

INDIVIDUAL DISMANTLING

TO DISMANTLE THE SW HUB

Proceed as follows:

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

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

TO DISMANTLE THE SB HUB

Proceed as follows:

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

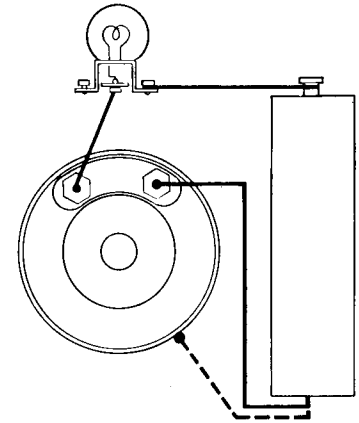
11. It should not be necessary to remove the planet cage pawl cup.
12. The planet cage, together with the hardened bearing plate, is secured by a special fixing plate which fits in the shallow groove in the axle. To remove it, fit the gear ring on the planet cage and stand the assembly on a partly open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

TO DISMANTLE THE SG HUB

Proceed as follows:

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

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



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

TO DISMANTLE THE AW HUB

Proceed as follows:

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

TO DISMANTLE THE AB HUB

Proceed as follows:

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

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

TO DISMANTLE THE AG HUB

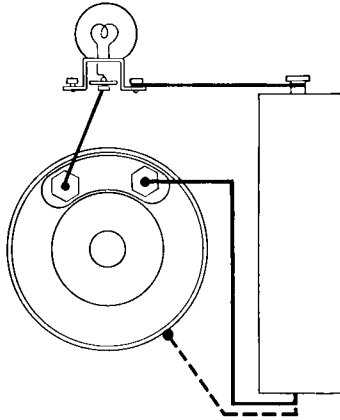
Proceed as follows:

1. Unscrew and remove the indicator rod from the axle. Then extract the 'Dynohub' unit as follows:
 - a. Remove the dynamo cone locknut, adjusting washers and spacing washers (if any), making a note of their arrangement so that they can be replaced in their original positions.
 - b. Remove the four magnet-fixing nuts and lock washers from the back of the hub shell and then remove the four magnet-fixing screws.
 - c. Hold the wheel parallel to the workbench and with a mallet tap the end of the spindle. This will cause the complete 'Dynohub' unit to drop out. There is a shim washer between the cone and the armature, and it must be replaced when the hub is re-assembled.
 - d. The magnet spacing ring can now be lifted out of the hub shell.
 - e. Unless it is essential to do so, the armature and magnet should never be separated. If they are to be separated, a keeper ring should be used as otherwise the magnet will rapidly lose its magnetism. Even a moment's separation will cause loss of magnetism and a spanner placed across the magnet is useless as a substitute for a keeper ring.
To separate the magnet and the armature, hold the 'Dynohub' unit in the left hand with the terminal plate across the palm. Then fit a keeper ring over the armature and lightly tap the keeper with the palm of the right hand. The magnet will then slide off the armature on to the keeper.
 - f. At this stage it is wise to test the armature with a test meter. If there is no reading on the test meter there is a break in the

TO DISMANTLE THE TCW HUB

Proceed as follows:

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



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

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

TO DISMANTLE THE AM HUB

Proceed as follows:

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

TO DISMANTLE THE AC HUB

Proceed as follows:

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

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

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

TO DISMANTLE THE ASC HUB

Proceed as follows:

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

TO DISMANTLE THE FW HUB

Proceed as follows:

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

TO DISMANTLE THE FG HUB

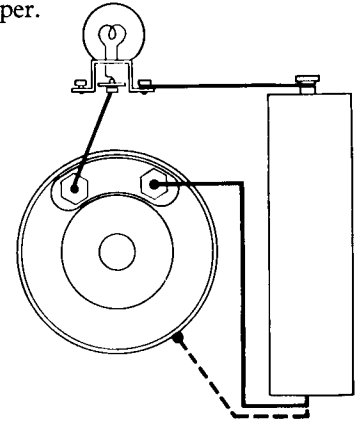
Proceed as follows:

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

spindle will cause the dynamo unit to drop out complete.

- d. The magnet spacing ring can now be lifted out of the hub drum.
- e. Unless it is essential to do so, the armature and magnet should never be separated. If they are to be separated, a keeper ring is absolutely necessary, because the magnet will lose its magnetism unless there is always iron inside it. Even a moment's separation will cause loss of magnetism, and a spanner placed across the magnet is useless as a substitute for a keeper ring. To separate the magnet and the armature, hold the dynamo unit in the left hand, with the terminal plate against the palm. Then fit a keeper over the armature and lightly tap the keeper with the palm of the right hand. The magnet will slide off the armature and on to the keeper.

- f. At this stage it is wise to test the armature with a test meter. If there is no reading on the test meter there is a break in the winding. If a test meter is not available, a battery and bulb may be connected as shown in the diagram, and if the bulb does not light, a break in the armature winding is indicated. A second test is to disconnect the lead from one of the armature terminals and touch the outer edges of the armature with the bare lead. If the bulb lights, this indicates a short circuit.



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

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

TO DISMANTLE THE FM HUB

Proceed as follows:

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

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

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

TO DISMANTLE THE FC HUB

Proceed as follows:

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

TO DISMANTLE THE BF, BFC, BR or BRC HUB

Proceed as follows:

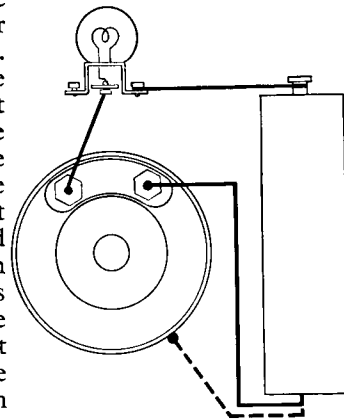
1. Remove the left-hand locknut, the notched cone adjusting washer, and any other washers on the brake side of the hub, making a note of their arrangement so that they can be replaced in their original positions.
2. Remove the brake arm complete with shoes.
3. Remove the inner spacing washer and the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

TO DISMANTLE THE GH6 HUB

Proceed as follows:

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

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



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

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

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

For paragraph 6 read 'Unscrew the dynamo-side cone and lift the ball cage out of the hub shell. The spindle may now be pulled out from the other side, together with the fixed cone.' All further comments apply equally to all GH6 hubs.