Partial Failure.	<ol style="list-style-type: none"> 1. Loose bulb or bulbs. 2. Frayed ends of twin flex. 3. Terminal nuts loose. 	<ol style="list-style-type: none"> 1. Check if bulbs are screwed fully home. 2. Check each terminal point. 3. Check nuts for tightness but be careful not to use too much force.
Frequent burning out of bulbs.	<ol style="list-style-type: none"> 1. Loose contacts. 	<ol style="list-style-type: none"> 1. Check all Terminals in Headlamp and Rear Lamp for tightness and ensure bulbs make firm contact.

Mechanical Faults:

<i>Faults:</i>	<i>Cause</i>	<i>Remedy</i>
Rubbing.	<ol style="list-style-type: none"> 1. Usually caused by grit between cover plate and inner dust cap. 2. Loose cones may permit armature and magnet to rub. 3. Dirt between armature and magnet. 4. The omission of the card disc carrying the patent numbers which must be fitted between magnet and cover plate. 	<ol style="list-style-type: none"> 1. The groove should be cleaned and filled with light grease. 2. Correct adjustment of cones will cure this fault. 3. The hub should be dismantled and cleaned if this is the cause. 4. Ensure that disc is fitted.

GENERAL DISMANTLING Instructions **FOR STURMEY-ARCHER HUBS**

4

When gear and brake controls and flex wires have been disconnected and the wheel removed from the cycle frame, dismantling of the hub begins with the removal of the left-hand locknut, the washers (if any) and the left-hand cone. A note should always be made of their order and number so that they may be put back correctly when the hub is re-assembled. Next, unscrew the right-hand ball ring but because it has a two-start thread and must be replaced in its original position, that position must be marked. String or adhesive tape may be attached to the spoke nearest to the letters 'SA' which are stamped in one of the notches on the ring. The whole internal can now be withdrawn from the hub shell.

Where a brake is incorporated in the hub, the brake unit must be removed before the left-hand cone can be unscrewed. The last washer to be taken off before coming to the brake plate is the notched adjusting washer which fits over the flats on the end of the cone for normal wheel adjustment purposes. When this notched washer has been taken off, lift out the brake arm and shoes as a complete unit, and then proceed to unscrew the left-hand cone. Similarly, the generator must first be removed from hubs incorporating a 'Dynohub' lighting unit. The procedure is explained in detail in the appropriate chapters of this section of the catalogue.

Removal of the right-hand ball ring in the case of the TCW is described in the chapter headed 'To Dismantle the TCW Hub.'

In all other cases, the right-hand ball ring, which has a right-hand thread, is loosened by means of a 'C' spanner or a hammer and square-ended punch against one of the notches.

If it is required to remove the sprocket, insert a thin screwdriver in the groove of the driver which comes nearest to the opening in the circlip and prise off the circlip. The spacing washers, sprocket and outer dust cap may then be lifted off the driver. There must always be two $\frac{1}{16}$ " washers. Careful note should be made of their position and also whether the sprocket offset is facing inwards or outwards, as they must all be put back in the same way in order to maintain the original chain line.



END OF SUB-SECTION 4.— SERVICE SECTION — STURMEY-ARCHER MASTER CATALOGUE

INDIVIDUAL DISMANTLING Instructions

FOR STURMEY-ARCHER HUBS

TO DISMANTLE THE SW HUB

Proceed as follows:

1. Remove the hub internal as described in the general instructions but hold the hub vertically with the sprocket end uppermost and withdraw the internals complete, taking care not to tilt them until the three low-gear pawls have been removed, because they are loose in the planet cage.
2. While holding a small screwdriver in the left-hand end of the indicator rod, unscrew the coupling spindle at the other end and remove both from the axle.
3. Put the left-hand end of the axle in a vice and remove the right-hand locknut, washers if any, cone lock washer, and right-hand cone whilst carefully noting the order in which they are fitted.
4. Lift off, in the following order, the clutch spring, the driver, the thrust spring, the right-hand ball ring, the pawl retaining washer, the pawl ring with three pawls, the gear ring, the axle thrust washer and the sliding clutch.
5. Push out the axle key and remove the clutch sleeve.
6. Remove the pinion retaining ring and the pinions, leaving the planet cage attached to the axle.
7. If necessary, as a result of a worn bearing surface or ratchets, the left-hand ball cup may now be removed from the hub shell in the same way as the right-hand ball ring, but it has a left-hand thread.
8. The dust caps on the cones are pressed into position and need not be removed unless they are damaged. Each cap faces inwards and the back of it should be level with the square on the cone.
9. The dust caps in the driver and the left-hand ball cup can be prised out with a screwdriver for examination of the ball tracks and ball cages. If distorted by removal they should be replaced by new ones.
10. The dust cap on the right-hand ball ring can be prised off with a screwdriver to examine the ball track and balls. There should be exactly 24 balls of $\frac{3}{16}$ " diameter.
11. It should not be necessary to remove the planet cage pawl cup.
12. The planet cage, together with the hardened bearing plate, is secured by a special fixing plate which fits in the shallow groove in the axle. To remove it, fit the gear ring on the planet cage and stand

the assembly on a partly open vice with the gear ring downwards. Fit an axle nut half way to protect the thread. A sharp blow on the nut will release the fixing plate. A new fixing plate must be used when replacing the planet cage and care should be taken to remove any metal from the axle groove.

TO DISMANTLE THE SB HUB

Proceed as follows:

1. Remove the internal from the hub shell as described in the general instructions, but care should be taken not to lose the inner spacing washer on the left-hand cone when lifting out the brake unit.
2. While holding a small screwdriver in the left-hand end of the indicator rod, unscrew the coupling spindle at the other end and remove both from the axle.
3. Put the left-hand end of the axle in a vice and remove the right-hand locknut, washers, if any, cone lock washer, and right-hand cone whilst carefully noting the order in which they are fitted.
4. Lift off, in the following order, the clutch spring, the driver, the thrust spring, the right-hand ball ring, the pawl retaining washer, the pawl ring with three pawls, the gear ring, the axle thrust washer and the sliding clutch.
5. Push out the axle key and remove the clutch sleeve.
6. Remove the pinion retaining ring and the pinions leaving the planet cage attached to the axle.
7. If necessary, as a result of a worn bearing surface or ratchets, the left-hand ball cup may now be removed from the hub shell with tool DD12987. It has a left-hand thread.
8. The dust caps on the cones are pressed into position and need not be removed unless they are damaged. Each cap faces inwards and the back of it should be level with the square on the cone.
9. The dust caps in the driver and the left-hand ball cup can be prised out with a screwdriver for examination of the ball tracks and ball cages. If distorted by removal they should be replaced by new ones.
10. The dust cap on the right-hand ball ring can be prised off with a screwdriver to examine the ball track and balls. There should be exactly 24 balls of $\frac{3}{16}$ " diameter.

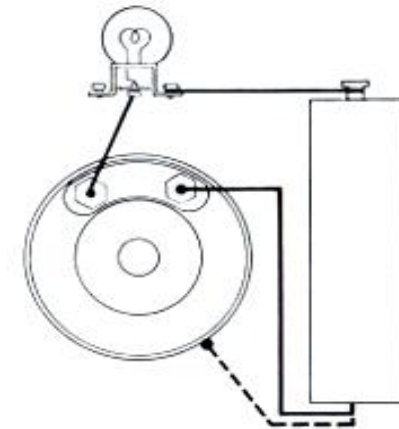
11. It should not be necessary to remove the planet cage pawl cup.
12. The planet cage, together with the hardened bearing plate, is secured by a special fixing plate which fits in the shallow groove in the axle. To remove it, fit the gear ring on the planet cage and stand the assembly on a partly open vice with the gear ring downwards. Fit the axle nut half way to protect the thread. A sharp blow on the nut will release the fixing plate. A new fixing plate must be used when replacing the planet cage and care should be taken to remove any metal from the axle groove.
13. If the shoes have to be removed from the brake arm, unscrew the nut which secures the cam lever and pull the cam lever from the square-ended end of the cam. Then remove the nut and spring washer which secures the fulcrum pin and lift the shoes away.

TO DISMANTLE THE SG HUB

Proceed as follows:

1. Unscrew and remove the indicator rod from the axle. Then extract the 'Dynohub' unit as follows:
 - a. Remove the four magnet-fixing nuts and lock washers from the back of the hub shell and then remove the four magnet-fixing screws.
 - b. Remove the dynamo cone locknut, adjusting washers and spacing washers (if any), making a note of their arrangement so that they can be replaced in their original positions.
 - c. Hold the wheel parallel to the workbench and with a mallet tap the end of the spindle and this will cause the complete 'Dynohub' unit to drop out. There is a shim washer between the cone and the armature and it must be replaced when the hub is re-assembled.
 - d. The four magnet spacing pieces L127 can now be lifted out of the hub shell. Care should be taken to ensure that these parts are not lost.
 - e. Unless it is essential to do so, the armature and magnet should never be separated. If they are to be separated, a keeper ring should be used as otherwise the magnet will rapidly lose its magnetism. Even a moment's separation will cause loss of magnetism and a spanner placed across the magnet is useless as a substitute for a keeper ring.
To separate the magnet and the armature, hold the 'Dynohub' unit in the left hand with the terminal plate across the palm. Then fit a keeper ring over the armature and lightly tap the keeper with the palm of the right hand. The magnet will then slide off the armature on to the keeper.
 - f. At this stage it is wise to test the armature for continuity with a test meter. If there is no reading it is certain that there is a break in the winding. If a test meter is not available, a battery

and bulb may be connected as shown in the diagram, and if the bulb does not light a break in the armature winding is indicated. A second test is to disconnect the lead from one of the armature terminals and touch the outer edges of the armature with the bare lead. If the bulb lights this indicates a short circuit.



2. Now unscrew right-hand ball ring from hub shell and withdraw gear internals as described in the general instructions.
3. Put the left-hand end of the axle in a vice and remove the right-hand locknut, washers if any, cone lock washer, and right-hand cone whilst carefully noting the order in which they are fitted.
4. Lift off, in the following order, the clutch spring, driver, thrust spring, right-hand ball ring, pawl retaining washer, pawl ring with three pawls, gear ring, axle thrust washer and sliding clutch.
5. Push out the axle key and remove the clutch sleeve.
6. Remove the pinion retaining ring and the pinions, leaving the planet cage attached to the axle.
7. If necessary, as a result of a worn bearing surface or ratchets, the left-hand ball cup may be removed from the hub shell with tool DD12987. It has a left-hand thread.
8. The dust caps on the cones are pressed into position and need not be removed unless they are damaged. Each cap faces inwards and the back of it should be level with the square on the cone.
9. The dust caps in the driver and the left-hand ball cup can be prised out for examination of the ball tracks and ball cages. If distorted by removal they should be replaced by new ones.
10. The dust cap on the right-hand ball ring can be prised off with a screwdriver to examine the ball track and balls. There should be exactly 24 balls of $\frac{3}{16}$ " diameter.
11. It should not be necessary to remove the planet cage pawl cup.
12. The planet cage, together with bearing plate, is secured by a special fixing plate which fits in the shallow groove in the axle. To remove it, fit the gear ring on the planet cage and stand the assembly on a partly open vice with the gear ring downwards. Fit the axle nut half way to protect the thread. A sharp blow on the nut will release the fixing plate. A new fixing plate must be used when replacing the planet cage and care should be taken to remove any metal from the axle groove.

TO DISMANTLE THE AW HUB

Proceed as follows:

1. Remove the hub internal as described in the general instructions.
2. Remove the low gear pawls, pins and springs. The pawl pins are easily pushed out of the planet cage to release the pawls and springs.
3. Place the left-hand end of the axle in a vice and remove the right-hand locknut, washers if any, cone lock washer and cone, making a note of their arrangement so that they can be replaced in their original positions.
4. Lift off in the following order, the clutch spring and cap, the driver, the right-hand ball ring and the gear ring.
5. Remove the gear ring pawls, pins and springs. The pawl pins are easily pushed out of the gear ring to release the pawls and springs.
6. Remove the thrust ring and washer, and unscrew the indicator rod.
7. Push out the axle key and remove the sliding clutch and sleeve.
8. Lift off the planet cage complete.
9. Take out the pinion pins and remove the pinions from the planet cage.
10. If necessary, because of a worn bearing surface or ratchets, the left-hand ball cup may be removed from hub shell. It has a left-hand thread and is removed by gripping the outside flat surfaces in a vice and turning the wheel in a clockwise direction.
11. The channel-section dust cap in the left-hand ball cup similar to that in the driver, is a press-in fit and may be prised out with a wide screwdriver to avoid damage. If a new ball retainer and balls have to be fitted it is recommended that a new dust cap is fitted at the same time.

TO DISMANTLE THE AB HUB

Proceed as follows:

1. Remove the internal from the hub shell as described in the general instructions, but when lifting out the brake unit care should be taken not to lose the inner spacing washer on the left-hand cone.
2. Remove the low gear pawls, pins and springs. The pawl pins are easily pushed out of the planet cage to release the pawls and springs.
3. Place the left-hand end of the axle in a vice and remove the right-hand locknut, washers if any, cone lock washer and cone, making a note of their arrangement so that they can be replaced in their original positions.
4. Lift off, in the following order, the clutch spring and cap, the driver, the right-hand ball ring and the gear ring.
5. Remove the gear ring pawls, pins and springs. The pawl pins are easily pushed out of the gear ring to release the pawls and springs.

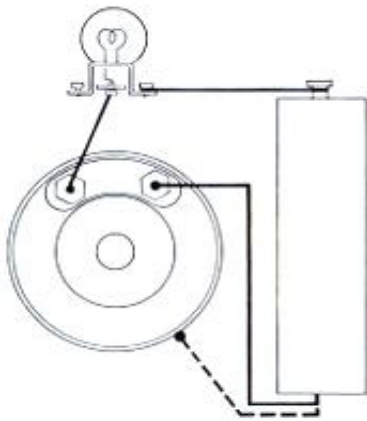
6. Remove thrust washer and thrust ring and unscrew the indicator rod.
7. Push out the axle key and remove the sliding clutch and sleeve.
8. Lift off the planet cage complete.
9. Take out the pinion pins and remove the pinions from the planet cage.
10. If necessary, because of a worn bearing surface or ratchets, the left-hand ball cup which has a left-hand thread may be removed from the hub shell by a special box spanner (DD911) which is available for this purpose.
11. If it is necessary to remove the shoes from the brake arm, unscrew the nut which secures the cam lever and pull the cam lever from the squared end of the cam. Then remove the nut and spring washer which secures the fulcrum pin and lift the shoes away.

TO DISMANTLE THE AG HUB

Proceed as follows:

1. Unscrew and remove the indicator rod from the axle. Then extract the 'Dynohub' unit as follows:
 - a. Remove the dynamo cone locknut, adjusting washers and spacing washers (if any), making a note of their arrangement so that they can be replaced in their original positions.
 - b. Remove the four magnet-fixing nuts and lock washers from the back of the hub shell and then remove the four magnet-fixing screws.
 - c. Hold the wheel parallel to the workbench and with a mallet tap the end of the spindle. This will cause the complete 'Dynohub' unit to drop out. There is a shim washer between the cone and the armature, and it must be replaced when the hub is re-assembled.
 - d. The magnet spacing ring can now be lifted out of the hub shell.
 - e. Unless it is essential to do so, the armature and magnet should never be separated. If they are to be separated, a keeper ring should be used as otherwise the magnet will rapidly lose its magnetism. Even a moment's separation will cause loss of magnetism and a spanner placed across the magnet is useless as a substitute for a keeper ring.

To separate the magnet and the armature, hold the 'Dynohub' unit in the left hand with the terminal plate across the palm. Then fit a keeper ring over the armature and lightly tap the keeper with the palm of the right hand. The magnet will then slide off the armature on to the keeper.
 - f. At this stage it is wise to test the armature with a test meter. If there is no reading on the test meter there is a break in the



winding. If a test meter is not available, a battery and bulb may be connected as shown in the diagram, and if the bulb does not light a break in the armature winding is indicated. A second test is to disconnect the lead from one of the armature terminals and touch the outer edges of the armature with the bare lead. If the bulb lights, this indicates a short circuit.

2. Unscrew right-hand ball ring from the hub shell and withdraw the gear internals as described in the general instructions.
3. Remove the low gear pawls, pins and springs. The pawl pins are easily pushed out of the planet cage to release the pawls and springs.
4. Place the left-hand end of the axle in a vice and remove the right-hand locknut, washers if any, cone lock washer and cone, making a note of their arrangement so that they can be replaced in their original positions.
5. Lift off, in the following order, the clutch spring and cap, the driver, the right-hand ball ring and the gear ring.
6. Remove the gear ring pawls, pins and springs. The pawl pins are easily pushed out of the gear ring to release the pawls and springs.
7. Pull off the thrust washer and thrust ring.
8. Push out the axle key and remove the sliding clutch and sleeve.
9. Lift off the planet cage complete.
10. Take out the pinion pins and remove the pinions from the planet cage.
11. If necessary, because of a worn bearing surface or ratchets, the left-hand ball ring may be removed from the shell by means of special tool (DD10565).

TO DISMANTLE THE TCW HUB

Proceed as follows:

1. Place the sprocket end of the axle in a vice.
2. Remove the left-hand locknut and lock washer, the brake arm nut and lock washer, and finally lift off the brake arm and pull out the left-hand cone, which is not threaded.
3. Make a mark on the right-hand ball ring and the hub shell. The ball ring has a two-start thread, and if the marks are not in their original positions when the hub is re-assembled, the ring must be unscrewed and started again. If the hub is left with the ball ring in the wrong position it may be necessary to re-true the wheel.
4. Remove the wheel from the vice and loosen the right-hand ball ring by using the 'C' spanner (DD1145), or insert a square-ended punch in one of the notches and give it a sharp blow with a hammer. It has a right-hand thread.
5. Hold the wheel in a vertical position with the right hand gripping the ball ring and holding the left-hand end of the axle in the left hand. By turning the ball ring towards the body and the axle away from the body, the ball ring may be released without applying the brake.
6. When the ball ring is free, turn the wheel into the horizontal position and withdraw the internal.
7. Remove the brake plate, the brake band, the brake thrust plate, the planet cage pawl ring, the cam spring and the brake cam.
8. Place the left-hand end of the axle in a vice and remove the right-hand locknut, any other washers, the cone lock washer and the right-hand cone, making a careful note of their arrangement so that they may be replaced in their original positions.
9. Lift off, in the following order, the clutch spring and cap, the driver with sprocket attached, the right-hand ball ring, the gear ring pawl ring and the gear ring.
10. Remove the thrust washer and thrust ring and unscrew the indicator rod.
11. Push out the axle key and remove the sliding clutch and sleeve.
12. Lift off the planet cage complete and take out the pinion pins and remove the pinions.
NOTE.—The left-hand ball cup, which is a press-in fit in the hub shell, cannot be removed. To attempt to do so would undoubtedly damage both cup and shell.
13. The channel-section dust cap in the driver is pressed into position and may be prised out with a wide screwdriver to avoid damage. If a new ball retainer and balls have to be fitted it is best to fit a new dust cap in addition.
14. If it is necessary to remove the pawl pins from the pawl rings of the gear ring or planet cage, they should be drilled out because they are riveted in position.

TO DISMANTLE THE AM HUB

Proceed as follows:

1. Remove indicator from hub and remove the internal from the hub shell as described in the general instructions.
2. Place the left-hand end of the axle in a vice and remove the right-hand locknut, washers if any, the cone lock washer and the right-hand cone, making a note of their arrangement so that they can be replaced in their original positions.
3. Lift off, in the following order, the clutch spring and cap, the driver, the right-hand ball ring and the gear ring.
4. Remove the thrust washer and ring. Push out the axle key and remove the clutch sleeve and sliding clutch.
5. Push out the pinion pins and remove the pinions and planet cage. The pawl pins and springs can now be removed.
6. If necessary, because of a worn bearing surface or ratchets, the left-hand ball cup may be removed from hub shell. It has a left-hand thread and is removed by gripping the outside flat surfaces in a vice and turning the wheel in a clockwise direction.
7. The channel-section dust caps in the driver and the left-hand ball cup are pressed into position and can be prised out with a wide screwdriver. It is recommended that a new dust cap be fitted if a new ball retainer and balls have to be fitted.

TO DISMANTLE THE AC HUB

Proceed as follows:

1. Remove the internal from the hub shell as described in the general instructions.
2. Unscrew and withdraw the indicator rod and chain.
3. Place the left-hand end of the axle in a vice and remove the right-hand locknut, any other washers, the cone lock washer and the right-hand cone, making a note of their arrangement so that they can be replaced in their original positions.
4. Lift off, in the following order, the clutch spring and cap, the driver, the ball ring and gear ring.
5. Remove the pawls, pins and springs from the gear ring. The pins are not fixed in position and can easily be pushed out.
6. Remove the thrust ring and washer.
7. Push out the axle key and remove the clutch sleeve and sliding clutch.
8. Lift off the planet cage assembly and compound cage and pinions.
9. Remove pawls, pins and springs from the planet cage. These are not fixed and may easily be pushed out.
10. Place the right-hand end of the axle in a vice, straighten the edges

of the tab washer and remove the left-hand locknut, the tab washer, the locating plate and the secondary sun pinion.

11. If necessary, because of a worn bearing surface or ratchets, the left-hand ball cup may now be removed. It has a left-hand thread and is removed with a special tool (DD11182), which enters from the right-hand end, thus avoiding the need to remove the dust cap and ball cage from the cup. The teeth of both the tool and the cup must be in full engagement.
12. The channel dust caps in the driver and the left-hand ball cup are pressed into position and can be prised out with a wide screwdriver. It is recommended that a new dust cap be fitted if a new ball retainer and balls have to be fitted.

TO DISMANTLE THE ASC HUB

Proceed as follows:

1. Remove the internal from the hub shell as described in the general instructions.
2. Unscrew and withdraw the indicator rod and chain.
3. Place the left-hand end of the axle in a vice and remove the right-hand locknut, any other washers, the cone lock washer and the right-hand cone, making a note of their arrangement so that they can be replaced in their original positions.
4. Lift off, in the following order, the clutch spring and cap, the driver, the ball ring and the gear ring.
5. Remove the thrust ring and washer.
6. Push out the axle key and remove the clutch sleeve and sliding clutch.
7. Lift off, in the following order, the planet cage assembly, the sun pinion, the low gear spring, the low gear clutch and the intermediate planet cage and pinions.
8. Remove the axle from the vice and slip the compensator spring, complete with collar, out of the axle.
9. Place the right-hand end of the axle in a vice, straighten the edges of the tab washer and remove the left-hand locknut, the tab washer, the locating plate, the secondary sun pinion, the low gear key and the clutch sleeve.
10. The left-hand ball cup is pressed into position and *on no account should it be removed from the hub shell.*
11. The channel dust caps in the driver and the left-hand ball cup are pressed into position and can be prised out with a wide screwdriver. It is recommended that a new dust cap be fitted if a new ball retainer and balls have to be fitted.

TO DISMANTLE THE FW HUB

Proceed as follows:

1. Remove the indicator from the hub and remove the internal from the hub shell as described in the general instructions.
2. Place the left-hand end of the axle in a vice and remove the right-hand locknut, washers if any, the cone lock washer and the right-hand cone, making a note of their arrangement so that they can be replaced in their original positions.
3. Lift off, in the following order, the clutch spring and cap, the driver, the right-hand ball ring and the gear ring.
4. Remove the thrust washer and ring. Push out the axle key and remove the clutch sleeve and sliding clutch.
5. Push out the pinion pins and remove the pinions and planet cage.
6. The low gear pawl pins are riveted in position. If they have to be removed, file the riveted part flat and knock out the pins with a small punch. The pawls and springs can then be removed.
7. Remove axle from vice. The internal compensating spring, complete with collar, can now be taken out of the right-hand end of the axle.
8. Place the right-hand end of the axle in a vice, straighten the edges of the tab washer, and remove the nut and tab washer holding the internally toothed dog ring. Remove the dog ring.
9. Push the two sun pinions along the axle so that the larger one engages with the axle dogs and move the sleeve under the smaller one in the opposite direction in order to expose the second axle key. Push out this axle key.
10. Slide the two sun pinions, sleeve and spring off the axle.
11. If necessary, because of a worn bearing surface or ratchets, the left-hand ball cup may be removed. It has a left-hand thread and is removed by gripping the outside flat surfaces in a vice and spinning the wheel in a clockwise direction.
12. The channel-section dust caps in the driver and the left-hand ball cup are pressed into position and can be prised out with a wide screwdriver. It is recommended that a new dust cap be fitted if a new ball retainer and balls have to be fitted.

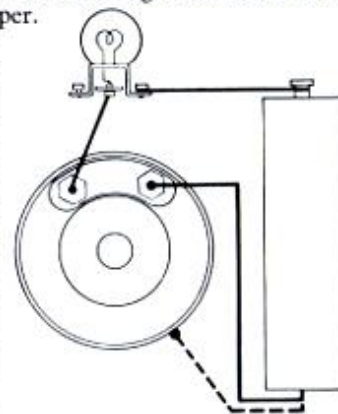
TO DISMANTLE THE FG HUB

Proceed as follows:

1. Before the internal can be removed from the shell as described in the general instructions the generator must be extracted as follows:
 - a. Remove the dynamo cone locknut, adjusting washers and spacing washers (if any), making a note of their arrangement so that they can be replaced in their original positions.
 - b. Remove the four magnet-fixing nuts and lock washers from the back of the hub drum, and then remove the four magnet-fixing screws. Also remove indicator and coupling from axle.
 - c. Hold the wheel, with the dynamo downwards, just above the workbench. A few light taps with a mallet on the end of the

spindle will cause the dynamo unit to drop out complete.

- d. The magnet spacing ring can now be lifted out of the hub drum.
- e. Unless it is essential to do so, the armature and magnet should never be separated. If they are to be separated, a keeper ring is absolutely necessary, because the magnet will lose its magnetism unless there is always iron inside it. Even a moment's separation will cause loss of magnetism, and a spanner placed across the magnet is useless as a substitute for a keeper ring. To separate the magnet and the armature, hold the dynamo unit in the left hand, with the terminal plate against the palm. Then fit a keeper over the armature and lightly tap the keeper with the palm of the right hand. The magnet will slide off the armature and on to the keeper.
- f. At this stage it is wise to test the armature with a test meter. If there is no reading on the test meter there is a break in the winding. If a test meter is not available, a battery and bulb may be connected as shown in the diagram, and if the bulb does not light, a break in the armature winding is indicated. A second test is to disconnect the lead from one of the armature terminals and touch the outer edges of the armature with the bare lead. If the bulb lights, this indicates a short circuit.



2. Remove the internal from the hub shell as described in the general instructions. The low-gear pawls take the form of plungers operated by coil springs and the holes for them are drilled in the webs of the planet cage. Although these holes are drilled right through, the hole is very slightly smaller at the end away from the ball cup. At this end is fitted a $\frac{3}{16}$ " ball bearing. The coil springs fit on these balls and the ends of the pawls fit into the opposite ends of the coil springs. These pawls, springs and ball bearings should now be removed.
3. Place the left-hand end of the axle in a vice and remove the right-hand locknut, washer if any, the cone lock washer and the right-hand cone, making a note of their arrangement so that they can be replaced in their original positions.
4. Lift off, in the following order, the clutch spring and cap, the driver, the right-hand ball ring and the gear ring.
5. Remove the thrust washer and ring. Push out the axle key and remove the clutch sleeve and sliding clutch.

6. Push out the pinion pins and remove the planet pinions from the planet cage.
7. Remove axle from vice. The internal compensating spring, complete with collar, can now be taken out of the right-hand end of the axle.
8. Place the right-hand end of the axle in a vice, straighten the edges of the tab washer, and remove the nut and tab washer holding the internally toothed dog ring. Remove the dog ring.
9. Push the two sun pinions along the axle so that the larger one engages with the axle dogs and move the sleeve under the smaller one in the opposite direction in order to expose the second axle key. Push out this axle key.
10. Slide the two sun pinions, sleeve and spring off the axle.
11. If necessary, because of a worn bearing surface or ratchets, the left-hand ball cup may be removed by unscrewing four screws (K425) whose hexagon heads are at the back of the drum on the hub shell. A special box spanner (DD11241) is supplied for this purpose.
12. The channel-section dust cap in the driver is pressed into position and can be prised out with a wide screwdriver. It is recommended that a new dust cap be fitted if a new ball retainer and balls have to be fitted.

TO DISMANTLE THE FM HUB

Proceed as follows:

1. Remove the internal from the hub shell as described in the general instructions.
2. Unscrew and withdraw the indicator rod and chain.
3. Place the left-hand end of the axle in a vice and remove the right-hand locknut, any other washers, the cone lock washer and the right-hand cone, making a note of their arrangement so that they can be replaced in their original positions.
4. Lift off, in the following order, the clutch spring and cap, the driver, the ball ring and the gear ring.
5. Remove the pawls, pins and springs from the gear ring. The pins are not fixed in position and can easily be pushed out.
6. Remove the thrust ring and washer.
7. Push out the axle key and remove the clutch sleeve and sliding clutch.
8. Lift off, in the following order, the planet cage assembly, the sun pinion, the low gear spring, the low gear clutch and the intermediate planet cage and pinions.
9. The low gear pawl pins are riveted in position in the latest models. If they must be removed file the riveted ends flat and knock out the pins with a small punch. The pawls and spring can then be removed. With earlier models the pins are not fixed in position and can easily be pushed out, but the pawl pins should be riveted up when the planet cage is re-assembled.
10. Remove the axle from the vice and slip the compensator spring, complete with collar, out of the axle.
11. Place the right-hand end of the axle in a vice, straighten the edges of the tab washer and remove the left-hand locknut, the tab washer,

the locating plate, the secondary sun pinion, the low gear key and the clutch sleeve.

12. If necessary, because of a worn bearing surface or ratchets, the left-hand ball cup may be removed with a special tool (DD11182), which enters from the right-hand end, thus avoiding the need to remove the dust cap and ball cage from the cup. The teeth of this tool and the cup must be in full engagement.
13. The channel dust caps in the driver and the left-hand ball cup are pressed into position and can be prised out with a wide screwdriver. It is recommended that a new dust cap be fitted if a new ball retainer and balls have to be fitted.

TO DISMANTLE THE FC HUB

Proceed as follows:

1. Remove the internal from the hub shell as described in the general instructions.
2. Unscrew and withdraw the indicator rod and chain.
3. Place the left-hand end of the axle in a vice and remove the right-hand locknut, and other washers, the cone washer and the right-hand cone, making a note of their arrangement so that they can be replaced in their original positions.
4. Lift off, in the following order, the clutch spring and cap, the driver, the ball ring and the gear ring.
5. Remove the pawls, pins and springs from the gear ring. The pins are not fixed in position and can easily be pushed out.
6. Remove the thrust ring and washer.
7. Push out the axle key and remove the clutch sleeve and sliding clutch.
8. Lift off, in the following order, the planet cage assembly, the sun pinion, the low gear spring, the low gear clutch and the intermediate planet cage and pinions.
9. Remove the pawls, pins and springs from the planet cage. These are not fixed and may easily be pushed out.
10. Remove the axle from the vice and slip the compensator spring, complete with collar, out of the axle.
11. Place the right-hand end of the axle in a vice, straighten the edges of the tab washer, and remove the left-hand locknut, the tab washer, the locating plate, the secondary sun pinion, the low gear key and the clutch sleeve.
12. If necessary, because of a worn bearing surface or ratchets, the left-hand ball cup may be removed with a special tool (DD11182), which enters from the right-hand end, thus avoiding the need to remove the dust cap and ball cage from the cup. The teeth of this tool and the cup must be in full engagement.
13. The channel dust caps in the driver and the left-hand ball cup are pressed into position and can be prised out with a wide screwdriver. It is recommended that a new dust cap be fitted if a new ball retainer and balls have to be fitted.

TO DISMANTLE THE BF, BFC, BR or BRC HUB

Proceed as follows:

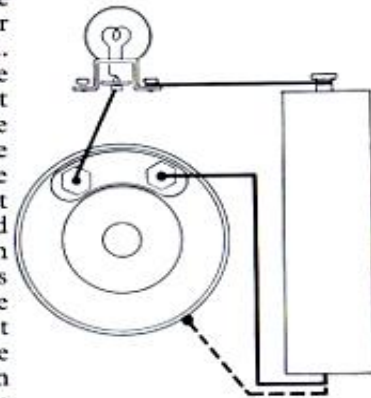
1. Remove the left-hand locknut, the notched cone adjusting washer, and any other washers on the brake side of the hub, making a note of their arrangement so that they can be replaced in their original positions.
2. Remove the brake arm complete with shoes.
3. Remove the inner spacing washer and the (left-hand) cone.
4. Lift out the ball cage.
5. The spindle may now be pulled out from the other side. If the right-hand cone bearing surface is in good condition and the spindle threads are sound, there is no need to remove the right-hand locknut and cone.
6. The channel-section dust cap in the right-hand hub cup is just a press-in fit and can be prised out with a wide screwdriver (to avoid damage). The ball cage may be lifted out for examination of the hub bearing surface. If a new ball retainer and balls have to be fitted, it is usually best to fit a new dust cap as well. Both hub cups are part of the hub shell, and if either is worn a complete new shell must be fitted.
7. If the shoes have to be removed from the brake arm, unscrew the nut which secures the cam lever and pull the cam lever from the squared end of the cam. Then remove the fulcrum nut and spring washer (or screw in the case of the BFC hub). The shoes, complete with the fulcrum and the cam can now be lifted off.

TO DISMANTLE THE GH6 HUB

Proceed as follows:

1. Remove the dynamo-side locknut and washers, making a note of their arrangement so that they can be replaced in their original positions.
2. Remove the four magnet-fixing nuts and lock washers from the back of the hub drum, and then remove the four magnet-fixing screws.
3. Hold the wheel, with the dynamo downwards, just above the work-bench. A few light taps with a mallet on the end of the spindle will cause the dynamo unit to drop out complete.
4. The magnet spacing ring can now be lifted out of the hub drum.
5. Unless it is essential to do so, the armature and magnet should never be separated. If they are to be separated, a keeper ring is absolutely necessary, because the magnet will lose some of its magnetism unless there is always iron inside it. Even a moment's separation will cause loss of magnetism, and a spanner placed across the magnet is useless as a substitute for a keeper ring. To separate the magnet and the armature, hold the dynamo unit in the left hand,

with the terminal plate against the palm. Then fit a keeper over the armature and lightly tap the keeper with the palm of the right hand. The magnet will slide off the armature and on to the keeper. At this stage it is wise to test the armature with a test meter. If there is no reading on the test meter there is a break in the winding. If a test meter is not available, a battery and bulb may be connected as shown in the diagram, and if the bulb does not light a break in the armature winding is indicated. A second test is to disconnect the lead from one of the armature terminals and touch the outer edges of the armature with the bare lead. If the bulb lights, this indicates a short circuit.



6. Remove the cone locknut on the left-hand side and unscrew the left-hand cone.
7. The channel-section dust cap is just a press-in fit and can be prised out with a wide screwdriver (to avoid damage). The ball cage may be lifted out for examination of the hub bearing surface. If a new ball-retainer and balls have to be fitted, it is usually best to fit a new dust cap as well. Both hub cups are part of the hub shell, and if either is worn a complete new shell must be fitted.
8. The spindle may now be pulled out from the dynamo side, together with the right-hand cone. If the bearing surface is in good condition and the spindle threads are sound, there is no need to remove the cone.
9. The ball cage may be lifted out for examination of the hub bearing surface.

SPECIAL NOTE.—GH6 hubs prior to 1952 had the adjusting cone on the dynamo side. This cone is extended to pass through the armature body and is flatted at the outer end to take (K428) notched adjuster washer, by means of which the cone may be turned.

Dismantling instructions from 1 to 5 remain exactly the same as for the current model.

For paragraph 6 read 'Unscrew the dynamo-side cone and lift the ball cage out of the hub shell. The spindle may now be pulled out from the other side, together with the fixed cone.'

All further comments apply equally to all GH6 hubs.

The **INSPECTION** OF STURMEY-ARCHER HUBS

Whenever a Sturmeley-Archer hub is dismantled the component parts should be inspected as follows:

Variable Gear Hubs

1. Slide the clutch up and down the driver prongs to see that the movement is free.
2. See that there are exactly 24 balls ($\frac{3}{16}$ " diameter) in the right-hand ball ring.
3. Examine the gear ring for cracks, chipping, or signs of wear on the internal splines and teeth.
4. Check the truth of the axle between centres.
5. Examine all ball races for pitting or signs of wear.
6. Examine the sliding clutch for signs of wear (rounding off at the points of engagement).
7. Examine all pinion teeth for signs of wear or chipping.
8. Examine the pinion pin ends or planet cage dogs for wear.
9. Examine the pawl ring dogs and their engagement with the gear ring (SW, SB, SG) for signs of wear.
10. Examine the pawls and pawl ratchets for signs of wear.
11. *FW, FG, FM, FC and ASC hubs only.*—See that compensator spring drops freely through the axle.
12. *FW, FG, FM, FC and ASC hubs only.*—See that the compensator spring is at least $1\frac{3}{16}$ " long (without the collar).
13. *FM, FC and ASC hubs only.*—Examine the low-gear dog splines for signs of wear.
14. *FW, FG, FM, FC and ASC hubs only.*—Examine the axle dogs for signs of wear (rounding off).
15. *FW, FG, FM, FC and ASC hubs only.*—Fix an (X8) collar on to the indicator rod and screw the rod and chain together, to make sure that the parts are mating correctly. This should be done inside the axle because the slender threaded portion is easily bent. The two parts should not be screwed together without the collar. After this test, it is important to refit the (X8) collar into the end of the compensator spring. It must be a tight fit.

Brake Hubs

16. See that the leading edge of each brake lining is tapered off for the first quarter of an inch. (If they are not, the ends may lift and cause a squeal.)
17. See that all rivets are below the lining surface and cannot touch the hub drum.
18. Examine the linings for signs of wear or oil.

'Dynohubs'

19. Test the armature for continuity of winding.

GENERAL RE-ASSEMBLING Instructions

FOR STURMEY-ARCHER HUBS

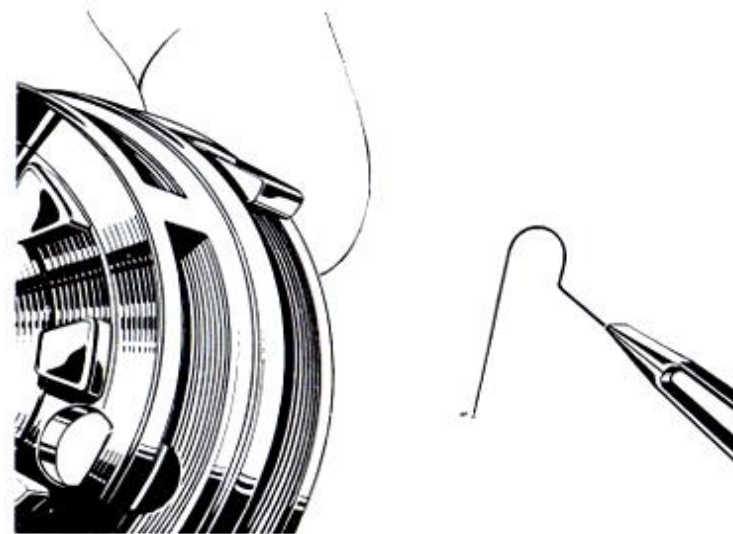
Broadly speaking, dismantled Sturmeley-Archer hubs are re-assembled by reversing the sequence of operations carried out when taking them to pieces. But it is more convenient to begin by first reconstructing certain minor combinations of components and then proceed to re-assemble the mechanism as a whole.

The methods of preparing some of these 'sub-assemblies' are less obvious than the processes by which they were taken apart, and as they apply equally to several hubs they are described here and not repeated in detail in the sub-sections devoted to the individual hubs.

Drivers and Sprockets. The screwed driver (K507) and the 12-splined driver (K657) are no longer available. Hubs in which they were used must be converted by fitting the (K462) 3-splined driver and sprocket as a complete unit (including spacing washers and circlip).

To replace pawls and springs in the planet cage of AW, AB, AG, AM, AC and FC Sturmeley-Archer variable-gear hubs hold the planet cage in the left-hand, with flanges (in which the pawls fit) away from the body. Place a pawl between the flanges, with the flat top surface pointing towards the right, and insert a pawl pin through the outside flange and half-way through the pawl. With tweezers or thin-nosed pliers* grip the bent leg of the pawl spring in the right hand and pass the spring along the side of the pawl until the loop of the spring is in line with the hole through the pawl and both legs of the spring are between the pawl and the planet cage. The pawl pin can now be pushed right in. It will enter the spring and keep it in position, and the bent leg of the spring will press against the pawl and so keep it projecting towards the right. If the job has been done correctly, the pawls will be pointing towards the right, with the flat surface uppermost, when the planet cage is held so that the dogs or pinion pins are facing the body.

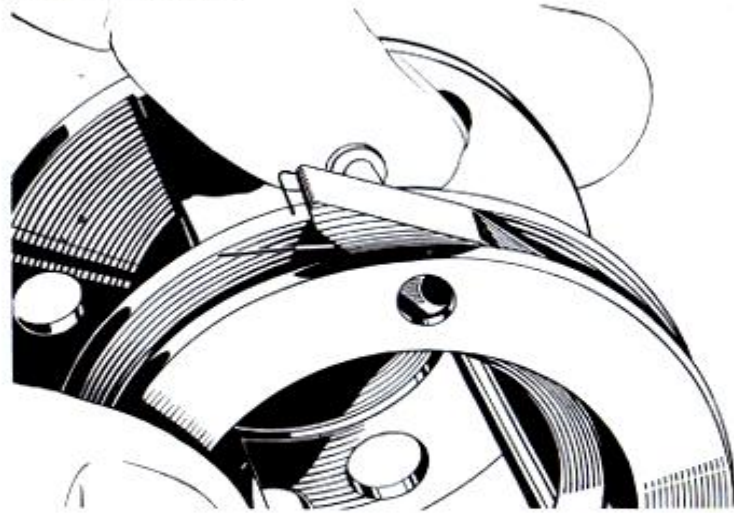
*If tweezers are not available, the spring can be pushed into position with a small rod, about $\frac{1}{8}$ " in diameter. (It is easy after a little practice.)



To replace pawls and springs in the planet cage of a Sturmeley-Archer FW or FM variable-gear hub, hold the planet cage in the left hand, with the flanges (in which the pawls fit) away from the body, or in the case of a TCW hold the planet cage pawl ring in the left hand, with the recess for the pawl pin heads towards the body. Place a pawl between the flanges, with the flat top surface pointing towards the right but with the hole in the pawl to the left of the holes in the flanges. Push a pawl pin through the hole in the inner flange and, with the thumb of the left hand over the pin head, hold it in contact with the side of the pawl. With the right hand take the foot of the pawl spring between thumb and forefinger and thread the straight leg under the pawl pin from the rear and pull it forward until the loop of the spring encircles the pawl pin. With a finger of the right hand, hold the foot of the spring under the nose of the pawl and, with a finger of the left hand, advance

the pawl until the hole in it is in line with the holes in the flanges, and the pawl pin can be pushed home. If the job has been done correctly when the planet cage is held so that the dogs are facing the body. The pawl pin must now be riveted over lightly and without distorting the pin head, which may cause serious damage if it projects inwards and fouls the teeth of the planet pinions. Support the pawl pin head on a piece of flat steel held in a vice (for the FW hub) or by means of a short steel rod (in the case of the FM hub).

File off any projections caused by the riveting in the case of TCW because if the face is not smooth there will be unnecessary friction when the hub is in use.



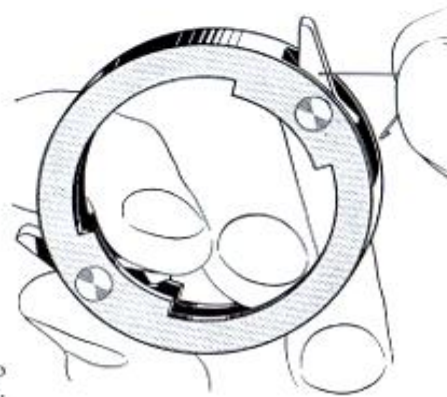
Fitting pawl and spring to planet cage pawl ring—TCW.



Fitting spring to gear ring pawl ring.



To replace pawls and springs in the gear ring of a Sturmey-Archer variable-gear hub AW, AB, AG, AM, AC, FW, FG, FM or FC, place the gear ring, with the teeth downwards, on a flat surface. Place a pawl spring along the side of a pawl so that the loop is over the pin hole and the foot is under the long nose of the pawl. While holding a pawl pin ready in the left hand, grip the nose of the pawl and the foot of the spring between the thumb and forefinger of the right hand and slide the pawl, tail first, between the flanges of the gear ring. When the hole in the pawl and the loop in the spring coincide with the holes in the flanges, push the pawl pin into position.



To replace pawls and springs in the gear ring of a Sturmey-Archer TCW variable-gear (tricoaster) hub, first fit a pawl and pawl pin into the pawl ring and rivet the pawl pin into position. File the pawl-pin head so that it does not project beyond the face of the pawl ring. Turn the pawl back as far as it will go, and insert the tail of a spring between the pawl ring and the pawl pin, at the same time fitting the bent end of the spring under the outer end of the pawl. Then turn back the pawl to its correct position.

Brake Shoe Assembly. The diagram alongside clearly illustrates the correct assembling of the brake shoes, but the following points should be specially noted:

It is important that brake shoes are re-assembled with the side of the brake cam with the largest flat on the inside—towards the axle. (See letter 'A' of diagram.)

To allow both brake shoes to be applied evenly the cam is slightly off-set and if not fitted correctly will allow one shoe only to operate with consequent loss of braking efficiency. It is also important to ensure that the flange which carries the brake springs fits next to the brake arm plate.

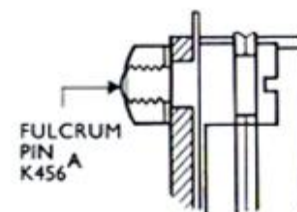
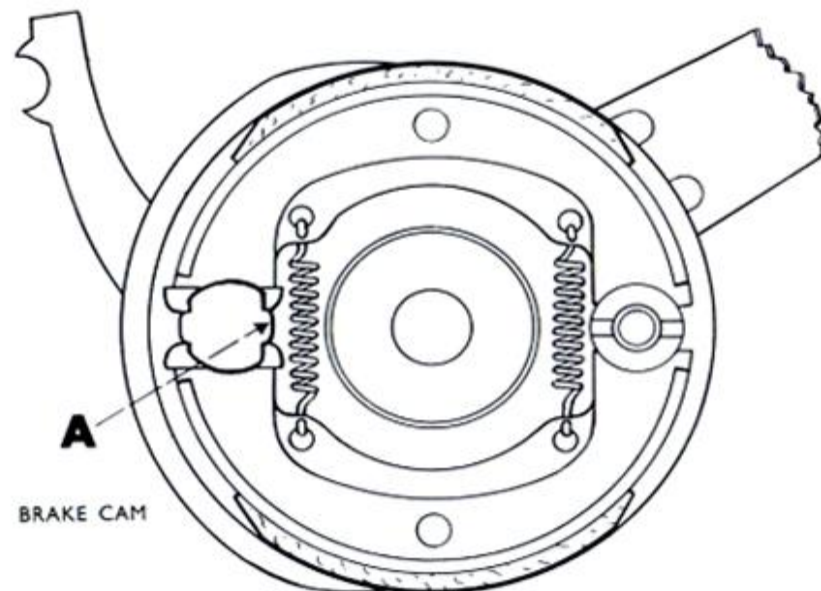
Brake shoe assemblies consist of the shoes with fulcrum and springs. As two different types of fulcrum are in use a symbol number for each assembly is provided to ensure that they are correctly supplied.

1. K458AZ. Brake shoe assembly with pin-type fulcrum (K456A).
For all brake hubs except BFC. (See Fig. 1.)
2. K458ZA. Brake shoe assembly with sleeve-type fulcrum (K456) threaded internally.
For BFC hubs only. (See Fig. 2.)

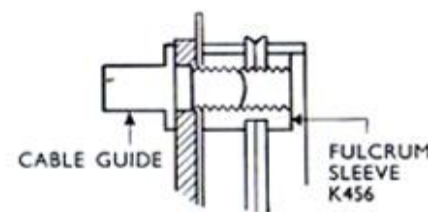
The appropriate symbol number must be quoted when ordering.

Steel brake shoes were re-designed in 1951, and only the code numbers of the latest patterns are used in this catalogue. The original parts to which they correspond are:

- K162Z. Brake shoe cam (now K452).
- K167. Fulcrum sleeve (now K456).
- K158Z. Brake shoes (now K458AZ) or (K458ZA).
- K159. Shoe end cap (now K459A).
- K160AZ. Brake arm (rear) (now K460AZ) or K457AZ.



(1) FOR AB/ABC, BR/BRC and BF
K458^{AZ} (SHOES)

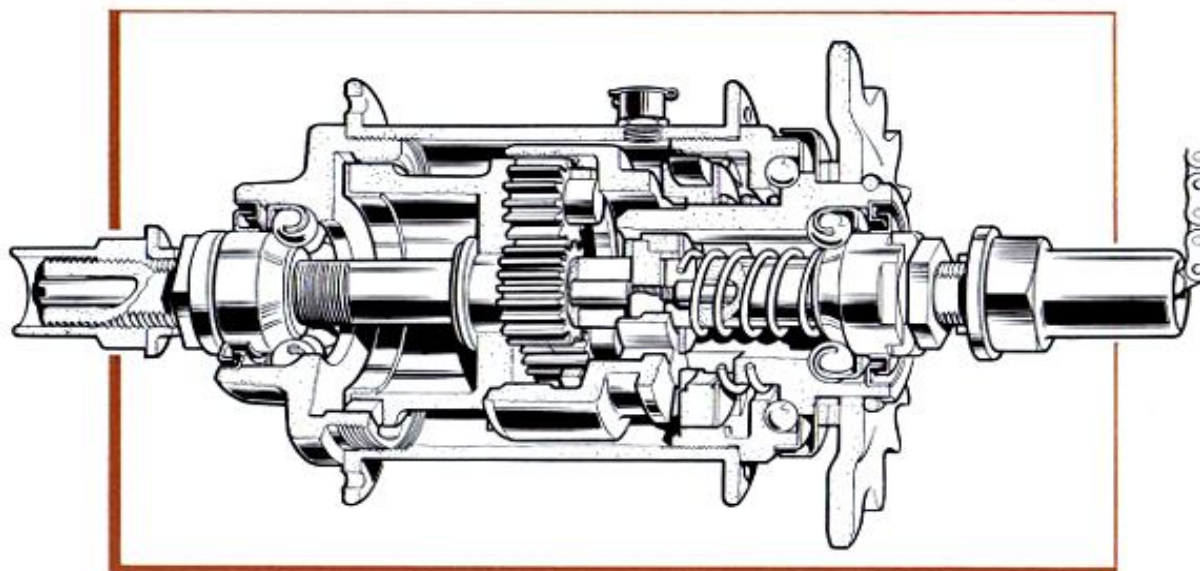


(2) FOR BFC ONLY
K458^{ZA} (SHOES)

INDIVIDUAL RE-ASSEMBLING Instructions

FOR STURMEY-ARCHER HUBS

8



TO RE-ASSEMBLE THE SW HUB

Proceed as follows:

1. If the left-hand ball cup has been removed from the hub shell, replace it by screwing anti-clockwise (it has a *left-hand thread*). Make sure that the position marks put on it and the hub flange before dismantling are in proper register.
2. Prepare the following preliminary sub-assemblies:
 - a. Fit the ball cage into the left-hand ball cup, with the ring of the ball retainer facing outwards and the recess in the dust cap also facing outwards. If a new ball-retainer is being fitted, the dust cap also should be new.
 - b. Fit the ball cage into the driver, with the ring of the ball-retainer facing outwards and the recess in the dust cap also facing outwards. If a new ball-retainer is being fitted, the dust cap should be new. If the sprocket has been removed see No. 22 below.
 - c. Fit the balls (only 24) and the inner dust cap into the right-hand ball ring, making sure that the balls can revolve freely with the dust cap in place.
 - d. Smear grease in the channels of the dust caps of the left-hand ball cup and the driver and in the recess of the right-hand ball ring.

- Screw a cone on to the right-hand end of the axle as far as the flats (to protect the threads) and then fix the axle, with the slotted end

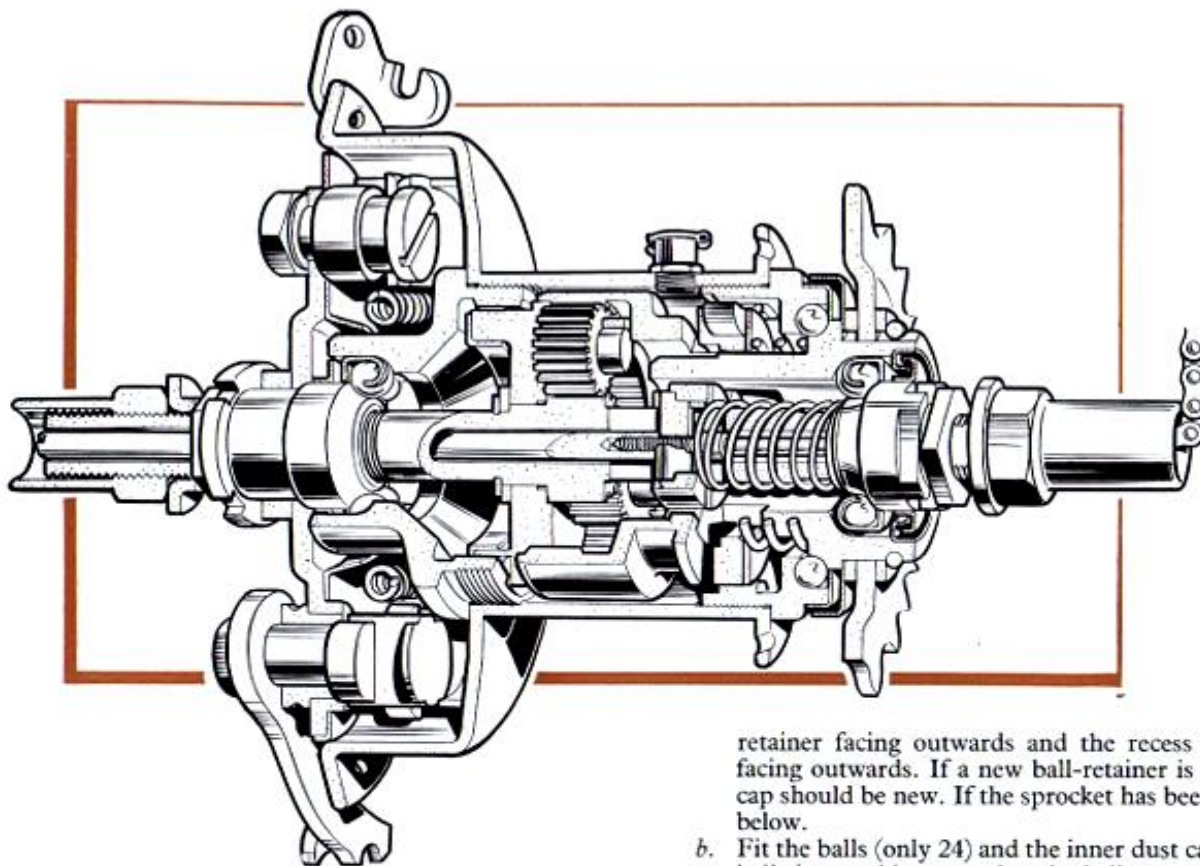


downwards, in a vice, and fit the planet cage, with the pins downwards. Fit the bearing plate, making sure that it engages the flat on the small shoulder on the axle, followed by a new conical fixing plate, also pointing downwards. Place a hollow punch (DD12403) over the axle, and with one or two sharp blows from a hammer flatten the plate into the axle groove to hold the planet cage in position. Make sure that the planet cage can revolve freely.

- Remove the axle from the vice, take the cone off the right-hand end and re-fix the axle, left-hand end downwards, in the vice. Fit the planet pinions and retaining ring.
- Fit the clutch sleeve, with the flange downwards, and the axle key, with the flats upwards.
- Fit the sliding clutch, with the recess downwards, so that it engages with the axle-key flats.
- Fit the thrust washer.
- Fit the gear ring and make sure that it can rotate freely.
- Fit the pawl ring, with the projections downwards.
- Smear the pawl ring pockets with light grease and fit the pawls and pawl-retaining washer.
- Fit the right-hand ball ring.
- Fit the large thrust spring over the prongs of the driver, making sure that the end of the spring comes to the centre of one of the prongs.
- Fit the driver and the spring.

- While holding the driver down (to compress the thrust spring), fit the clutch spring over the axle and screw on the right-hand cone far enough to hold the assembled mechanism in place.
- Screw up the right-hand cone *finger-tight*. Then slacken it back no more than half a turn. The assembled mechanism should be quite free to revolve on the axle. On no account must the cone be unscrewed more than half a turn, as that would throw the gear mechanism out of adjustment.
- Fit the cone lock-washer and packing washers (if any), and cone locknut. Fasten the locknut securely.
- Lubricate the assembled mechanism with about two teaspoonfuls of good quality thin oil.
- Smear the planet-cage pawl pockets with light grease and fit the pawls.
- Hold the cycle wheel in the left hand, with the open (right-hand) end of the hub shell facing downwards, and insert the assembled mechanism carefully from below, to prevent the pawls from falling out of position. Screw the right-hand ball ring finger-tight only.
- Make sure that the position marks put on the ball ring and the hub flange before dismantling will register properly, and then screw up tightly.
- Fit the left-hand cone, washers (if any), and locknut in the arrangement noted when dismantling, and adjust the hub bearing as described in 'The Fitting and Adjustment of Sturmey-Archer Hubs.'
- If the sprocket has been removed from the driver, smear grease in the inside of the dust cap and fit it over the driver, making sure that it is properly centred on the flange of the driver. Replace the sprocket and washers in the arrangement noted when dismantling, and add the circlip.
- Insert the indicator rod in the left-hand end of the axle, and the coupling and toggle-chain in the right-hand end of the axle, and screw them tightly together, *but do not over-tighten*.
- Replace the wheel in the cycle frame and adjust the gear as described in 'The Fitting and Adjustment of Sturmey-Archer Hubs.'

STURMEY
ARCHER



TO RE-ASSEMBLE THE SB HUB

Proceed as follows:

1. If the left-hand ball cup has been removed from the hub shell, use the special tool (DD12987) to replace it, and remember that it must be screwed anti-clockwise because it has a left-hand thread. The joint between the ball cup and the hub shell must be cemented with a good sealing compound to prevent oil from leaking through to the brake shoes. Either the slight recess in the shell or the face of the shoulder on the ball cup which makes contact with the shell should be well painted over with sealing compound before the ball cup is screwed home.
2. Prepare the following preliminary sub-assemblies:
 - a. Fit the ball cage into the driver, with the ring of the ball-

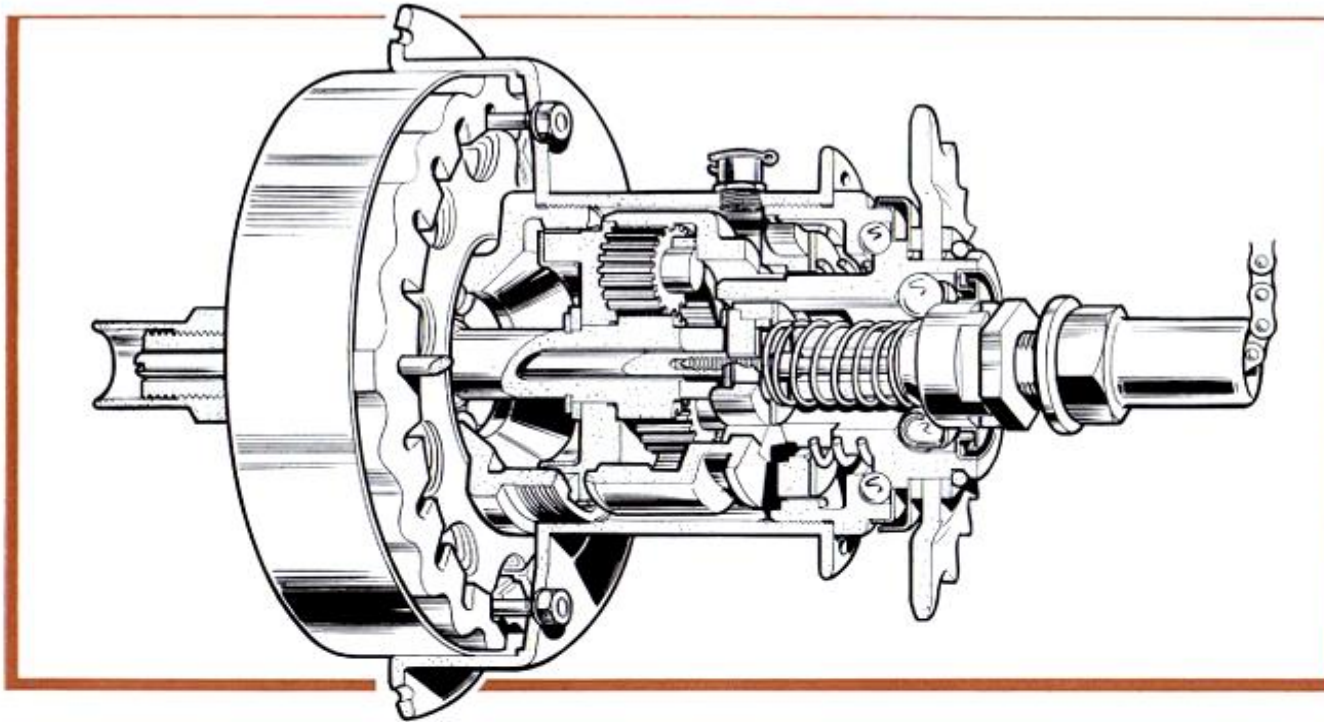
retainer facing outwards and the recess in the dust cap also facing outwards. If a new ball-retainer is being fitted, the dust cap should be new. If the sprocket has been removed see No. 24 below.

- b. Fit the balls (only 24) and the inner dust cap into the right-hand ball ring, making sure that the balls can revolve freely with the dust cap in place.
 - c. Smear grease in the channels of the dust cap, the driver, and in the recess of the right-hand ball ring.
3. Screw a cone on to the right-hand end of the axle as far as the flats (to protect the threads) and then fix the axle, with the slotted end downwards, in a vice, and fit the planet cage, with the pins downwards. Fit the bearing plate, making sure that it engages the flat on



- the small shoulder on the axle, followed by a new conical fixing plate, also pointing downwards. Place a hollow punch (DD12403) over the axle, and with one or two sharp blows from a hammer flatten the plate into the axle groove to hold the planet cage in position. Make sure that the planet cage can revolve freely.
4. Remove the axle from the vice, take the cone off the right-hand end and refix the axle, left-hand end downwards, in the vice. Fit the planet pinions and retaining ring.
 5. Fit the clutch sleeve, with the flange downwards, and the axle key, with the flats upwards.
 6. Fit the sliding clutch, with the recess downwards, so that it engages with the axle-key flats.
 7. Fit the thrust washer.
 8. Fit the gear ring and make sure that it can rotate freely.
 9. Fit the pawl ring, with the projections downwards.
 10. Smear the pawl ring pockets with light grease and fit the pawls and pawl-retaining washer.
 11. Fit the right-hand ball ring.
 12. Fit the large thrust spring over the prongs of the driver, making sure that the end of the spring comes to the centre of one of the prongs.
 13. Fit the driver and spring.
 14. While holding the driver down (to compress the thrust spring), fit the clutch spring over the axle and screw on the right-hand cone far enough to hold the assembled mechanism in place.
 15. Screw up the right-hand cone *finger-tight*. Then slacken it back no more than half a turn. The assembled mechanism should be quite free to revolve on the axle. On no account must the cone be unscrewed more than half a turn, as that would throw the gear mechanism out of adjustment.
 16. Fit the cone lockwasher and packing washers (if any), and cone locknut. Fasten the locknut securely.
 17. Lubricate the assembled mechanism with about two teaspoonfuls of good quality thin oil.
 18. Smear the planet-cage pawl pockets with light grease and fit the pawls.
 19. Hold the cycle wheel in the left hand, with the open (right-hand) end of the hub shell facing downwards, and insert the assembled mechanism carefully from below, to prevent the pawls from falling out of position. Screw the right-hand ball ring finger-tight only.
 20. Make sure that the position marks put on the ball ring and the hub flange before dismantling will register properly, and then screw up tightly.
 21. Drop a ball cage into left-hand ball cup (ring of cage outwards) and fit the left-hand cone and shim washer.
 22. Replace the brake anchor plate complete with shoes. (If the shoes have been removed, make sure when replacing them that the longer of the two short arms on the cam spindle is pointing towards the drum surface and the shorter one towards the hub axle; otherwise only one shoe will be brought into action when the brake is operated.) If the brake shoe assembly has been dismantled see general instructions.
 23. Fit the outer washers, the notched cone-adjusting washer, and the left-hand locknut in the arrangement noted when dismantling the hub. Adjust the hub bearing, as described in 'The Fitting and Adjustment of Sturmey-Archer Hubs.'
 24. If the sprocket has been removed from the driver, fit the dust cap over the driver, making sure that it is properly centred on the flange of the driver. Replace the sprocket and washers in the arrangement noted when dismantling, and add the circlip.
 25. Insert the indicator rod in the left-hand end of the axle, and the coupling and toggle-chain in the right-hand end of the axle, and screw them tightly together, *but do not over-tighten*.
 26. Replace the wheel in the cycle frame. The axle is flatted to prevent it from turning in the slots of the cycle frame—a very important point, especially with combined gear-and-brake hubs, and special lipped washers are supplied, to engage in the frame slots. See that the brake plate is not strained when being connected to the anchor clip, which must be fixed so that it engages easily, and make sure that the clip is tight on the frame. If the machine is being laid up, put one or two drops of oil between the brake plate and the cam lever, but not enough to penetrate into the brake drum.
 27. Adjust the gear as described in 'The Fitting and Adjustment of Sturmey-Archer Hubs.'

STURMEY
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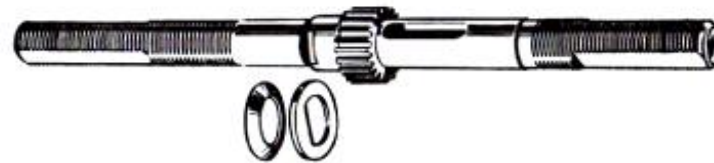


TO RE-ASSEMBLE THE SG HUB

Proceed as follows:

1. If the left-hand ball cup has been removed from the hub shell, replace it by screwing anti-clockwise (it has a *left-hand thread*), using tool DD12987. Make sure that the position marks put on it and the hub shell before dismantling are in proper register.
2. Prepare the following preliminary sub-assemblies:
 - a. Fit the ball cage into the driver, with the ring of the ball-retainer facing outwards and the recess in the dust cap also facing outwards. If a new ball-retainer is being fitted, the dust cap should be new. If the sprocket has been removed see No. 32 below.
 - b. Fit the balls (only 24) and the inner dust cap into the right-hand ball ring, making sure that the balls can revolve freely with the dust cap in place.
 - c. Smear grease in the channels of the dust cap of the driver and in the recess of the right-hand ball ring.

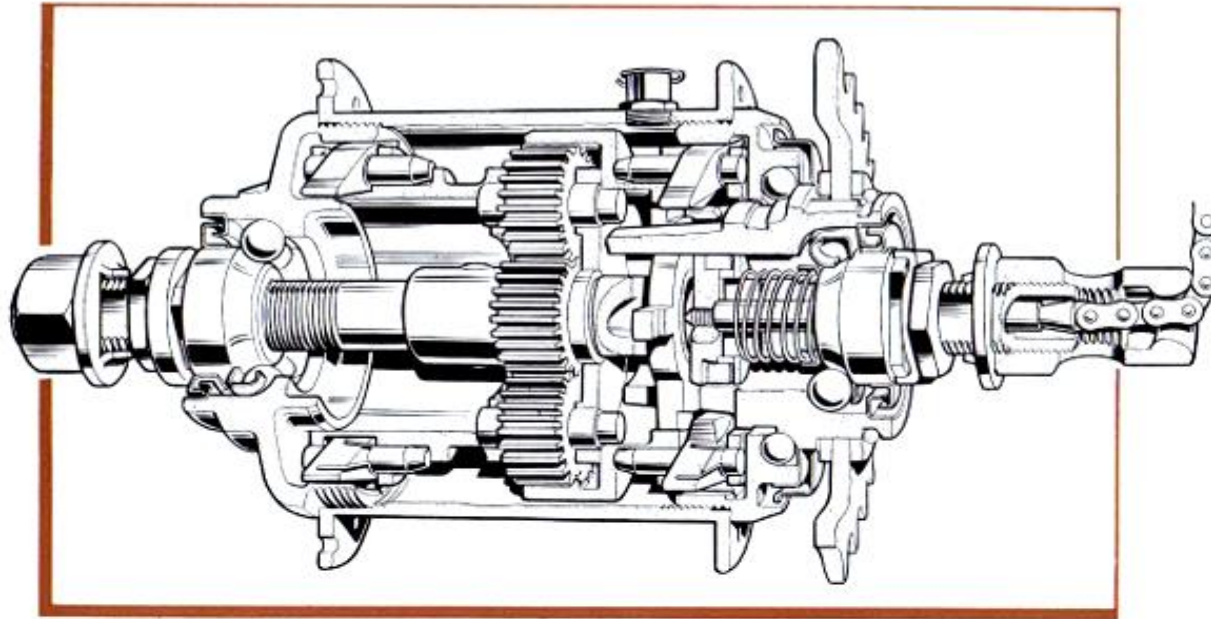
3. Screw a cone on to the right-hand end of the axle as far as the flats (to protect the threads) and then fix the axle, with the slotted end downwards, in a vice, and fit the planet cage, with the pins downwards. Fit the bearing plate, making sure that it engages the flat



on the small shoulder on the axle, followed by a new conical fixing plate, also pointing downwards. Place a hollow punch (DD12403) over the axle, and with one or two sharp blows from a hammer flatten the plate into the axle groove to hold the planet cage in position. Make sure that the planet cage can revolve freely.

4. Remove the axle from the vice, take the cone off the right-hand end and refix the axle, left-hand end downwards, in the vice. Fit the planet pinions and retaining ring.
5. Fit the clutch sleeve, with the flange downwards, and the axle key, with the flats upwards.
6. Fit the sliding clutch, with the recess downwards, so that it engages with the axle-key flats.
7. Fit the thrust washer.
8. Fit the gear ring and make sure that it can rotate freely.
9. Fit the pawl ring, with the projections downwards.
10. Smear the pawl ring pockets with light grease and fit the pawls and pawl-retaining washer.
11. Fit the right-hand ball ring.
12. Fit the large thrust spring over the prongs of the driver, making sure that the end of the spring comes to the centre of the prongs.
13. Fit the driver and the spring.
14. While holding the driver down (to compress the thrust spring), fit the clutch spring over the axle and screw on the right-hand cone far enough to hold the assembled mechanism in place.
15. Screw up the right-hand cone *finger-tight*. Then slacken it back no more than half a turn. The assembled mechanism should be quite free to revolve on the axle. On no account must the cone be unscrewed more than half a turn, as that would throw the gear mechanism out of adjustment.
16. Fit the cone lock washers and packing washers (if any), and cone locknut. Fasten the locknut securely.
17. Lubricate the assembled mechanism with about two teaspoonfuls of good quality thin oil.
18. Smear the planet-cage pawl pockets with light grease and fit the pawls.
19. Hold the cycle wheel in the left hand, with the open (right-hand) end of the hub shell facing downwards, and insert the assembled mechanism carefully from below, to prevent the pawls from falling out of position. Screw the right-hand ball ring finger-tight only.
20. Make sure that the position marks put on the ball ring and the hub flange before dismantling will register properly, and then screw up tightly.
21. Drop a ball cage into the left-hand ball cup (ring of cage outwards), then screw up the left-hand cone.
22. If the magnet and armature have been separated, take the magnet and keeper ring in the left hand and, with the right hand, lay the armature alongside it.
23. While holding the magnet with the chamfer facing outwards, push the armature and the keeper through, so that the magnet slides from the keeper on to the armature.
24. Fit the card disc (carrying patent numbers) inside the cover plate, with its notches opposite the magnet notches.
25. Fit the cover plate over the magnet, making sure that the four holes in the cover plate are in line with the notches in the card and the magnet.
26. Fit the four spacing pieces into the hub shell.
27. Fit the shim washer on the cone.
28. Push the complete dynamo unit into the hub shell, making sure that the holes in the cover plate are in line with those in the hub shell.
29. Fit the magnet fixing screws, washers, and nuts.
30. Fit the spacing washers, adjusting washers and dynamo cone locknut in the arrangement noted when dismantling.
31. Adjust the hub bearing as described in 'The Fitting and Adjustment of Sturmey-Archer Hubs.' (A correctly adjusted wheel must have a slight trace of play at the rim. The pull of the magnet disguises the wheel adjustment, and if this point is not watched the ball races may be damaged through over-tightening.)
32. If the sprocket has been removed from the driver, smear light grease in the inside of the dust cap and fit over the driver, making sure it is properly centred on the flange of the driver. Replace the sprocket and washers in the arrangement noted when dismantling, and add the circlip.
33. Insert the indicator rod in the left-hand end of the axle, and the coupling and toggle-chain in the right-hand end of the axle, and screw them tightly together, but do not over-tighten.
34. Replace the wheel in the cycle frame and adjust the gear as described in 'The Fitting and Adjustment of Sturmey-Archer Hubs.'

STURMEY
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TO RE-ASSEMBLE THE AW HUB

Proceed as follows:

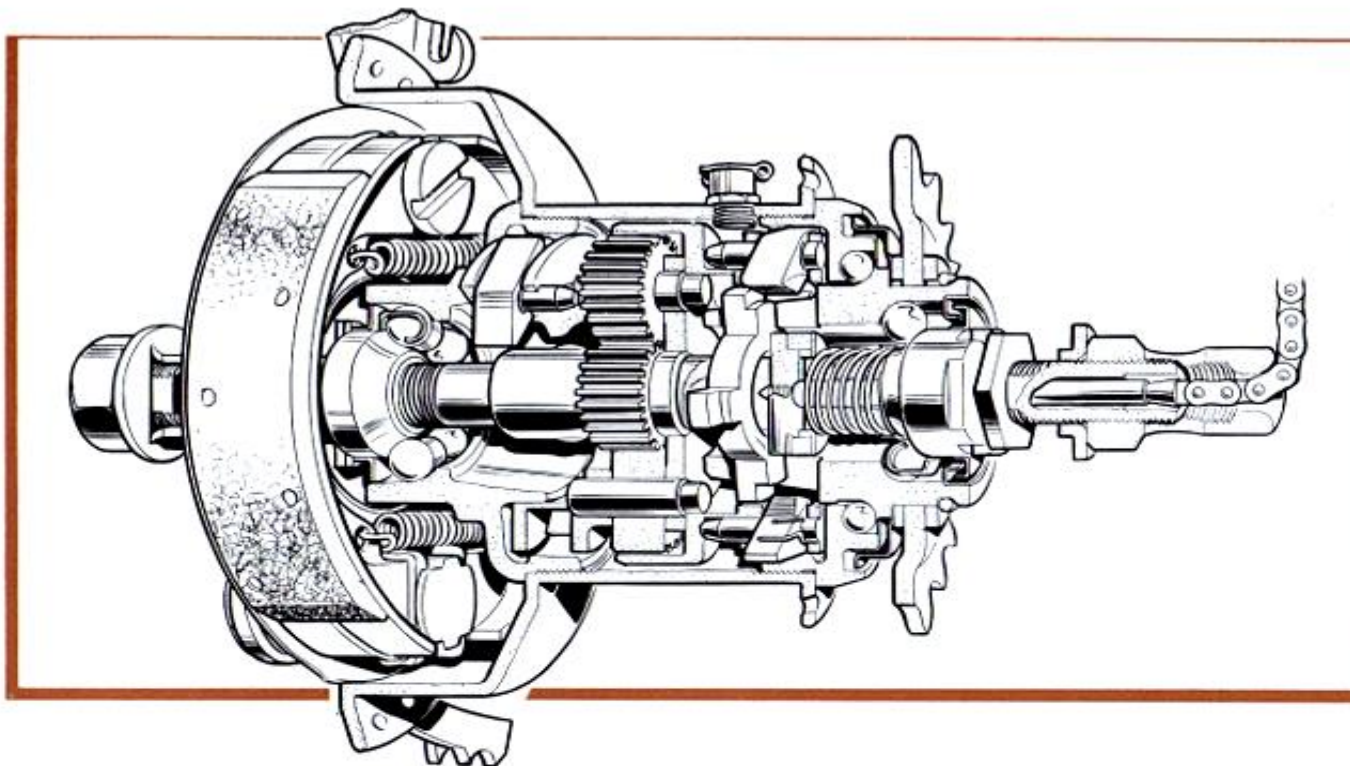
1. If the left-hand ball cup has been removed from the hub shell, replace it by screwing anti-clockwise (it has a *left-hand thread*).
2. Prepare the following preliminary sub-assemblies:
 - a. Fit the ball cage into the left-hand ball cup, with the ring of the ball-retainer facing outwards and the recess in the dust cap also facing outwards. If a new ball-retainer is being fitted, the dust cap also should be new.
 - b. Fit the ball cage into the driver, with the ring of the ball-retainer facing outwards and the recess in the dust cap also facing outwards. If a new ball-retainer is being fitted, the dust cap also should be new. If the sprocket has been removed, see No. 17 below.
 - c. Fit the balls (only 24) and the inner dust cap to the right-hand ball ring, making sure that the balls can revolve freely with the dust cap in place.
 - d. Fit the pawls, pins, and springs into the gear ring as described in the general instructions to 'The Re-assembling of Sturmey-Archer Hubs.' (The planet-cage pawls, pins and springs are not fitted at this stage.)
 - e. Smear grease in the channels of the dust caps of the left-hand ball cup and the driver and in the recess of the right-hand ball ring. *Do not use grease anywhere else.*
3. Hold the left-hand end of the axle in a vice, so that the slot for the axle key is above the sun pinion, and fit the planet cage.
4. Add the planet pinions and pins. (The small ends of the pins protrude.)
5. Fit the sleeve (flange first), the sliding clutch with recess on the flange of the sleeve, and the axle key (with the flat of the key facing upwards), and screw in the indicator rod to hold them in that position.
6. Fit the thrust ring and washer, making sure that the flatted ends of the key engage properly in the slots of the thrust ring.
7. Fit the previously prepared gear-ring sub-assembly.
8. Fit the previously prepared right-hand ball-ring sub-assembly.
9. Fit the previously prepared driver sub-assembly.
10. Drop the clutch spring over the axle.

5. Fit the sleeve (flange first), the sliding clutch with the recess over the flange of the sleeve, and the axle key (with the flat of the key facing upwards), and screw in the indicator rod to hold them in that position.
6. Fit the thrust ring and washer, making sure that the flatted ends of the key engage properly in the slots of the thrust ring.
7. Fit the previously prepared gear-ring sub-assembly.
8. Fit the previously prepared right-hand ball-ring sub-assembly.
9. Fit the previously prepared driver sub-assembly.
10. Drop the clutch spring over the axle.
11. Fit the cap and screw up the right-hand cone *finger-tight*. Then slacken it back half a turn and lock it in that position with the special washer and locknut. On no account must the cone be unscrewed more than half a turn, as that would throw the gear mechanism out of adjustment.
12. Invert the assembly in the vice and fit the planet-cage pawls as described in the general instructions to 'The Re-assembly of Sturmey-Archer Hubs.'
13. Remove the assembled mechanism from the vice and, while holding it with the planet cage uppermost, pour about two teaspoonfuls of a good-quality thin oil into the cage.
14. Hold the cycle wheel in the left hand, with the open (right-hand) end of the hub shell facing downwards, and insert the assembled mechanism from below, screwing up the right-hand ball ring finger-tight only.
15. Make sure that the position marks made on the ball ring and the hub flange before dismantling will register properly, and then screw up tightly.
16. Fit the left-hand cone and spacing washer.
17. Replace the brake anchor plate complete with shoes. (If the shoes have been removed, make sure when replacing them that the longer of the two short arms on the cam spindle is pointing towards the drum surface and the shorter one towards the hub axle; otherwise only one shoe will be brought into action when the brake is operated.) If the brake shoe assembly has been dismantled, see general instructions.
18. Fit the outer washers, the notched cone-adjusting washer, and the left-hand locknut in the arrangement noted when dismantling the hub. Adjust the hub bearing as described in 'The Fitting Adjustment of Sturmey-Archer Hubs.'
19. If the sprocket has been removed from the driver, fit the outer dust cap over the driver before replacing the sprocket, and see that the dust cap is properly centred on the flange of the driver. Replace the sprocket and spacing washers in the arrangement noted when dismantling, and add the circlip.
20. Replace the wheel in the cycle frame and adjust the gear as described in 'The Fitting and Adjustment of Sturmey-Archer Hubs.'

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11. Fit the cap and screw up the right-hand cone *finger-tight*. Then slacken it back half a turn and lock it in that position with the special washer and locknut. On no account must the cone be unscrewed more than half a turn, as that would throw the gear mechanism out of adjustment.
12. Invert the assembly in the vice and fit the planet-cage pawls as described in the general instructions to 'The Re-assembling of Sturmey-Archer Hubs.'
13. Remove the assembled mechanism from the vice and, while holding it with the planet cage uppermost, pour about two teaspoonfuls of a good quality thin oil into the cage.
14. Hold the cycle wheel in the left hand, with the open (right-hand) end of the hub shell facing downwards, and insert the assembled mechanism from below, screwing up the right-hand ball ring finger-tight only.
15. Make sure that the position marks made on the ball ring and the hub flange before dismantling will register properly, and then screw up tightly.
16. Fit the left-hand cone, washers (if any), and locknut in the arrangement noted when dismantling, and adjust the hub bearings as described in 'The Fitting and Adjustment of Sturmey-Archer Hubs.'
17. If the sprocket has been removed from the driver, fit the outer dust cap over the driver before replacing the sprocket, and see that the dust cap is properly centred on the flange of the driver. Replace the sprocket and spacing washers in the arrangement noted when dismantling, and add the circlip.
18. Replace the wheel in the cycle frame and adjust the gear as described in 'The Fitting and Adjustment of Sturmey-Archer Hubs.'





AB

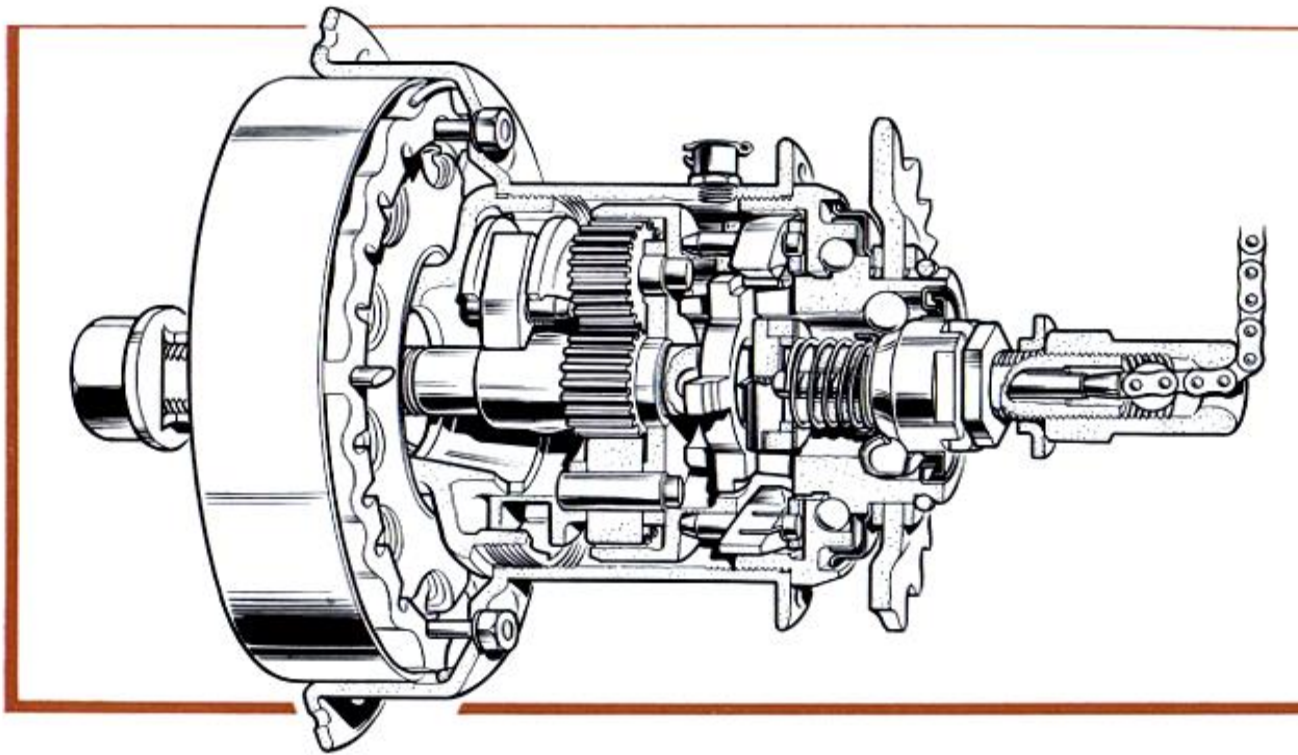
TO RE-ASSEMBLE THE AB HUB

Proceed as follows:

1. If the left-hand ball cup has been removed from the hub shell, use the special tool (box spanner DD911) to replace it, and remember that it must be screwed anti-clockwise because it has a *left-hand thread*. The joint between the ball cup and the hub shell must be cemented with a good sealing compound to prevent oil from leaking through to the brake shoes. Either the slight recess in the shell or the face of the shoulder on the ball cup which makes contact with the shell should be well painted over with sealing compound before the ball cup is screwed home.
2. Prepare the following preliminary sub-assemblies:
 - a. Fit the ball cage into the driver, with the ring of the ball-retainer facing outwards and the recess in the dust cap also facing outwards. If a new ball-retainer is being fitted, the dust cap also should be new. If the sprocket has been removed, see No. 19 below.
 - b. Fit the balls (only 24) and the inner dust cap to the right-hand ball ring, making sure that the balls can revolve freely with the dust cap in place.
 - c. Fit the pawls, pins and springs into the gear ring as described in the general instructions to 'The Re-assembling of Sturmev-Archer Hubs.' (The planet-cage pawls, pins and springs are not fitted at this stage.)
 - d. Smear grease in the channels of the dust caps of the driver and in the recess of the right-hand ball ring. *Do not use grease anywhere else.*
3. Hold the left-hand end of the axle in a vice, so that the slot for the axle key is above the sun pinion, and fit the planet cage.
4. Add the planet pinions and pins. (The small ends of the pins protrude.)

5. Fit the sleeve (flange first), the sliding clutch with the recess over the flange of the sleeve, and the axle key (with the flat of the key facing upwards), and screw in the indicator rod to hold them in that position.
6. Fit the thrust ring and washer, making sure that the flatted ends of the key engage properly in the slots of the thrust ring.
7. Fit the previously prepared gear-ring sub-assembly.
8. Fit the previously prepared right-hand ball-ring sub-assembly.
9. Fit the previously prepared driver sub-assembly.
10. Drop the clutch spring over the axle.
11. Fit the cap and screw up the right-hand cone *finger-tight*. Then slacken it back half a turn and lock it in that position with the special washer and locknut. On no account must the cone be unscrewed more than half a turn, as that would throw the gear mechanism out of adjustment.
12. Invert the assembly in the vice and fit the planet-cage pawls as described in the general instructions to 'The Re-assembly of Sturmey-Archer Hubs.'
13. Remove the assembled mechanism from the vice and, while holding it with the planet cage uppermost, pour about two teaspoonfuls of a good-quality thin oil into the cage.
14. Hold the cycle wheel in the left hand, with the open (right-hand) end of the hub shell facing downwards, and insert the assembled mechanism from below, screwing up the right-hand ball ring finger-tight only.
15. Make sure that the position marks made on the ball ring and the hub flange before dismantling will register properly, and then screw up tightly.
16. Fit the left-hand cone and spacing washer.
17. Replace the brake anchor plate complete with shoes. (If the shoes have been removed, make sure when replacing them that the longer of the two short arms on the cam spindle is pointing towards the drum surface and the shorter one towards the hub axle; otherwise only one shoe will be brought into action when the brake is operated.) If the brake shoe assembly has been dismantled, see general instructions.
18. Fit the outer washers, the notched cone-adjusting washer, and the left-hand locknut in the arrangement noted when dismantling the hub. Adjust the hub bearing as described in 'The Fitting Adjustment of Sturmey-Archer Hubs.'
19. If the sprocket has been removed from the driver, fit the outer dust cap over the driver before replacing the sprocket, and see that the dust cap is properly centred on the flange of the driver. Replace the sprocket and spacing washers in the arrangement noted when dismantling, and add the circlip.
20. Replace the wheel in the cycle frame and adjust the gear as described in 'The Fitting and Adjustment of Sturmey-Archer Hubs.'





AG

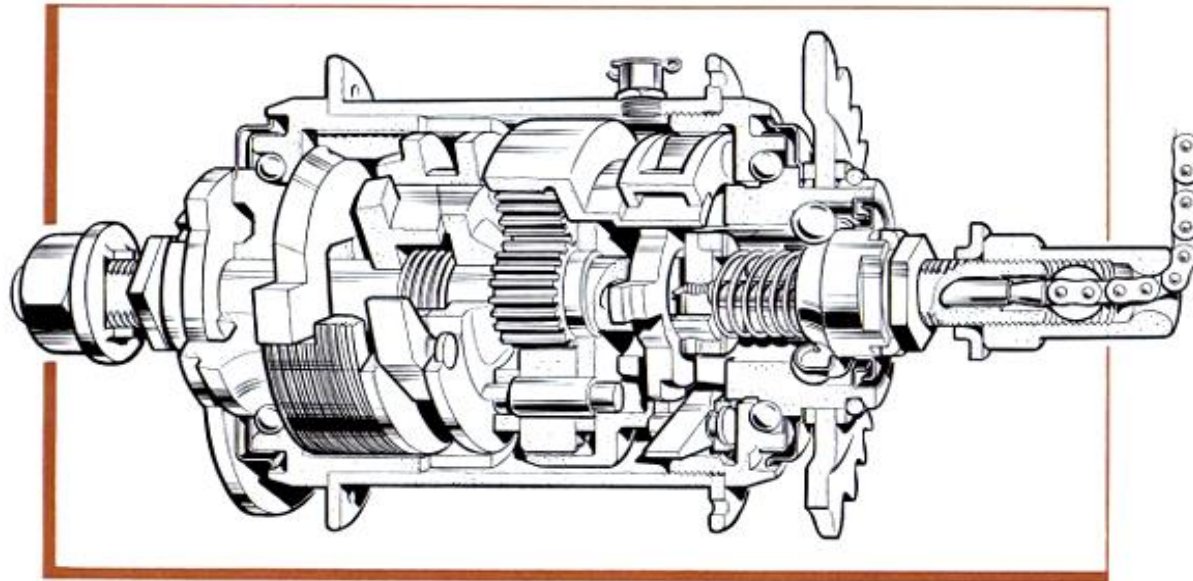
TO RE-ASSEMBLE THE AG HUB

Proceed as follows:

1. If the left-hand ball cup has been removed from the hub shell, replace it by screwing anti-clockwise (it has a *left-hand thread*).
2. Prepare the following preliminary sub-assemblies:
 - a. Fit the ball cage into the driver, with the ring of the ball-retainer facing outwards and the recess in the dust cap also facing outwards. If a new ball-retainer is being fitted, the dust cap also should be new. If the sprocket has been removed, see No. 23 below.
 - b. Fit the balls (only 24) and the inner dust cap to the right-hand ball ring, making sure that the balls can revolve freely with the dust cap in place.
 - c. Fit the pawls, pins and springs into the gear ring as described in the general instructions to 'The Re-assembling of Sturmey-Archer Hubs.' (The planet-cage pawls, pins and springs are not fitted at this stage.)
 - d. Smear grease in the channels of the dust cap of the driver and in the recess of the right-hand ball ring. *Do not use grease anywhere else.*
3. Hold the left-hand end of the axle in a vice, so that the slot for the axle key is above the sun pinion, and fit the planet cage.
4. Add the planet pinions and pins. (The small ends of the pins protrude.)
5. Fit the sleeve (flange first), the sliding clutch with the recess over the flange of the sleeve and the axle key (with the flat of the key facing upwards), and screw in the indicator rod to hold them in that position.
6. Fit the thrust ring and washer, making sure that the flatted ends of the key engage properly in the slots of the thrust ring.
7. Fit the previously prepared gear ring sub-assembly.

8. Fit the previously prepared right-hand ball-ring sub-assembly.
9. Fit the previously prepared driver sub-assembly.
10. Drop the clutch spring over the axle.
11. Fit the cap and screw up the right-hand cone *finger-tight*. Then slacken it back half a turn and lock it in that position with the special washer and locknut. On no account must the cone be unscrewed more than half a turn, as that would throw the gear mechanism out of adjustment.
12. Invert the assembly in the vice and pour about two teaspoonfuls of good quality thin oil into the planet cage, then fit the planet cage pawls as described in the general instructions to 'The Re-assembling of Sturmey-Archer Hubs'.
13. Screw up the left-hand cone.
14. If the magnet and armature have been separated, take the magnet and keeper ring in the left hand and, with the right hand, lay the armature alongside it.
15. While holding the magnet with the chamfer facing outwards, push the armature and the keeper through so that the magnet slides from the keeper on to the armature.
16. Fit the card disc (carrying patent numbers) inside the cover plate, with its notches opposite the magnet notches.
17. Fit the cover plate over the magnet, chamfer inwards, making sure that the four holes in the cover plate are in line with the notches in the card and the magnet.
18. Fit the metal spacing ring into the hub shell.
19. Fit the shim washer.
20. Push the complete dynamo unit into the hub shell, making sure that the holes in the cover plate are in line with those in the hub shell.
21. Fit the magnet fixing screws, washers and nuts.
22. Fit the spacing washers, adjusting washers and dynamo cone locknut in arrangement noted when dismantling. Check wheel adjustment.
23. If the sprocket has been removed from the driver, fit the outer dust cap over the driver before replacing the sprocket, and see that the dust cap is properly centred on the flange of the driver. Replace the sprocket and spacing washers in the arrangement noted when dismantling, and add the circlip.
24. Replace the wheel in the cycle frame and adjust the gear as described in 'The Fitting and Adjustment of Sturmey-Archer Hubs'.

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TCW

TO RE-ASSEMBLE THE TCW HUB

Proceed as follows:

1. Prepare the following preliminary sub-assemblies:

- a. Fit the ball cage into the driver, with the ring of the ball retainer facing outwards and the recess in the dust cap also facing outwards. If a new ball-retainer is being fitted, the dust cap also should be new. If the sprocket has been removed, see No. 21 below.
- b. Fit the balls (only 24) and the retainer cap into the left-hand ball cap, making sure that they can revolve freely with the dust cap in place.
- c. Fit the balls (only 24) and the inner dust cap to the right-hand ball ring, making sure that they can revolve freely with the dust cap in place.
- d. Fit the pawls, pins and springs into the gear ring pawl ring and rivet the pins as described in the general instructions to 'The Re-assembling of Sturmey-Archer Hubs.'
- e. Fit the pawls, pins and springs into the planet cage pawl ring and rivet the pins as described in the general instructions to 'The Re-assembling of Sturmey-Archer Hubs.'
- f. Smear grease in the channel of the driver dust cap, in the recess

of the right-hand ball ring, and in the recess of the left-hand ball cup.

2. Hold the left-hand end of the axle in a vice, so that the slot for the axle key is above the sun pinion, and fit the planet cage.
3. Add the planet pinions and pins, making sure that the flattened ends of the pins are facing downwards.
4. Fit the sleeve (flange first), the sliding clutch with the recess over the flange of the sleeve and the axle key (with the flat of the key facing upwards), and screw in the indicator rod to hold them in the correct position.
5. Fit the thrust ring and washer, making sure that the flattened ends of the key engage properly in the slots of the thrust ring.
6. Fit the gear ring and the previously prepared gear-ring pawl ring sub-assembly, making sure that the heads of the pawl pins are facing upwards. NOTE.—A K511A gear ring must *never* be substituted for the correct combination of K484 gear ring and K485 gear-ring pawl ring.
7. Fit the previously prepared right-hand ball-ring sub-assembly.
8. Fit the previously prepared driver sub-assembly.
9. Drop the clutch spring over the axle.
10. Fit the cap and screw up the right-hand cone *finger-tight*. Then

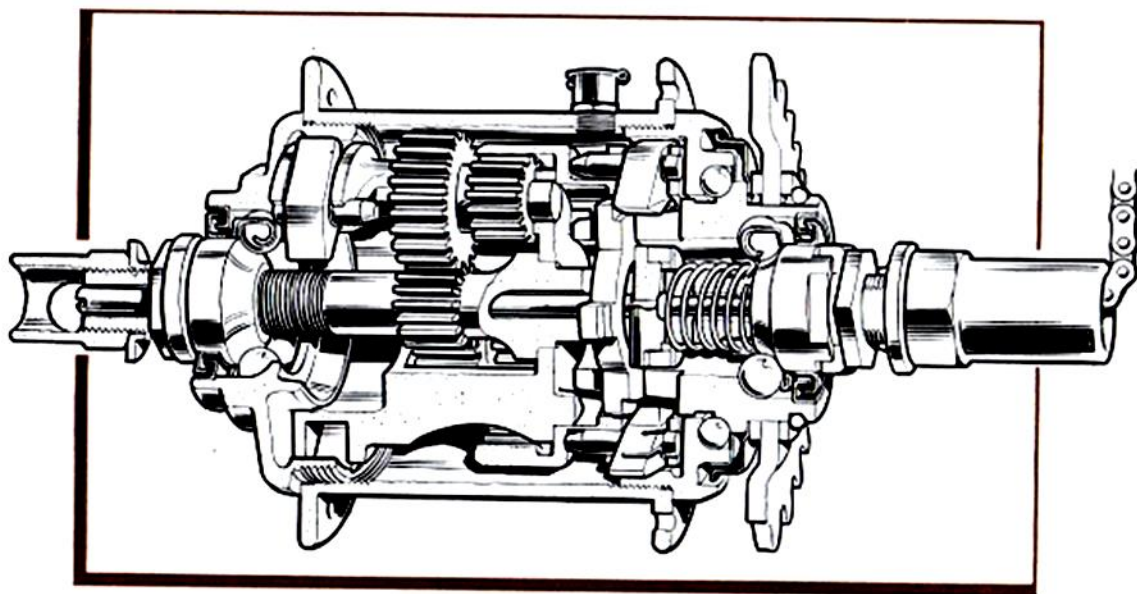
slacken it back half a turn and lock it in that position with the special washer and locknut. On no account must the cone be unscrewed more than half a turn, as that would throw the gear mechanism out of adjustment.

11. Remove the assembled mechanism from the vice and replace it the other way up. Pour about two teaspoonfuls of good quality thin oil into the planet cage.
12. Fit the brake cam. (This part may be smeared with a light grease.)
13. Fit the previously prepared planet cage pawl-ring sub-assembly (over the flats on the pinion pins).
14. Fit the cam spring and the brake thrust plate. The cam spring must come between the brake cam and the brake thrust plate. It is important not to fit it in any other position by mistake.
15. Fit the brake band and the brake plate. (These may be smeared with a light grease.)
16. Remove the assembled mechanism from the vice.
17. Hold the cycle wheel in the left hand, with the open (right-hand)

end facing downwards, and insert the assembled mechanism from below, screwing the right-hand ball ring finger-tight only.

18. Make sure that the marks put on the ball ring and the hub flange before dismantling will register properly, and then screw up tight.
19. Fit the left-hand cone, making sure that the square on it engages with the square in the brake plate.
20. Fit the outer dust cap, the brake arm, the lock washer, the brake-arm nut, the lock washer and locknut. Then adjust the hub bearing (as described in 'The Fitting and Adjustment of Sturmey-Archer Hubs'), so that just the slightest amount of play can be felt at the wheel rim.
21. If the sprocket has been removed from the driver, fit the outer dust cap over the driver before replacing the sprocket, and see that the dust cap is properly centred on the flange of the driver. Replace the sprocket and spacing washers in the arrangement noted when dismantling, and add the circlip.
22. Replace the wheel in the cycle frame and adjust the gear as described in 'The Fitting and Adjustment of Sturmey-Archer Hubs'.





TO RE-ASSEMBLE THE AM HUB

Proceed as follows:

1. If the left-hand ball cup has been removed from the hub shell, replace it by screwing anti-clockwise because it has a *left-hand thread*.
2. Prepare the following preliminary sub-assemblies:
 - a. Fit the ball cage into the left-hand ball cup, with the ring of the ball-retainer facing outwards and the recess in the dust cap also facing outwards. If a new ball-retainer is being fitted, the dust cap also should be new.
 - b. Fit the ball cage into the driver, with the ring of the ball-retainer facing outwards and the recess in the dust cap also facing outwards. If a new ball-retainer is being fitted, the dust cap also should be new. If the sprocket has been removed, see No. 15 below.
 - c. Fit the balls (only 24) and the inner dust cap to the right-hand ball ring, making sure that the balls can revolve freely with the dust cap in place.
 - d. Fit the pawls, pins and springs into the gear ring as described in the general instructions to 'The Re-assembling of Sturmev-Archer Hubs.'

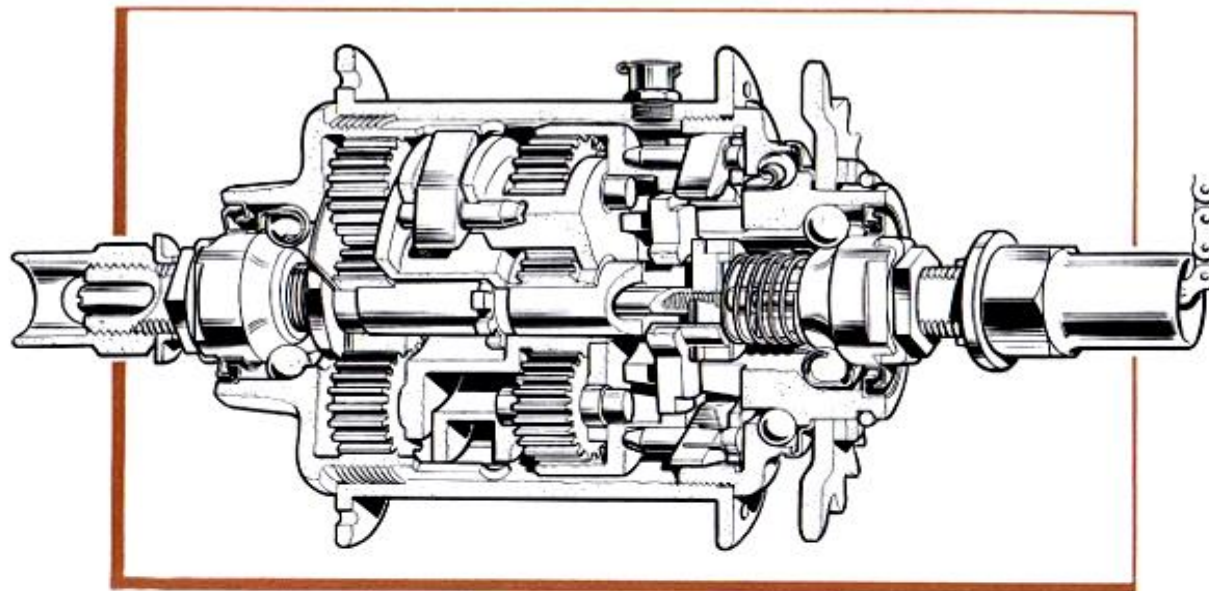
- e. Smear grease in the channels of the dust caps of the left-hand ball cup and the driver and in the recess of the right-hand ball ring. *Do not use grease anywhere else.*
3. Hold the axle vertically in a vice by the flats on the left-hand end and put the planet cage in place.
4. Add the double planet pinions and pins, so that they engage with



AM

- the two sun pinions. The marked teeth must in each case point radially outwards, as shown in the drawing, or the hub will not be correctly timed. (Notice also that three teeth on the small end of each planet pinion are visible over the end of the planet cage). To check the timing, engage the gear ring with the pinions and rotate several times. It should rotate quite freely. Remove gear ring after testing.
5. Fit the clutch sleeve (flange first), the sliding clutch with the recess over the flange of the sleeve, the key and the thrust ring and thrust washer. The notches on the thrust ring must engage with the flats on the key.
 6. Remove the axle from the vice, and insert the indicator and coupling into the right-hand end, threading it through the axle key.
 7. Fit the gear ring, the right-hand ball ring, the driver, the clutch spring, and the clutch-spring cap, in that order.
 8. Fit the right-hand cone and screw it up *finger-tight*. Then slacken it back half a turn and lock it in that position with the special locking washer and locknut. On no account must the cone be unscrewed more than half a turn, as that would throw the gear mechanism out of adjustment.
 9. Fit the planet-cage pawls as described in the general instructions to 'The Re-assembly of Sturmey-Archer Hubs.'
 10. Hold the assembled mechanism with the planet cage uppermost and pour about two teaspoonfuls of a good quality thin oil into the cage.
 11. Insert the assembled mechanism into the hub shell and screw up the right-hand ball ring finger-tight only.
 12. Make sure that the marks put on the ball ring and the hub flange before dismantling will register properly, and then screw up tightly.
 13. Fit the left-hand cone, washer and locknut in the arrangement noted when dismantling, and adjust the hub bearings as described in 'The Fitting and Adjustment of Sturmey-Archer Hubs.'
 14. Fit any special washers noted when dismantling the hub.
 15. If the sprocket has been removed from the driver, fit the outer dust cap over the driver before replacing the sprocket, and see that the dust cap is properly centred on the flange of the driver. Fit the sprocket and spacing washers in the arrangement noted when dismantling and add the circlip.
 16. Replace the wheel in the cycle frame and adjust the gear as described in 'The Fitting and Adjustment of Sturmey-Archer Hubs'.





TO RE-ASSEMBLE THE AC HUB

Proceed as follows:

1. If the left-hand ball cup has been removed from the hub shell, replace it by screwing anti-clockwise because it has a *left-hand thread*, using the special tool, DD11182, which enters from the right-hand end. The teeth of the tool and the cup must be in full engagement.
2. Prepare the following preliminary sub-assemblies:
 - a. Fit the ball cage into the left-hand ball cup, with the ring of the ball-retainer facing outwards and the recess in the dust cap also facing outwards. If a new ball-retainer is being fitted, the dust cap also should be new.
 - b. Fit the ball cage into the driver, with the ring of the ball-retainer facing outwards and the recess in the dust cap also facing outwards. If a new ball-retainer is being fitted, the dust cap also should be new. If the sprocket has been removed see No. 22 below.
 - c. Fit the pawls, pins and springs into the gear ring as described in the general instructions to 'The Re-assembling of Sturmev-Archer Hubs.'
 - d. Fit the pawls, pins and springs to the planet cage as described

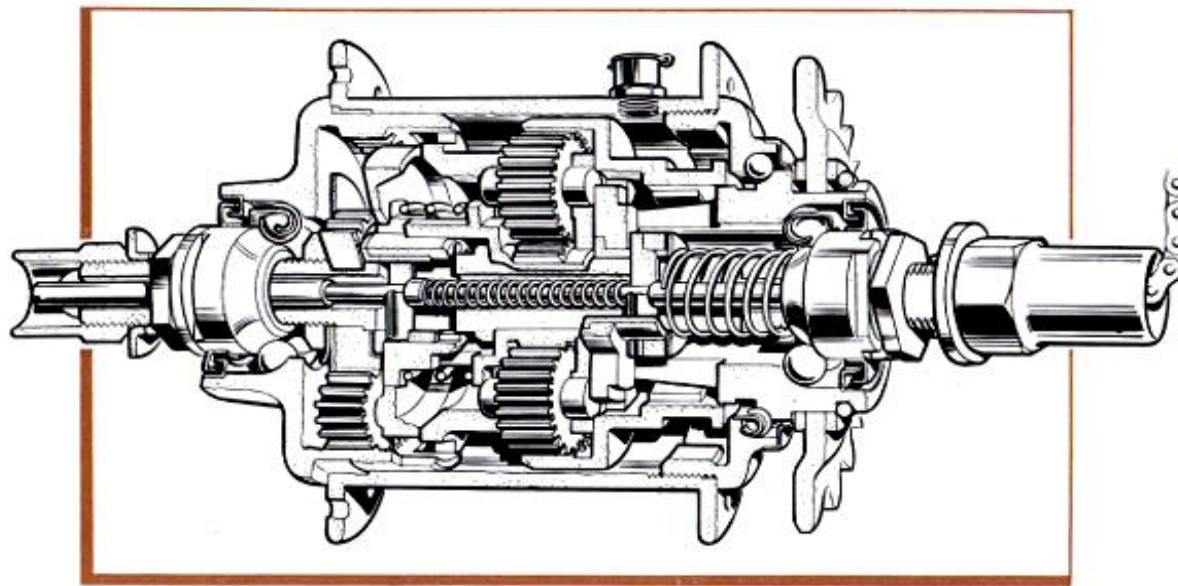
in the general instructions to 'The Re-assembling of Sturmev-Archer Hubs.'

- e. Smear grease in the channels of the dust caps of the left-hand ball cup and the driver and in the recess of the right-hand ball ring. *Do not use grease anywhere else.*
3. Hold the axle in the vice with the longer slot uppermost and fit the compound cage, followed by the primary planet cage assembly.
4. Fit the clutch sleeve (flange first) and the sliding clutch with the recess over the flange of the sleeve.
5. Lift the clutch sleeve and the clutch up to the top of the long axle slot, then fit axle key through the clutch sleeve, making sure that the two flats on the key are facing upwards.
6. Fit the indicator coupling by passing the rod down the axle, through the axle key.
7. Remove the axle from the vice and push the indicator rod into the left-hand end of the axle. Press the assembled mechanism down on a flat surface to force the indicator rod into the axle, at the same time pressing down on the sliding clutch. Then rotate the indicator chain to screw it to the indicator rod. When the chain is felt to be fully screwed home, insert a *small* screwdriver into the slot of the indicator and exert a *slight* extra pressure on the chain, to make

AC

- sure that the indicator and the rod are both fully screwed together, taking care not to twist off the small threaded end.
8. Fix the axle in the vice again and make sure that the clutch slides quite freely on the axle when the indicator chain is moved up and down.
 9. Fit the thrust collar, making sure that both slots fit over the flats of the axle key. Add the thrust washer.
 10. Fit the gear ring, the ball ring (with ball cage), the driver, the axle spring and the clutch spring cap, in that order.
 11. Fit the right-hand cone and screw it up *finger-tight*. Then slacken it back half a turn and lock it in that position with the special washer and locknut. On no account must the cone be unscrewed more than half a turn, as that would throw the gear mechanism out of adjustment.
 12. Fit the planet cage pawls as described in the general instructions to 'The Re-assembling of Sturmey-Archer Hubs'.
 13. Remove the assembled mechanism from the vice and replace it the other way.
 14. Fit the pinions to the compound cage.
 15. Fit the secondary sun pinion, with the recess downwards, so that the sun pinion engages with the square flats on the axle.
 16. Fit the locating plate and tab washer and tighten the locknut. Turn over the edge of the washer on two opposite sides of the locknut.
 17. Remove the assembled mechanism from the vice, hold it vertically with the planet cage uppermost and pour about two teaspoonfuls of a good quality thin oil into the cage.
 18. Insert the assembled mechanism into the hub shell and screw up the right-hand ball ring finger-tight only.
 19. Make sure that the marks put on the ball ring and the hub flange before dismantling will register properly, and then screw up tightly.
 20. Fit the left-hand cone, washer and locknut in the arrangement noted when dismantling, and adjust the hub as described in 'The Fitting and Adjustment of Sturmey-Archer Hubs.'
 21. Fit any special washers noted when dismantling the hub.
 22. If the sprocket has been removed from the driver, fit the outer dust cap over the driver before replacing the sprocket, and see that the dust cap is properly centred on the flange of the driver. Replace the sprocket and the spacing washers in the arrangement noted when dismantling, and add the circlip.
 23. Replace the wheel in the cycle frame and adjust the gear as described in 'The Fitting and Adjustment of Sturmey-Archer Hubs.'





TO RE-ASSEMBLE THE ASC HUB

Proceed as follows:

Prepare the following preliminary sub-assemblies:

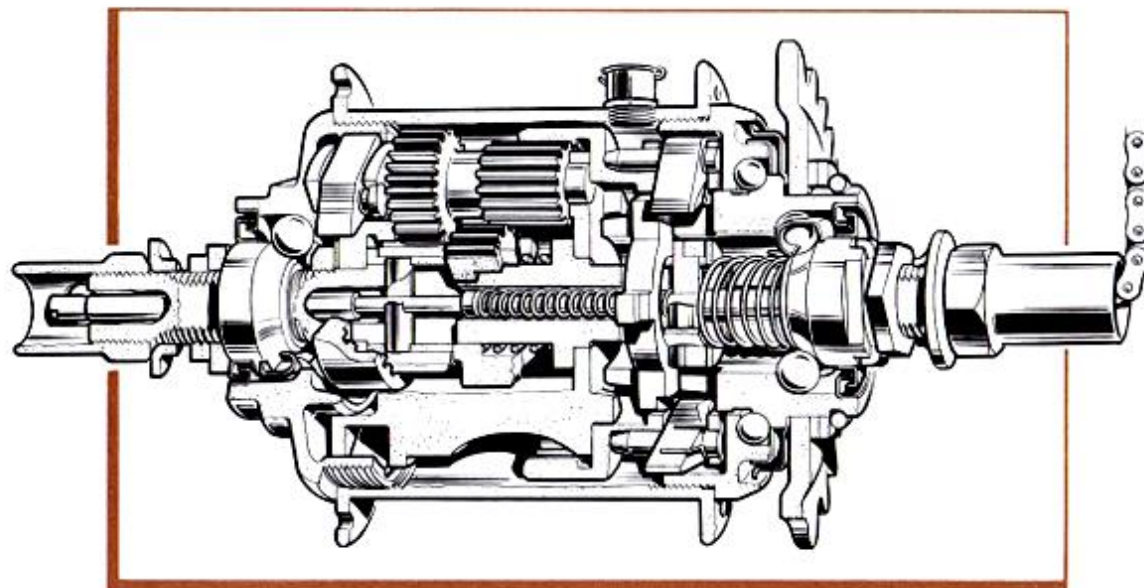
1. a. Fit the ball cage into the left-hand ball cup, with the ring of the ball-retainer facing outwards and the recess in the dust cap also facing outwards. If a new ball-retainer is being fitted, the dust cap also should be new.
- b. Fit the ball cage into the driver, with the ring of the ball-retainer facing outwards and the recess in the dust cap also facing outwards. If a new ball-retainer is being fitted, the dust cap also should be new. If the sprocket has been removed see No. 27 below.
- c. Smear grease in the channels of the dust cap of the left-hand ball cup and the driver and in the recess of the right-hand ball ring. *Do not use grease anywhere else.*
2. Hold the axle in a vice, with the smaller slot uppermost, and fit the low-gear clutch sleeve with its flange on top.
3. Slip the small low-gear key through the holes of the low-gear clutch sleeve, making sure that the hole through the key is in line with the bore of the axle. Hold the key temporarily in position by dropping the indicator rod down the axle through the key.

4. Holding the indicator rod in position with one finger, remove the axle from the vice and hold it the other way up. Fit the low-gear clutch on to the axle, with the four dogs pointing downwards.
5. Fit the large low-gear spring and the primary sun pinion, with its four large legs pointing downwards and so engaging the low-gear clutch. (The low-gear spring, the compensating spring, and the clutch spring must be of the same series. If one has to be replaced, the other two must be.)
6. Slip the indicator rod out of the axle (the low-gear clutch key will now stay in position) and put the axle back in the vice.
7. Fit the primary planet cage complete.
8. Drop the compensating spring down the axle, collar first.
9. Fit the clutch sleeve (flange first) and the sliding clutch with the recess over the flange of the sleeve.
10. Lift the clutch sleeve and the clutch up to the top of the long axle slot and insert axle key through the clutch sleeve, making sure that the two flats on the key are facing upwards.
11. Fit the indicator coupling by passing the rod down the axle, through the axle key and into the compensator spring. Note that the indicator coupling must always be fitted before the indicator rod.
12. Remove the axle from the vice and push the indicator rod into the

ASC

- left-hand end of the axle. Press the assembled mechanism down on a flat surface to force the indicator rod into the axle, at the same time pressing down on the sliding clutch. Then rotate the indicator chain to screw it to the indicator rod. When the chain is felt to be fully screwed home insert a *small* screwdriver into the slot of the indicator rod and exert a *slight* extra pressure on the chain, to make sure that the indicator and the rod are both fully screwed together, taking care not to twist off the small threaded end.
13. Fix the axle in the vice again and make sure that the clutch slides quite freely on the axle when the indicator chain is moved up and down.
 14. Fit the thrust collar, making sure that both slots fit over the flats of the axle key. Add the thrust washer.
 15. Fit the gear ring, the ball ring (with ball cage), the driver, the axle spring and the clutch spring cap in that order.
 16. Fit the right-hand cone and screw it up *finger-tight*. Then slacken it back half a turn and lock it in that position with the special washer and locknut. On no account must the cone be unscrewed more than half a turn, as that would throw the gear mechanism out of adjustment.
 17. Remove the assembled mechanism from the vice and replace it the other way up.
 18. Fit the secondary planet cage, with the pins upwards and the slots engaging the limbs of the low-gear dog.
 19. Fit the secondary planet pinion.
 20. Fit the secondary sun pinion, with the recess downwards, so that the sun pinion engages with the square flats on the axle.
 21. Fit the locating plate and tab washer and tighten the locknut. Turn over the edge of the washer on two opposite sides of the locknut.
 22. Remove the assembled mechanism from the vice, hold it vertically with the planet cage uppermost and pour about two teaspoonfuls of a good quality thin oil into the cage.
 23. Insert the assembled mechanism into the hub shell and screw up the right-hand ball ring finger-tight only.
 24. Make sure that the marks put on the ball ring and the hub flange before dismantling will register properly, and then screw up tightly.
 25. Fit the left-hand cone, washer and locknut in the arrangement noted when dismantling, and adjust the hub as described in 'The Fitting and Adjustment of Sturmey-Archer Hubs.'
 26. Fit any special washers noted when dismantling the hub.
 27. If the sprocket has been removed from the driver, fit the outer dust cap over the driver before replacing the sprocket, and see that the dust cap is properly centred on the flange of the driver. Replace the sprocket and the spacing washers in the arrangement noted when dismantling, and add the circlip.
 28. Replace the wheel in the cycle frame and adjust the gear as described in 'The Fitting and Adjustment of Sturmey-Archer Hubs.'

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TO RE-ASSEMBLE THE FW HUB

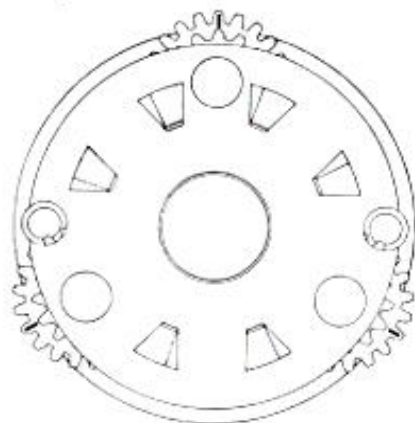
Proceed as follows:

1. If the left-hand ball cup has been removed from the hub shell, replace it by screwing anti-clockwise because it has a *left-hand thread*.
2. Prepare the following preliminary sub-assemblies:
 - a. Fit the ball cage into the left-hand ball cup, with the ring of the ball-retainer facing outwards and the recess in the dust cap also facing outwards. If a new ball-retainer is being fitted, the dust cap also should be new.
 - b. Fit the ball cage into the driver, with the ring of the ball-retainer facing outwards and the recess in the dust cap also facing outwards. If a new ball-retainer is being fitted, the dust cap also should be new. If the sprocket has been removed, see No. 19 below.
 - c. Fit the balls (only 24) and the inner dust cap to the right-hand ball ring, making sure that the balls can revolve freely with the dust cap in place.
 - d. Fit the pawls, pins and springs into the gear ring as described in the general instructions to 'The Re-assembling of Sturmey-Archer Hubs.'
 - e. Fit the pawls, pins and springs into the planet cage and rivet the pins on the left-hand (ball cup) side as described in the general instructions to 'The Re-assembling of Sturmey-Archer Hubs.'
 - f. Smear grease in the channels of the dust caps of the left-hand ball cup and the driver and in the recess of the right-hand ball ring. *Do not use grease anywhere else.*
3. Working from the left-hand (short slot) side of the axle, slide the low gear spring, the primary sun pinion, and the secondary sun pinion and sleeve on to the axle in that order, and push them along until the dogs engage. (The low-gear spring, the compensating spring, and the clutch spring of a four-speed hub must be of the same series. If one has been replaced, the other two must be.)
4. Holding the pinions in position, withdraw the secondary sun pinion sleeve until the low-gear keyhole is exposed, and insert the low-gear key making sure that the hole through the key is in line with the bore of the axle. Release the pinions, so that they can spring back and secure the key. Use the indicator rod to check that the hole in the low-gear key is still in line with the axle bore.
5. Fit the dog ring so that it engages on the axle square, and secure it with the washer and nut, spanner-tight. Then turn down the edge of the lock washer over two opposite sides of the locknut, to secure it. (Earlier models of this hub may not be fitted with tab lock

FW

washers.) Drop the indicator rod down the axle to check that the end of the indicator rod comes level with the end of the axle.

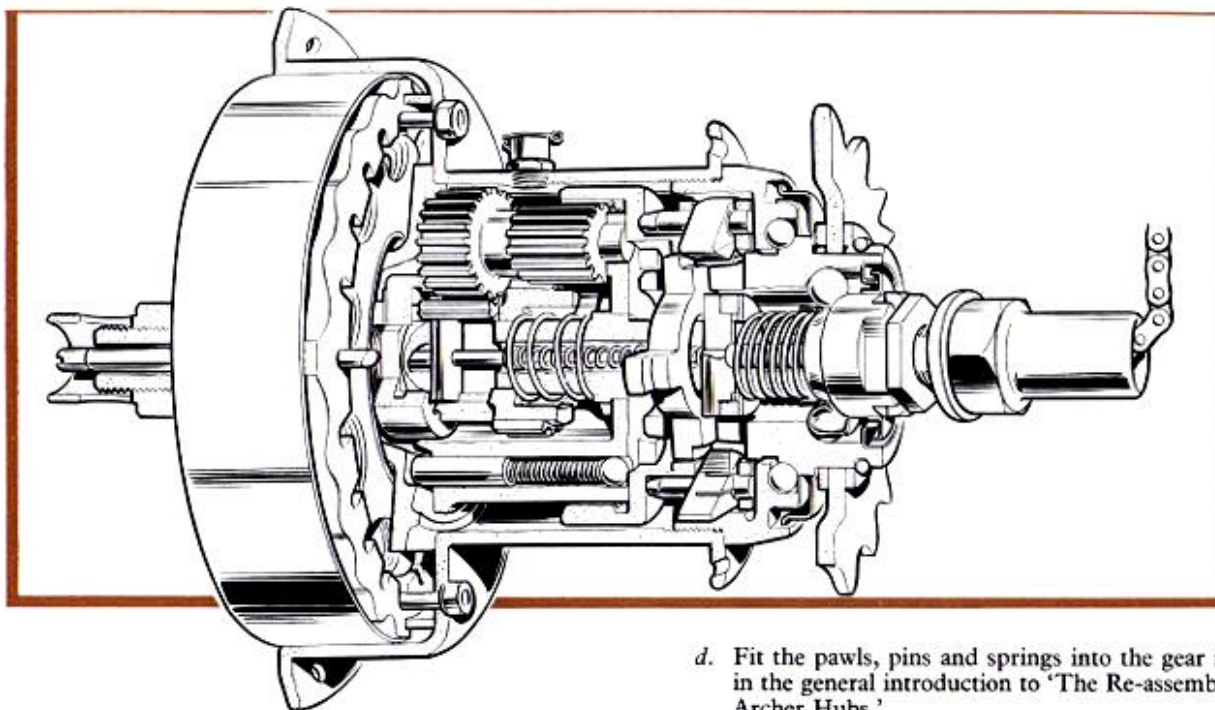
6. Remove the indicator, then hold the axle vertically in a vice by the flats on the left-hand end, and put the planet cage in place.
7. Add the double planet pinions and pins so that they engage with the two sun pinions. The marked teeth must in each case point radially outwards, as shown in the drawing, or the hub will not be correctly timed. (Notice also that three teeth on the small end of each planet pinion are visible over the end of the planet cage.) To check the timing, engage the gear ring with the pinions and rotate several times. It should rotate quite freely. Remove gear ring after testing.



8. Drop the compensator spring down the axle, collar first.
9. Fit the clutch sleeve (flange first), the sliding clutch with the recess over the flange of the sleeve, the key and the thrust ring and thrust washer. The notches on the thrust ring must engage with the flats on the key.
10. Remove the axle from the vice and insert the indicator chain and coupling into the right-hand end, threading it through the main key and the compensator spring collar.

11. Insert the indicator rod, and press the left-hand end of the axle and indicator rod against a solid surface while holding the assembled mechanism vertically and pressing downwards on the sliding clutch, so that the indicator coupling can be screwed to the indicator rod. When the chain is felt to be fully screwed home insert a *small* screwdriver into the slot of the indicator rod and exert a slight (rotatory) pressure on the chain, to make sure that the indicator rod is tight, taking care not to twist off the small threaded end. Make sure that the sliding clutch is free to move along the axle when the indicator chain is moved up and down.
12. Fit the gear ring, the right-hand ball ring, the driver, the clutch spring, and the clutch-spring cap, in that order.
13. Fit the right-hand cone and screw it up *finger-tight*. Then slacken it back half a turn and lock it in that position with the special locking washer and locknut. On no account must the cone be unscrewed more than half a turn, as that would throw the gear mechanism out of adjustment.
14. Hold the assembled mechanism with the planet cage uppermost and pour about two teaspoonfuls of a good quality thin oil into the cage.
15. Insert the assembled mechanism into the hub shell and screw up the right-hand ball ring finger-tight only.
16. Make sure that the marks put on the ball ring and the hub flange before dismantling will register properly, and then screw up tightly.
17. Fit the left-hand cone, washer and locknut in the arrangement noted when dismantling, and adjust the hub bearing as described in 'The Fitting and Adjustment of Sturmey-Archer Hubs.'
18. Fit any special washers noted when dismantling the hub.
19. If the sprocket has been removed from the driver, fit the outer dust cap over the driver before replacing the sprocket, and see that the dust cap is properly centred on the flange of the driver. Fit the sprocket and spacing washers in the arrangement noted when dismantling and add the circlip.
20. Replace the wheel in the cycle frame and adjust the gear as described in 'The Fitting and Adjustment of Sturmey-Archer Hubs.'

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TO RE-ASSEMBLE THE FG HUB

Proceed as follows:

1. If the left-hand ball cup has been removed from the hub shell replace it and screw up tight the four hexagonal-headed screws, which are inserted into the drum wall from the outside and screw into the square flange of the ball cup.
2. Prepare the following preliminary sub-assemblies:
 - a. Fit the ball cage into the left-hand ball cup, with the ring of the retainer facing outwards.
 - b. Fit the ball cage into the driver, with the ring of the ball-retainer facing outwards and the recess in the dust cap also facing outwards. If a new ball-retainer is being fitted, the dust cap also should be new. If the sprocket has been removed see No. 29 on next page.
 - c. Fit the balls (only 24) and the inner dust cap to the right-hand ball ring, making sure that the balls can revolve freely with the dust cap in place.

- d. Fit the pawls, pins and springs into the gear ring as described in the general introduction to 'The Re-assembling of Sturmey-Archer Hubs.'
 - e. Smear grease in the channel of the dust cap of the driver and in the recess of the right-hand ball ring. *Do not use grease anywhere else.*
3. Working always from the left-hand (short slot) side of the axle, slide the low-gear spring, the primary sun pinion, and the secondary sun pinion and sleeve on to the axle in that order, and push them along until the dogs engage. (The low-gear spring, the compensator spring, and the clutch spring of a four-speed hub must be of the same series. If one has been replaced the other two must be.)
 4. Holding the pinions in position, withdraw the secondary sun pinion sleeve until the low-gear key hole is exposed, and insert the low-gear key, making sure that the hole through the key is in line with the bore of the axle.
Release the pinions so that they can spring back and secure the key. Use the indicator rod to check that the hole in the low-gear key is still in line with the axle bore.
 5. Fit the dog ring so that it engages on the axle square, and secure it with the washer and nut, spanner-tight. Then turn down the edge of the lock washer over two opposite sides of the locknut, to secure it. (Earlier models of this hub may not be fitted with tab lock washers.)

FG

Drop the indicator rod down the axle to check that the end of the indicator rod comes level with the end of the axle.

6. Remove indicator rod and hold the axle vertically in a vice by the flats at the left-hand end and put the planet cage in place.

7. Add the double planet pinions and pins so that they engage with the two sun pinions. The marked teeth must in each case point radially outwards, as shown in the drawing, or the hub will not be correctly timed. (Notice also that three teeth on the small end of each planet pinion are visible over the end of the planet cage.)

To check the timing, engage the gear ring with the pinions and rotate several times. It should rotate quite freely. Remove the gear ring after testing.



8. Drop the compensator spring down the axle, collar first.

9. Fit the clutch sleeve (flange first), the sliding clutch with recess over the flange of the sleeve, the key and the thrust ring. The notches on the thrust collar must engage with the flats on the key.

10. Remove the axle from the vice and insert the indicator chain and coupling into the right-hand end, threading it through the main key and the compensator spring. Insert indicator rod in left-hand end of axle, threading it through low-gear key and compensator spring collar.

11. Press the left-hand end of the axle and indicator rod against a solid surface while holding the assembled mechanism vertically and pressing down on the sliding clutch so that the indicator coupling can be screwed to the indicator rod. When the chain is felt to be fully screwed home insert a *small* screwdriver into the slot of the indicator rod and exert a slight extra (rotatory) pressure on the chain to make sure that the indicator rod is tight, taking care not to twist off the small threaded end. Make sure that the sliding clutch is free to move along the axle when the indicator chain is moved up and down.

12. Fit the gear ring, the right-hand ball ring, the driver, the clutch spring, and the clutch-spring cap, in that order.

13. Fit the right-hand cone and screw it up *finger-tight*. Then slacken it back half a turn and lock it in that position with the special locking washer and locknut. On no account must the cone be unscrewed more than half a turn, as that would throw the gear

mechanism out of adjustment.

14. Hold the assembled mechanism with the planet cage uppermost and pour about two teaspoonfuls of a good quality thin oil into the cage.

15. Drop a $\frac{1}{16}$ " ball bearing down each of the three pawl-pin holes in the planet cage. Then drop one coil-type pawl spring, followed by one plunger-type pawl, down each hole. (The inner end of each pawl is shaped to fit inside the pawl spring.)

16. Hold the cycle wheel in the left hand, with the open (right-hand) end of the hub shell facing downwards, and insert the assembled mechanism carefully from below, to prevent the pawls from falling out of position. Screw the right-hand ball ring finger-tight only.

17. Make sure that the position marks put on the ball ring and the hub flange before dismantling will register properly, and then screw up tightly.

18. Fit the left-hand cone.

19. If the magnet and armature have been separated, take the magnet and keeper ring in the left hand and, with the right hand, lay the armature alongside it.

20. While holding the magnet with the chamfer facing outwards, push the armature and the keeper through so that the magnet slides from the keeper on to the armature.

21. Fit the card disc (carrying patent numbers) inside the cover plate, with its notches opposite the magnet notches.

22. Fit the cover plate over the magnet, chamfer inwards, making sure that the four holes in the cover plate are in line with the notches in the card and the magnet.

23. Fit the metal spacing ring into the hub shell.

24. Fit the shim washer on the cone.

25. Push the complete dynamo unit into the hub shell, making sure that the holes in the cover plate are in line with those in the hub shell.

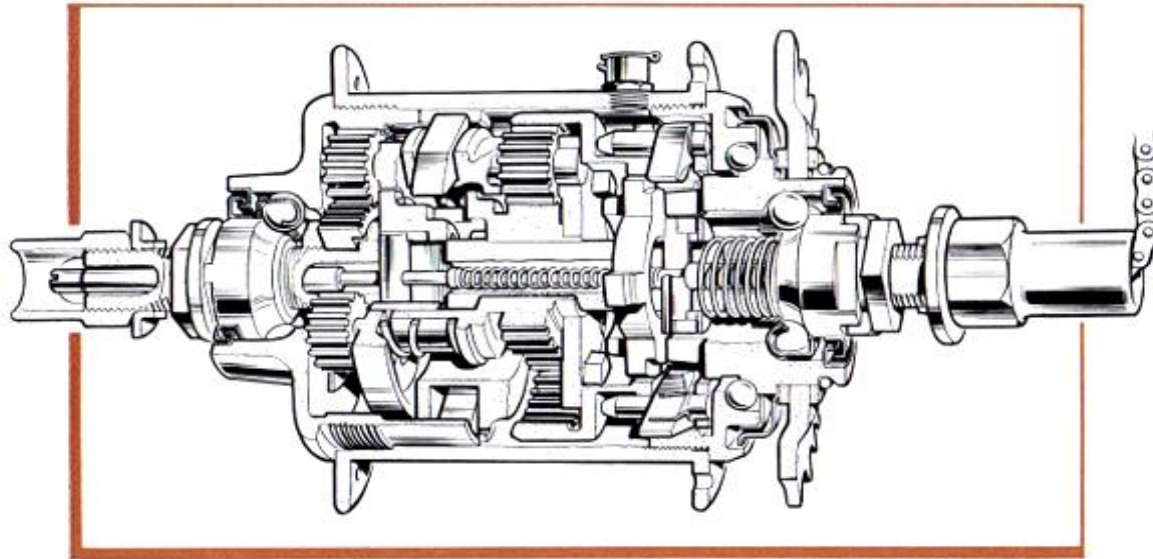
26. Fit the magnet fixing screws, washers and nuts.

27. Fit the spacing washers, adjusting washer and dynamo cone locknut in the arrangement noted when dismantling.

28. Adjust the hub bearing as described in 'The Fitting and Adjustment of Sturmey-Archer Hubs.' (A correctly adjusted wheel must have a slight trace of play at the rim. The pull of the magnet disguises the wheel adjustment, and if this point is not watched, the ball races may be damaged through over-tightening.)

29. If the sprocket has been removed from the driver, fit the outer dust cap over the driver, making sure that it is properly centred on the flange of the driver. Replace the sprocket and washers in the arrangement noted when dismantling, and add the circlip.

30. Replace the wheel in the cycle frame and adjust the gear as described in 'The Fitting and Adjustment of Sturmey-Archer Hubs.'



TO RE-ASSEMBLE THE FM HUB

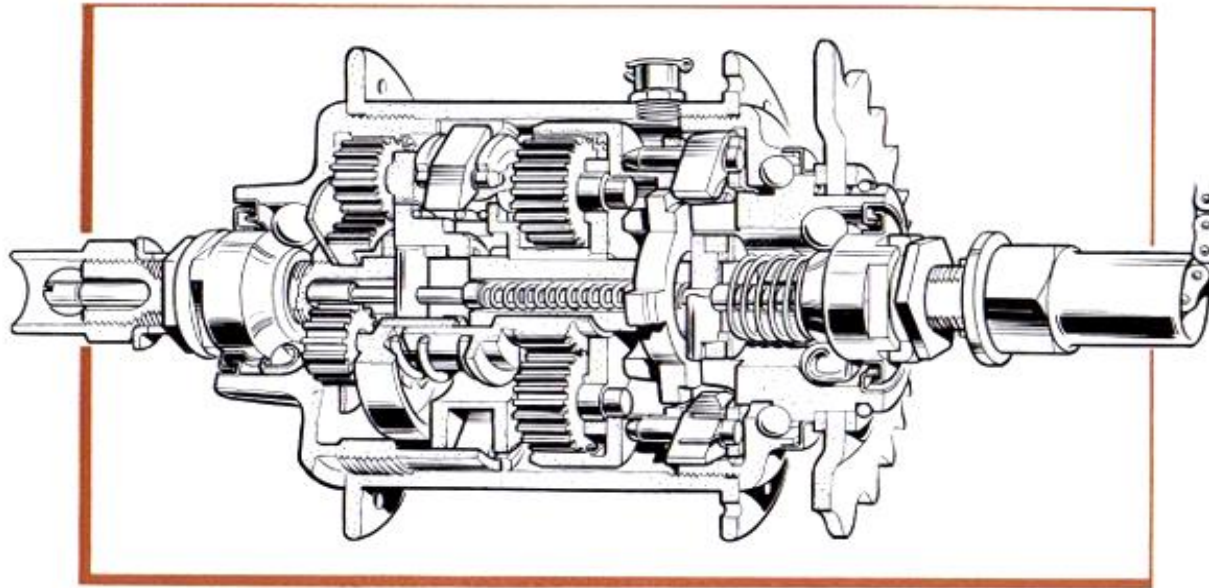
Proceed as follows:

1. If the left-hand ball cup has been removed from the hub shell, replace it by screwing anti-clockwise because it has a left-hand thread, using the special tool, DD11182, which enters from the right-hand end. The teeth of the tool and the cup must be in full engagement.
2. Prepare the following preliminary sub-assemblies:
 - a. Fit the ball cage into the left-hand ball cup, with the ring of the ball-retainer facing outwards and the recess in the dust cap also facing outwards. If a new ball-retainer is being fitted, the dust cap also should be new.
 - b. Fit the ball cage into the driver, with the ring of the ball-retainer facing outwards and the recess in the dust cap also facing outwards. If a new ball-retainer is being fitted, the dust cap also should be new. If the sprocket has been removed see No. 28 below.
 - c. Fit the balls (only 24) and the inner dust cap into the right-hand ball ring, making sure that the balls can revolve freely with the dust cap in place.
 - d. Fit the pawls, pin and springs into the gear ring as described in the general instructions to 'The Re-assembling of Sturmev-Archer Hubs.'
 - e. Fit the pawls, pins and springs to the planet cage as described in the general instructions to 'The Re-assembling of Sturmev-Archer Hubs.'
 - f. Smear grease in the channels of the dust caps of the left-hand ball cup and the driver and in the recess of the right-hand ball ring. *Do not use grease anywhere else.*
3. Hold the axle in a vice, with the smaller slot uppermost, and fit the low-gear clutch sleeve, with its flange on top.
4. Slip the small low-gear key through the holes of the low-gear clutch sleeve, making sure that the hole through the key is in line with the bore of the axle. Hold the key temporarily in position by dropping the indicator rod down the axle through the key.
5. Holding the indicator rod in position with one finger, remove the axle from the vice and hold it the other way up. Fit the low-gear clutch on to the axle, with the four dogs pointing downwards.
6. Fit the large low-gear spring and the primary sun pinion, with its four large legs pointing downwards and so engaging the low-gear clutch. (The low-gear spring, the compensating spring and the clutch spring must be of the same series. If one has to be replaced, the other two must be.)

FM

7. Slip the indicator rod out of the axle (low-gear clutch key will now stay in position) and put the axle back in the vice.
8. Fit the primary planet cage complete.
9. Drop the compensating spring down the axle, collar first.
10. Fit the clutch sleeve (flange first) and the sliding clutch with the recess over the flange of the sleeve.
11. Lift the clutch sleeve and the clutch up to the top of the long key slot and insert the axle key through the clutch sleeve, making sure that the two flats on the key are facing upwards.
12. Fit the indicator coupling by passing the rod down the axle, through the axle key, and into the compensator spring. Note that the indicator coupling must always be fitted before the indicator rod.
13. Remove the axle from the vice and push the indicator rod into the left-hand end of the axle. Press the assembled mechanism down on a flat surface to force the indicator rod into the axle. At the same time press down on the sliding clutch. Then rotate the indicator chain to screw it to the indicator rod. When the chain is felt to be fully screwed home insert a *small* screwdriver into the slot of the indicator and exert a *slight* extra pressure on the chain, to make sure that the indicator and the rod are both fully screwed together, taking care not to twist off the small threaded end.
14. Fix the axle in the vice again and make sure that the clutch slides quite freely on the axle when the indicator chain is moved up and down.
15. Fit the thrust collar, making sure that both slots fit over the flats of the axle key. Add thrust washer.
16. Fit the gear ring, the ball ring, the driver, the axle spring and the clutch spring cap, in that order.
17. Fit the right-hand cone and screw it up *finger-tight*. Then slacken it back half a turn and lock it in that position with the special washer and locknut. On no account must the cone be unscrewed more than half a turn, as that would throw the gear mechanism out of adjustment.
18. Remove the assembled mechanism from the vice and replace it the other way up.
19. Fit the secondary planet cage, with the pins upwards and the slots engaging the limbs of the low-gear dog.
20. Fit the secondary planet pinions.
21. Fit the secondary sun pinion, with the recess downwards, so that the sun pinion engages with the square flats on the axle.
22. Fit the locating plate and tab washer and tighten the locknut. Turn over the edge of the washer on two opposite sides of the locknut.
23. Remove the assembled mechanism from the vice, hold it vertically with the planet cage uppermost and pour about two teaspoonfuls of a good quality thin oil into the cage.
24. Insert the assembled mechanism into the hub shell and screw up the right-hand ball ring finger-tight only.
25. Make sure that the marks put on the ball ring and the hub flange before dismantling will register properly, and then screw up tightly.
26. Fit the left-hand cone, washer and locknut in the arrangement noted when dismantling, and adjust the hub as described in 'The Fitting and Adjustment of Sturmey-Archer Hubs.'
27. Fit any special washers noted when dismantling the hub.
28. If the sprocket has been removed from the driver, fit the outer dust cap over the driver before replacing the sprocket, and see that the dust cap is properly centred on the flange of the driver. Replace the sprocket and the spacing washers in the arrangement noted when dismantling, and add the circlip.
29. Replace the wheel in the cycle frame and adjust the gear as described in 'The Fitting and Adjustment of Sturmey-Archer Hubs.'

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TO RE-ASSEMBLE THE FC HUB

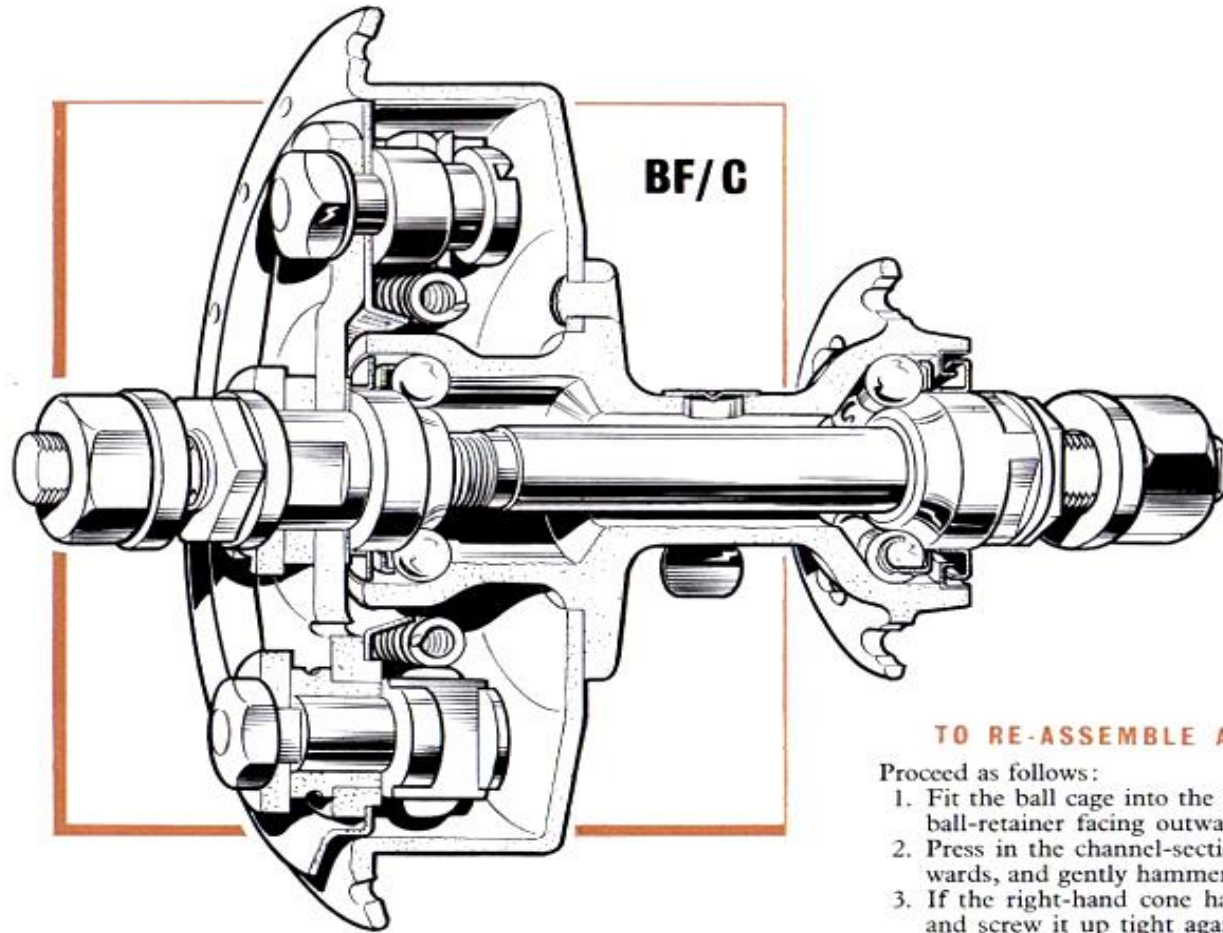
Proceed as follows:

1. If the left-hand ball cup has been removed from the hub shell, replace it by screwing anti-clockwise because it has a left-hand thread, using the special tool, DD11182, which enters from the right-hand end. The teeth of the tool and the cup must be in full engagement.
2. Prepare the following preliminary sub-assemblies:
 - a. Fit the ball cage into the left-hand ball cup, with the ring of the ball-retainer facing outwards and the recess in the dust cap also facing outwards. If a new ball-retainer is being fitted, the dust cap also should be new.
 - b. Fit the ball cage into the driver with the ring of the ball-retainer facing outwards and the recess in the dust cap also facing outwards. If a new ball-retainer is being fitted, the dust cap also should be new. If the sprocket has been removed see No. 28 below.
 - c. Fit the pawls, pins and springs into the gear ring as described in the general instructions to 'The Re-assembling of Sturmev-Archer Hubs.'
 - d. Fit the pawls, pins and springs to the planet cage as described in the general instructions to 'The Re-assembling of Sturmev-Archer Hubs.'
 - e. Smear grease in the channels of the dust caps of the left-hand ball cup and the driver and in the recess of the right-hand ball ring. *Do not use grease anywhere else.*
3. Hold the axle in a vice, with the smaller slot uppermost, and fit the low-gear clutch sleeve, with its flange on top.
4. Slip the small low-gear key through the holes of the low-gear clutch sleeve, making sure that the hole through the key is in line with the bore of the axle. Hold the key temporarily in position by dropping the indicator rod down the axle and through the key.
5. Holding the indicator rod in position with one finger, remove the axle from the vice and hold it the other way up. Fit the low-gear clutch on to the axle, with the four dogs pointing downwards.
6. Fit the large low-gear spring and the primary sun pinion, with its four large legs pointing downwards and so engaging the low-gear clutch. (The low-gear spring, the compensating spring, and the clutch spring must be of the same series. If one has to be replaced, the other two must be.)
7. Slip the indicator rod out of the axle (the low-gear clutch key will now stay in position) and put the axle back in the vice.

FC

8. Fit the primary planet cage complete.
9. Drop the compensating spring down the axle, collar first.
10. Fit the clutch sleeve (flange first) and the sliding clutch with recess over the flange of the sleeve.
11. Lift the clutch sleeve and the clutch up to the top of the long axle slot and insert axle key through the clutch sleeve, making sure that the two flats on the key are facing upwards.
12. Fit the indicator coupling by passing the rod down the axle, through the axle key, and into the compensator spring. Note that the indicator coupling must always be fitted before the indicator rod.
13. Remove the axle from the vice and push the indicator rod into the left-hand end of the axle. Press the assembled mechanism down on a flat surface to force the indicator rod into the axle, at the same time pressing down on the sliding clutch. Then rotate the indicator chain to screw it to the indicator rod. When the chain is felt to be fully screwed home insert a *small* screwdriver into the slot of the indicator rod and exert a *slight* extra pressure on the chain, to make sure that the indicator and the rod are both fully screwed together, taking care not to twist off the small threaded end.
14. Fix the axle in the vice again and make sure that the clutch slides quite freely on the axle when the indicator chain is moved up and down.
15. Fit the thrust collar, making sure that both slots fit over the flats of the axle key. Add the thrust washer.
16. Fit the gear ring, the ball ring (with ball cage), the driver, the axle spring and the clutch spring cap, in that order.
17. Fit the right-hand cone and screw it up *finger-tight*. Then slacken it back half a turn and lock it in that position with the special washer and locknut. On no account must the cone be unscrewed more than half a turn, as that would throw the gear mechanism out of adjustment.
18. Remove the assembled mechanism from the vice and replace it the other way up.
19. Fit the secondary planet cage, with the pins upwards and the slots engaging the limbs of the low-gear dogs.
20. Fit the secondary planet pinions.
21. Fit the secondary sun pinion, with the recess downwards, so that the sun pinion engages with the square flats on the axle.
22. Fit the locating plate and tab washer and tighten the locknut. Turn over the edge of the washer on two opposite sides of the locknut.
23. Remove the assembled mechanism from the vice, hold it vertically with the planet cage uppermost and pour about two teaspoonfuls of good quality thin oil into the cage.
24. Insert the assembled mechanism into the hub shell and screw up the right-hand ball ring finger-tight only.
25. Make sure that the marks put on the ball ring and the hub flange before dismantling will register properly, and then screw up tightly.
26. Fit the left-hand cone, washer, and locknut in the arrangement noted when dismantling, and adjust the hub as described in 'The Fitting and Adjustment of Sturmey-Archer Hubs.'
27. Fit any special washers noted when dismantling the hub.
28. If the sprocket has been removed from the driver, fit the outer dust cap over the driver before replacing the sprocket, and see that the dust cap is properly centred on the flange of the driver. Replace the sprocket and the spacing washers in the arrangement noted when dismantling, and add the circlip.
29. Replace the wheel in the cycle frame and adjust the gear as described in 'The Fitting and Adjustment of Sturmey-Archer Hubs.'

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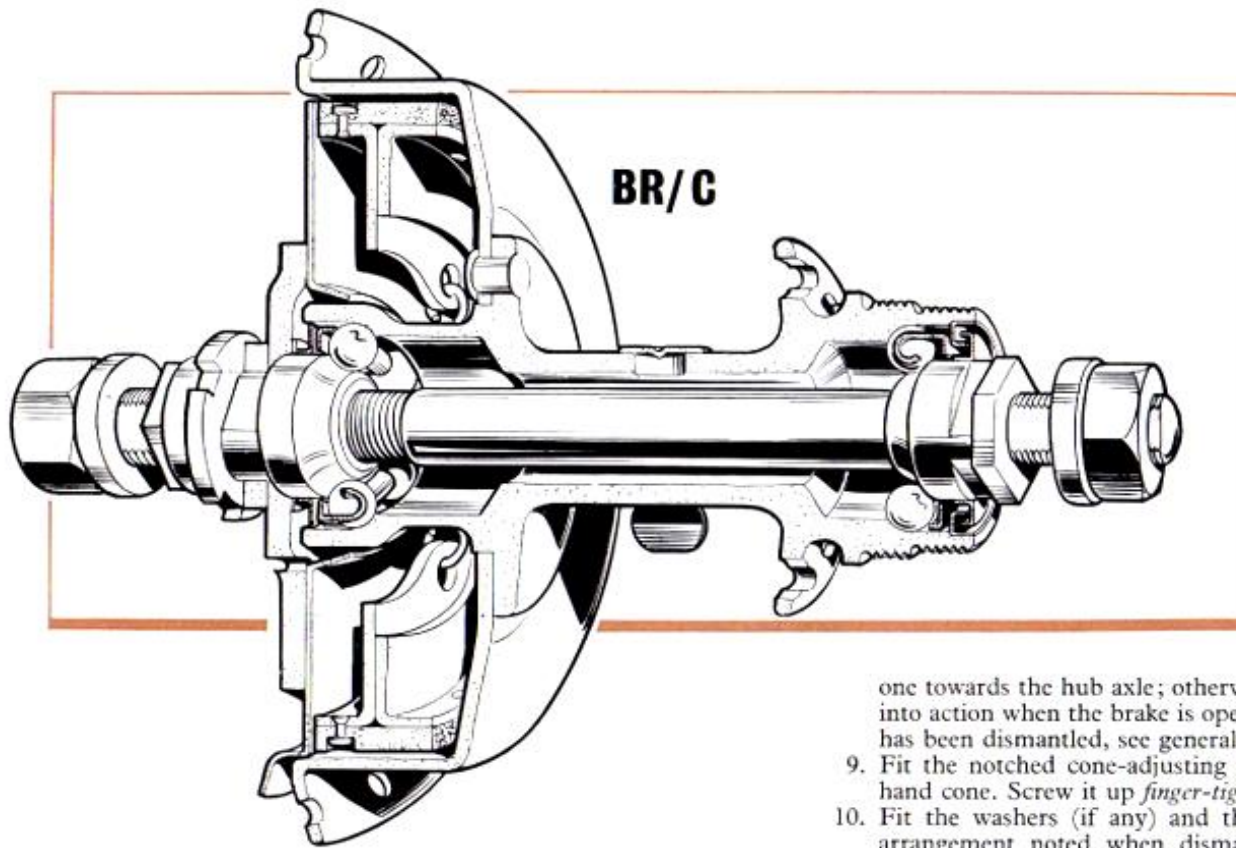


TO RE-ASSEMBLE A BF, BFC, BR or BRC HUB

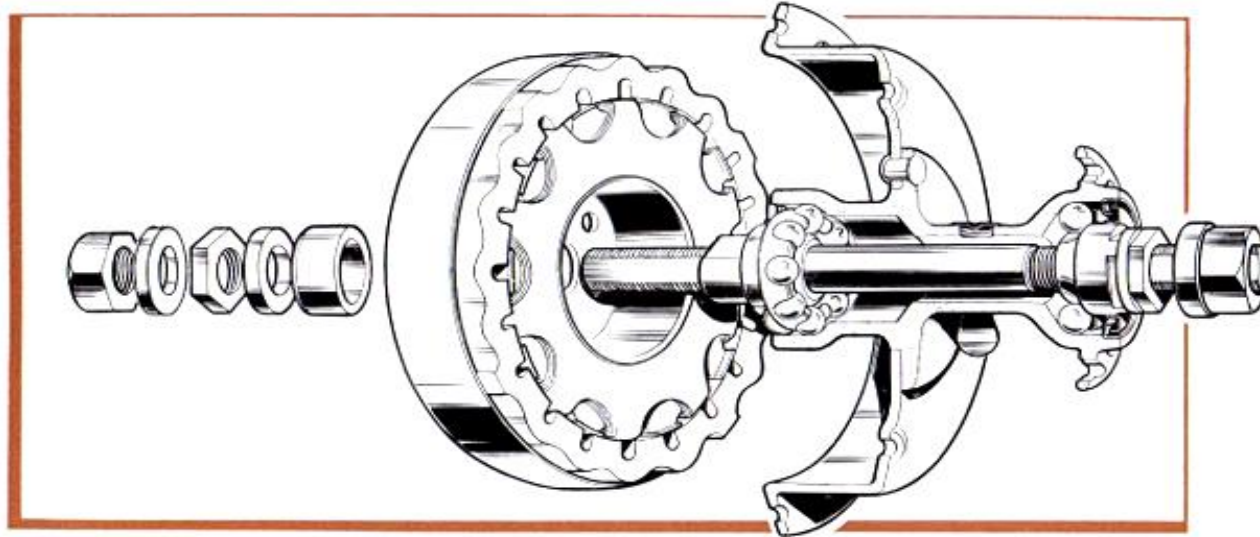
Proceed as follows:

1. Fit the ball cage into the right-hand hub cup with the ring of the ball-retainer facing outwards.
2. Press in the channel-section dust cap, with the recess facing outwards, and gently hammer it home.
3. If the right-hand cone has been removed, replace it on the axle and screw it up tight against the shoulder.
4. Fit the right-hand spacing washers (if any) and cone locknut.
5. Pass the spindle through the hub shell, from the right-hand side.
6. Fit the ball cage into the left-hand hub cup, with the ring of the ball-retainer facing outwards.
7. Fit the (left-hand) cone and spacing washers.
8. Replace the brake anchor plate, complete with shoes, over the end of the left-hand cone. (If the shoes have been removed, make sure when replacing them that the longer of the two short arms on the cam spindle is pointing towards the drum surface and the shorter

BF/
BR



- one towards the hub axle; otherwise only one shoe will be brought into action when the brake is operated.) If the brake shoe assembly has been dismantled, see general instructions.
9. Fit the notched cone-adjusting washer over the flats of the left-hand cone. Screw it up *finger-tight* and then slacken it half a turn.
 10. Fit the washers (if any) and the left-hand cone locknut in the arrangement noted when dismantling the hub, adjust the hub bearing as described in 'The Fitting and Adjustment of Sturmey-Archer Hubs.'
 11. Replace the wheel in the cycle frame. The axle is flatted to prevent it from turning in the slots of the cycle frame—a very important point—and special lipped washers are supplied with BR BRC hubs to engage in the frame slots. See that the brake plate of a rear brake is not strained when being connected to the anchor clip, which must be fixed so that it engages easily. The arm of a front brake must be a good fit in the clip. Brake arm clips must be tight on the frame or fork. If the machine is being laid up, put one or two drops of oil between the brake-plate and the cam lever, but not enough to penetrate into the brake drum.



TO RE-ASSEMBLE THE GH6 HUB

Proceed as follows (see notes at end if hub was supplied before April 1952):

1. Fit the ball cage with the ball-retainer ring facing outwards, into the cup on the left-hand (the smaller) end of the hub shell. If a new ball-retainer is being fitted, the dust cap also should be new.
2. Fit the dust cap, with the channel facing outwards, and press it home (or tap lightly with a hammer).
3. If the dynamo-side cone has been removed from the spindle, replace it (LB357AZ) on the spindle and screw it up tight against the shoulder on the spindle.
4. Fit the ball cage, with the ball retainer ring facing outwards, into the cup on the dynamo-side of the hub shell.
5. Insert the spindle into the hub shell from the dynamo-side.
6. Fit the left-hand cone and adjust the hub bearings as described in 'The Fitting and Adjustment of Sturmev-Archer Hubs.' (A correctly adjusted wheel must have a slight trace of play at the rim.)
7. Fit the cone locknut and screw it up tight against the left-hand cone.
8. If the magnet and armature have been separated, take the magnet and keeper ring in the left hand and, with the right hand, lay the armature alongside it.
9. While holding the magnet with the chamfer facing outwards, push the armature and the keeper through so that the magnet slides from the keeper on to the armature.
10. Fit the card disc (carrying patent numbers) inside the cover plate, with its notches opposite the magnet notches.
11. Fit the cover plate over the magnet, chamfer inwards, making sure that the four holes in the cover plate are in line with the notches in the card and the magnet.
12. Fit the metal spacing ring into the hub shell.
13. Fit the shim washer over the cone.
14. Push the complete dynamo unit into the hub shell, making sure that the holes in the cover plate are in line with those in the hub shell.
15. Fit the magnet fixing screws, washers and nuts.
16. Fit the spacing cup, washer (if any) and dynamo cone locknut in the arrangement noted when dismantling.

GH6 LIGHTING SETS ISSUED BEFORE APRIL 1952

Hubs supplied before April 1952 had the adjusting cone on the dynamo-side of the hub. These are assembled as follows:

1. Fit the left-hand cone (LB358Z) on the spindle and screw it up tight against the shoulder on the spindle.
2. Fit the cone locknut and screw it up tight against the cone.
3. Fit the ball cage, with the ball-retainer ring into the cup on the

GH6

left-hand (the smaller) end of the hub shell. If a ball-retainer is being fitted, the dust cap also should be new.

4. Fit the dust cap, with the channel facing outwards, and press it home (or tap lightly with a hammer).
5. Fit the spindle into the hub shell, from the left-hand side.
6. Fit the ball cage, with the ball-retainer facing outwards, into the cup on the dynamo-side of the hub shell.
7. Fit the dynamo-side cone. Assemble armature, magnet and cover plate as described in paragraphs 8 to 11 above.
12. Fit the metal spacing ring into the hub shell.
13. Fit the shim washer over the cone.
14. Push the complete dynamo unit into the hub shell, making sure

that the holes in the cover plate are in line with those in the hub shell.

15. Fit the magnet fixing screws, washers and nuts.
16. Fit the spacing washers, the notched adjusting washer and dynamo cone locknut in the arrangement noted when dismantling.
17. Adjust the hub bearing as described in 'The Fitting and Adjustment of Sturmey-Archer Hubs.' (A correctly adjusted wheel must have a slight trace of play at the rim. The pull of the magnet disguises the wheel adjustment, and if this point is not watched the ball races may be damaged through over-tightening.)
18. Replace the wheel in the cycle frame as described in 'The Fitting and Adjustment of Sturmey-Archer Hubs.'



END OF SUB-SECTION 8.—SERVICE SECTION — STURMEY-ARCHER MASTER CATALOGUE

SUNDRY DATA

SUB-SECTION

9

SPECIAL REPAIRS · GEAR RATIOS · AXLES INDICATORS AND TOOLS

SPECIAL REPAIR FACILITIES

To cover the few instances where repair work requires special tools or equipment which dealers cannot be expected to have available, a Service Replacement Scheme is operated through the Company's depots and provides prompt and efficient service at a low cost to the customer.

THE ITEMS COVERED BY THIS SCHEME ARE:

1. RE-MAGNETIZING OF MAGNETS

If a magnet only is received by us, it is necessary to fit a keeper ring for its return. A charge is made for this keeper ring which is returnable for credit at any time.

2. REPLACEMENT OF ARMATURES

All armatures are re-built with current pattern parts.

3. TRIGGER CONTROLS

Current pattern parts are used to replace obsolete trigger parts.

4. RE-LINING OF BRAKE SHOES

We recommend that brake shoes be returned to us for re-lining to ensure accurate setting.

AXLE CHART FOR BRAKES AND DYNOHUBS—TYPE BF, BR AND GH6

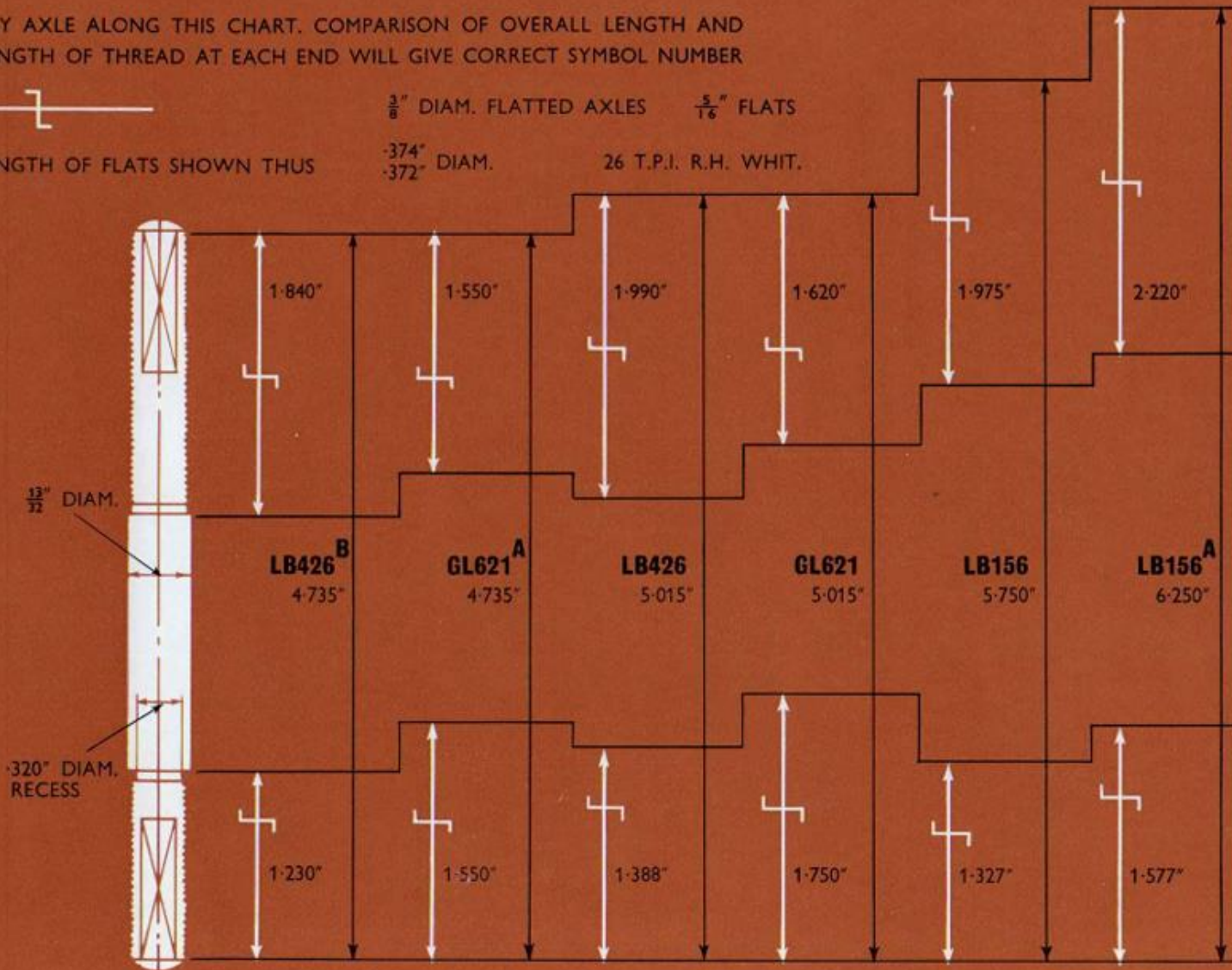
LAY AXLE ALONG THIS CHART. COMPARISON OF OVERALL LENGTH AND LENGTH OF THREAD AT EACH END WILL GIVE CORRECT SYMBOL NUMBER



LENGTH OF FLATS SHOWN THUS

$\frac{3}{8}$ " DIAM. FLATTED AXLES $\frac{5}{16}$ " FLATS

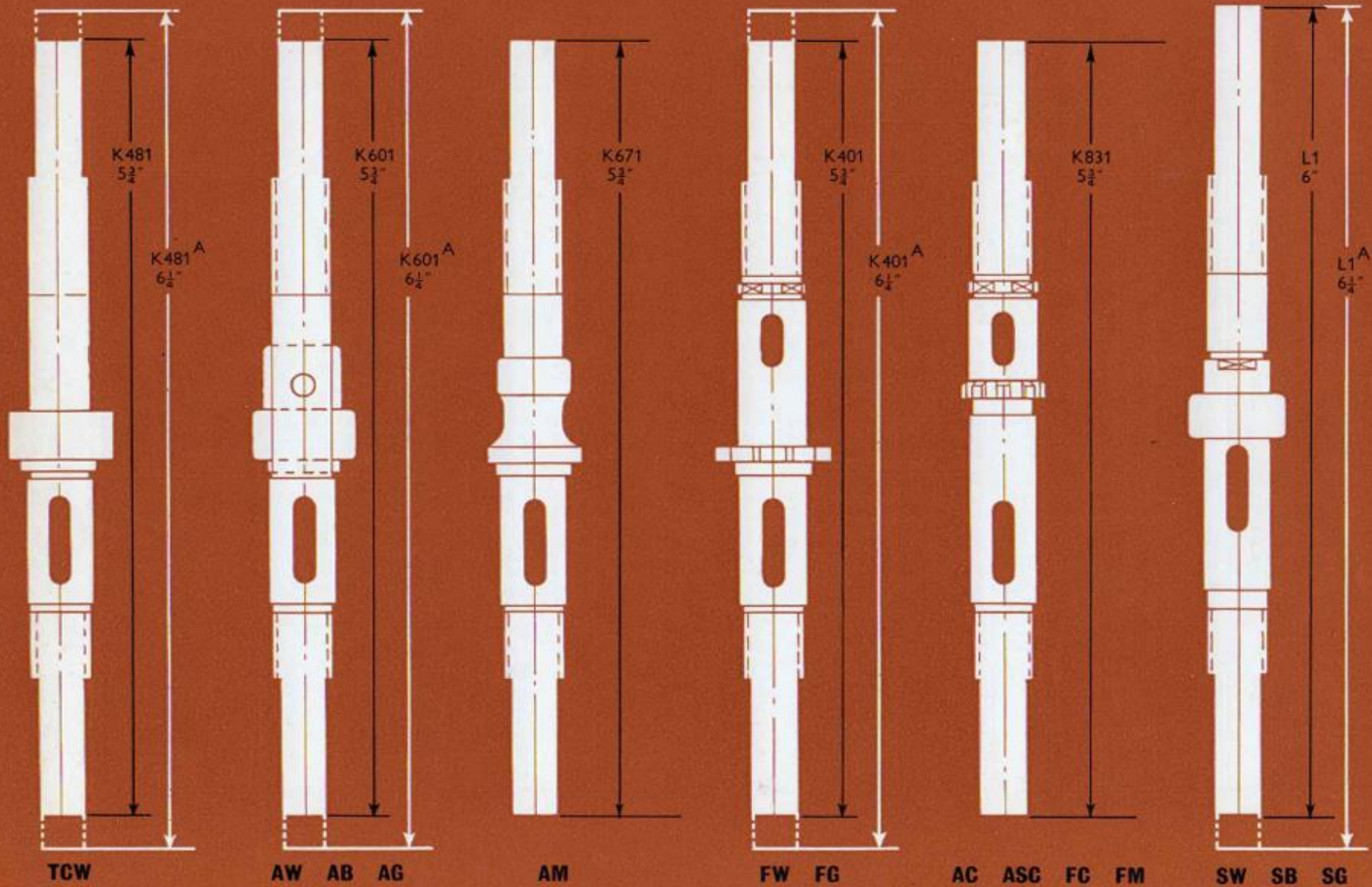
$\frac{3}{32}$ " DIAM. 26 T.P.I. R.H. WHIT.



$\frac{13}{32}$ " DIAM.

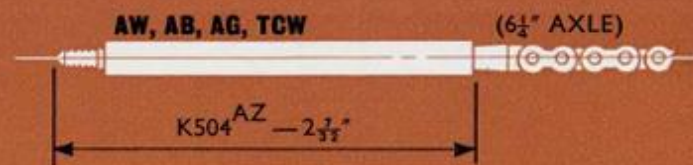
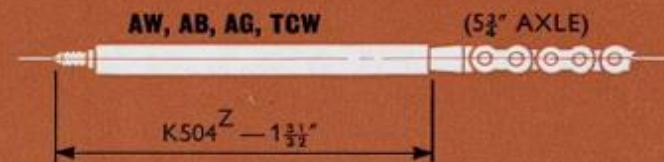
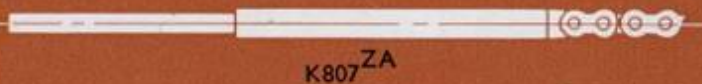
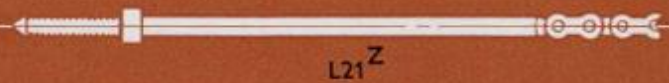
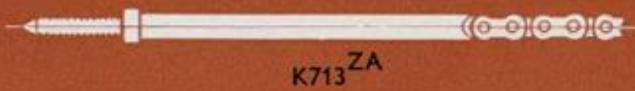
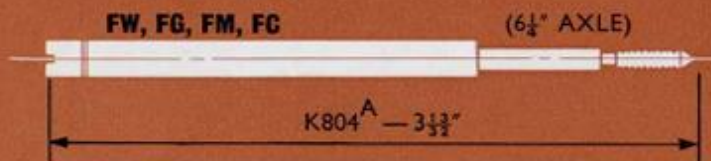
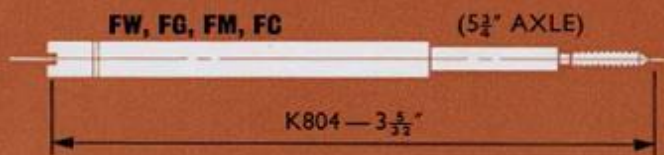
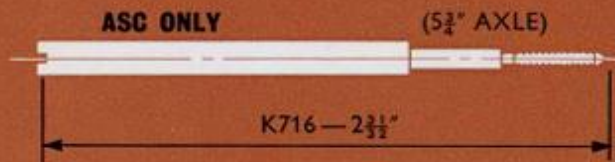
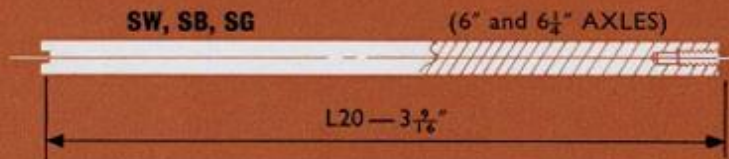
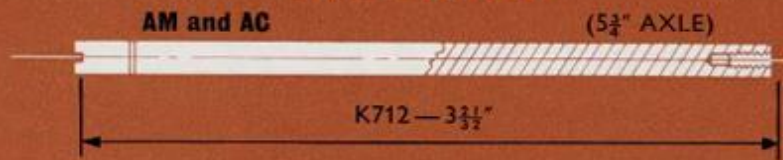
$\frac{3}{32}$ " DIAM. RECESS

AXLE CHART FOR 3- AND 4-SPEED HUBS



INDICATOR

COUPLING



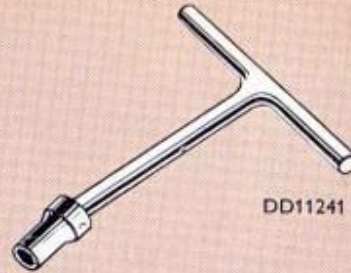
TOOLS



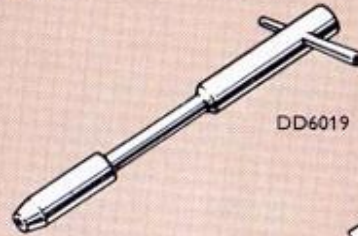
DD10565



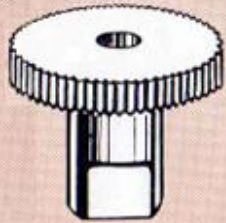
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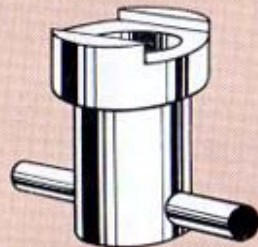
DD11241



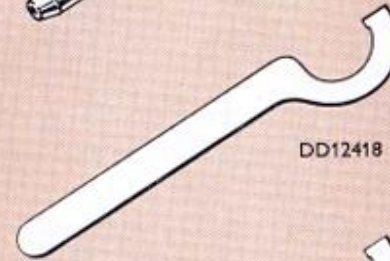
DD6019



DD11182



DD911



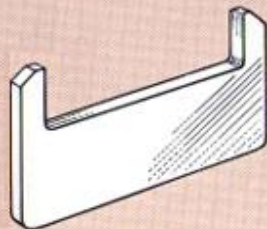
DD12418



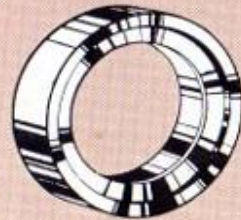
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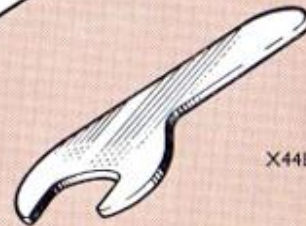
DD1145



DD12987



GD495



X44B

'DYNOHUB'

- DD6019 Tube Spanner (6 B.A.)
- DD6839 Spanner for tightening fixed cone
- GD495 Keeper Ring
- DD11241 Box Spanner for Ball Cup Fixing Screws, FG
- DD10565 Tool for removing Left-Hand Ball Cup (3-speed) slotted AG type

3- and 4-SPEED GEARS

- X44B Spanner for Axle Nuts and Plain Cones
- DD911 Tool for removing Left-Hand Ball Cup (3-speed)
- DD11182 Tool for removing Left-Hand Ball Cup (4-speed)
- DD1145 "C" Spanner for Right-Hand Ball Ring, A Range
- DD12403 Hollow Punch, S Range
- DD12418 "C" Spanner, S Range
- DD12987 Tool for removing Left-Hand Ball Cup SB and SG

END OF SUB-SECTION 9.—SERVICE SECTION—STURMEY-ARCHER MASTER CATALOGUE

GUARANTEE

STURMEY-ARCHER products are guaranteed against defects of manufacture for a period of 12 months from the date of sale provided they remain during that period the property of the first retail purchaser. This guarantee does not apply to damage caused by wear and tear, misuse or neglect.

All conditions or warranties implied by statute or otherwise as to the quality or fitness for any purpose of the products supplied by us are hereby excluded. THE LIABILITY WHICH WE ACCEPT UNDER THIS GUARANTEE IS LIMITED TO THE FREE SUPPLY OF A NEW PART IN EXCHANGE FOR THE PART WHICH MAY HAVE PROVED DEFECTIVE OR AT OUR DISCRETION TO THE REPAIR OF THE ORIGINAL PART, EXCLUDING IN EITHER CASE THE COST OF FITTING, AND DOES NOT EXTEND TO ANY RESULTING LOSS OR INJURY.

If any product of ours shall be found to be defective within the period specified above it must be sent to us carriage paid with a request that it be replaced under the guarantee. The name of the dealer from whom it was purchased and the date of purchase must also be stated.

This guarantee extends only to those of our products which are purchased either direct from us or from one of our duly appointed dealers.

STURMEY-ARCHER GEARS LIMITED.