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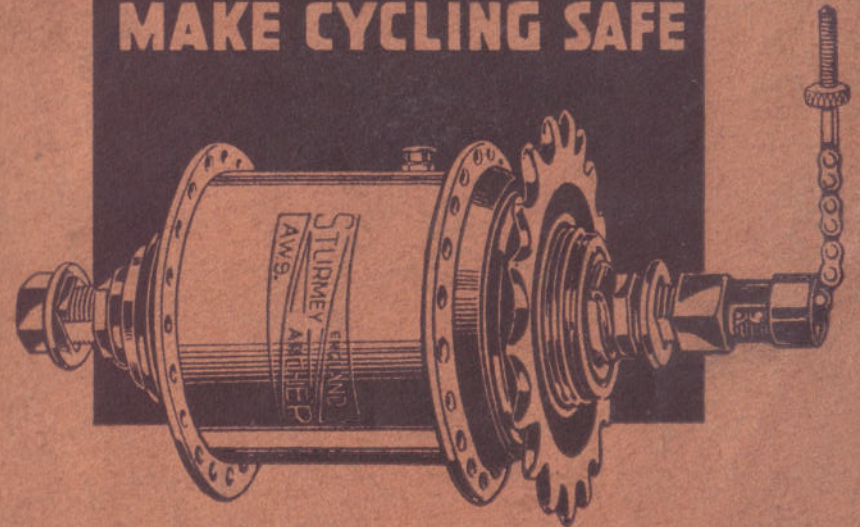
# STURMEY-ARCHER

## HUBS

THE GEARS THAT  
MAKE CYCLING EASY



THE BRAKES THAT  
MAKE CYCLING SAFE



A COMPREHENSIVE SURVEY OF A  
RANGE OF HUBS TO SUIT  
EVERY CYCLIST

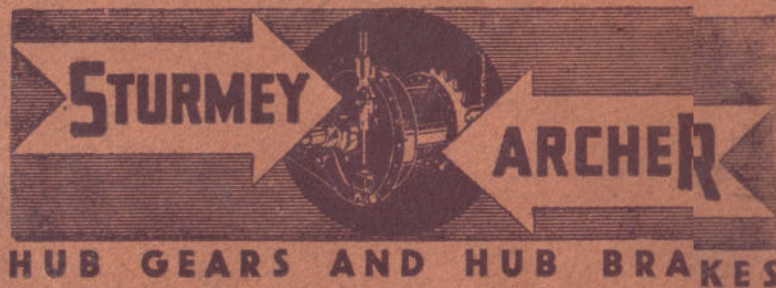
### STURMEY-ARCHER GEARS LIMITED

Lenton Boulevard  
NOTTINGHAM

Telephone :  
75154

Telegrams :  
"Triple, Nottingham"

Series No. 1177



## PREFACE.

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It is nearly 40 years ago since Sturmey-Archer Gears made their initial appearance, and they have established in the interim a reputation amongst all classes of cyclists as the greatest asset to pleasurable riding. Neat, light, totally enclosed and oil bathed to ensure sweet and silky running, Sturmey-Archer Gears are renowned for their reliability under all riding conditions.

Sturmey-Archer Expanding Brake Hubs are delightfully smooth in action, and the exceptional strength and durability of the mechanism ensures long life and absolute efficiency. An important feature is that the defacing of the rim is entirely eliminated.

EVERY CYCLIST desirous of getting the fullest advantage and enjoyment out of cycling should have a Sturmey-Archer Gear.

### WHY ?

1. BECAUSE—The rider who uses a cycle for business will find that it **saves time, saves exertion and saves money.**
2. BECAUSE—The rider who cycles for pleasure will find **Pleasure doubled, Labour halved and Speed increased.**

### ONE TOUCH OF THE LEVER

and the hill is climbed with ease, fatigue in face of the head wind vanishes, speed is attainable, when road and wind are favourable, without rapid pedalling, overheating, or heart and lung strain, and you have charm and variety in place of dull monotony.

Although there are millions of Bicycles now in use fitted with Sturmey-Archer Gears, there are still a number of cyclists who condemn themselves to the old fashioned single gear bicycle.

Amongst all the cyclists who have abandoned single gearing for the Sturmey-Archer, it is the rarest thing to find an instance of any cyclist reverting to a single geared bicycle.

But cycling has revived. There are more cyclists on the road to-day than ever. There must be a reason. There is a reason. If you watch that cyclist who sails easily up a hill, the girl who rides along with every hair in place and no streak of dishevelment, the man who swings past you without effort, you will see on the handlebar or the top tube a little lever, and if you look very closely, you may observe that the hub of the back wheel is a little larger than usual.

That is all the indication of the invention which has made "all the difference in cycling." It has made cycling easy.

Cycling owes something to the motor-car. No one would dream of going out in a car with only one gear. Yet cycles are still bought and sold with only one gear. The human engine is exposed to a strain which is never contemplated for the mechanical engine.

Sturmey-Archer Gears are recognised as essential fitments to all modern machines and are recommended by all leading manufacturers.

## Three of the World's most Famous Riders who use Sturmey-Archer Gears



Sid Ferris.



Bert James.



Charles Holland.

### RECORDS THEY HAVE ACHIEVED

in 1937 and 1938 on Bicycles fitted with the AR Close Ratio and AM Medium Ratio 3-speed Hubs.

**THE EDINBURGH—LONDON RUN.** Distance 386 miles. This was made by "Sid" Ferris in 20 hours, 19 minutes, thus beating the previous record by 1 hour, 30 minutes, on the 3rd June, 1937.

**THE LAND'S END—JOHN O' GROATS RECORD,** by "Sid" Ferris, covering a distance of 870 miles in the remarkable time of 2 days, 6 hours, 33 minutes, thus beating the previous record by 2 hours, 28 minutes, July 1937.

**THE 1,000 MILES RECORD BY S. FERRIS** in 2 days, 22 hours, 40 minutes, thus beating the existing record by the astonishing margin of 3 hours, 12 minutes, July 1937.

**THE LONDON—PORTSMOUTH AND BACK.** Distance 137 miles, by "Bert" James, covering the distance in 6 hours, 33 minutes, 57 seconds.

**THE LIVERPOOL—LONDON RECORD** smashed by "Bert" James on the 19th September, 1937, covering a distance of 200½ miles in the record time of 9 hours, 27 minutes, thus beating the previous record by 3 minutes.

**THE 100 MILE RECORD.** Achieved by "Bert" James on March 19th, 1938, smashing the previous record by 9 minutes, 53 seconds.

**THE LONDON—YORK and 12 HOUR RECORD.** "Bert" James' time for the London—York ride was 8 hours, 44 minutes, beating the previous record by 16 minutes, and he carried on to cover 260 miles in 12 hours, adding 7 miles to the 12 Hour Record on May 12th, 1938.

**THE LIVERPOOL—EDINBURGH RECORD.** Distance 210½ miles, covered in 10 hours on June 9th, 1938, by Charles Holland, beating the previous record by 12 minutes.

**October 13th, 1938.** Charles Holland broke the Land's End—London Record, 287½ miles in 13 hours 44 minutes. 25 minutes better than previous record held by Opperman.

### COMMENTS BY FAMOUS RECORD BREAKERS ABOUT STURMEY-ARCHER GEARS

"This is the Hub that helped me break the Edinburgh—London, Land's End—John o' Groats and 1,000 miles records. It's exactly what we racing men have always been looking for—a totally enclosed HUB gear with a really close ratio. I'll never ride without it."  
(Signed) "SID" FERRIS.

"I used a Sturmey-Archer Gear with Trigger Control on my recent record-breaking runs, so I know what an enormous advantage it is to be able to change gear with just a "finger-flick"—hands remaining securely on the handlebars. The Sturmey-Archer 3-speed hub was a wonderful help."  
(Signed) "BERT" JAMES.

"On the occasion of my record-breaking ride from Liverpool—Edinburgh, I put my faith in the AM Medium Ratio Hub. In very hilly country, as on this route, this hub gear is ideal. The frictionless running ensures maximum speed for minimum effort."  
(Signed) CHARLES HOLLAND.

## PROOF OF THE VALUE OF THE STURMEY-ARCHER GEAR

### UNSOLICITED TESTIMONIALS.

"Glad to say that the AR Hub is working perfectly. I feel I must compliment you on this hub, as it is a revelation in frictionless gearing; both for easy changing and positive action whether under load or not."

V. F. P., Westhoughton, Lancs.

"I require another Sturmey-Archer AR 3-speed Hub, as I sold my wheel to my chum, who said that it was the hub he was wanting, and as I have a spare rim 26 x 1½", I will take it with me to Belfast, and get a Sturmey-Archer AR Hub built up. My chum is indeed pleased with the AR, and so am I. I will never race or tour without the Sturmey-Archer AR 3-speed, for buying a bicycle without a Sturmey-Archer Gear is like buying a car without a gearbox."

J. H., Armoy.

"With reference to the AM type Gear: this has now done over 9,000 miles. First, I must say that apart from 'MAKING CYCLING EASY' it has given me quite a new conception of the pastime. I thought the KS beyond reproach, but the gear change is infinitely superior to any variable gear I have used. There is not one item I can complain of, it has functioned perfectly."

J. M., Watford.

"I was amazed at the freeness of the AM Hub when I was freewheeling down hills, there was not the least bit of friction anywhere. The gear was a much more easy movement than the ordinary free wheel. I am entering for the next massed start race at Donnington, for which I think this gear is ideal."

C., Nottingham.

#### One from Australia:—

"I feel I must write to you and express my deepest admiration for your wonderful 3-speed gears. I recently had a Sturmey-Archer 3-speed fitted to my bike, and the result is nothing short of marvellous. I am situated in the roughest of mountain roads here, most of the hills being strewn with rocks, potholes and loose metal, which means that you cannot rush at a hill to climb it; but since I have had the 3-speed, I just sail up them."

C. J., Tweed River, New South Wales.

"I was trying the new Sturmey-Archer Close Ratio gear in a 25 miles road race. I tried it to-day (that is Sunday) and I must say that I am very pleased with it. Not only did I make fastest time, but I also broke the record for the course by about 20 seconds,

which has stood for quite a number of years. Some people think a gear of any description is a handicap, but not with the Sturmev, as you have no trouble with your chain jumping. I shall certainly use it in future events."

Another Nottingham Rider.

"I have been educating myself as to the mysteries inside a "S-A" Hub. Results: much knowledge; increased confidence in self and gear; enthusiasm for the niceness of the 'entrails'. In fact so much so that I have persuaded a friend of mine to fit a Sturmev-Archer gear. Now he's keen too."

B. G., Streatham, London.

"I would now like to take this opportunity of offering you my sincere congratulations on the excellence of your product. I have never once been troubled with oil in the drums, have noticed no appreciable increase in weight and have skidded only once, even on wet roads, when at speed. Moreover, I have always felt perfectly sure of a quick stop at all speeds, under all road conditions, and have several times avoided injury, both to myself and 'bike,' when a nasty smash seemed imminent. The action is beautifully smooth, and the drums are waterproof under all weather conditions. In short, a fine job and worth their weight in gold."

R. P. G., of Crayford, Kent.

"I am not in the habit of writing to manufacturers about their goods, but I am so delighted with the performance of articles bearing your name that I had to write this.

"I have a bicycle fitted with Sturmev-Archer 3-speed and front and rear hub brakes, and am convinced that I have got the safest and easiest-running cycle I have ever had. It is apparently impossible to skid with this type of brake and that is a big advantage in this district of winding, gravelly roads with steep gradients that are climbable with the aid of bottom gear. I am of the opinion that this type of brake will revolutionise cycling and anyone buying a new machine not fitted with these and the 3-speed gear is foolish.

"I notice in your advertisements in the Press and elsewhere that your slogan seems to be 'The gear that makes cycling easy.' My own recent experiences are an excellent proof of this, but I think you will have to change your slogan to 'The Hub of the Cycling World' or 'The World Revolves Round on a Sturmev-Archer,' or something on these lines if my prediction of the success of your present models is any indication."

H. G. S., of Redcar, Yorks.

"The hub brake has a wonderfully silky feel and seems to eliminate skids altogether. The machine can be pulled up in a very short space without any side slip or skid at all. The whole hub runs smoothly and silently and appears to be a thoroughly workmanlike job. I thank you for giving an added stimulus to the great game of cycling."

D. A. L., of Salford, Lancs.

"I feel I should say a word in praise of your Tandem Hubs. Riding a tandem fitted with these hubs and brakes I am often asked by tandem critics, 'Do they stand up to tandem work?' As I live in the heart of the South Downs, which most cyclists know full well, the hills are very severe.

"I am always riding on these hills; therefore, there could be no better test for hub gears than this.

"My answer to them is decidedly 'YES, they do.' I find them trouble-free and, in my opinion, they give 50% longer life to the chains. I would strongly advise tandem riders to fit these gears with hub brakes which are second to none and ride in safety with ease and pleasure."

W. C., of Seaford, Sussex.

"I have just completed 1,000 miles on the Tandem 3-speed Brake Hub. I am delighted with its performance; it is the first time that I have been able to face the descent of any hill on a tandem and to feel that I had plenty of reserve braking in hand.

"Anyone who knows the country round this district knows that some severe gradients are to be met with, and I have yet to see the hub overheat.

"I rather expected to lose a certain amount of liveliness in the wheel to gain this extra braking, but I cannot feel any loss whatever. I know many cyclists who are replacing other type gears and brakes with the Tandem 3-speed Brake Hub, which is a sure indication of its capabilities."

From Nelson, Lancs.

"I think you may be interested to know about the excellent service which one of your expanding brake 3-speed hubs has given on my tandem. The machine was built for me early in 1934. A few weeks later I added a Jem sidecar to accommodate my fifteen-months-old son. There is now a baby daughter in the family, so I have added a carrier seat and straps for the boy. The outfit has been to Ireland twice, Wales once, and has had constant use nearer home, but the Sturmev-Archer Hub has never complained. Except for regular oiling I have given the hub no attention at all, but it still works perfectly. I have never weighed the tandem and sidecar, but the crew and human freight weigh 27 stone. Some load!"

R. R., Oxford.



One from a Manufacturer :-

"You will be pleased to know that we are making a 'Swing over' to Sturmev-Archer in our speed gear orders, for the constant trouble, both to us and our customers from other types of change gear can no longer be tolerated, and in consequence our orders for your hubs are increasing in proportion."

**THE ISLE OF MAN T.T. RACE, HELD IN  
JUNE, 1938, WAS WON ON A CYCLE  
FITTED WITH A STURMEV - ARCHER  
3-SPEED HUB.**

# THE STURMEY-ARCHER 3-SPEED TRIGGER CONTROL

## FEATURES :

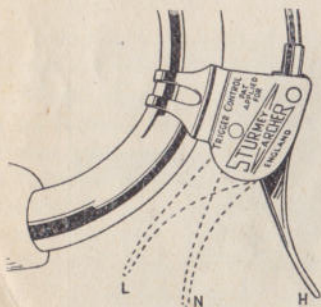
This control has been primarily designed for sporting and racing riders, but it can be used with equal advantage on any Sturmey-Archer 3-speed Hub.

Fitted on the handlebar in close proximity to the grip, it provides an instantaneous change either up or down by the flick of a finger.

On changing up from low gear (by pressing lever down) a positive stop mechanism is incorporated, making it impossible to jump through middle gear. A second pressure in middle gear, however, immediately gives top gear.

When changing down, no such stop is incorporated, as there is considerably less risk of missing gear, also it is sometimes necessary to change from top to low direct, in order to ensure a quick getaway.

The pressure required to change gear either up or down is very light and only one finger is required for manipulation.



The lever being placed conveniently to the grip renders it unnecessary to move the hand from the grip, thus ensuring that there is no loss of steering control when changing gear.

The cable is detachable for replacement without dismantling the control, and complete with wires and pulleys, the control weighs only 5 ozs.

Price when supplied separately, complete with wires, etc., 5/-.

Extra charge when supplied with a Sturmey-Archer 3-speed Hub fitted to a new machine, or a hub supplied loose, 3/-.

## PROOF OF THE VALUE OF THE STURMEY-ARCHER TRIGGER CONTROL

" Permit me to say that I am very glad that I took your advice and waited for the Sturmey-Archer AM Gear with the new trigger control. In these days of 'gadgets' good, bad and indifferent, one gets rather cautious about reports of new innovations in the Cycling press, but this one fully merits all that was said of it. What a pleasure to be able to change gear on a hill without releasing the grip on the bars! I have always claimed that for the speedman the loss of power and control caused by groping about for levers has practically nullified the benefits derived from a 3-speed gear, but with the Sturmey-Archer trigger it is only necessary to move one finger. Moreover, the positive stop mechanism avoids that great bugbear, jumping past the middle gear. As I experienced no difficulty with it right from the start, that proves its simplicity. It is, in my opinion the best real improvement that has been introduced for years, not only to racing men, but all riders."

C., London.

" I would very much like to thank you for making such a wonderful gear control. I have given it a thorough good try-out during the last week or so, and I raced on it last Sunday in the massed start 100 km. and it worked lovely, better than ever I think. The gears were just ideal: it was as sweet as anything. It was very nice and saved a lot of time not having to take your hands off the change gear.

Once or twice as we were in a fast sprint even off the seat trying hard, just a flick of the finger and you were in top, saved all that time of having to get back in your seat to change with those other types of gears. I will not be without it in all my long distance races on road or massed start."

L. T., London.

" If ever a component proved itself the trigger control did on that ride, as quick release from bottom to top and smooth decrease obtained in minimum space and time definitely makes a faster and safer ride, and I should say for tandem riders that little gadget is 100 per cent."

A. T., Bacup.

" I have now had a fair opportunity of testing your new trigger control in various phases of the sport and have found it to be a really excellent proposition, especially for racing. The device should prove exceptionally useful for massed start races."

F. J., Cardiff.

" I had the opportunity of using the AR Hub and trigger control in the Club's 50 mile time trial, and I should like to say the trigger control was perfect and a pleasure to use throughout the ride, not once did it falter, and it certainly helped me to win."

S., Notts.

## LATEST QUICK RELEASE GEAR CABLE CONNECTION

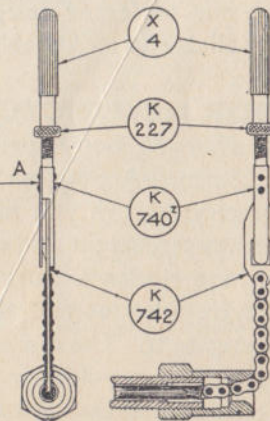
We have designed a new quick release connection for the gear control wire which enables the wire to be instantaneously disconnected and re-connected without interfering with the gear control adjustment, and it is particularly suitable for sports machines.

Part K.742 is attached to the chain instead of the normal screwed connection, and clipped to this is the part K.740Z, consisting of a latch and spring retainer. The end of this latch is screwed and takes the normal X.4 Knurled connection and K.227 Locknut.

The gear is adjusted in the usual way, but when it is required to disconnect the cable it is only necessary to press with the thumb at A (on the spring side).

The cable will then spring apart. To re-connect, the part K.742 is pushed upwards between the spring and the latch until it engages. There is no need to readjust, as the connection takes up the same position after replacing as it had before disconnecting.

Standard equipment with AM and AR close ratio 3-speed Hub, 6d. extra on all other types of 3-speeds.



# Special Advantages of the Sturmey-Archer 3-Speed Gear

**ELIMINATION OF FRICTION.** Throughout the whole hub, special care has been taken with bearing design to make the hub as frictionless as possible and in actual use no difference whatever in the running can be felt, compared with the single speed hub. All the bearings are designed to give a minimum friction loss and all of them run in oil, so ensuring that sweet "silkeness" of running, only to be found in Sturmey-Archer.

**WATERPROOF.** The cone dust caps have been designed to give the maximum weather protection to the hub, whilst still leaving the hub perfectly free. Absolutely no friction whatever at this point. Providing the hub is regularly lubricated, these will effectively keep out mud and water.

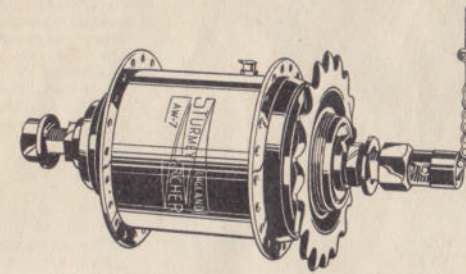
**GEAR CHANGE.** An entirely new type of gear change has been introduced in this range of 3-speed hubs, and in changing gear no skill whatever is necessary in timing the movement of the gear lever with the pedalling action. The hub will positively change gear under all riding conditions, whether driving or free-wheeling. The only indication of a change of gear is a slight forward movement of the pedals which occurs automatically on changing gear either up or down. Top-tube, handlebar control or trigger control can be supplied to operate the gears.

**ACCURACY, STRENGTH and DURABILITY.** The most minute care, accuracy and years of experience have enabled us to perfect the manufacture of the Sturmey-Archer 3-speed Gear. The gears are immensely strong and reliable and a great margin of strength is provided in the working parts. Correct hardening of the working parts in conjunction with our perfected design makes the Sturmey-Archer the most durable and reliable of all variable gears.

**YOUR NEW BICYCLE.** In ordering a new bicycle insist upon having a Sturmey-Archer 3-speed Gear. No bicycle should be without it. For the Sturmey-Archer can be fitted to any bicycle, and it is fitted to all the best bicycles. If you have an old bicycle, get your local Agent to fit a Sturmey-Archer; it will add untold pleasure to the joys of riding. Once you have ridden a Sturmey-Archer you will never be tempted to ride a bicycle without one again. Try a friend's machine fitted with it. Investigate it. The more you do so the more you will be convinced. For it is the Sturmey-Archer 3-speed Gear which has revived cycling and indeed "made cycling easy" for young and old.

STURMEY-ARCHER provides a comprehensive range of Hubs to suit every class of rider.

## AW STANDARD WIDE RATIO 3-SPEED HUB



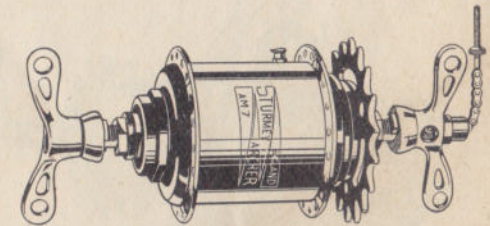
Of similar pattern to the original Sturmey 3-speed Hub, the gears of the AW Hub are always in mesh, and are entirely dustproof. A water-excluding device prevents the ingress of moisture, and the whole mechanism runs in oil. Gear changing is simplicity itself. A glance at the table relating to this hub will show what a wide variety of ratios are available. The gear ratios provided give an increase of 33 1/2% from normal to high and 25% decrease from normal to low.

Suitable for tourist, sports and all types of roadster and tandem machines.

Supplied loose (additional charge for fitting) ... .. .	23/9
When fitted as an extra on a new machine ... .. .	21/-

## AM MEDIUM RATIO 3-SPEED HUB

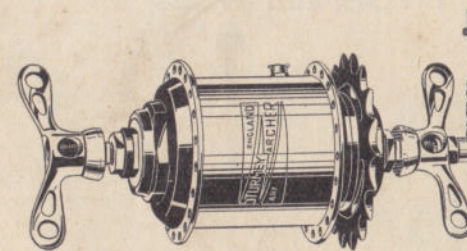
Designed to meet the exacting demands of the clubman and other enthusiastic sports riders. Particularly suitable for massed start racing. Provides an instantaneous change of gear under all riding conditions whether driving or free wheeling. Wing nuts and quick release connection are standard fittings. The gear ratios give an increase of 15.55% from normal to high and 13.46% decrease from normal to low.



Suitable for clubmen, and riders of all types of sports machines and tandems.

Supplied loose (additional charge for fitting) ... .. .	26/-
When fitted as an extra on a new machine ... .. .	23/-

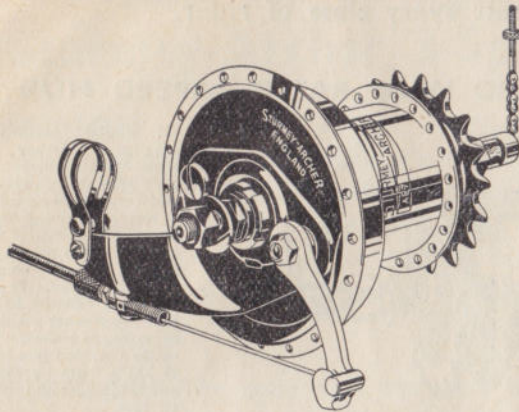
## AR ULTRA CLOSE RATIO 3-SPEED HUB



7.24% increase, 6.76% decrease. The new AR Ultra-Close Ratio 3-speed Sports Hub has been designed expressly for fast road work, and is a worthy addition to the long line of 3-speed hubs, which have "led the field" for more than 30 years. It has clearly demonstrated itself to be absolutely weather-proof, trouble-proof, and a revelation in easy, effortless gear changing. No other gear can possibly give sweeter, easier, or more effortless riding. Wing nuts and 9 inch release connection are standard.

Supplied loose (additional charge for fitting) ... .. .	29/-
When fitted as an extra on a new machine ... .. .	25/3

### ABC STANDARD WIDE RATIO 3-SPEED HUB

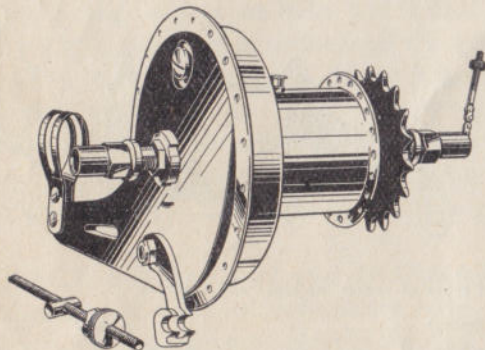


Fitted with internal expanding brake with cable control. Suitable for tourist, sports and all types of roadster machines. Riders greatly appreciate the many advantages of the Sturmey-Archer expanding brake 3-speed Hub. The brake ensures perfect control of one's machine, and the range of gears make riding a continuous pleasure. The gear ratios give an increase of 33 1/3% from normal to high and 25% decrease from normal to low.

AB similar to ABC but fitted with rod brake control and suitable for tourist and all types of roadster machines.

Supplied loose (additional charge for fitting) ... ..	32/6
When fitted as an extra on a new machine ... ..	27/6

### AT TANDEM STANDARD WIDE RATIO 3-SPEED HUB

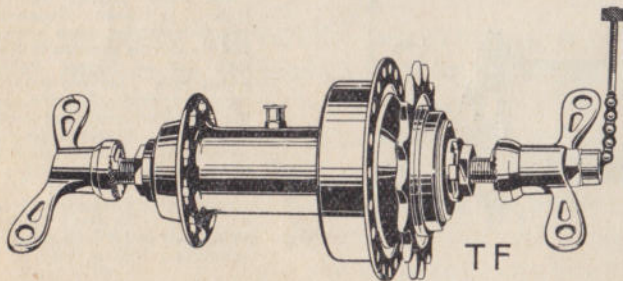


Fitted with internal expanding brake with large diameter (4 1/2) brake drum. Operated by cable - cum - rod brake control. 33 1/3% increase from normal to high and 25% decrease from normal to low. Suitable for all types of tandems.

ATC Tandem 3-speed hub as above but with cable brake control. AT and ATC hubs can be supplied with 1 1/2" or 1 3/4" chain lines.

Supplied loose (additional charge for fitting) ... ..	35/
When fitted as an extra on a new machine ... ..	28/6

### T AND TF TWO-SPEED HUBS

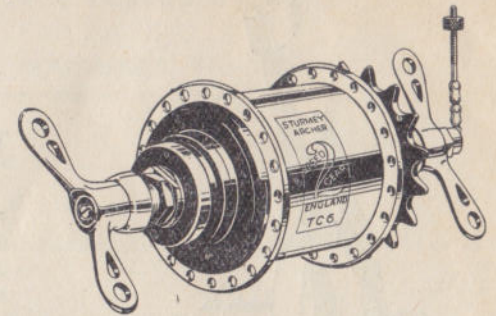


T 2-SPEED HUB with free wheel, suitable for all types of solo or tandem machines.

TF Similar to T but with fixed sprocket, suitable for clubmen and riders of all sports machines and tandems. Wing nuts and quick release connection are standard.

Supplied loose (additional charge for fitting) ... ..	19/6
When fitted as an extra on a new machine ... ..	16/9

### TC TWO-SPEED CLOSE RATIO HUB



Fixed Gear or Free Wheel. 13.46% reduction for low gear. Wing nuts and quick release connections are standard fittings when supplied with fixed gear. Specially produced for clubmen and sporting riders who want a fixed gear hub with a closer ratio than the TF pattern, the new TC has rapidly established itself in the hearts of fast roadmen.

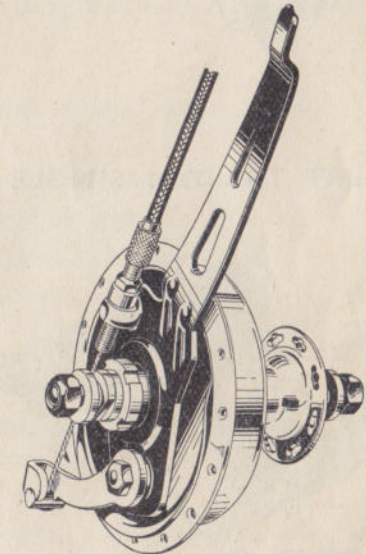
Supplied loose (additional charge for fitting) ... ..	19/6
When fitted as an extra on a new machine ... ..	16/9

### BFC FRONT HUB

FRONT HUB WITH INTERNAL EXPANDING BRAKE and cable control, suitable for sports and sports tourist machines.

BF hub similar to BFC but having rod brake control and suitable for tourist and roadster machines.

Supplied loose (additional charge for fitting) ... ..	13/9
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### BRC REAR HUB

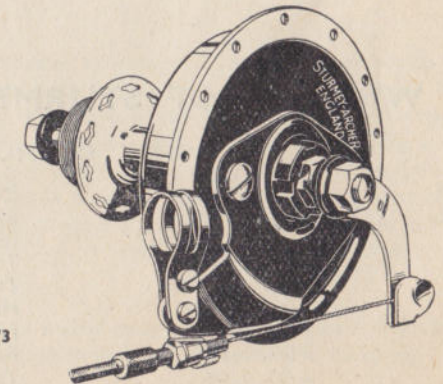
SINGLE SPEED REAR HUB WITH INTERNAL EXPANDING BRAKE and cable control. Suitable for sports and sports tourist machines.

BR hubs similar to BRC but having rod control and suitable for tourist and roadster machines.

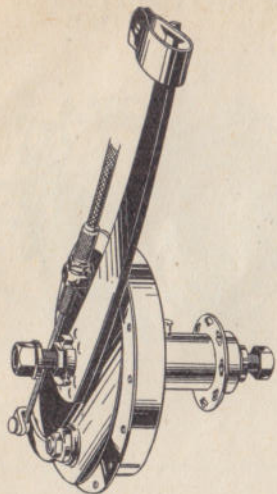
BRD hub similar to BR but suitable for use in conjunction with derailleur gears.

BRCD hub similar to BRC but suitable for use with derailleur gears.

Supplied loose (additional charge for fitting) ... ..	15/3
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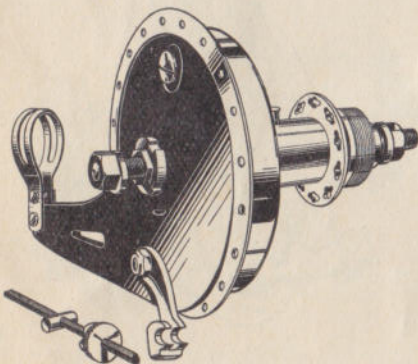


### BFT TANDEM FRONT HUB

FRONT HUB with internal expanding brake with large diameter ( $4\frac{3}{8}$ ) brake drum. Operated by cable brake control. Suitable for all types of tandems.

Supplied loose (additional charge for fitting) 17/-

### BRT TANDEM SINGLE SPEED REAR HUB



REAR HUB with large diameter ( $4\frac{3}{8}$ ) brake drum. Operated by cable-cum-rod control.

BRTC Tandem single speed rear hub as above, but with cable brake control. Both BRT and BRTC hubs are made suitable for fitting derailleur gears.

Suitable for all types of tandems.

Supplied loose (additional charge for fitting) ... 18/6

## WEIGHTS OF STURMEY-ARCHER HUBS

### WEIGHTS OF HUBS ONLY.

AW	...	2 lbs. 6 ozs.	BR	...	2 lbs. 3 ozs.
AM	...	2 lbs. 7 ozs.	BFT	...	2 lbs. 10 ozs.
AR	...	2 lbs. 10 ozs.	BRT	...	2 lbs. 11 ozs.
AB	...	3 lbs. 8 ozs.	Top tube gear control	...	3 ozs.
AT	...	4 lbs.	Trigger handlebar control	...	5 ozs.
T	...	1 lb. 14 ozs.	Handlebar control	...	6 ozs.
TF	...	1 lb. 9 ozs.	Front cable control	...	7 ozs.
TC	...	2 lbs. 5 ozs.	Rear cable control	...	8 ozs.
BF	...	2 lbs. 1 oz.	Tandem cable-cum-rod control	...	15 ozs.

## ADAPTABILITY

**ADAPTABILITY FOR SOLO MACHINES.** Hub width  $4\frac{5}{16}$ " overall (can be reduced to  $4\frac{1}{16}$ " by removal of spacing washer on left side and cone lock nut on right side if necessary).

Shell for rear hub drilled 36 or 40 holes.

Shell for front hub drilled 32 or 36 holes.

Sprockets available from 16 to 20 teeth and also 22 teeth. Sprockets with 14 or 15 teeth can be supplied for AR and AM Hubs.

Sprockets are suitable for  $\frac{1}{2}$ "  $\times$   $\frac{1}{8}$ " chain.

Sprockets can also be supplied for  $\frac{1}{2}$ "  $\times$   $\frac{3}{16}$ " chain in the following sizes only (screw-on fitting) : 16, 18 and 22 teeth.

Chain line variable between  $1\frac{1}{2}$ " minimum to  $1\frac{3}{4}$ " maximum, by reversing sprocket and using one or two  $\frac{1}{16}$ " spacing washers.

**ADAPTABILITY FOR TANDEM MACHINES.** AT or ATC Hub, width  $4\frac{13}{16}$ " overall, giving  $1\frac{1}{4}$ " chain line.

Shell drilled for either 36 or 40 holes, suitable for 12 gauge spokes.

Sprockets available from 16 to 22 teeth for  $\frac{1}{2}$ "  $\times$   $\frac{1}{8}$ " chain.

Sprockets can also be supplied for  $\frac{1}{2}$ "  $\times$   $\frac{3}{16}$ " chain, 16, 18 and 22 teeth.

For a chain line of  $1\frac{1}{2}$ " or  $1\frac{3}{8}$ " a longer axle must be used with K.365 distance sleeve at the sprocket end. This makes overall width of hub  $5\frac{1}{16}$ ". Sprocket is reversed to obtain  $1\frac{3}{8}$ " chain line, and spacing washers can be added if required for  $1\frac{3}{4}$ " chain line.

**DETACHMENT.** The AM Medium Ratio and AR Close Ratio 3-speed Hubs. Every device to facilitate quick detachability of these hubs from the machine is fitted as standard.

- Both cones are fitted with locknuts so that the hub adjustment is not affected in removing the wheel from the cycle. (Standard to all 3-speed hubs.)
- A quick release connection is fitted to the gear control wire which enables the wire to be quickly disconnected and reconnected without upsetting the gear control adjustment.
- Wing Nuts.** These are of special Sturmey-Archer design in which the washer portion is provided with an elongated hole to engage the axle flats, together with an extended tongue across the front face which engages with the slots in the fork ends, so preventing any possibility of the axle turning in the frame. Further, the washer face is of large area with specially cut serrations, giving a perfect grip on the fork ends, and preventing any endwise movement of the wheel in the frame. Wing Nuts are a standard fitment to the AM and AR Hubs, and can also be supplied on any other type of hub at an extra charge of 1/- per pair.
- Sprocket.** The sprocket is also of special design, so as to be easily removable. It is made to fit over splines, and is then secured by a threaded lock-ring (left-hand thread).

# STURMEY-ARCHER GEAR RATIO TABLES

## AW, AB, ABC, AT & ATC 3-SPEED STANDARD WIDE RATIO HUBS

The following table shows the ratio obtainable with 26" and 28" wheels, and 16 to 20 tooth hub sprockets.

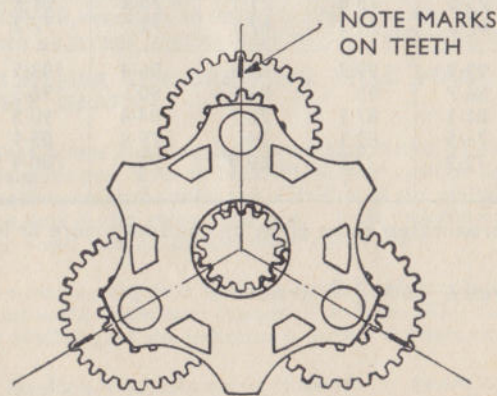
No. of Bracket Chain Wheel.	Teeth on Hub Sprocket.	26 inch Wheels.			28 inch Wheels.		
		Low	Nor.	High	Low	Nor.	High
40	16	48.8	65	86.7	52.5	70	93.3
	17	45.9	61.2	81.6	49.4	65.9	87.9
	18	43.4	57.8	77.1	46.6	62.2	82.9
	19	41	54.7	72.9	44.2	58.9	78.5
	20	39	52	69.3	42	56	74.7
42	16	51.2	68.2	90.9	55.1	73.5	98
	17	48.2	64.2	85.6	51.9	69.2	92.3
	18	45.5	60.7	80.9	49	65.3	87.1
	19	43.1	57.5	76.7	46.4	61.9	82.5
	20	41	54.6	72.8	44.1	58.8	78.4
44	16	53.6	71.5	95.3	57.8	77	102.7
	17	50.5	67.3	89.8	54.4	72.5	96.7
	18	47.7	63.6	84.8	51.3	68.4	91.2
	19	45.2	60.2	80.3	48.6	64.8	86.4
	20	42.9	57.2	76.3	46.2	61.6	82.1
46	16	56	74.7	99.6	60.4	80.5	107.3
	17	52.7	70.3	93.7	56.9	75.8	101.1
	18	49.8	66.4	88.5	53.6	71.5	95.3
	19	47.2	62.9	83.9	50.9	67.8	90.4
	20	44.9	59.8	79.7	48.3	64.4	85.9
48	16	58.5	78	104	63	84	112
	17	55.1	73.5	98	59.3	79.1	105.5
	18	52	69.3	92.4	56	74.7	99.6
	19	49.3	65.7	87.6	53	70.7	94.3
	20	46.8	62.4	83.2	50.4	67.2	89.6
50	16	61	81.3	108.4	65.6	87.5	116.7
	17	57.4	76.5	102	61.8	82.4	109.9
	18	54.2	72.2	96.3	58.4	77.8	103.7
	19	51.3	68.4	91.2	55.3	73.7	98.3
	20	48.8	65	86.7	52.5	70	93.3

The Gear Ratios provided are high gear 33½ per cent. above normal, and low gear 25 per cent. below normal. The normal gear is according to the number of teeth on the front chain wheel, as in a single-speed machine.

## AM MEDIUM RATIO 3-SPEED HUB

13.46% Decrease. Direct Drive. 15.55% Increase.

No. of Teeth on Bracket Chain Wheel	Teeth on Hub Sprocket.	26in. Wheels.			27in. Wheels.		
		Low	Nor.	Top	Low	Nor.	Top
40	14	64.3	74.2	85.6	66.9	77.1	88.8
	15	60	69.3	80.2	62.4	72	83.2
	16	56.4	65	75.1	58.5	67.5	77.9
	17	53.1	61.2	70.6	55	63.5	73.4
	18	50.1	57.8	66.8	52.1	60	69.3
42	14	67.7	78	90	70.2	81	93.5
	15	63	72.8	84.1	65.7	75.6	87.2
	16	59	68.2	78.7	61.5	70.9	82
	17	55.6	64.2	74.1	57.7	66.7	77
	18	52.7	60.7	70	54.6	63	72.8
44	14	70.7	81.7	94.2	73.6	84.8	97.9
	15	66.2	76.3	87.9	68.7	79.2	91.3
	16	62.1	71.5	82.6	64.3	74.2	86.6
	17	58.3	67.3	77.7	60.7	69.9	80.8
	18	55.2	63.6	73.5	57.2	66	76.2
46	14	74	85.4	98.6	77	88.7	102.5
	15	69.1	79.7	92	71.8	82.8	95.6
	16	64.8	74.7	86.2	67.3	77.6	89.5
	17	61.2	70.3	81.3	63.3	73	84.2
	18	57.6	66.4	76.8	59.8	69	79.6
48	14	77.4	89.1	103	80.3	92.5	107
	15	72.1	83.2	96	75	86.4	100
	16	67.7	78	90	70.2	81	93.5
	17	63.7	73.5	85	66.1	76.2	88
	18	60	69.3	80.2	62.5	72	83.2
50	14	80.6	92.9	107.4	83.6	96.4	111.4
	15	75.2	86.7	100.3	78	90	104.1
	16	70.5	81.3	94	73.2	84.4	97.6
	17	66.3	76.5	88	68.8	79.4	91.7
	18	62.6	72.2	83.3	65.1	75	86.5



**Planet Cage.** If it should be necessary to dismantle this hub, particular attention must be paid to the correct meshing of the gear teeth when fitting the double planet pinions in their cage. If one of these should be fitted wrongly a locked wheel and serious damage is likely. We give a diagram illustrating this, and would point out that one tooth on the large end of each planet is marked. It is important that these three marks are set radial with the centre of the planet pinion pins and the hub axle before the pinion pins are fitted.

## AR CLOSE RATIO 3-SPEED HUB

No. of Bracket Chain Wheel	Teeth on Hub Sprocket	26in. Wheels.			27in. Wheels.		
		Low	Nor.	Top	Low	Nor.	Top
40	14	69.2	74.2	79.6	71.9	77.1	82.7
	15	64.6	69.3	74.3	67.1	72	77.2
	16	60.6	65	69.7	62.9	67.5	72.4
	17	57.1	61.2	65.6	59.2	63.5	68.1
	18	53.9	57.8	62	55.9	60	64.3
42	14	72.7	78	83.6	75.5	81	86.9
	15	67.9	72.8	78.1	70.5	75.6	81.1
	16	63.6	68.2	73.1	66.1	70.9	76
	17	59.8	64.2	68.8	62.2	66.7	71.6
	18	56.6	60.7	65.1	58.7	63	67.6
44	14	76.2	81.7	87.6	79.1	84.8	91
	15	71.1	76.3	81.8	73.8	79.2	85
	16	66.6	71.5	76.7	69.2	74.2	79.6
	17	62.7	67.3	72.2	65.2	69.9	75
	18	59.3	63.6	68.2	61.5	66	70.8
46	14	79.6	85.4	91.6	82.7	88.7	95.2
	15	74.3	79.7	85.5	77.2	82.8	88.8
	16	69.6	74.7	80.1	72.3	77.6	83.2
	17	65.5	70.3	75.4	68.1	73	78.3
	18	61.9	66.4	71.2	64.3	69	74
48	14	83.1	89.1	95.6	86.3	92.5	99.2
	15	77.6	83.2	89.2	80.6	86.4	92.7
	16	72.7	78	83.7	75.5	81	86.9
	17	68.5	73.5	78.8	71.1	76.2	81.7
	18	64.6	69.3	74.3	67.1	72	77.2
50	14	86.6	92.9	99.7	89.9	96.4	103.5
	15	80.9	86.7	93	83.9	90	96.5
	16	75.8	81.3	87.2	78.7	84.4	90.5
	17	71.3	76.5	82.1	74	79.4	85.1
	18	67.3	72.2	77.5	69.9	75	80.4

NOTE.—Low and Top Gears are approximately those given by one tooth more or less on the hub sprocket.

7.24% Increase. 6.76% Decrease.

## Instructions for Lubrication of Sturmey-Archer Hubs

On the attention given to lubrication depends to a very large extent the sweet running and life of the gears. The attention given to the quality of the oil and to regular oiling is most important, and is well repaid by long, efficient and trouble-free service. One great advantage of sufficient oil is that it is a safeguard against water getting into the hub.

Before using a new hub, or one that has been stored away for some time, inject one teaspoonful of Sturmey-Archer Hub Lubricant and add from  $\frac{1}{4}$  to  $\frac{1}{2}$  this quantity at least once every fortnight afterwards. Oil only through the lubricator in the shell and make sure that the lubricator hole is clear and that the oil sinks into the hub. See that the cover is properly closed afterwards.

Solid or semi-solid grease, and oils that are inclined to become gummy must on no account be used, otherwise the pawls stick and cause the gear to operate badly.

The gear control and the pulleys should also receive occasional attention to maintain easy action. Vaseline is recommended for these but must only be applied sparingly. The handlebar control should be oiled frequently in order to maintain the free action of the cams, otherwise this type of control may become stiff in operation.

**Use only Sturmey-Archer Hub Lubricant.** This is a high grade oil of superior quality which will not become gummy, nor will it evaporate or cause corrosion.

Supplied in 4 oz. tins at 8d. each from your Cycle Dealer.

## Gear Adjustment

After fitting the wheel to the cycle, screw the indicator into the axle key up to its stop as shown at A in the diagram. This can be checked by noting that the second rivet will then be level with the end of the axle as shown at B in diagram. The indicator may then require unscrewing a trifle to line the chain up with the control wire as shown. It is **NEVER** necessary to unscrew more than one half-turn for this purpose, as the chain can then be turned over on itself to point either up or down.

**FURTHER UNSCREWING WILL MAKE IT IMPOSSIBLE TO ADJUST THE GEARS.**

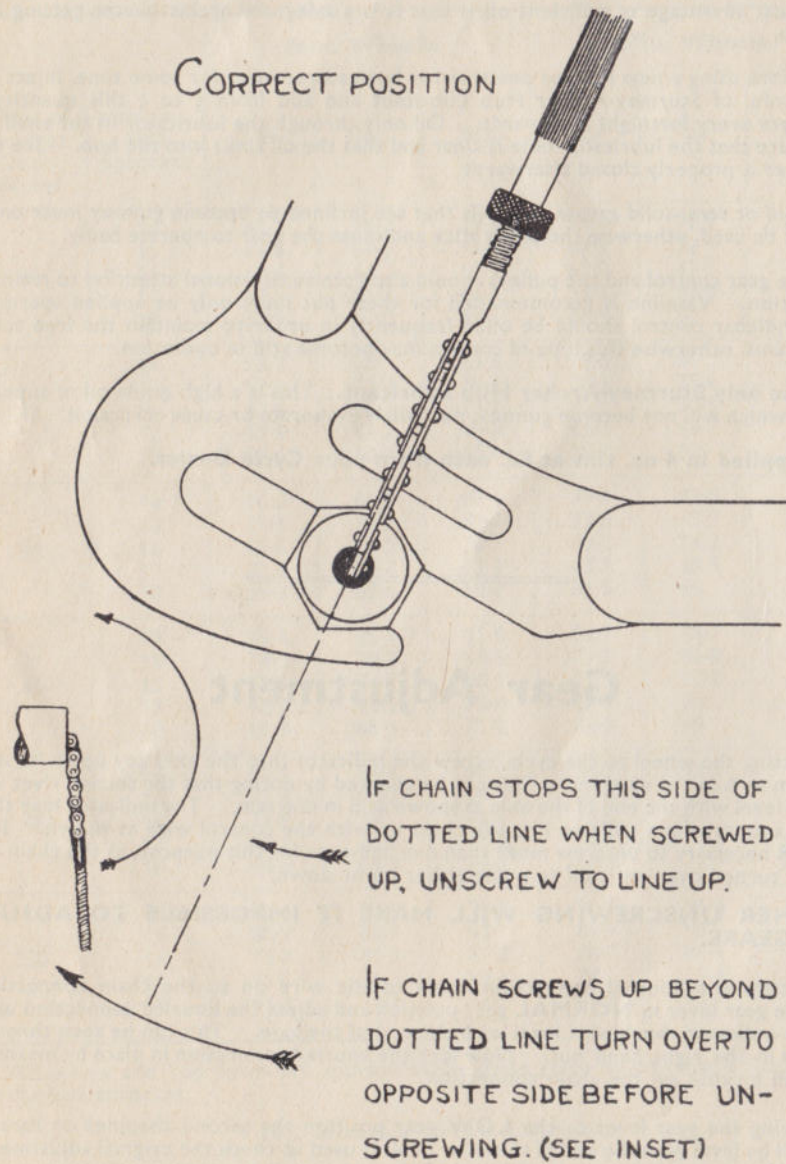
Next screw the knurled connection fitted to the wire on to the chain connection. Place the gear lever in **NORMAL** gear position and adjust the knurled connection until the first indicator shoulder is level with the end of the axle. This can be seen through the slots in the right hand nut. Now lock the knurled connection in place by means of the small locknut on the chain connection.

On moving the gear lever to the **LOW** gear position the second shoulder or base of cone will be level with the end of the axle. This is used to check the original adjustment. In **HIGH** gear the indicator is within the axle and cannot be seen.

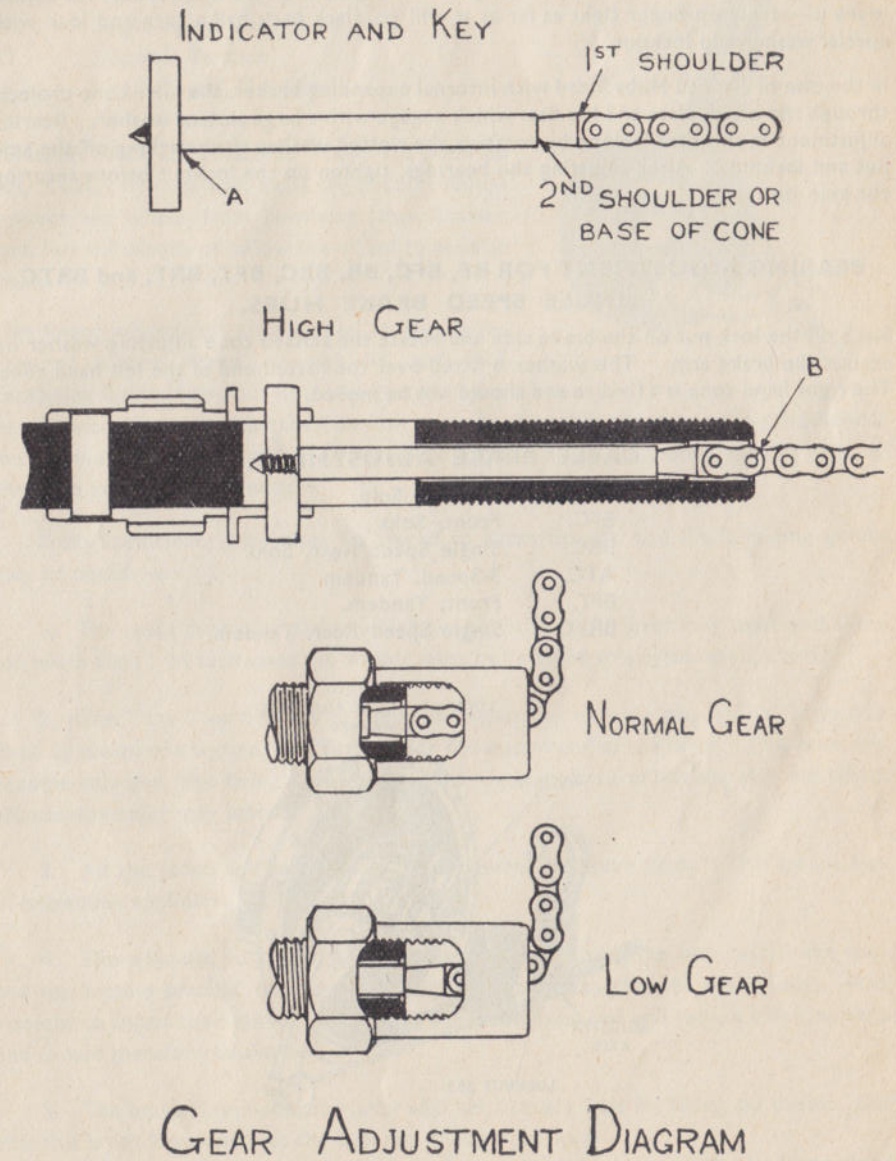
If insufficient adjustment is obtained by means of the chain connection, the quadrant (or wire stop in the case of a handlebar control) can be moved along the top tube in the required direction, and the final adjustment made on the chain connection.

# Gear Adjustment Diagram

**IMPORTANT.**—Gear Adjustment for AW, AB, ABC, AT and ATC Hubs.  
Also for 1937 and 1938 AM and AR Types.



# Gear Adjustment Diagram



If at any time the wheel should be removed, or the control wire disconnected, it is important to check that the indicator is screwed fully home, before attempting to readjust the gear control as instructed previously.

**3-SPEED BEARING ADJUSTMENT.** All bearings are adjusted simultaneously by turning the left hand cone after slacking off the cone locknut, locking this again after adjustment. The right hand cone is set at the works, and locked with a special washer and should not be disturbed. If the right hand cone should be moved, correct adjustment is—screw up finger tight as far as it will go, slack back half a turn and lock with special washer and locknut.

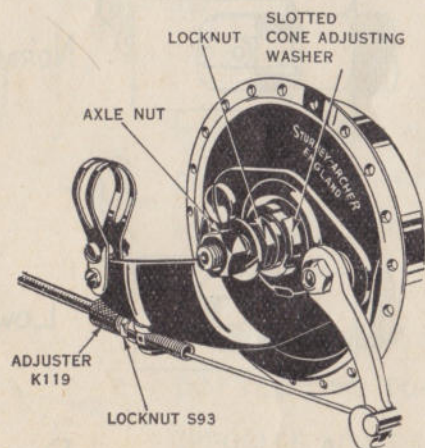
In the case of 3-speed Hubs fitted with internal expanding brakes, the L.H. cone projects through the brake plate and has flats which engage with a large slotted washer. Bearing adjustment in this case is done by rotating the slotted washer after slacking off the axle nut and locknut. After adjusting the bearings, tighten up the locknut before securing the axle nut.

### BEARING ADJUSTMENT FOR BF, BFC, BR, BRC, BFT, BRT, and BRTC SINGLE SPEED BRAKE HUBS.

Slack off the lock nut on the brake side and rotate the slotted cone adjusting washer up against the brake arm. This washer is fitted over the flattened end of the left hand cone. The right hand cone is a fixture and should not be moved.

### CABLE BRAKE ADJUSTMENT.

ABC.	3-Speed, Solo.
BFC.	Front, Solo.
BRC.	Single Speed Rear, Solo.
ATC.	3-Speed, Tandem.
BFT.	Front, Tandem.
BRTC.	Single Speed Rear, Tandem.



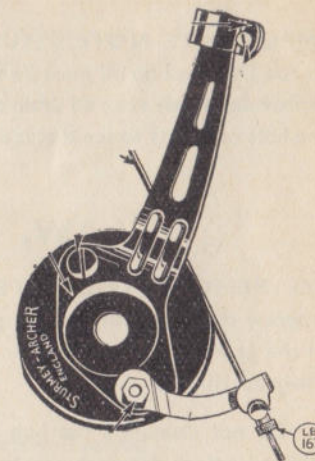
Apply the brake frequently when new, to bed the linings to the drum surface. The brake cable will then require adjusting. Slacken off the small hexagon nut (S93) on the adjusting screw (K119) up against the wire guide (K171) and unscrew the adjuster the required amount (in an anti-clockwise direction). Finally secure by tightening up the locknut (S93) again.

## Rod Brake Adjustment

### ROD BRAKE ADJUSTMENT

AB.	3-speed, Solo.
BF.	Front. Single Speed, Solo.
BR.	Single Speed Rear, Solo.
AT.	3-Speed, Tandem.
BRT.	Single Speed, Tandem.

**FINGER ADJUSTMENT.** Turn the knurled nut, LB167, on the rod, until the friction linings prevent the wheel from revolving, then slacken back just sufficiently to allow the wheel to revolve freely.



This finger adjustment also applies to the cable-rod control fitted to the AT and BRT Expanding Brake Hubs, but further adjustment can be obtained if required at the junction between the cable and the rod by slackening the locknut and turning the knurled connection, K119, tightening up the locknut after the adjustment is made.

Brake inefficiency may often be traced to these fittings, and the following points may be noted :—

1. The studs in the handlebar which support the roller lever may wear and allow too much play. In such cases the matter must be referred to a cycle manufacturer.
2. The "tab" on the end of the roller lever may develop play. This is usually fixed by means of a square hole, fitting over the square end of the lever. This hole may become enlarged (this being a matter for the cycle manufacturer) or the lock nut which secures the lever may loosen.
3. All the joints and swivel pins in the control can wear slack. This means loss of movement applied to the brake shoes.
4. There should be  $\frac{1}{2}$ " clearance between the link joining the two rear brake rods and the bottom bracket, to allow ample movement for applying the brake fully. Any attempt to adjust the brake by shortening the down-tube rod will reduce this clearance and should therefore be avoided.
5. The brake shoe operating lever also has a square hole for fixing purposes. See that this is not loose and that the lock nut is fully tightened.

**Brake Parts.** It is important when fitting the brake arm to see that the clip for securing it to the frame is set to fit the arm without any side strain, otherwise the alignment of the shoes with the drum is affected. The brake arm cannot be bent for this purpose.

There is no internal adjustment. Care must be taken however to see that the linings are not allowed to wear sufficiently to allow the heads of the fixing rivets to come into contact with the drum surface.

**IMPORTANT NOTE.** STURMEY-ARCHER Internal Expanding Brakes are designed to run DRY and no oil must be injected through the hole in the brake plate. This hole is provided solely as an oil drain to release any surplus oil from the hub bearings. Inspect the hole regularly to see that it does not become clogged with dirt.

## AW, AM and AR HUBS

**TO REMOVE THE INTERNALS.** First remove the left-hand cone. Then unscrew the right-hand ball ring from the shell (right-hand thread). This will detach all the gears except the left-hand ball cup. This ball cup screws into the shell with a left-hand thread.

Do not dismantle the hub unless it is essential to do so, as the hub is carefully adjusted before despatch, and it is not advisable to interfere with this adjustment. If at any time it has to be dismantled see that the recess in the R.H. ball ring in which the outer dust cap revolves is filled with vaseline or grease as a protection against water entering the bearings. Also put a little vaseline or grease in the R.H. and L.H. cone ball races.

## AB, ABC, AT and ATC HUBS

**TO REMOVE THE INTERNALS.** Remove the L.H. cone lock nut and pull off the slotted washer used for cone adjustment purposes. This releases the brake parts en bloc and exposes the L.H. cone for removal. Then unscrew the R.H. ball ring from the shell (R.H. thread). This will detach all the gears except the L.H. ball cup. This ball cup screws into the shell with a left-hand thread. Difficulty may be experienced when re-fitting the L.H. ball cup, in securing an oil-tight joint. In such cases an oil sealing washer (K135) should be used.

Do not dismantle the hub unless it is essential to do so, as the hub is carefully adjusted before despatch, and it is not advisable to interfere with this adjustment. If at any time it has to be dismantled see that the recess in the R.H. ball ring in which the outer dust cap revolves is filled with vaseline or grease as a protection against water entering the bearings. Also put a little vaseline or grease in the R.H. and L.H. cone ball races.

**TOOLS.** A special spanner is necessary to enable the L.H. ball cup to be unscrewed from the shell. This is available and is listed after the spares in the price list. A cone spanner with "C" end for L.H. adjusting washer and for the L.H. cone is also supplied (K44a).

A spanner for the cones and nuts is listed under symbol number X44A.

A "C" shaped spanner is also supplied for the sprocket lock nut used on the AR Hubs and on some hubs of the AM type (K235).

For removing the usual screw-on sprockets the Driver Holder DD5978 is necessary.

The two following tools are required for the complete dismantling of the AR type planet cage assembly :—

DD4976. Planet Cage Holding Fixture.

DD4977. Gear Ring Peg Spanner.

All these tools are listed after the spares list of the hubs for which they should be used.

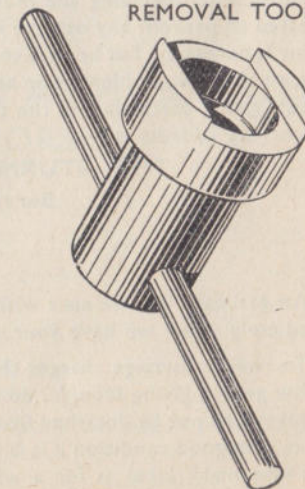


Bert James—"The SturmeY-Archer 3-speed Hub was a wonderful help."

## General Notes

1. Keep the gear control properly adjusted.
2. Change gears smartly, as slow gear changes may cause chipping of the engaging dogs.
3. Do not dismantle the hub unless it is essential to do so, as the hub is carefully adjusted before despatch, and it is not advisable to interfere with this adjustment. If at any time it has to be dismantled see that the recess in the R.H. ball ring in which the outer dust cap revolves is filled with vaseline or grease as a protection against water entering the bearings. Also put a little vaseline or grease in the R.H. and L.H. cone ball races.
4. Keep the L.H. cone correctly adjusted so that the wheel revolves freely without any appreciable lateral movement at the rim.
5. Pay special attention to lubrication and use SturmeY-Archer Hub Lubricant.
6. It is important that the axle in the 3-speed hubs should be prevented from rotating in the chain stay slots, by the flats provided for the purpose. If the fork ends are too wide, special washers can be supplied to take up the play.

BALL CUP  
REMOVAL TOOL.



## Notes and Rules for Ordering Spare Parts

- Prices do not include cost of postage or carriage, but goods value £2 and over will be sent carriage paid.
- We provide detailed dimensions and descriptions as far as possible to enable customers to identify alternative parts, but where any doubt exists, we recommend that the old parts should be sent as patterns. Give some description on the advice, as pinion, pawl, screw, cage, or spring. This helps to identify parts.
- Parts sent as patterns should be marked with sender's name and address either on the address label or inside the package, for identification.
- Patterns are not returned unless specially requested at time of ordering, as this avoids excess postage and packing. We cannot in any case return parts for which replacements are supplied under the terms of our guarantee.
- Do not enclose cash with goods. Remittances should be sent by separate letter post for your own protection.
- Customers having no account with us should not fail to remit when sending the order and also include postage. If the remittance exceeds the cost of the parts, the balance is always refunded with our invoice and receipt.
- Goods will be sent by C.O.D. service if desired but we prefer customers to ask for this on their orders as parcels are sometimes refused on account of the collection fees charged by the post office.
- We are willing at all times to give customers the benefit of our advice on any difficulties which may arise. We therefore invite all owners to write us for any information required which cannot be found in this booklet.

## Repairs

We are always ready to undertake any repairs for our customers and in most cases it will be best to send us the complete rear wheel. Remove all loose fittings, such as axle nuts, etc., including the indicator, and make sure that the ends of the axle are protected to prevent any damage in transit. For despatch by passenger train no other packing is necessary, but be sure to put your name as the sender, at the top of the address labels, so that we can identify on arrival. Then send us instructions in a separate letter by post, giving particulars of the trouble experienced for our guidance where possible. The correct address is:—

**THE STURMEY-ARCHER GEARS, LTD.,**  
**Service Dept.,**  
**Lenton,**  
**NOTTINGHAM.**

An estimate will be sent without delay, and we can usually complete the repairs immediately when we have your acceptance and remittance against this estimate.

To reduce carriage charges the internals may be removed and sent by post, but if the low gear is giving trouble, do not omit to send the left-hand ball cup. Otherwise this part need not be detached from the shell. Make sure, however, that the bearing surface is in good condition if it is not sent. Instructions can be enclosed in the parcel, otherwise mark label as for a wheel.

## Hub Gear Adjustments

FOR AM AND AR MEDIUM AND CLOSE RATIO  
 3-SPEED HUBS ONLY.

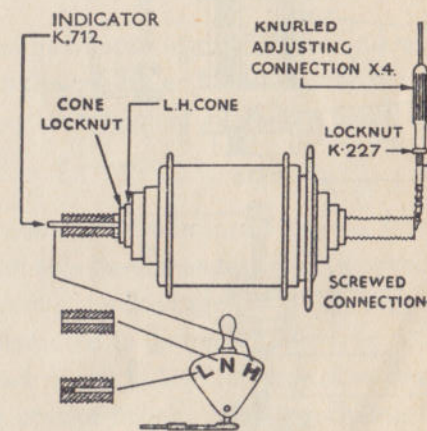
1939 TYPE.

To adjust gear control, first place gear lever in normal position. Then unscrew locknut K227 on the screwed connection X3, at chain end of hub, and adjust knurled connection, X4, fitted to wire, until the indicator screw K712 is level with the end of the axle. If this method gives insufficient adjustment, further adjustment can be obtained by sliding the clip on the top tube control, or the fulcrum clip in the case of handlebar control, along the top tube in the required direction.

The drawing shows the axle with the nut removed. It is not, however, necessary to take the nut off in order to carry out an adjustment as the position of the indicator can be easily observed through the hole in the end of the nut.

**Note.**—Check gear adjustment periodically, as the wire may become strained. Note also that if the rear wheel be moved, the gear control will require re-adjustment. See that the

control and pulley clips which guide the wire on the cycle frame are firm, and also see that the nuts on both sides of the axle are perfectly tight. The indicator should project  $\frac{3}{8}$ " out of the axle when the control is engaged in the high gear notch.



## SPARE PARTS FOR AM AND AR HUB AXLES AND INDICATORS

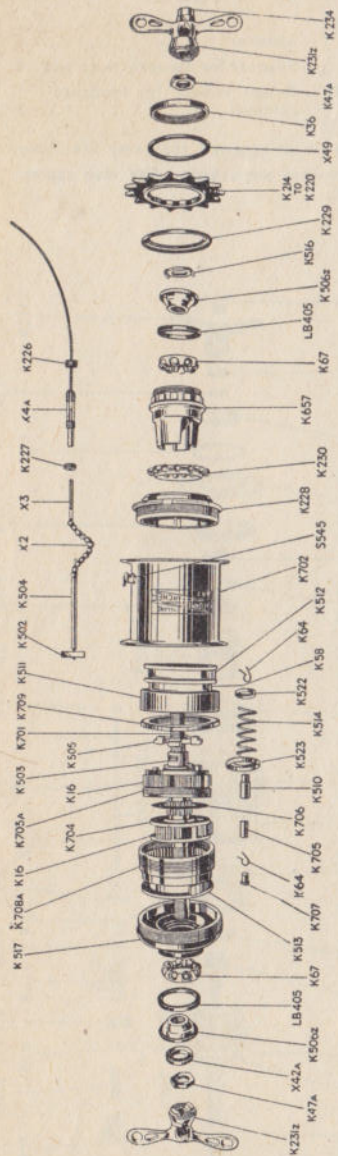
K711	Axle, 5 $\frac{1}{4}$ " long (AR Hub)	...	...	...	...	...	3/3
K711A	Axle, 6 $\frac{1}{4}$ " long (AR Hub)	...	...	...	...	...	3/3
K661	Axle, 5 $\frac{1}{4}$ " long (AM Hub)	...	...	...	...	...	3/3
K661A	Axle, 6 $\frac{1}{4}$ " long (AM Hub)	...	...	...	...	...	3/3
K502A	Axle Key. For AM and AR Hubs	...	...	...	...	...	2d.
K712	Indicator. For 5 $\frac{1}{4}$ " Axle. (AM and AR Hub)	...	...	...	...	...	6d.
K712A	Indicator. For 6 $\frac{1}{4}$ " Axle. (AM and AR Hub)	...	...	...	...	...	6d.
K713	Coupling Spindle, complete with chain screwed connection and lock nut. (AM and AR Hub)	...	...	...	...	...	1/-
K714	Indicator Collar. (AM and AR Hub)	...	...	...	...	...	2d.





SPARE PARTS—continued

SPARE PARTS—continued



Ref. No.		s.	d.
K504Z	Indicator Spindle with chain and connection for K701	1	0
K504AZ	Indicator Spindle with chain and connection for K701A	1	0
K514	Clutch Spring	0	1
K522	Clutch Spring Cap	0	1
K506Z	Axle Cone (R.H. or L.H.)	0	10
LB404	Cone Dust Cap	0	1
K516	R.H. Cone Locking Washer	0	1
K47A	Cone Lock Nut	0	1
X42A	L.H. Packing Washers $\frac{1}{8}$ " thick (omitted if hub is required only $\frac{1}{2}$ " wide overall)	0	1
K231Z	Wing Nuts per pair	2	0
K234	Chain Guide for R.H. wing nut	0	2
K519	R.H. Axle Nut	0	6
K520	L.H. Axle Nut	0	2
K521	Axle Lock Washer	0	1
K67	Ball Retainer for axle cones	0	3
K227	Connection Lock Nut	0	1

SHELL AND DRIVE PARTS.

Ref. No.		s.	d.
K60	R.H. Ball Ring (except for 14T or 15T cogs)	2	6
K63	Inner R.H. Dust Cap for K60	0	2
K228	Set of 24 Balls $\frac{1}{8}$ " diameter for R.H. Ball Ring	0	4
K228	R.H. Ball Ring (only for 14T or 15T sprockets)	2	6
K230	Ball Retainer for K228	0	4
K657	Driver without LB405 dust cap	3	0
LB405	Dust Cap for L.H. ball ring or for driver	0	1 $\frac{1}{2}$
K702R	Shell, 40 holes	4	0
K702A	Shell, 36 holes	4	0
K517	L.H. Ball Cup	2	6
S545	Lubricator	0	1
K62	Outer R.H. Dust Cap for K60	0	2
K229	Outer R.H. Dust Cap for K228	0	2
K214	Sprocket, 14T	1	0
K215	Sprocket, 15T	0	9
K216	Sprocket, 16T	0	9
K217	Sprocket, 17T	0	9
K218	Sprocket, 18T	0	9
K219	Sprocket, 19T	0	9
K220	Sprocket, 20T	0	9
X49	Sprocket Washer	0	1
K36	Sprocket Lock Nut	0	4

TOOLS.

Ref. No.		s.	d.
X44A	Spanner for Cones and Nuts	0	6
K235	Spanner for Sprocket Lock Nut	0	6
DD4976	Planet Cage Holding Fixture	3	4
DD4977	Gear Ring Peg Spanner	3	0
DD5978	Driver Holder for sprocket removal	2	3

GEAR PARTS.

Ref. No.		s.	d.
K704	Intermediate Planet Cage	3	0
K705	Intermediate Pinion Spindle	0	1
K16	Pinion	0	4
K706	Spacing Shim (fitted between the two planet cages)	0	0 $\frac{1}{2}$
K708A	L.H. Gear Ring	3	0
K709	Cage Locking Ring	0	3
K703A	Planet Cage	2	6
K510A	Pinion Pin	0	1
K513	Low Gear Pawl	0	3
K64	Pawl Spring	0	0 $\frac{1}{2}$
K707	Low Gear Pawl Spindle	0	1
K511	Gear Ring	3	0
K512	R.H. Pawl for Gear Ring	0	3
K58	Gear Ring Pawl Pin	0	1

AR CLOSE-RATIO

AXLE AND CLUTCH PARTS including CONES AND NUTS.

Ref. No.		s.	d.
K701	Axle (Standard)	3	3
K701A	Axle (extra long)	3	3
K503	Sleeve	0	4
K505	Sliding Clutch	1	0
K502	Axle Key	0	2
K523	Cap for Axle Key	0	1

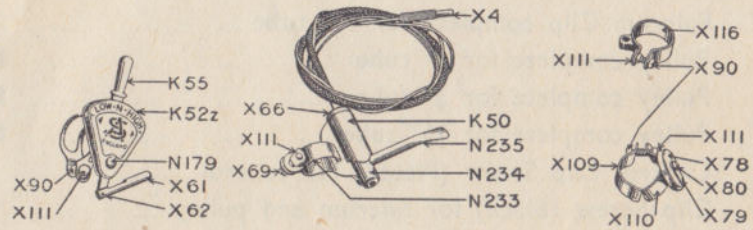
GEAR CONTROLS

TOP TUBE PATTERN.

Ref. No.		s.	d.
K52Z	Quadrant complete (state whether $\frac{3}{8}$ ", 1" or 1 $\frac{1}{8}$ " tube)	2	6
K55Z	Quadrant Lever	0	9
X61	Quadrant Connection	0	4
X62	Quadrant Connection Pin	0	0 $\frac{1}{2}$
N120	Quadrant Lever Spring	0	1
N179	Quadrant Lever Stud	0	1
X35	Split Pin for N179	0	0 $\frac{1}{2}$
X78	Pulley Wheel	0	3
X80	Pulley Wheel Screw	0	1
X79	Pulley Wheel Arm	0	1
X109	Pulley Half Clip	0	3
X110	Pulley Clip, 1" dia.	0	3
X110A	Pulley Clip, 1 $\frac{1}{2}$ " dia.	0	3
X69	Pulley Clip Screw	0	1
X111	Clip Nut	0	2
X78Z	Pulley complete (state whether for 1" or 1 $\frac{1}{2}$ " tube)	1	0
X90	Quadrant Clip Screw	0	1
X4	Knurled Connection (Standard)	0	4

Ref. No.		s.	d.
X4A	Knurled Connection, old type (quick release)	0	4
X81AZ	Top Tube Wire with nipples and grip, and X4A connection (Black):		
	Gent's, up to 36" long	0	6
	Lady's, up to 58" long	0	8
	Tandem, up to 59" long	0	8
K226	Wire Grip	0	1
X81Z	T.T. Wires and Connection X4 (Black):		
	Gent's, up to 36" long	0	6
	Lady's, up to 54" long	0	8
	Tandem, up to 58" long	0	8
KC1A	Top Tube Control complete, including X4A Connection with one pulley only	4	0
KC1	Top Tube Control complete, including X4 Connection with one pulley only	4	0

GEAR CONTROLS



HANDLEBAR PATTERN.

Ref. No.		s.	d.
K50	Outer Cam	0	9
K65	Cam Cap	0	2
K66	Cable Stop	0	1
N234	Inner Sleeve	0	9
N235	Handlebar Lever	0	9
N233	Cam Half Clip	0	3
X116Z	Fulcrum Clip, 1" dia.	0	6
X116AZ	Fulcrum Clip, $\frac{3}{8}$ " dia.	0	6
X78Z	Pulley complete	1	0
X81AZ	Inner Wire with Nipples and Grip and X4A Connection (Solo) up to 58" long	0	8
X81AZ	Inner Wire with Nipples and Grip and X4A Connection (Tandem and Lady's) up to 78" long	0	10
K226	Wire Grip	0	1
X81Z	Inner Wire and Connection X4 (Black):		
	Gent's, up to 58" long	0	8
	Lady's, up to 78" long	0	10
	Tandem, up to 79" long	0	10

Ref. No.		s.	d.
X82	Outer Casing, Black	1	0
X82AZ	Handlebar Inner Wire and Outer Cable complete, but less X4A connection.		
	Gent's with 58" wire	1	8
	Lady's with 78" wire	1	10
KC2A	Handlebar Control complete including X4A Connection (state length of wire required) with one pulley only	6	0
KC2L	Handlebar Control with two pulleys	6	4
KC2	Handlebar Control complete, including X4 Connection (state length of wire required) with one pulley only	6	0

## Trigger Control for 3-Speed Solo or Tandem Hubs

		s.	d.
GA249	Trigger Control Quadrant complete with fixing screw and nut and cable ferrule ... ..	2	6
K735Z	Inner and Outer Wires complete with nipples : Solo 58" long ... ..	1	8
K735AZ	Inner and Outer Wires complete with nipples : Tandem 72½" long ... ..	1	10
K735	Wire Nipple for trigger control ... ..	0	½
X105	Wire Nipple for hub end ... ..	0	½
X82	Outer Cable, 20" long ... ..	1	0
K734	Cable Ferrule for trigger control ... ..	1	
X83	Cable Ferrule for fulcrum clip ... ..	0	½
X116Z	Fulcrum Clip complete for 1" tube ... ..	6	
X116AZ	Fulcrum Clip complete for 7⁄8" tube ... ..	6	
X116BZ	Fulcrum Clip complete for 1½" tube ... ..	6	
X78Z	Pulley complete for 1" tube ... ..	1	0
X78AZ	Pulley complete for 7⁄8" tube ... ..	1	0
X78BZ	Pulley complete for 1½" tube ... ..	1	0
X90	Control Clip Screw (Plated) for control ... ..	1	
X69	Clip Screw (Black) for fulcrum and pulley ... ..	1	
X111	Clip Screw Nut (Plated) for control ... ..	2	
X111A	Clip Screw Nut (Black) for fulcrum and pulley ... ..	2	
GA249AZ	Trigger Control complete and length wires and one pulley ... ..	5	0
GA249AZ	Trigger Control complete with two pulleys, and tandem length wire ... ..	6	0

### NEW QUICK-RELEASE CONNECTION

K740Z	Screwed Connection with K741 Spring ... ..	8	
K227	Lock Nut for knurled connection X4 ... ..	1	
K742Z	Indicator 2⅜" long with chain and connector plate ... ..	1	0
K742AZ	Indicator 2⅝" long with chain and connector plate ... ..	1	0
K742BZ	Indicator 2⅞" long with chain and connector plate ... ..	1	0

## Guarantee

Sturmey-Archer Hubs (which expression shall include spare parts thereof) are guaranteed against defects of manufacture for a period of 12 months from the date of sale providing they are still the property of the first retail purchaser. This guarantee is subject to the conditions specified below.

With all hubs we give a special guarantee instead of the guarantee implied by statute or otherwise as to the quality or fitness for the purpose of cycling of hubs supplied by us, any such implied guarantee being in all cases excluded.

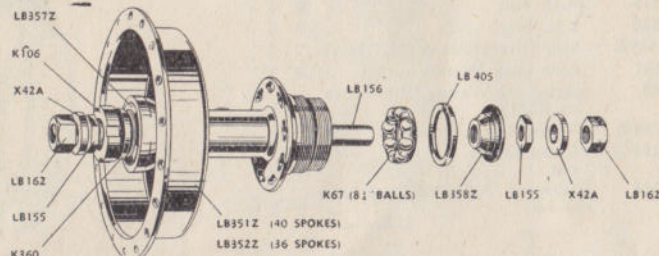
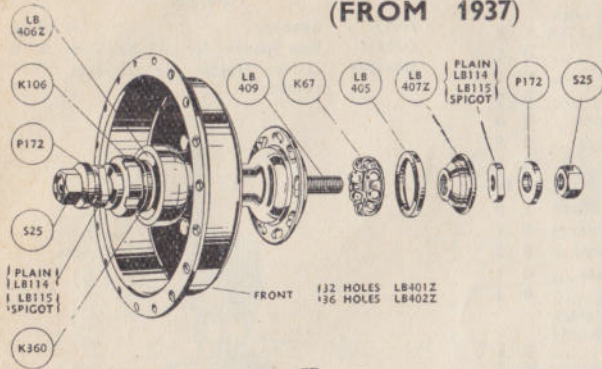
We guarantee, subject to the conditions mentioned below, that all precautions which are usual and reasonable have been taken by us to secure excellence of materials and workmanship, but damage for which we make ourselves responsible under this guarantee is limited to the free supply of a new part in exchange for the part of the hub which may have proved defective, and does not include the cost of fitting. The purchaser shall not be entitled to claim any damage whatever, save replacement of the defective parts. This guarantee does not apply to defects caused by wear and tear, misuse or neglect.

If a defective part should be found in any of our hubs it must be sent to us carriage paid, accompanied by an intimation from the sender that he desires to have it replaced free of charge under our guarantee, and he must also furnish us at the same time with the date of purchase. Failing compliance with the above, no notice will be taken of anything which may arrive, but such articles will lie here at the risk of the senders and this guarantee shall not be enforceable. We guarantee only new hubs. A hub bought second-hand is not guaranteed by us.



# BF and BR Hub Parts

(FROM 1937)



BF AND BFC HUB PARTS (FROM 1937)

Ref. No.	Description	s.	d.
LB401Z	Hub Shell, 32 spoke holes, 13g. spokes	6	0
LB401RZ	Hub Shell, 32 spoke holes, 14g. spokes	6	0
LB402Z	Hub Shell, 36 spoke holes, 13g. spokes only	6	0
S545	Lubricator	0	1
LB409	Spindle, 5" long	0	5
LB409A	Spindle, 4 1/2" long	0	5
LB406Z	L.H. Cone with Dust Cap	0	10
LB407Z	R.H. Cone with Dust Cap	0	10
LB405	Cup Dust Cap	0	1 1/2
K67	Ball Retainer with 1/2" diam. balls	0	3
K360	Packing Washer	0	1
K106	L.H. Adjusting Washer 1/8" thick	0	5
LB121	L.H. Adjusting Washer 3/16" thick	0	5
LB114	Lock Nut (Plain)	0	2
LB115	Lock Nut (Spigot)	0	2
P172	Washer	0	1
S25	Axle Nut	0	2
LB142Z	Wing Nuts	per pair	1 6
LB141	Wing Nuts (Drop-out Hub) without serrated washer	per pair	1 0

### BRAKE PARTS.

Ref. No.	Description	s.	d.
LB147Z	Brake Plate and Torque Arm (Cable)	3	0
LB138Z	Brake Plate and Torque Arm (Rod)	3	0
K158Z	Brake Shoes complete with Linings	4	3
K166	Brake Shoe Spring	0	2
K163	Cam Bush	0	2
K162	Operating Cam and Washer	0	6
LB149	Brake Cam Lever (Cable)	0	6
LB150	Brake Cam Lever (Rod)	0	6
K175	Brake Lever Nut	0	1
K118	Brake Wire Guide (Cable)	0	4
LB127	Fulcrum Screw (Rod)	0	3
LB126	Brake Arm Clip, "D" Forks	0	4
LB112	Brake Arm Clip, Standard	0	4
LB130	Brake Arm Clip, Duplex	0	4
LB111	Brake Arm Clip, Sports	0	4
LB140	Brake Arm Clip, Taper Fork	0	4
LB145	Brake Arm Clip, Raleigh	0	4
X90	Clip Bolt	0	1
S386	Clip Bolt Nut	0	1

### TOOL.

Ref. No.	Description	s.	d.
LB122	Spanner	0	6

# HUB PARTS AND BRAKE CONTROL—continued

BR AND BRC HUB PARTS (FROM 1937)

Ref. No.	Description	s.	d.
LB351Z	Hub Shell, 40 spoke holes for 13g. spokes	7	0
LB351RZ	Hub Shell, 40 spoke holes for 14g. spokes	7	0
LB352Z	Hub Shell, 36 spoke holes for 13g. spokes	7	0
S545	Lubricator	0	1
LB156	Spindle 5 1/2" long	0	6
LB156A	Spindle 6 1/2" long	0	6
LB164	Spindle 6" long for Derailleur gear	0	6
LB357Z	L.H. Cone with dust cap	0	10
LB358Z	R.H. Cone with dust cap	0	10
LB405	Cup Dust Cap	0	1 1/2
K67	Ball Retainer with 1/2" diam. Balls	0	3
K360	Packing Washer	0	1
K106	L.H. Adjusting Washer 1/8" thick	0	5
LB155	Lock Nut	0	1
LB165	Spacing Collar for Derailleur gear	0	5
LB162	Axle Nut	0	2
CC28	Step	0	9
X42	Washer, 1/8" thick	0	1
X42A	Washer, 3/16" thick	0	1
LB161Z	Wing Nuts	per pair	1 6
K36	Sprocket Lock Nut	0	4

### BRAKE PARTS.

Ref. No.	Description	s.	d.
K160Z	Brake Plate and Arm	2	6
K158Z	Brake Shoe complete with linings	4	3
K166	Brake Shoe Spring	0	2
K163	Cam Bush	0	2
K162	Operating Cam and Washer	0	6
LB127	Fulcrum Screw	0	3
LB166	Brake Cam Lever	0	6
K175	Brake Lever Nut	0	1
K171	Brake Wire Guide } For Cable Control	0	1
K168	Wire Guide Nut } only	0	1
K172	Lock Washer } Not used for rod.	0	0
N43	Brake Arm Clip, Standard	0	2
K124	Brake Arm Clip, Sports	0	2
X69	Brake Arm Clip Bolt	0	1
S386	Clip Bolt Nut	0	1
X69	Alt. Brake Arm Clip Bolt	0	1 1/2
S546	Clip Thumb Screw	0	6

### TOOL.

Ref. No.	Description	s.	d.
K44A	Spanner	0	6

### CABLE BRAKE CONTROLS (SOLO).

Ref. No.	Description	s.	d.
P1156A	Handlebar Brake Lever (N.R. Upturned or Inverted Bar)	1	6
P1053A	Ditto (Drop Bar)	1	6
P1055	Handlebar Lever Fulcrum	1	0
S637	Handlebar Clip Bolt for 3/8" Bar	0	2
S638	Clip Nut for S637	0	1
P1054	H.B. Lever Fulcrum Clip, 3/8" Bar	0	4
P1193	Ditto 1" Bar	0	4
S583	Fulcrum Clip Bolt	0	2
S443	Handlebar Fulcrum Nut	0	1
K131	Handlebar Clip Bolt, 1" Bar	0	2
S69	Ditto (Celluloid Bar)	0	2
X111A	Handlebar Clip Nut for K131	0	2
M112	Cable Ferrule (Standard)	0	1
S581	Roller Nipples (for H.B. end) (Standard)	0	1
LB350	Cable Guide (fits in P1055)	0	1
K119	Wire Stop Screw	0	3
K120	Ditto Adjuster Nut	0	2
S93	Control Wire Stop Screw Lock Nut	0	1
LB168	Wire Nipples for cam lever end	per doz.	0 6
K127A	Outer Cable (Standard) Front	0	8
K127	Ditto Rear, Gent's or Lady's	1	0
K128	Inner Wire, fitted with roller nipple S581 (Standard), Rear	0	6
K128A	Ditto Front	0	4
PM151	Frame Cable Clip (spring type) for 1" or 1 1/8" tube	0	2

Inner and Outer Brake Wires complete with Adjuster and with Roller Nipple both ends.

Ref. No.	Description	s.	d.
GD431Z	Front Hub, 32" cable, 36 1/2" wire	1	6
GD433Z	Gent's Rear, 53 1/2" cable, 60 1/2" wire	2	0
	Ladies' Rear, same size	2	0

# HUB PARTS AND BRAKE CONTROL—continued

## BRAKE CONTROLS complete (Cable Type) (SOLO) :—

		s.	d.
KC3AF	Front Solo	5	0
KC3AR	Rear Gent's or Lady's	5	6

## ROD CONTROL FOR BF HUB.

		s.	d.
LB329	Front Brake Stirrup	0	9
LB309A	Front Fork Inner Clip for oval tube	0	3
LB309	Front Fork Inner Clip for "D" shaped or duplex fork blades	0	3
LB330	Front Fork Outer Clip for "D" or oval shaped tube	0	2
LB330A	Front Fork Outer Clip (Humber), duplex forks only	0	2
S74	Front Fork Clip Bolt	0	1
LB331	Front Fork Fulcrum Bolt	0	2
S98	Nut for Fulcrum Bolt	0	1
LB334	Top Connection for front brake rod	0	4
S535	Brake Rod Connection Screw	0	1
S433	Brake Rod Connection Nut	0	1
LB305	Brake Rod with Top Connection (16½" overall)	0	8
LB167	Adjusting Nut	0	2
KCSB	Set of Front Rod Control Fittings	2	9

## ROD CONTROL FOR REAR HUBS AB & BR.

		s.	d.
LB334	Rear Rod Connection (short)	0	4
S535	Rear Rod Bolt	0	1
S433	Rear Rod Nut	0	1
LB307A	Down Tube Rod 20½" and two connections	1	2
LB320	Bottom Bracket Brake Link	0	4
LB321	Seat Tube Clip	0	2
S74	Seat Tube Clip Bolt	0	1
S98	Clip Bolt Nut	0	1
LB322	Brake Link Swivel Bolt	0	2
S98	Swivel Bolt Nut	0	1
LB323	Brake Link Spring	0	1
LB306	Bottom Brake Rod 19½" with connection	0	8
LB167	Adjusting Nut (Swivel type)	0	2

## BELL CRANK, BOLT-ON FIXING.

		s.	d.
P1183	R.H. Side Action Bell Crank	0	3
LB325	L.H. Side Action Bell Crank	0	3
S154	Fulcrum Bolt	0	3
S558	Bell Crank Bush	0	1
P89	Bell Crank Washer	0	1
S98	Bell Crank Nut	0	1
	Bolt-on Bell Crank complete	0	8

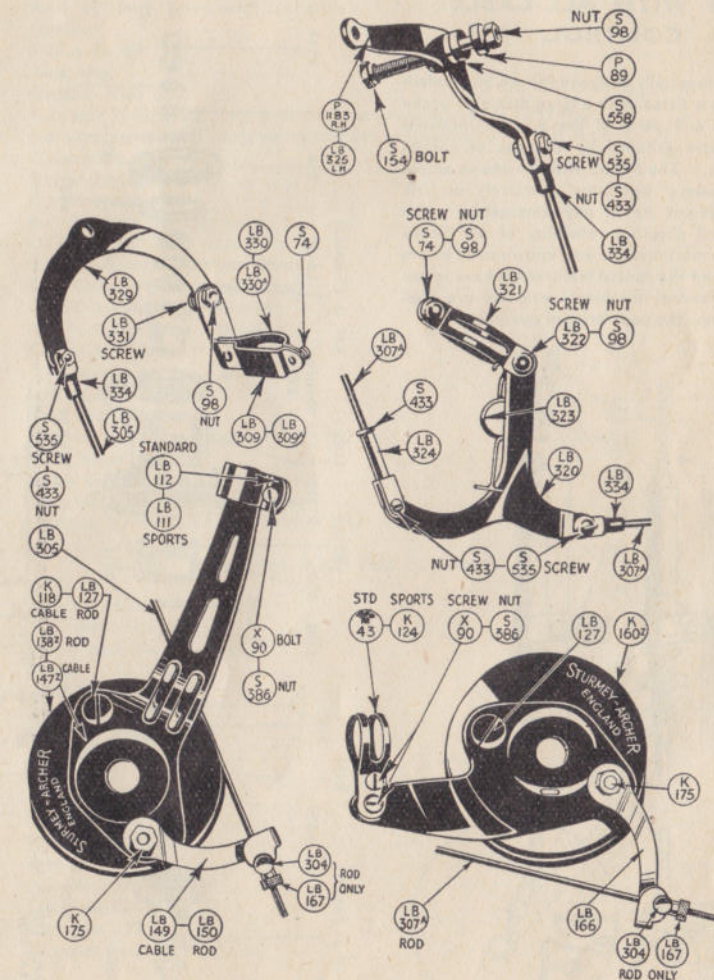
## BELL CRANK, CLIP-ON FIXING.

		s.	d.
LB326AZ	Bell Crank with Fulcrum, Left Hand	0	9
LB326BZ	Bell Crank with Fulcrum, Right Hand	0	9
LB327A	Half Clip	0	2
LB332	Fulcrum Bolt	0	2
S443	Fulcrum Bolt Nut	0	1
	Clip-on Bell Crank complete	1	3
KC6B	Set of Rear Rod Control Fittings	4	6

NOTE.—We can also supply Telescopic Tubes for connecting above rod fittings to handlebar rods when required in the following lengths :—

		s.	d.
LB343Z	Brake Tube, 3" long	0	10
S533/S443/P1056	Stud, Nut and Washer	0	2
S535	Connection Screw	0	1
S433	Connection Nut	0	1
LB344Z	Brake Tube, 4" long	0	10
LB345Z	Brake Tube, 5" long	0	10
LB346Z	Brake Tube, 6" long	0	10
LB347Z	Brake Tube, 7" long	1	0
LB348Z	Brake Tube, 8" long	1	0
LB349Z	Brake Tube, 9" long	1	0

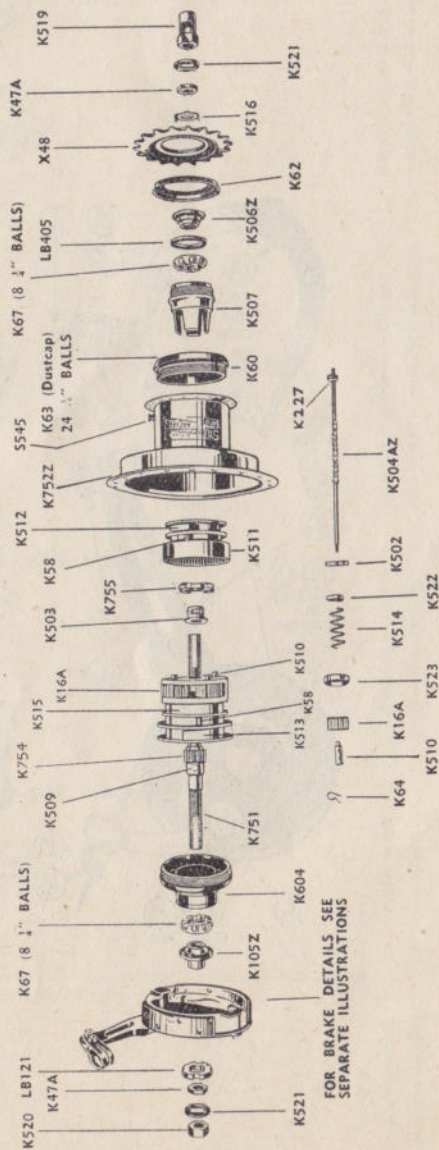
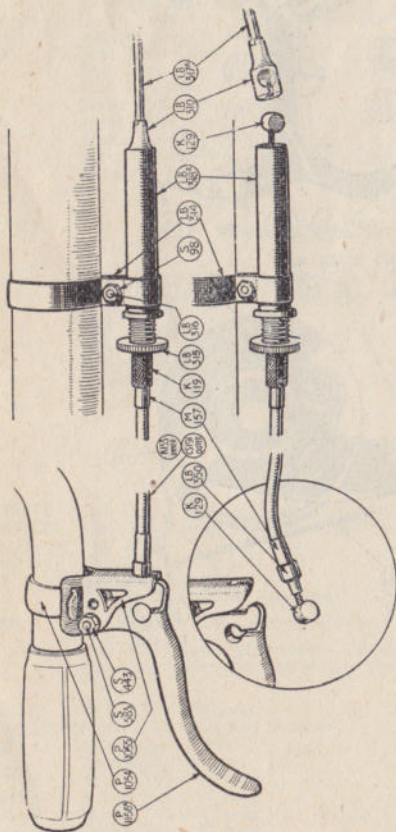
# AB, BF and BR Rod Brake Fittings



# AT Tandem Standard Wide Ratio 3-Speed Hub with Cable-cum-Rod Control

## ATC TANDEM STANDARD WIDE RATIO 3-SPEED HUB WITH ALL CABLE CONTROL.

This hub is specially designed for use on Tandem Bicycles and is fitted with a large diameter brake drum (4 3/8"), and parts of the 3-speed internals have been strengthened by the use of special quality steels. The brakes will provide an ample margin of safety, operating effectively on the steepest gradient or in any emergency. The durability and absolute reliability of our brake hubs on Solo machines are well known to all lovers of Cycling, and the special features we have introduced for Tandem machines, will, we are confident, enhance the popularity of our hubs.



FOR BRAKE DETAILS SEE SEPARATE ILLUSTRATIONS

## TANDEM—continued

### SPARE PARTS FOR AT AND ATC HUBS

#### AXLE AND CLUTCH PARTS, including Cones and Nut:—

Ref. No.		s.	d.
K751	Axle only, 6 1/2" long for hubs of 1 1/8" chain line only ...	2	0
K754	Sun Pinion (NCCH Steel) ...	0	8
K509	Dowel for Sun Pinion ...	0	1
K751Z	Axle, 6 1/2" long, fitted with sun pinion ...	2	9
K751A	Axle only, 6 3/4" long for hubs of 1 1/2" to 1 3/8" chain line ...	2	0
K751AZ	Axle, 6 3/4" long, fitted with sun pinion ...	2	9
K503	Sleeve ...	0	4
K755	Sliding Clutch ...	1	3
K502	Axle Key ...	0	2
K523	Cap for Axle Key ...	0	1
K504Z	Indicator Spindle, 2 3/8" long, with chain and connection for K751 Axle ...	1	0
K504BZ	Indicator Spindle, 2 3/8" long, with chain and connection for K751A Axle ...	1	0
K227	Connection Lock Nut ...	0	1
K514	Clutch Spring ...	0	1
K522	Clutch Spring Cap ...	0	1
K67	Ball Retainer for axle cones ...	0	3
LB404	Dust Cap for R.H. cone ...	0	1
K506Z	R.H. Cone with dust cap fitted ...	0	10
K105Z	L.H. Cone with dust cap fitted ...	1	0
LB121	L.H. Cone Adjusting Washer ...	0	5
K516	R.H. Cone Locking Washer ...	0	1
K47A	Cone Lock Nut ...	0	1
K519	R.H. Nut ...	0	6
K520	L.H. Nut ...	0	2
K521	Axle Lock Washer ...	0	1
K48	Axle Lock Washer (alternative to K21) ...	0	1
K231Z	Wing Nuts ...	per pair	2
K234	Chain Guide for R.H. nut ...	0	2
K366	Serrated Axle Washer (optional) ...	0	2
K365	Distance Sleeve (used only with K751A Axle) ...	0	5

#### SHELL AND DRIVE PARTS.

Ref. No.		s.	d.
K60	R.H. Ball Ring ...	2	6
K63	R.H. Inner Ball Retainer ...	0	2
	Set of 24 Balls, 3/8" diam. ...	0	4
K507	Driver ...	3	0
LB405	Dust Cap for driver ...	0	1 1/2
K752Z	Shell, 40 holes ...	8	0
K752AZ	Shell, 36 holes ...	8	0
K604	L.H. Ball Cup ...	2	6
S545	Lubricator ...	0	1
K62	Outer R.H. Dust Cap ...	0	2
X48E	Sprocket, 16T ...	0	9
X48C	Sprocket, 17T ...	0	9
X48	Sprocket, 18T ...	0	9
X48D	Sprocket, 19T ...	0	9
X48F	Sprocket, 20T ...	0	9
X48G	Sprocket, 22T ...	1	6
X49	Sprocket Packing Washer ...	0	1

#### GEAR PARTS.

Ref. No.		s.	d.
K515	Planet Cage ...	3	6
K16A	Planet Pinion in NCCH Steel ...	0	5
K510	Pinion Pin ...	0	1
K513	Low Gear Pawl ...	0	3
K64	Pawl Spring ...	0	0 1/2
K58	Pawl Pin ...	0	1
K511	Gear Ring ...	3	0
K512	Gear Ring Pawl ...	0	3

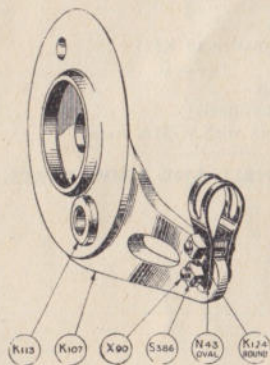
## TANDEM—continued

TOOLS.		s.	d.
Ref. No.			
K44A	Spanner ... ..	0	6
DD911	Ball Cup Spanner ... ..	4	0
DD5978	Driver Holder for Sprocket Removal ... ..	2	3

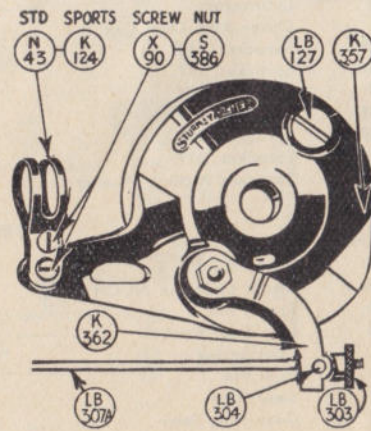
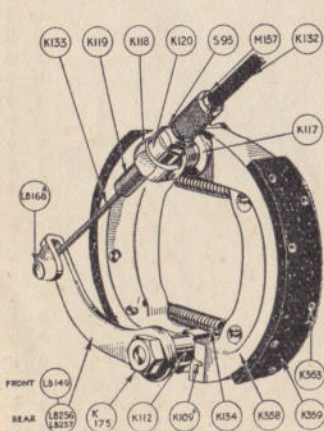
BRAKE PARTS.		s.	d.
Ref. No.			
K357	Brake Arm ... ..	4	0
K358Z	Brake Shoe complete ... ..	per pair	6 0
K359	Brake Linings with Rivets K363 ... ..	per pair	2 0
K134	Brake Shoe Spring ... ..	0	2
K112	Brake Operating Cam and Washer ... ..	0	5
K113	Cam Bush ... ..	0	2
K118	Wire Guide for cable operation ... ..	0	4
LB127	Fulcrum Screw for rod operation ... ..	0	3
LB257	Cam Lever for cable operation ... ..	0	6
LB256	Cam Lever for rod operation ... ..	0	6
LB304	Swivel Pin for rod operation ... ..	0	1
K175	Cam Lever Nut ... ..	0	1
K124	Brake Arm Clip (round) ... ..	0	2
N43	Brake Arm Clip (oval or 'D') ... ..	0	1
X69	Brake Arm Clip Screw ... ..	0	1
S386	Clip Screw Nut ... ..	0	6
S546	Thumb Screw (alternative to X69 Screw) ... ..	per pair	2 3
	Fitting new Linings to Brake Shoes ... ..		

For Particulars of Component Parts for the Top Tube and Handlebar Controls, see Pages 29 and 30.

### BRAKE PARTS



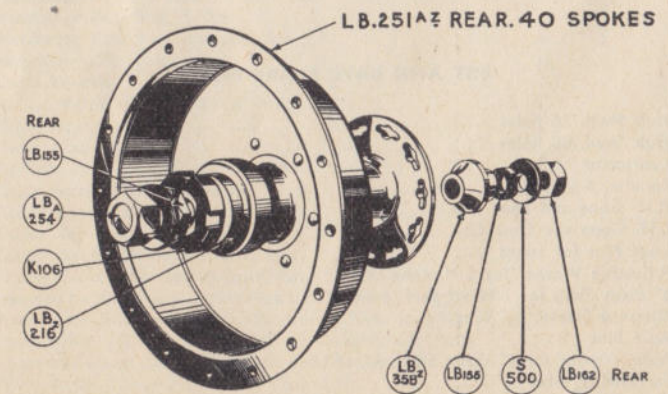
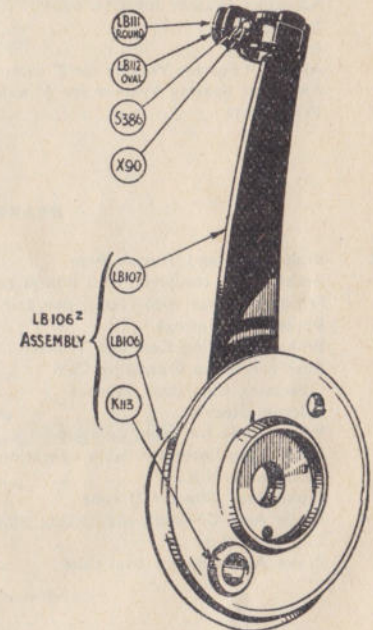
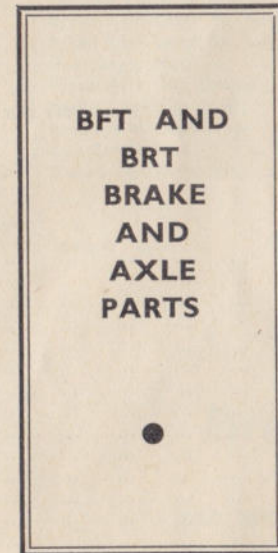
### For AT and ATC HUBS



## BFT, BRT and BRTC Hubs

**FEATURES.** These are single speed hubs, fitted with the same large diameter internal expanding hand operated brake as used in our AT Hub.

The BFT is for the front and is 3 1/4" wide over cones. The BRT Hub is for the rear wheel and is 4 7/8" wide over cones, giving a chain line of 1 3/4" and is suitable for the fitting of the Derailleur Gear.



## HUBS—continued

### BT8 SPARE PARTS. Front Tandem Hub, BFT Type.

Ref. No.		s.	d.
LB502Z	Hub Shell complete, 32 holes	10	0
LB501Z	Hub Shell complete, 40 holes	10	0
S545	Lubricator	0	1
LB504	Spindle, 5 $\frac{1}{16}$ " long, $\frac{3}{8}$ " diam.	0	6
LB358Z	R.H. Cone with dust cap	0	8
LB216Z	L.H. Cone with dust cap	0	10
LB404	Dust Cap for R.H. cone	0	1
LB405	Cup Dust Cap	0	1 $\frac{1}{2}$
K67	Ball Retainer	0	3
LB155	Lock Nut for L.H. cone	0	1
LB121	Adjusting Washer for L.H. cone	0	5
LB204	Spacing Nut	0	2
LB162	Axle Nut	0	2
X42	Axle Nut Spacing Washer for $\frac{3}{8}$ " axle, $\frac{1}{16}$ " thick	0	1
X42A	Axle Nut Spacing Washer for $\frac{3}{8}$ " axle, $\frac{1}{8}$ " thick	0	1
LB161Z	Wing Nuts	per pair	1 6

### BRAKE PARTS.

Ref. No.		s.	d.
LB217Z	Brake Plate and Torque Arm	4	0
K358Z	Brake Shoes complete with linings and springs	6	0
K359	Friction Linings with rivets, per pair	2	0
K134	Brake Shoe Springs	0	2
K112	Brake Operating Cam and Washer	0	5
K113	Bush for Brake Operating Cam	0	2
K114	Operating Cam Bush Washer	0	1
K117	Fulcrum Sleeve	0	2
K118	Wire Guide for cable operation	0	4
LB149	Brake Cam Lever for cable operation	0	6
K175	Cam Lever Nut	0	1
LB219	Brake Arm Clip for D tube	0	4
X90	Brake Arm Clip Bolt	0	1
S386	Clip Bolt Nut	0	1
LB205	Brake Arm Clip for oval tube	0	4

### TOOL.

Ref. No.		s.	d.
K44A	Spanner	0	6

### BRT AND BRTC SPARE PARTS.

Ref. No.		s.	d.
LB252Z	Hub Shell, 36 holes	11	0
LB251Z	Hub Shell, 40 holes	11	0
S545	Lubricator	0	1
LB254A	Spindle, 6 $\frac{1}{16}$ " long	0	7
LB215Z	R.H. Cone and Dust Cap	0	8
LB216	L.H. Cone and Dust Cap	0	10
LB155	Lock Nut for cones	0	1
K106	Adjusting Washer for L.H. cone	0	5
	$\frac{1}{2}$ " diam. Balls for L.H. or R.H. cone	per set of 10	0 3
LB255	Distance Sleeve, $\frac{3}{16}$ " long	0	5
LB162	Axle Nut	0	2
X42	Axle Washer for $\frac{3}{8}$ " diam. axle, $\frac{1}{16}$ " thick	0	1
K366	Serrated Washer	0	2
LB161Z	Wing Nuts	per pair	1 6

## HUBS—continued

### BRAKE PARTS.

Ref. No.		s.	d.
K357	Rear Brake Arm	4	0
K358Z	Brake Shoes complete with linings and springs	6	0
K359	Friction Linings with rivets	per pair	2 0
K134	Brake Shoe Spring	0	2
K112	Brake operating Cam and Washer	0	5
K113	Bush for brake operating cam	0	2
K114	Operating Cam Bush Washer	0	1
K117	Fulcrum Sleeve	0	2
K118	Wire Guide (for cable operation)	0	4
LB127	Fulcrum Screw (alternative to K118 for cable-cum-rod operation)	0	3
LB257	Brake Cam Lever for cable operation	0	6
LB256	Brake Cam Lever for cable-cum-rod control	0	6
K175	Cam Lever Nut	0	1
K124	Brake Arm Clip (round)	0	2
N43	Brake Arm Clip (oval)	0	2
X69	Brake Arm Clip Screw	0	1
S386	Clip Screw Nut	0	1
S546	Thumb Screw for brake arm clip	0	6

### TOOL.

Ref. No.		s.	d.
K44A	Spanner	0	6

## Brake Controls

### ATC, BFT, BRT and BRTC All-Cable Type.

Ref. No.		s.	d.
P1156A	Handlebar Brake Lever (N.R. upturned or inverted bar)	1	6
P1053A	Handlebar Brake Lever (drop bar)	1	6
P1055	Handlebar Lever Fulcrum	1	0
P1054	Handlebar Fulcrum Clip, $\frac{3}{8}$ " bar	0	4
P1193	Handlebar Fulcrum Clip, 1" bar	0	4
S583	Fulcrum Clip Bolt	0	2
S443	Handlebar Fulcrum Nut	0	1
K131	Handlebar Clip Bolt, $\frac{3}{8}$ " bar	0	2
X69	Handlebar Clip Bolt (celluloid bar)	0	2
X111A	Handlebar Clip Nut	0	2
M157	Cable Ferrule	0	1
K129	Roller Nipple (for handlebar end)	0	1
K119	Wire Stop Screw	0	3
K120	Ditto Adjuster Nut	0	2
S93	Control Wire Stop Screw Locknut	0	1
LB350	Cable Guide (fits in P1055)	0	1
LB168A	Roller Nipple for hub end	0	1
K132	Outer Cable, 79" long (rear)	2	0
K132	Outer Cable, 32" long (front)	1	0
P1151	Frame Cable Clip (spring type) for 1" or 1 $\frac{1}{8}$ " tube	0	2
K133	Inner Wire, fitted with roller nipple K129, 84 $\frac{1}{16}$ " long (rear)	1	0
K133	Inner Wire, fitted with roller nipple K129, 37 $\frac{1}{16}$ " long (front)	0	6
GD434	Inner Wire and Outer Cable (Rear Tandem), 79" long	3	6
GD432	Inner Wire and Outer Cable (Front Tandem), 32" long	2	0
KC3AT	Front Brake Control complete (Tandem)	5	6
KC4	Rear All-Cable Brake Control, complete (Tandem)	7	0



## BRAKE CONTROLS—continued

### CABLE-CUM-ROD TYPE FOR AT AND BRT TANDEM BRAKE HUBS.

Ref. No.		s.	d.
P1156A	Handlebar Brake Lever, North Road bars ...	1	6
P1053A	Handlebar Brake Lever, drop bars ...	1	6
P1055	Handlebar Lever Fulcrum ...	1	0
P1054	Handlebar Fulcrum Clip, $\frac{5}{8}$ " bar ...	0	4
P1193	Handlebar Fulcrum Clip, bar ...	0	4
S583	Handlebar Fulcrum Bolt ...	0	2
S443	Fulcrum Nut ...	0	1
K131	Handlebar Clip Bolt, $\frac{7}{8}$ " bar ...	0	2
X69	Handlebar Clip Bolt, 1" bar ...	0	2
X111A	Handlebar Clip, Bolt Nut ...	0	2
S450	Cable Guide ...	0	1
K132	Outer Cable, Bowden, 59" long ...	1	4
CS191	Inner Wire (19 strands), 56 $\frac{1}{2}$ " long ...	0	8
M157	Cable Ferrule ...	per pair	0 0 $\frac{1}{2}$
K129	Roller Nipple ...	per pair	0 1
K119	Control Wire Stop ...	0	3
LB315	Lock Nut ...	0	2
LB313	Spring ...	0	2
LB314	Frame Clip ...	0	3
LB316	Frame Clip Bolt ...	0	2
S98	Frame Clip Bolt Nut ...	0	1
LB310	Cable Coupling Piece ...	0	3
LB317A	Brake Rod, 42" long, with 5" thread ...	0	8
LB304	Brake Lever Swivel Pin ...	0	1
LB303	Brake Rod Adjusting Nut ...	0	2
P1152	Frame Cable Clip ...	0	2
LB318Z	Spring Casing with screw cap ...	0	7
GD334Z	Inner and Outer wires complete (cable 45 $\frac{1}{2}$ " long, for clip-on fixing) ...	2	4
GD335Z	Inner and Outer Wires, complete (cable 43 $\frac{1}{2}$ " long for brazed-on fixing) ...	2	4
KC9	Cable-cum-Rod Control complete ...	7	6



Charlie Holland "puts his faith in the AM Medium Ratio Hub."

## Sturmey-Archer 2-Speed Hubs

25% Reduction for Low Gear.

**FEATURES.** The T and TF Hubs are designed expressly for the Lightweight enthusiast, who requires a strong and reliable hub, which will provide the necessary variance of ratio.

All types have a direct drive on normal gear, whilst low gear gives a 25% reduction. They are suitable for both Single and Tandem machines.

Both gears are fixed in the TF hub, but for those who desire it, a free wheel can be supplied for use in place of the fixed sprocket. The free wheel calls for a special lock-nut to secure it in position. It is then a T hub.

The sprockets or the freewheels fit over splines on the hub, and may thus be very quickly and easily changed. Lock nuts are fitted to both cones so that adjustment of the hub is not affected by wheel removal.

Wing Nuts are standard on TF Hubs, and can be fitted to the other models when ordered. A quick release connection is fitted on the gear control wire. Alternative forms are offered as follows:—

- T 2-speed Hub with Free Wheel.
- TF 2-speed Hub with Fixed Gears and Wing Nuts.

**WEIGHTS.** T Hub 1lb. 14ozs., less controls.  
 TF Hub 1lb. 9ozs., less controls.  
 Top Tube Gear Controls, 3ozs.  
 Handlebar Gear Control, 6ozs.

**ADAPTABILITY.** Hub width 4 $\frac{1}{16}$ " over lock-nuts (4 $\frac{1}{16}$ " if lock-nuts omitted). Shell drilled for 40 or 36 spokes up to 13 gauge. Fixed sprockets available with 14, 15, 16, 17, 18, 19, 20 or 22 teeth. Free wheels available with 16, 17, 18, 19 or 20 teeth with offset (standard) or central teeth.

### SPARE PARTS FOR T AND TF HUBS

#### AXLE PARTS.

Ref. No.		s.	d.
TF101AZ	Axle with dog sleeve (Tandem) 6 $\frac{3}{8}$ " long ...	4	6
TF101Z	Axle with dog sleeve, 5 $\frac{1}{8}$ " long ...	4	6
TF108	Sun Pinion ...	0	6
TF107	Pinion Carrier ...	0	4
K67	Ball Retainer ...	0	3
K6AZ	Right Hand Cone with dust cap ...	1	0
N222	Star Washer ...	0	2
K19AZ	L.H. Cone with dust cap ...	1	0
K47	Locknut for cone ...	0	1
K48	Axle Locking Washer ...	0	1
X42A	Axle Washer ...	0	1
N190	L.H. Nut ...	0	8
N200	R.H. Chain Nut ...	0	9
K231Z	Wing Nuts ...	per pair	2 0
K234	Chain Guide for R.H. wing nut ...	0	2

#### INDICATOR PARTS.

Ref. No.		s.	d.
K227	Screwed Connection Lock Nut ...	0	1
N7Z	Coupling Spindle complete ...	1	0
N6	Indicator Screw for TF101Z ...	0	6
TF126	Indicator Screw for TF101AZ (4 $\frac{3}{8}$ " long) ...	0	6
TF113	Indicator Spring ...	0	2
N6Z	Indicating Spindle complete ...	1	8
TF126Z	Indicating Spindle complete for TF101AZ ...	1	8
X8	Main Spring Collar ...	0	1
X47	Axle Spring Screw ...	0	1
N8	Main Axle Spring ...	0	2

## HUBS—continued

### SHELL AND GEARS.

Ref. No.	Description	s.	d.
TF102Z	Hub Shell T.F. 40 spokes	5	6
TF102AZ	Hub Shell T.F. 36 spokes	0	1
S545	Lubricator	0	3
TF106	Planet Pinion Bush	0	6
TF105	Planet Pinion	4	8
TF111C	Inner Ball Race	0	3
TF110A	Driver	0	3
TF112	Outer Dust Cap	0	3

### DRIVE PARTS.

Ref. No.	Description	s.	d.
TF16Z	Free Wheels for $\frac{1}{2}$ " x $\frac{1}{8}$ " chain :	2	9
TF17Z	16T x $\frac{1}{2}$ " chain line	2	9
TF18Z	17T x $\frac{1}{2}$ " " " "	2	9
TF19Z	18T x $\frac{1}{2}$ " " " "	2	9
TF20Z	19T x $\frac{1}{2}$ " " " "	2	9
TF16AZ	16T x $\frac{1}{2}$ " " " "	2	9
TF17AZ	17T x $\frac{1}{2}$ " " " "	2	9
TF18AZ	18T x $\frac{1}{2}$ " " " "	2	9
TF19AZ	19T x $\frac{1}{2}$ " " " "	0	8
TF124	Lockring for Freewheel	1	0
K214	Sprocket, 14T	0	9
K215	Sprocket, 15T	0	9
K216	Sprocket, 16T	0	9
K217	Sprocket, 17T	0	9
K218	Sprocket, 18T	0	9
K219	Sprocket, 19T	0	9
K220	Sprocket, 20T	0	4
K36	Sprocket Locknut	0	1
X49	Sprocket Packing Washer (for used)	0	1

### TOOLS.

Ref. No.	Description	s.	d.
X44A	Spanner, T.F. for cones and nuts	0	6
K43	Screwdriver for assembling indicator parts	0	6
K235	Spanner for sprocket locknut	0	6

## Gear Controls

### GEAR CONTROLS FOR T, TF AND TC HUBS.

#### Top Tube Pattern.

Ref. No.	Description	s.	d.
TF121Z	Quadrant complete (state whether for $\frac{3}{8}$ ", 1" or 1 $\frac{1}{8}$ " tube)	2	6
K55Z	Quadrant Lever	0	9
X61	Quadrant Connection	0	4
X62	Quadrant Connection Pin	0	1
N120	Quadrant Lever Spring	0	1
N179	Quadrant Lever Stud	0	0
X35	Split Pin for N179	0	2
X111	Clip Nut	1	0
X78Z	Pulley complete (state whether for 1" or 1 $\frac{1}{8}$ " tube)	0	1
X90	Quadrant Clip Screw	0	0
CS108	Split Pin	0	4
X4	Knurled Connection for cable	0	4
X4A	Knurled Connection (quick release)	0	4
X81	Top Tube Wire and Connection (Black):—	0	6
	For Gent's Cycle—up to 36" long	0	8
	For Lady's Cycle—up to 58" long	0	8
	For Tandem Cycle—up to 59" long	4	0
KC7G	Top Tube Control complete with one pulley only	4	4
KC7L	Top Tube Control with two pulleys	4	4

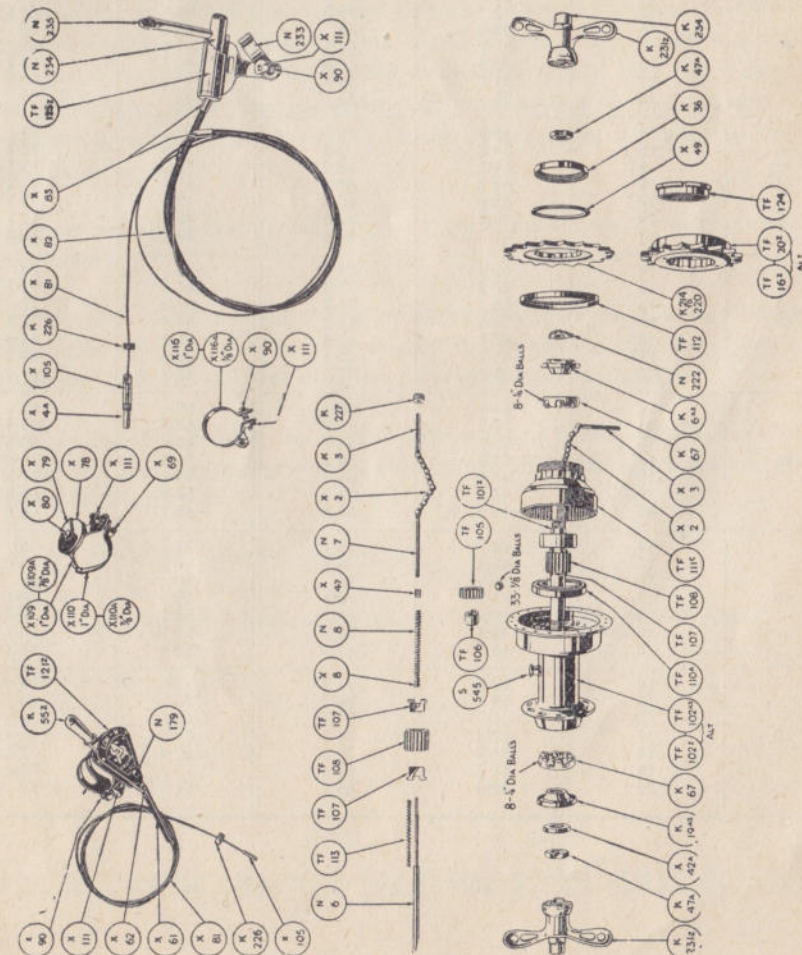
## GEAR CONTROLS—continued

### HANDLEBAR GEAR CONTROL PARTS for T, TF, and TC Hubs.

Ref. No.	Description	s.	d.
TF123	Outer Cam	0	9
K65	Cam Cap	0	2
K66	Cable Stop	0	1
N234	Inner Sleeve	0	9
N235	Handlebar Lever	0	9
N233	Cam Half Clip	0	3
X116	Fulcrum Clip, 1" diam.	0	6
X116A	Fulcrum Clip, $\frac{3}{4}$ " diam.	0	6
X78Z	Pulley, complete	1	0
X81Z	Inner Wire and Connection (Solo) up to 58" long	0	8
X81Z	Inner Wire and Connection (Tandem and Lady's) up to 78" long	0	10
X82	Outer Casing, Black	1	0
KC8G	Handlebar Control, complete (state length of wire required), with one pulley only	6	0
KC8L	Handlebar Control, with two pulleys	6	4

### PARTS & SYMBOL Nos. of the T and TF HUBS. TOP TUBE and

#### HANDLEBAR GEAR CONTROLS for T, TF and TC HUBS.



# HUBS

## GEAR TABLE T AND TF STURMEY-ARCHER 2-SPEED

Low Gear gives 25% reduction from normal.

Chain Wheel.	Hub Sprocket.	26in. WHEELS.		28in. WHEELS.	
		Low.	Normal.	Low.	Normal.
40	14	55.7	74.2	60	80
	15	52	69.3	56	74.6
	16	48.8	65	52.5	70
	17	45.9	61.2	49.5	65.9
	18	43.4	57.8	46.7	62.2
	19	41.1	54.7	44.2	58.9
	20	39	52	42	56
42	14	58.5	78	63	84
	15	54.6	72.8	58.8	78.4
	16	51.2	68.2	55.2	73.5
	17	48.2	64.2	51.9	69.2
	18	45.6	60.7	49	65.3
	19	43.2	57.5	46.5	61.9
	20	41	54.6	44.1	58.8
44	14	61.3	81.7	66	88
	15	57.3	76.3	61.6	82.1
	16	53.7	71.5	57.8	77
	17	50.5	67.3	54.4	72.5
	18	47.7	63.6	51.3	68.4
	19	45.2	60.2	48.6	64.8
	20	42.9	57.2	46.2	61.6
46	14	64.1	85.4	69	92
	15	59.8	79.7	64.5	85.9
	16	56.1	74.7	60.4	80.5
	17	52.8	70.3	56.9	75.8
	18	49.8	66.4	53.7	71.5
	19	47.2	62.9	50.9	67.8
	20	44.9	59.8	48.3	64.4
48	14	66.9	89.1	72	96
	15	62.4	83.2	67.2	89.6
	16	58.5	78	63	84
	17	55.2	73.5	59.4	79.1
	18	52	69.3	56.1	74.7
	19	49.3	65.7	53.1	70.7
	20	46.8	62.4	50.4	67.2
50	14	69.7	92.9	75	100
	15	65	86.7	70	93.3
	16	61	81.3	65.7	87.5
	17	57.4	76.5	61.8	82.4
	18	54.2	72.2	58.4	77.8
	19	51.3	68.4	55.3	73.7
	20	48.8	65	52.5	70

## TC Close Ratio 2-Speed Fixed or Free Gear

### HUBS

13.46% Reduction for Low Gear.

To meet the demand of Clubmen and riders of all types of Sports machines for a Two-Speed fixed gear with a closer ratio than the TF pattern hub, SturmeY-Archer Gears, Ltd., designed a new hub to be symbolised as the TC type. This hub is essentially a model embodying many features which will commend it to the sporting rider. Although similar in appearance externally to the Standard 3-speed hub, the internals differ in some respects.

The gear ratios have been arranged to suit the requirements of the great majority of sports riders.

The hub gives a direct frictionless drive on normal gear, whilst low gear provides a gear reduction of 13.46%. This is equivalent to a sprocket difference of two teeth. Both gears are fixed, and the gear change is remarkably easy and rapid.

The TC close ratio 2-speed hub has been designed as a fixed gear hub, but it can be supplied with a SturmeY-Archer Free Wheel splined to fit the corresponding splines on the splined driver.

Chain Line :  $1\frac{1}{2}$ " to  $1\frac{3}{4}$ " (fixed sprocket) } Hub width,  $4\frac{5}{16}$ " over cones.  
 $1\frac{1}{2}$ " to  $1\frac{5}{8}$ " (free wheel) }  
 $1\frac{3}{4}$ " with free wheel can be supplied with hub width of  $4\frac{9}{16}$ " only.

Weight : Hub only, 2lb 5ozs.

THERE'S A STURMEY-ARCHER GEAR FOR EVERY CLASS OF CYCLIST



# HUBS

## GEAR TABLE FOR TC HUB

Bracket Chain-Wheel.	Hub Sprocket.	26in. WHEELS.		28in. WHEELS.	
		Normal.	Low.	Normal.	Low.
40	14	74.2	64.2	80	69.2
	15	69.3	59.8	74.6	64.5
	16	65	56.25	70	60.6
	17	61.2	52.9	65.9	57
	18	57.8	50	62.2	53.8
	19	54.7	47.3	58.9	51
	20	52	45	56	48.5
42	14	78	67.5	84	72.7
	15	72.8	63	78.4	67.8
	16	68.2	59	73.5	63.6
	17	64.2	55.5	69.2	59.9
	18	60.7	52.5	65.3	56.5
	19	57.5	49.7	61.9	53.5
	20	54.6	47.3	58.8	50.9
44	14	81.7	70.7	88	76.2
	15	76.3	66	82.1	71.1
	16	71.5	61.9	77	66.6
	17	67.3	58.25	72.5	62.7
	18	63.6	55	68.4	59.2
	19	60.2	52.1	64.8	56.1
	20	57.2	49.5	61.6	53.3
46	14	85.4	73.9	92	79.6
	15	79.7	69	85.9	74.3
	16	74.7	64.6	80.5	69.7
	17	70.3	60.8	75.8	65.6
	18	66.4	57.5	71.5	61.9
	19	62.9	54.4	67.8	58.7
	20	59.8	51.7	64.4	55.7
48	14	89.1	77.1	96	83.1
	15	83.2	72	89.6	77.5
	16	78	67.5	84	72.7
	17	73.5	63.6	79.1	68.4
	18	69.3	59.9	74.7	64.6
	19	65.7	56.8	70.7	61.2
	20	62.4	54	67.2	58.1
50	14	92.9	80.4	100	86.5
	15	86.7	75	93.3	80.7
	16	81.3	70.4	87.5	75.7
	17	76.5	66.2	82.4	71.3
	18	72.2	62.5	77.8	67.3
	19	68.4	59.2	73.7	63.8
	20	65	56.3	70	60.5

Normal Gear is direct drive. Low gear is a reduction of 13-46%.  
Splined free wheels of 16, 17, 18, 19 and 20 teeth can also be supplied.

# Adjustments for T, TF and TC 2-Speed Hubs

(1) **Gear Control.** When the gears are correctly adjusted and the control lever is in low gear position the end of the indicating spindle should be level with the end of the hub axle. If the indicator projects slacken the lock nut at the end of the threaded portion of the chain connection, with the thumb and forefinger, and turn the milled adjuster until the indicator is level with the end of the axle. Then tighten the locking nut, and the gear control is correctly adjusted. The wire may also be tightened by moving the clip on the top tube towards the head of the machine. From time to time, verify these adjustments, as the wire may stretch in use.

Remember that if the rear wheel be moved when adjusting the driving chain at any time, this will alter the tension of the gear control wire which should be re-adjusted as mentioned above.

See that the fulcrum clips and pulley clips which guide the wire on the frame are tight, also see that the nuts on both sides of the axle are perfectly tight. A quick release connection is provided on the gear control cable, and to disconnect the cable it is only necessary to drop the gear lever into normal gear position, which gives slack wire. The nipple can then be slipped out of the connection without, in any way, interfering with the adjustment of the gears.

(2) **Bearings.** To set the right-hand cone correctly, it should be screwed up finger tight and then slackened back half a turn to allow the parts to revolve freely round the axle. It is not advisable to alter this cone unless it is essential to move it.

All the bearings are adjusted simultaneously by turning the left hand cone. When the cones are correctly adjusted the wheel should rotate freely with practically no sideways movement at the rim.

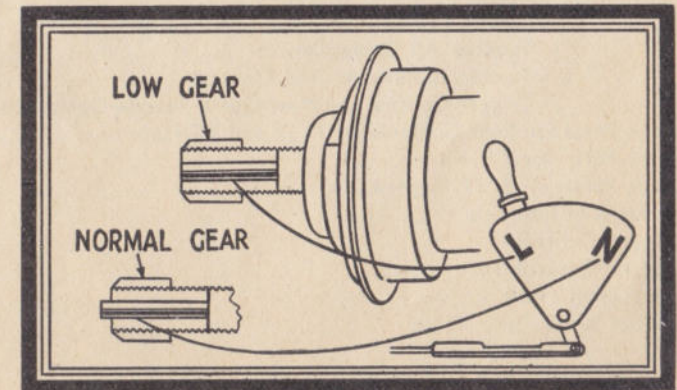
(3) **Indicating Spindle.** It is naturally essential that the indicator screw is fully screwed up, but remember the thread is a very fine one and is easily stripped if much force is used.

For convenience in wheel building the chain and coupling may be unscrewed and removed. When replacing hold a screwdriver in the notch of the indicator screw to prevent it turning whilst rotating the chain at the other end of the axle, to the right when screwing up.

If top gear does not hold and neither the sliding pinion teeth nor the planet cage teeth are worn, check the position of the hollow grub screw which anchors the outer end of the main axle spring. This should screw down  $\frac{1}{2}$ " below the end of the axle.

Slipping in low gear denotes worn teeth on sliding pinion and axle collar, unless due to wrong adjustment of the control wire.

**GEAR CHANGING.** It is not necessary to stop pedalling for this purpose, but the pressure on the pedals should be eased momentarily whilst the lever is moved.



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