KANGO
electric hammers

Service Handbook for Type 900 Demolition Hammer Type 950 Rotary Hammer

IMPORTANT

Supplementary information regarding modifications and repair procedures is issued from time to time in our Technical Information Sheets ('TIS'). Reference should be made to these sheets before commencing any repairs or servicing on the Hammers.

This issue is up to date with all the relevant modifications notified in Technical Information Sheets up to and including TIS 22, issued June 1976.

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SECTION 1 GENERAL NOTES

1.1 Part Numbers

1.1.1 Five-digit Part Numbers

All parts in the Type 900 Demolition Hammers and the Type 950 Rotary Hammers used to have four-digit part numbers. To facilitate the use of advanced data processing methods which have been introduced, part numbers now consist of five digits. This Service Handbook gives five-digit part numbers for all parts which are currently available. Note that obsolete parts which are no longer available have not been allocated five-digit part numbers.

As a general rule, the previous four-digit part numbers have been converted to five-digit numbers by the addition of a zero to the beginning of the number, for example 1906 Small Assembly Screw has become 01906 Small Assembly Screw.

Certain Screws, Shims and Gaskets are only available in packs (normally 5 per pack), and in these cases the packs are identified by the letter P as the first digit. For example P1903 represents a pack containing five Spring Washers. (The number 01903 represents a single Spring Washer.)

Certain Service Tools used to have a reference letter after the four-digit part number, and in these cases the letter now becomes the first digit. For example 7327A becomes A7327. Note that the complete Tool 7327 becomes 07327.

1.1.2 The Meaning of the Part Numbers

With five-digit part numbers, the first three digits identify the group to which the part belongs, whilst the last two digits identify the part within its group.

Note that if the first digit is a letter, it should be considered as a zero for the purpose of establishing its group.

For example, to identify Part No 01111, examination of the Group List in Section 1.1.3 shows that this belongs to the General Group 011, 'Gear Carrier and Crank Disc', and reference to the relevant parts list (Section 19.4) identifies it as 'Crank Disc'. Similarly, part number P2244 belongs to the General Group 022, 'Spring Pins, etc', and the relevant parts list (Section 21.4) shows this to be 'Clutch Shaft Shim .004" ' (pack of 5 shims).

1.1.3 Grouping of Part Numbers for Type 900 and 950 Parts

Group No.	*General Name of Group*	*Comments*
001	Handle and Top Bearing	
002	Switch Operating Linkage	
003	Brush Gear	
004	Armature and Fan	
005	Field Coil	
006	Motor Casing and Field Mounting	
007	Pinion Bearing Housing	
008	Switch Mounting	
009	Cable and Cable Entry	
010 and 060	Motor End Sundries (Nameplates etc.)	
011	Gear Carrier and Crank Disc	
012	Connecting Rod and Striker	
013	Clutch Unit and Drive Shaft	
014	Buffer Housing	
015	Hammer Casing and Transmitter	
016	Latch	
017	Depth Gauge and Handles	

Group No.	*General Name of Group*	*Comments*
019	Screws, Nuts and Washers	Groups 019 to 022 and 072 cover parts in the General Groups (see Section 21 for identification of these parts).
020	Coil Springs, Waved Washers and Dished Washers	
021	Bearings (all types)	
022 and 072	Spring Pins, Shims, Circlips, Gaskets, etc.	
023 and 073	Service Tools	
040	Cord Entry	

1.2 Greasing the Hammer

It is recommended that the Hammer should be cleaned out and repacked with grease at intervals of not more than 300 hours running.

170g (6 ozs.) of Kango Hammer Grease should be put into Type 900 Hammers, and 225g (8 ozs.) of Kango Hammer Grease should be put into Type 950 Hammers. It is therefore recommended that when it is desired to regrease the Hammer the opportunity should be taken to completely strip it and examine all components. The old grease can then be completely removed and a fresh charge put in with the certain knowledge that the Hammer is neither over nor under greased. Before re-assembling the Hammer, weigh the required quantity of Kango Hammer Grease into a clean container and use only that grease for repacking the Hammer. See Section 16, Repacking the Hammer with Grease, for more details.

1.3 Technical Information Sheets

IMPORTANT. Supplementary information regarding modifications and repair procedures is issued from time to time in our Technical Information Sheets ('TIS'). Reference should be made to these sheets before commencing any repairs or servicing on the Hammers.

SECTION 2 DEFECTS AND REMEDIES

Symptom	*Possible Cause*	*Remedy*
Motor fails to run	Faulty supply socket	Test and repair, or renew
	Faulty connection plug	Test and repair, or renew
	Faulty lead	Test and repair, or renew (see Section 3.1)
	Fuses blown	Check cause and renew
	Brushes sticking	Find cause and rectify
	Brushes worn out	Renew (see Section 3.3)
	Defective Switch	Renew (see Section 3.2)
	Armature or Field Coil defective	Test and renew, as necessary
	Defective internal wiring or connection	Test and renew, or repair as necessary
Motor speed low	Mains voltage low	Check voltage
	Armature defective	Test and renew, as necessary
Motor speed high	Mains voltage high	Check voltage
	Defective hammer mechanism	Examine and repair
	Field coil defective	Test and renew, as necessary
Motor hot, or sparks excessively	Defective hammer mechanism	Examine and repair
	Ventilating slots choked	Clean out
	Incorrect assembly	Dismantle and reassemble in accordance with instructions
	Brushes worn	Renew (see Section 3.3)
	Brushes sticking	Find cause and rectify
	Commutator worn	Re-machine
	Armature or Field Coil defective	Test and renew, as necessary
	Voltage too high	Check voltage
	Armature rubbing in Field Coil	Examine and repair, or renew
Motor runs correctly but no hammer blows are struck, or blow is weak	Hammer cold, grease thick	Switch on and off with the tool pressed against the work until blows are struck, allowing the mechanism to come to rest before switching on again
	Too much grease	Remove excess grease from mouth of Striker. Repack correctly (see Section 16)
	Defective hammer mechanism	Examine and repair
Motor runs correctly, hammer blows are powerful, but drill will not rotate properly (Type 950 only)	Hexagon on Drill Holder or Integral Shank Drill worn	Renew. Examine Driver for similar wear
	Hexagon in Driver worn	Renew
	Clutch slipping	Check clutch adjustment, or examine and renew Waved Washer Pack and/or Clutch Plates

SECTION 3 ON SITE REPAIRS

The various parts are illustrated in Figures 13 & 14

3.1 Replacing a Cut or Damaged Hammer Lead

3.1.1 When an earth wire is fitted it is necessary to remove the Plastic Handle to gain access to the earth socket. The four Plastic Handle Screws which hold the Handle to the Motor Casing MUST be loosened alternately to prevent damage due to the uneven release of the powerful spring load from Waved Washers which clamp the Field Coil. Ensure that no dirt or loose metal particles enter the motor or bearing housing when the handle is removed to expose the earth socket. Remove the Earth Screw and Spring Washer.

3.1.2 Remove the Switch Cover Plate Screws and Washers, and the Switch Cover Plate complete with liner.

3.1.3 Lift out the Switch Clamping Pads (if fitted).

3.1.4 Remove the Switch Locating Screws, Switch Clamping Pad Clip and Switch Locating Bushings (if fitted).

3.1.5 Lift out the Switch.

3.1.6 Pull the Silicone Rubber Band away from the heads of the Terminal Screws (or remove it if it is damaged). Disconnect the live and neutral leads from the Switch.

3.1.7 If the hammer is fitted with the earlier type of cable entry, remove the Cable Locking Bridge and withdraw the Cable and Cable Protector. Remove the Protector from the damaged Cable and slide it onto the new Cable. If the hammer is fitted with the new type of cord entry, remove the Cord Grip and withdraw the damaged Cord (Note that the Cord Guard does not need to be removed).

3.1.8 Prepare the new Cord by cutting back the outer covering to the dimensions given in Figure 1. Bare each lead end for a distance of 16mm (5/8''), solder it and form it into a hook to fit over a 3 B.A. or M4 thread, as shown in Figure 1.

3.1.9 If fitted with the earlier type of cable entry, twist the conductors together and thread them through the elbow portion of the Mains Lead Grommet. Push the Cable Protector fully home into the Cable Protector Housing ensuring that the outer sheathing of the Cable is just projecting beyond the end of the Mains Lead Grommet. Fit the Cable Locking Bridge to secure the Cable and Cable Protector.

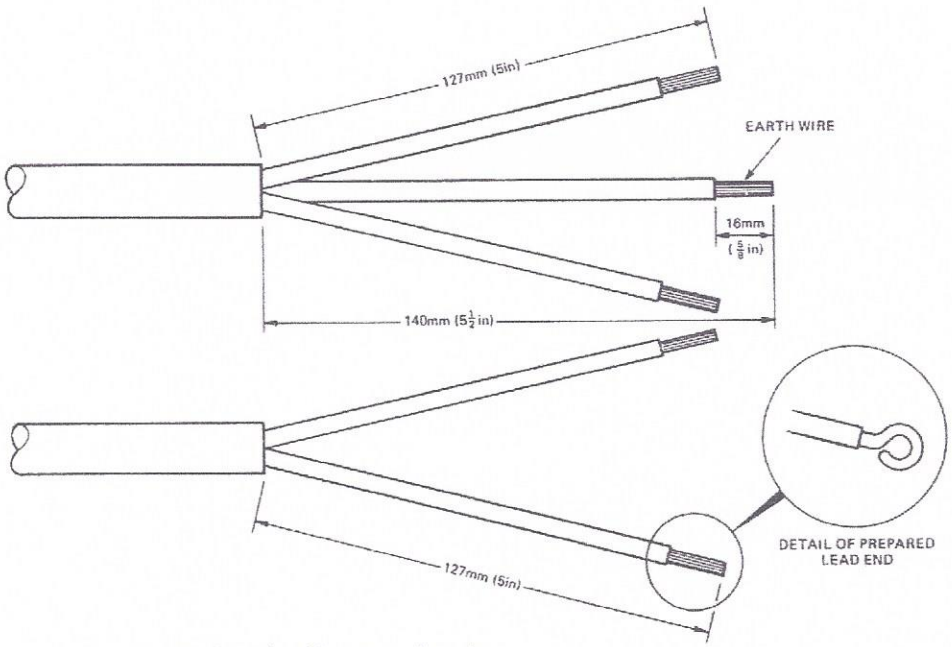


Figure 1 Preparing the Hammer Leads

3.1.10 If fitted with the new type of cord entry, twist the conductors together and thread them through the Cord Guard and Mains Lead Grommet, so that the outer sheathing of the Cord is just projecting beyond the end of the Mains Lead Grommet. Fit the Cord Grip to secure the Cord.

3.1.11 When an earth wire is fitted, this must be fed back through the end wall of the Switch Box Liner and connected to the earth socket. Then fit the Handle as described in Section 8.3.

3.1.12 Connect the live and neutral leads to the switch and reposition the Silicone Rubber Band.

3.1.13 Position the Switch on the Switch Support Pads or Terminal Housings, replace the Switch Clamping Pad Clip and Switch Locating Bushings (if required). Enter and tighten the Switch Locating Screws.

3.1.14 Replace the Switch Clamping Pads (if required).

3.1.15 Check the free operation of the Switch and if it is satisfactory replace the Switch Cover Plate and Liner and secure them with the Switch Cover Screws and Spring Washers (If not satisfactory refer to Section 8.3). Before tightening the screws ensure that the Switch Box Seal is in good condition and that it is correctly positioned on the rim of the Switch Box Liner.

3.2 Replacing a Faulty Switch

3.2.1 Remove the Switch Cover Plate Screws and Washers and remove the Switch Cover Plate complete with Liner.

3.2.2 Lift out the Switch Clamping Pads (if fitted).

3.2.3 Remove the Switch Locating Screws, Switch Clamping Pad Clip and Switch Locating Bushings (if fitted).

3.2.4 Lift the Switch out and remove the Silicone Rubber Band. Disconnect the supply leads and field coil leads (or T.V. Suppressors, if fitted).

3.2.5 Connect the supply leads and field coil leads (or T.V. Suppressors) to the new Switch, replace the Silicone Rubber Band and position the Switch on the Switch Support Pads or Terminal Housings.

3.2.6 Replace the Switch Clamping Pad Clip and Switch Locating Bushings (if required). Engage and tighten the Switch Locating Screws. Replace the Switch Clamping Pads (if required).

3.2.7 Check the switch operating linkage for free movement and check for correct setting by engaging the Lock Button. With the Lock Button engaged the Switch should have already snapped into the 'On' position and no further adjustment will then be necessary. If the Switch has not snapped 'On', adjust it as detailed in Section 8.3.6.

3.2.8 Replace the Cover Plate, complete with Liner and secure it with four Cover Plate Screws and Spring Washers.

3.3 Renewing the Carbon Brushes

3.3.1 After about 150 hours running the Carbon Brushes should be checked to ensure that they are not excessively worn. Proceed as follows:

3.3.2 Remove the End Cap Spring Rings and Outer Brush End Caps.

3.3.3 Unscrew and remove the Inner Brush End Caps and extract the Brushes complete with their springs. Identify each brush to its holder and note which way round it was fitted.

3.3.4 If the Brushes have worn down to, or are approaching 10mm (3/8") in length they should be renewed. When fitting a brush ensure:

(1) That the brush slides freely in its holder.

(2) That the legs of the spring clips are fitted inside the brush holder.

3.3.5 When refitting partially worn brushes, ensure that each is fitted to the holder from which it was removed and that it is fitted the same way round.

SECTION 4 REMOVING THE MOTOR AND DETACHING THE GEAR CARRIER

The various parts are illustrated in Figures 14, 15, 16 and 17

4.1 Remove the Forward Handle and the Drilling Handle (Type 950 only). Stand the Hammer on a locked-shank implement gripped firmly in a vice.

4.2 Remove the six Main Assembly Screws which hold the Motor to the Hammer Casing using a Long Allen Key 02313, once the screws have been loosened with a Standard Allen Key 02308.

NOTE: To break the joint between the motor end and hammer end, tap lightly with a rubber or hide hammer in such a way that if the motor tilts as the joint opens, it will tilt sideways (opening as though there were a hinge along the long side of the joint) so that the Connecting Rod can swing sideways, pivoting around its big and little end bearings, whilst the Striker remains in the Hammer Case. It can readily be seen that if the motor tilts the other way (the joint opening as though there were a hinge along the short side of the joint), there is a very real risk that the Connecting Rod will become bent.

4.3 Lift the motor up, withdrawing Piston and Striker from the Hammer Case.

The Connecting Rod should then be removed from the Crank Pin by springing the Crank Pin Circlip off the Crank Pin Nut with the blade of a small screwdriver and then pulling off the Crank Pin Washer.

Note that it is not necessary to unscrew the Crank Pin Nut in order to remove the Connecting Rod.

4.4 With a screwdriver blade wedged between the teeth of Crank Disc and Pinion to prevent it rotating remove the Small Assembly Screw securing the 19-Tooth Gear Clamp Plate. Remove the six Small Assembly Screws and Spring Washers holding the Gear Carrier to the Motor Casing and lift the Gear Carrier off. Set it aside for dismantling later.

SECTION 5 DISMANTLING THE MOTOR END INTO SUB-ASSEMBLIES

The various parts are illustrated in Figures 13 and 14

5.1 Removing the Handle, Top Bearing and Brush Holder Assembly

5.1.1 Remove the End Cap Spring Rings, Outer Brush End Caps, Inner Brush End Caps and Carbon Brushes.

5.1.2 Release the four screws which secure the Handle to the Motor Casing, ensuring that these are released alternately so that the powerful spring load from the Waved Washers which clamp the Field Coil does not distort or damage the Handle. Once this load has been relieved, the four screws may be quickly removed by using the Pozidriv Screwdriver 02391. When an earthed machine is dismantled the removal of the Handle will expose the earth connection which should be disconnected before proceeding further.

5.1.3 Remove the Motor End Plate Assembly, taking care that the outer race of the Top Bearing does not fall out of the Motor End Plate.

5.1.4 Disconnect the field coil connections to the brush holder terminals.

5.1.5 Draw the ball-and-cage assembly from the inner race and use Top Bearing Puller 02315 to draw the inner race off the armature shaft.

5.1.6 Remove the Bearing Shroud and withdraw the Brush Holder Housing.

5.1.7 Remove the Waved Washer Pair and the Pressure Ring.

5.2 Removing the Switch and Cord

5.2.1 Release the Switch Cover Plate Screws and lift off the Switch Cover Plate complete with Liner. Lift out the Switch Clamping Pads (if fitted).

5.2.2 Remove the Switch Locating Screws, Switch Clamping Pad Clip and Switch Locating Bushings (if fitted).

5.2.3 Lift out the Switch and pull the Silicone Rubber Band away from the heads of the terminal screws. Discard the band if it is damaged. Disconnect the live and neutral supply leads and field coil leads (or T.V. Interference Suppressors, if fitted).

5.2.4 Remove the outer Plunger Abutment Plate by springing the Pushrods apart. Feed the rods, still coupled by the inner Plunger Abutment Plate, into the Switch Box Liner and remove them from the Motor Casing.

5.2.5 Lever the Field Lead Grommets out of their seatings in the floor of the Switch Box Liner and draw them off the field coil leads.

5.2.6 If the hammer is fitted with the earlier type of cable entry, remove the Cable Locking Bridge and withdraw the Cable and Cable Protector. Disconnect the earth wire from the Motor Casing, if fitted, before withdrawing the Cable.

5.2.7 If the hammer is fitted with the new type of cord entry, remove the Cord Grip and withdraw the Cord. Disconnect the earth wire from the Motor Casing, if fitted, before withdrawing the Cord.

5.2.8 Push back the Mains Lead Grommet and lift out the Switch Box Liner.

5.3 Removing the Armature and Field Coil

5.3.1 Remove the two Cartridge Locating Screws.

5.3.2 Rotate the screw in the Motor Dismantling Tool 02317 until the face of the sliding bush lies approximately 2.5mm (3/32") below the face of the body. Locate the bore in the cast body of the tool over the projecting portion of the Pinion Bearing Cartridge, pass a Main Assembly Screw through each of the clearance holes in the cast body and tighten the screws into the threads in the end face of the Motor Case. Back off each screw half a turn. Turn the ejector screw in a clockwise direction and eject the Main Insulating Liner, complete with the Field Coil and the Armature complete with Fan, Pinion and Pinion Bearing Cartridge. Do not use additional leverage on the Ejector Screw – if the screw cannot be turned by hand, check that the Cartridge Locating Screws and the Switch Box Liner have been removed.

5.3.3 Remove the Armature complete with Fan, Pinion Bearing Cartridge and Pinion from the field coil and hold the Armature in a vice, using the Beechwood Blocks 02364 to grip the armature laminations. Locate the Pinion Nut 02363 over the Pinion and unscrew the Pinion with a suitable spanner. Slide the Pinion Bearing Cartridge off and unscrew the Fan with the Fan Spanner 02320.

5.3.4 Remove the Field Coil from the Main Insulating Liner.

SECTION 6 INSTRUCTIONS ON MOTOR SUB-ASSEMBLIES

The various parts are illustrated in Figures 13 and 14

Warning: **Great care should be taken to avoid damage to plastic mouldings and other electrical safety components in handling and assembly. Careless handling or assembly can defeat the purpose of double insulation and endanger the user.**

6.1 Switch Operating Parts in the Handle

6.1.1 The Plunger is held in place by a clip and should be pulled from its bore in the handle. (Some Hammers were fitted with an O-ring instead of a clip.)

6.1.2 Lever out the Large Handle Plug.

6.1.3 Unscrew the Lock Button Assembly.

6.1.4 Remove the Rocker after driving out the Rocker Pivot with the Rocker Pivot Drift 02325.

6.1.5 Examine the handle for cracks, burrs and other damage. Ensure that the plunger bore and the bore of the handgrip are clean and that the small hole in the handgrip, giving access to the Rocker Grubscrew, is clear.

6.1.6 Examine the Rocker to ensure that the lock button shoulder has not been chewed away.

6.1.7 Check that the Pressure Plate is properly located and back off the Rocker Grubscrew until the Pressure Plate can lie in the base of its recess in the Rocker.

6.1.8 Enter the Rocker into its duct. Using a piece of 6.35mm (¼") dia. steel rod, line the rocker pivot hole up to the pivot bore in the handgrip. Tap the Rocker Pivot fully home, ensuring that both ends lie well below the surface of the handgrip. Check the Rocker for free movement.

6.1.9 Check the Lock Button Assembly for free movement and screw it into its boss, using Socket Adaptor 02371 to avoid damage to the moulded hexagon. Do not overtighten, otherwise the plunger will lock in the nylon body. Check that the plunger is free to move and if it is not, unscrew the Lock Button Assembly slightly until it is free.

6.1.10 Enter the Plunger into its bore.

6.1.11 Hold the handgrip in the right hand and apply pressure to the end of the Plunger with the left hand. Operate the Rocker and check the action of the Lock Button.

6.1.12 Apply a little Bostik 299 or 1261 to the Large Handle Plug and press it into position.

6.2 Terminal Lead Clamps, and Motor Insulating Plate 0103 (Obsolete)

6.2.1 Examine the Motor Insulating Plate for cracks, burning or damage. Check the Terminal Lead Clamps for burning or tearing.

If Examination of these parts shows that replacement is necessary, proceed as indicated in the following paragraphs, and Section 6.3 if applicable.

6.2.2 The Motor Insulating Plate is secured to the Motor End Plate with Araldite and it is also a close fit on the central boss. To remove the plate, it must be levered off with a screwdriver or similar tool.

6.2.3 Remove the Terminal Lead Clamps from their housings on the Motor Insulating Plate by levering or pulling until their headed retaining studs pull through the holes in the Motor Insulating Plate.

6.2.4 To refit or renew the Terminal Clamps, pass the two small extensions on the terminal clamp studs through the clearance holes in the Motor Insulating Plate and draw the cone shaped heads through with a pair of small pliers, a little moisture on the studs will make assembly easier.

6.2.5 To refit or renew the Motor Insulating Plate, apply a small dab of domestic Araldite to the 'spokes' of the Motor End Plate but not around the Small Locating Pin.

6.2.6 Locate the small clearance hole in one lug of the Motor Insulating Plate over the Small Locating Pin, at the same time positioning the central plastic ring over the central boss.

6.2.7 Push the Motor Insulating Plate home so that it is seated on the webbed face of the Motor End Plate.

6.2.8 Check that the Terminal Lead Clamps are squarely seated, otherwise they may foul the revolving Bearing Shroud when the motor is assembled.

6.3 Terminal Pads, and Motor Insulating Plate 00123

6.3.1 To improve the electrical safety of the Hammers, a new Motor Insulating Plate has been introduced, having the Kango Part Number 00123. The new Plate is not fitted with Terminal Lead Clamps but instead it has two self-adhesive Terminal Pads which are stuck into two circular recesses on the plate.

6.3.2 The new Motor Insulating Plate is attached to the Motor End Plate in the same way as was the earlier Insulating Plate, as described in Sections 6.2.5, 6.2.6 and 6.2.7.

6.3.3 Check that the Terminal Pads are firmly stuck to the Motor Insulating Plate. If in doubt, replace the Pads.

6.4 Top Bearing Spring Assembly

6.4.1 Grip the Motor End Plate Assembly in a vice.

6.4.2 Remove the Top Bearing Outer Race and the Top Bearing Spring Ring. The spring ring is provided with a small extractor notch at one end.

6.4.3 Remove the Top Bearing Thrust Washer, Top Bearing Spring and Spring Seating Washer and Buffer.

6.4.4 Carefully examine the Spring and the conical rubber buffer. If there is any sign of damage, or deterioration of the rubber, the parts should be replaced.

6.4.5 Place the Spring Seating Washer and Buffer in the top bearing housing.

6.4.6 Snap the Top Bearing Spring over the projection on the back face of the Top Bearing Thrust Washer, place a small blob of B.P. Energrease LS.3 inside the spring and place the assembly of spring and washer in the housing.

6.4.7 Locate the Top Bearing Spring Ring in the mouth of the housing and use a flat ended piece of 32mm (1¼") dia. rod to force the pack of components into the housing until the Spring Ring snaps into its bore.

6.5 Brush Holder Assembly

6.5.1 Examine all parts and renew as necessary. To remove parts for renewal, proceed as set out in the following paragraphs.

6.5.2 Remove the Brush Holder Retaining Screws and Brush Holder Retaining Straps and swing the brush holder terminals clear of their Terminal Housings. These housings are secured with Araldite and it may be necessary to break the bond to swing the brush holder terminals clear.

6.5.3 Push the Brush Holders into the bore of the Brush Holder Housing and remove them.

6.5.4 If it has been necessary to destroy the bond between the Terminal Housings and the Brush Holder Housing they should be lightly smeared with domestic Araldite and refitted. Before the Araldite has set, slide the Brush Holders into their bores in the Brush Holder Housing and swing the terminals into place in the Terminal Housings. These may be slightly tilted to admit the terminals.

6.5.5 Pass the Alignment Bar 02326 through both brushways to align them and replace the Brush Holder Retaining Straps and Screws. Before the screws are finally tightened, push both Brush Holders hard against the faces of the internal bosses in the Brush Holder Housing.

6.5.6 Finally tighten the Brush Holder Retaining Screws and remove the Alignment Bar.

6.6 Pinion Bearing Cartridge Assembly

6.6.1 If the Assembly contains an Oil Seal, place the Pinion Bearing Cartridge in the Cartridge Ejector Base 02322 with the three holes facing outwards. Locate the three ejector pins fixed to the Cartridge Ejector 02321 in the three ejector holes and, with a vice or small press, push out the Oil Seal, Pinion Bearing, two Thick Dished Washers, Notched Washer and Thin Dished Washer.

6.6.2 If the Assembly does not contain an Oil Seal, and is retained by a Circlip, remove the Circlip using the Circlip Pliers 02369. The Bearing and Washers will then slide out of the Cartridge.

6.6.3 Examine all the parts and renew as necessary. Note that if an open, caged Pinion Bearing (Part Number 2102) is fitted an Oil Seal (Part Number 00703) MUST also be fitted.

If a shielded Pinion Bearing (Part Number 02158) is fitted it is not necessary to fit an Oil Seal.

6.6.4 *Note:* When re-assembling the Pinion Bearing Cartridge IT IS ESSENTIAL that the components should be fitted in the correct order and in the manner specified.

6.6.5 Lightly grease the bore of the Pinion Bearing Cartridge with B.P. Energrease LS.3. Identify the Thin Dished Washer, which is sufficiently flexible to be flattened under a light load, grease it and place it in the housing with the hollow face against the back of the housing bore.

6.6.6 Insert the Notched Washer, then coat the two Thick Dished Washers with B.P. Energrease LS.3 and place both of them, hollow face upwards, on the Notched Washer.

6.6.7 If the hammer is fitted with an open, caged Pinion Bearing (Part Number 2102), proceed as described in Sections 6.6.8, 6.6.9 and 6.6.10. If the Pinion Bearing to be fitted is a shielded bearing (Part Number 02158) proceed as described in Section 6.6.11.

6.6.8 Pack the Pinion Bearing with B.P. Energrease LS.3 and place the closed side (which carries the manufacturer's name) on the Dished Washers.

6.6.9 Pack the Oil Seal with B.P. Energrease LS.3 and locate it in the housing bore with its closed face uppermost.

6.6.10 With a press, or suitable smooth-jawed vice, press the Oil Seal in until its closed face is flush with the end face of the Pinion Bearing Cartridge. Take great care to avoid bruising or damaging the Oil Seal during assembly.

6.6.11 Do not attempt to pack any grease into the shielded Bearing. Slide the Bearing into the Cartridge up to the Dished Washers. If the Cartridge has a groove in the bore near the outer end, fit an Armature Bearing Circlip into the groove using the Circlip Pliers 02369. If a Circlip is not fitted it is necessary to take extra care when handling the complete assembly to ensure that the Bearing and Washers do not slide out of the Cartridge.

6.7 Cable Protector Housing and Mains Lead Grommet

6.7.1 Should it prove necessary to renew either or both of these parts, drill out the heads of the Cable Housing Screws until they break off. Lift off the Cable Protector Housing and remove the shanks of the screws with a pair of pliers. The Mains Lead Grommet can now be removed for renewal.

6.7.2 Slide a new Mains Lead Grommet into its bore, with the drilled hole in the flange engaging the Grommet Pin.

6.7.3 Fit the Cable Protector Housing with the locking bridge recess facing the switch chamber. Secure it with two Cable Housing Screws.

6.7.4 After tightening the screws, the driver sockets in the screw heads should be drilled out with a 60° inclusive angle drill until they will no longer receive the driver and are thus rendered tamper-proof.

6.8 Cord Guard Housing and Mains Lead Grommet

6.8.1 For Hammers fitted with the later type of cord entry, the Cord Guard Housing is removed by unscrewing the two Cord Guard Housing Screws. Note that the heads of these Screws do not require drilling out.

6.8.2 If the Cord Guard is damaged it should be pulled out of the Housing, and a new Guard should be pushed into the Housing so that the square end of the Guard locates in the recess in the Housing.

6.8.3 To remove the Mains Lead Grommet it is necessary to remove the Grommet Pin, using Pin Punch 02372 to tap the Pin through its hole. When the Mains Lead Grommet has been removed, the Insulating Bush can be removed by turning the Bush so that the flat on the flange can pass over the boss in the Motor Casing.

6.8.4 Fit the Insulating Bush into the bore in the Motor Casing, so that the flange on the Bush is inside the Casing. Note that the flat on the flange has to pass over the boss in the Casing. After inserting the Bush it is kept in position by rotating it so that the flange is trapped behind the boss.

6.8.5 Place the Mains Lead Grommet in position through the boss in the Motor Casing, ensuring that the hole in the Grommet flange is aligned with the hole at the side of the boss. Tap the Grommet Pin through these holes to secure the Mains Lead Grommet.

6.8.6 Place the Cord Guard Housing in position with the Cord Grip recess facing the switch chamber. Secure it with two Cord Guard Housing Screws. Note that these screws have the same thread as the Cable Housing Screws, but the heads of the Cord Guard Housing Screws are larger, and do not have to be drilled out.

6.9 Switch Cover Plate Liner and Switch Box Seal

6.9.1 To renew these items the damaged Liner must be completely removed and the interior of the Switch Cover Plate thoroughly cleaned.

6.9.2 Roughen the outer surface of the new Liner with emery cloth and secure the Switch Box Seal to it with Bostik 299 or 1261.

6.9.3 Apply Araldite domestic adhesive to the Switch Cover Plate and the Liner. Fit the Liner in position.

6.9.4 Before the adhesive sets, assemble the Liner and Cover Plate to the Motor Casing, taking care that none of the wiring is trapped and that the switch operating linkage is working correctly. Insert the Switch Cover Screws and Washers, tightening them down uniformly to avoid damage to the register projecting from the Switch Cover Plate Liner.

SECTION 7 ELECTRICAL TESTING AND WIRING DIAGRAMS

7.1 Notes on Electrical Testing

7.1.1 Double insulation provides two layers of insulation between current carrying parts and the metal casing of the Hammer. The insulating layer which prevents current from flowing between parts which must be maintained at different potentials is known as the Functional Insulation. Should the functional insulation fail at any point, the Hammer will still be safe because of the second layer, which is known as the Protective Insulation.

7.1.2 Owing to the very high quality of the insulation used in Kango Hammers it is possible for the functional insulation alone to withstand extremely high test voltages, even though the protective insulation may have sustained mechanical damage. It is also possible for the protective insulation to withstand extremely high voltages in the event of local failure of the functional insulation. Provided that a single layer of insulation (functional or protective) exists at every point, it would be possible for the Hammer to give a normal performance, but under these circumstances it would no longer be double insulated. This could particularly apply to the armature and field coil, i.e. the windings might be in direct, local contact with the laminations. Before the machine is returned to the user is it essential to test both the functional and the protective insulation independently in accordance with the recommendations of C.E.E.20 and B.S.2769: (Portable electric-motor operated tools), as described in the following paragraphs.

7.1.3 The method of testing the electrical strength of the Armature and Field Coil is given in the following paragraphs.

The recommended test voltages should be applied as follows:

(1) Initially not more than half the prescribed voltage should be applied, it should then be raised rapidly to the full value.

(2) The full voltage should be maintained without breakdown or flashover for a few seconds.

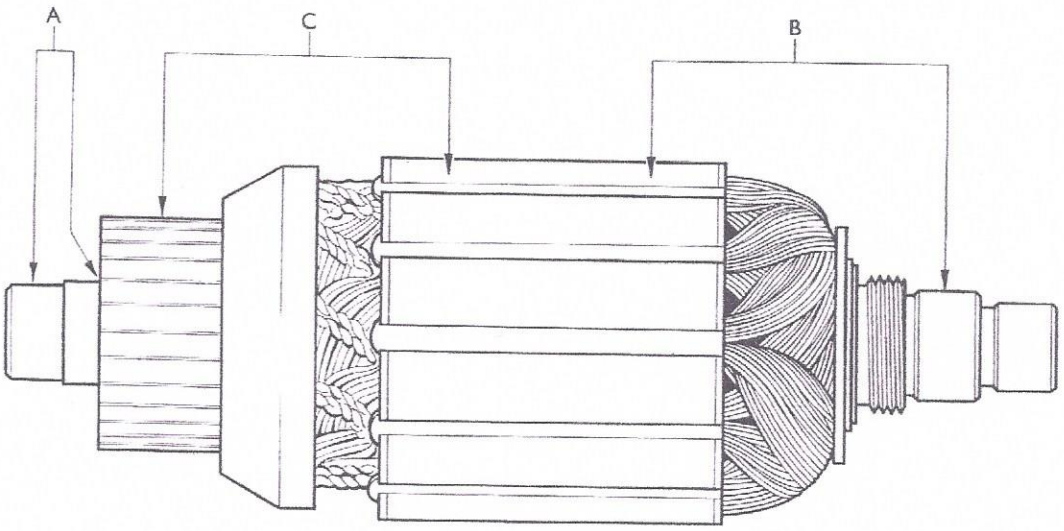


Figure 2 Testing Points for Armature Insulation

7.2 Testing the Armature (see Figure 2)

7.2.1 Protective Insulation

Apply 1250 volts rising to 2500 volts AC between commutator steel bush and spindle, (A), as in Section 7.1.3.

Note: Care should be taken to ensure that the probe applied to the steel bush is well clear of the spindle, to avoid a false flashover.

Apply 1250 volts rising to 2500 volts AC between laminations and spindle, (B), as in Section 7.1.3.

7.2.2 Functional Insulation

Apply 750 volts rising to 1500 volts AC between commutator segments and laminations, (C), as in Section 7.1.3.

7.3 Testing the Field Coil

7.3.1 Functional Insulation

Twist the four bared ends of the Field Coil leads together and apply 750 volts rising to 1500 volts AC across the lead ends and the laminations, as in Section 7.1.3.

7.3.2 Protective Insulation

To test the protective insulation of the Field Coil, place the coil in the Main Insulating Liner and place the liner in the Motor Casing which should not contain any other components. Ensure that the four field leads are not in contact with the laminations or Motor Casing. Take great care that no contact occurs between the bared ends and the Operator or the flash test probes during testing. Apply 1250 volts rising to 2500 volts AC across the laminations and the Motor Casing, as in Section 7.1.3.

7.4 Testing the complete Hammer

The electrical strength of the insulation throughout the hammer can be tested quite simply in the following manner:

With the hammer assembled, but without the carbon brushes being fitted, and with the switch closed, apply not more than 2000 volts initially and then raise quickly to 4000 volts from the Motor Casing in succession to each live pin of the plug on the hammer lead. The full voltage of 4000 volts should be maintained without breakdown or flash-over for a few seconds.

7.5 Insulation Resistance

With the hammer completely assembled and with the switch closed, apply 500 volts D.C. by means of a "megger" from the Main Casting to either live pin of the plug on the hammer lead. The resistance shown should be greater than 4 megohms.

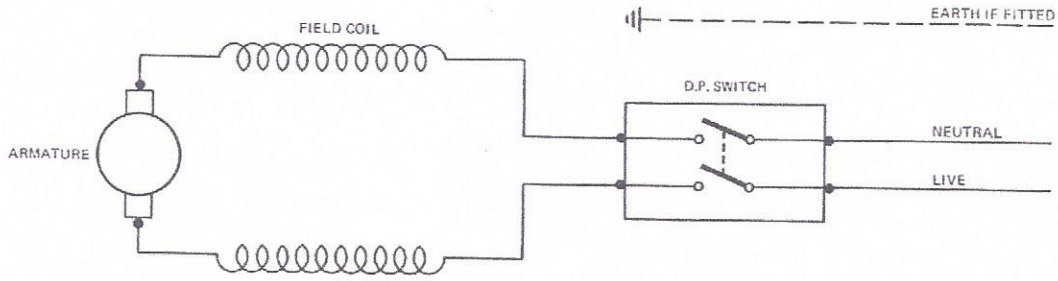


Figure 3 Wiring Diagram for Motor

7.6 Earth Continuity (for hammers with 3-core leads)

Using the megger or other means, measure the resistance from the Hammer Case to the earth pin of the plug on the Hammer Lead. The resistance should not exceed 1 ohm.

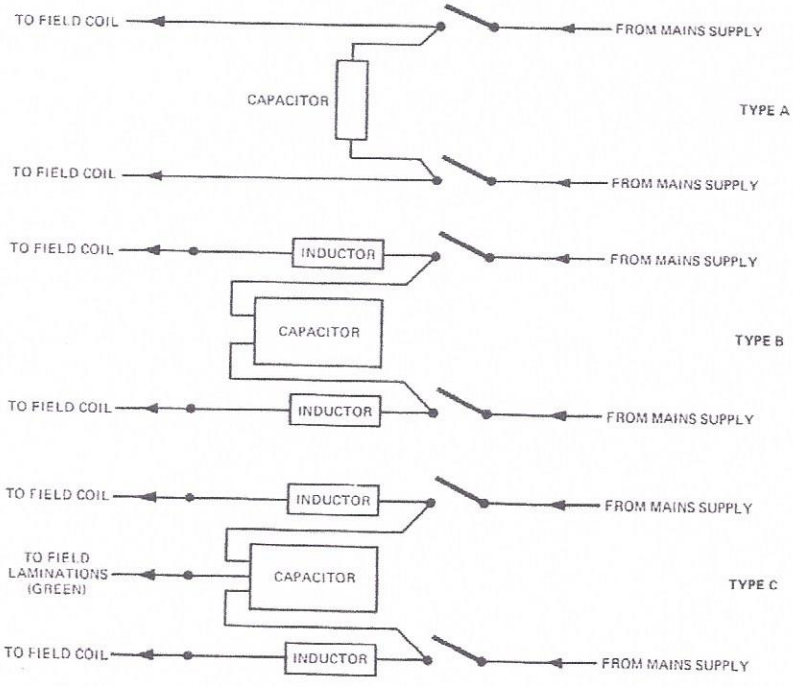
7.7 Checking and Cleaning of Motor Parts

During prolonged use in dirty conditions it is possible for a continuous layer of electrically conductive dust to build up on the surface of the insulating components. If such a layer of dirt is allowed to build up unchecked it may greatly lower the efficiency of the insulation. It is therefore essential that all oil, grease, dust and dirt should be removed from all motor parts whenever a Hammer is returned for repair. Insulating components should also be checked for cracks or other mechanical damage which might impair their efficiency. If in doubt – REPLACE.

7.8 Radio and T.V. Interference Suppression

7.8.1 There is an increasing requirement to suppress the Hammers against radio and T.V. interference. Three different types of suppression are possible giving varying degrees of suppression.

7.8.2 If there is a requirement only for radio interference suppression then a 0.07 μF Capacitor (Part Number 00941) should be fitted across the field lead connections to the Switch (See Figure 4, Type A). The Capacitor is positioned between the end of the switch and the Switch Box Liner, and a 30mm (1¼") length of self-adhesive Foam Rubber Strip (Part Number 00931) should be stuck to the Capacitor to prevent it from chafing against the Switch.



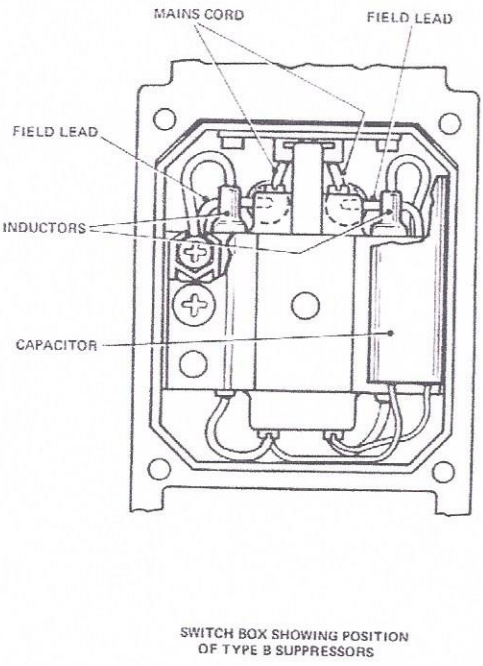


Figure 4 Suppression Diagrams

7.8.3 If there is a requirement for both radio and T.V. interference suppression then a Suppressor Kit (Part Number 00945) should be fitted (See Figure 4, Type B).

7.8.4 To fit the Suppressor Kit it is necessary to shorten the supply cord live and neutral leads by 50mm (2") and then strip and form hooks in the usual manner. These leads are then connected to the end of the Switch nearest the cord entry hole.

7.8.5 Form hooks on the ends of the two double leads from the Suppressor Kit, and attach to the other end of the Switch.

7.8.6 Fit the Silicone Rubber Band and then fit the Switch into the switch box in the normal manner. Ensure that the field leads are pulled out of the switch box, one on each side of the Switch at the cord entry end.

7.8.7 Cut off 10mm (3/8") from the soldered ends of the field leads, leaving 6mm (¼") bare, and attach a Connector (Part Number 00992) to each of the lead ends.

7.8.8 Attach the two remaining Suppressor Kit leads to the corresponding field lead connectors, then push the Connectors and the inductors down between the sides of the Switch and the sides of the Switch Box until the tops of the components are level with the top of the Switch Box.

7.8.9 Stick a 40mm (1½") strip of self-adhesive Foam Urethane (Part Number 00932) along one edge of the capacitor and then place the edge into the angle of the Switch Clamping Pad Clip.

7.8.10 Fit the Switch Cover Plate in the usual manner, checking that no leads are trapped and that the switch mechanism operates correctly without fouling any of the leads or suppression components.

7.8.11 A few Hammers are fitted with a Suppressor Kit which includes a connection to the Field Coil laminations (See Figure 4, Type C). This Kit is fitted in the same manner as that for the Type B Kit, with the addition of an extra Connector to join the extra capacitor lead to the Field Lamination Lead.

7.8.12 New Hammers have Connectors in the Terminal Housings, which replace the Connectors of 7.8.7. The positions of the Suppressor Components are shown in Figure 4 (illustration).

SECTION 8 RE-ASSEMBLING THE MOTOR

The various parts are illustrated in Figures 13 and 14

8.1 Refitting Armature, Field Coil, Brush Holder Assembly and Top Bearing

Note: The necessary checks and replacements, as described in Sections 6 and 7, should be carried out before re-assembly is commenced.

8.1.1 Hold the Armature in a vice, using the Beechwood Blocks 02364 to grip the laminations. Screw on the Fan and tighten it with the Fan Spanner 02320.

8.1.2 Lightly grease the end of the armature shaft and slide the Pinion Bearing Cartridge on it. If an Oil Seal is fitted, use a twisting motion to enable the lip of the Oil Seal to ride over the shoulder on the shaft.

8.1.3 Screw in the Pinion until finger tight. Fit the Pinion Nut 02363, and holding it to prevent it riding back up the helical teeth on the Pinion, tighten with a suitable spanner.

8.1.4 Mount the Motor Casing in a smooth-jawed vice with the handle flange uppermost. Grip the casing by the long flat sides of the hammer casing flange, but take great care not to overtighten the vice and thus distort the Motor Casing.

8.1.5 Lower the Armature, complete with Fan, Pinion Bearing Cartridge and Pinion into the Motor Casing until the Pinion Cartridge has registered in and projected through its bore in the Motor Casing.

8.1.6 Remove the Motor Casing from the vice and align the tapped holes in the Pinion Bearing Cartridge with the clearance holes in the Motor Casing. Position the two Cartridge Locating Screws and screw them home. Ensure that the screw heads do not stand proud as they would then interfere with the location of the Gear Carrier. To ensure that the contents of the Pinion Bearing Cartridge do not become displaced by accidental pressure on the Pinion, fit Pinion Mask 02323 over the Pinion and secure it with two Small Assembly Screws.

8.1.7 Place the Main Insulating Liner on the bench with the field lead grommet holes nearest the Operator. Check that the ends of the field coil leads are tinned and that there are no loose strands. Drop the field coil into the Main Insulating Liner and press it down until the lamination pack is fully entered between the four lugs in the base of the Liner. Very lightly oil the field bore in the Motor Casing and, with the Motor Casing held in a vice as described in paragraph 8.1.4, lower the Field Coil and Liner into the Motor Casing, ensuring that the Liner Locating Pin passes between the guide ribs on the Main Insulating Liner. Press the assembly down until, by looking through the switch cavity, it can be seen that the outside shoulder on the Main Insulating Liner is in contact with the internal shoulder in the Motor Casing.

8.1.8 Select the two long leads, and thread them through the holes in the flat wall of the Main Insulating Liner, passing one long lead behind the upstanding short lead, which is secured to it by a short length of sleeving. Press both long leads down against the end cheek of the lamination pack. The two remaining leads are the field connections to the brush holders and should now be standing up from the Motor Casing.

8.1.9 Pass the Pressure Ring over the brush holder leads and the Armature, ensuring that the half-round notches are near the switch chamber. Snap the Pressure Ring into the mouth of the Main Insulating Liner.

8.1.10 Pass the Waved Washer Pair over the brush holder leads and Armature and locate them on their register on the Pressure Ring.

8.1.11 Pass the Brush Holder Housing over the brush holder leads and the Armature. Each brush holder lead should pass through the adjacent clearance hole in the base of the Brush Holder Housing, i.e. between the internal lug (which carries the Brush Holder) and the Terminal Housing. The bared end of each lead should then be formed into a hook which will grip the Terminal Screw. Squeeze the lead insulation into the square section channels in the Terminal Housings with the pre-formed hooks lying in the bores of the Terminal Housings above the brass terminal connection blocks. Pass the Terminal Screws through the pre-formed hooks and tighten them down.

Ensure that the Field Leads are well clear of the Armature.

Note that new Brush Holder Housings have an external lug which locates in a slot in the Motor Casing. This lug should be cut off if fitting a new Brush Holder Housing to a Motor Casing without a slot.

8.1.12 Push the Bearing Shroud over the end of the armature spindle and use the Top Bearing Assembly Tool 02324 to draw the inner ring of the Top Bearing on to the armature spindle (this tool engages with the right-hand thread in the end of the spindle).

8.1.13 Grease the Top Bearing ball-and-cage assembly with B.P. Energrease LS.3 and snap it into place on the inner ring.

8.2 Refitting the Cord and Switch

8.2.1 Examine the Switch Box Gasket for damage. Renew if necessary.

8.2.2 Pass the two holes in the floor of the Switch Box Liner over the two leads projecting through the flat side wall of the Main Insulating Liner. Lower the Switch Box Liner into its cavity and press the Mains Lead Grommet home. Thread the two Field Lead Grommets over the field leads (small end first), locate them in the clearance holes in the floor of the Switch Box Liner and press them into the holes in the Main Insulating Liner.

8.2.3 Examine the Push Rods for damage and check them for free sliding in their bores in the Motor Casing. Snap the Push Rods into the end jaws of one of the Plunger Abutment Plates and pass the coupled rods through the clearance holes in the Switch Box Liner and the two bores in the Motor Casing. With the Pushrods projecting as far as possible from the handle face of the Motor Casing, snap one end jaw of the second Plunger Abutment Plate over the locating groove in one Pushrod, then spring the rods apart equally until the other end jaw will engage the locating groove in the second Pushrod. Slide the assembly back and forth several times to check for free movement.

8.2.4 If the Hammer is fitted with the earlier type of cable entry, fit the Cable Protector to the Cable, twist the conductors together and thread them through the elbow portion of the Mains Lead Grommet. Push the Cable Protector fully home into the Cable Protector Housing. Ensure that the outer sheathing of the cable is flush with, or slightly proud of the end of the Mains Lead Grommet and fit the Cable Locking Bridge. Untwist the conductors ready for connection to the Switch.

8.2.5 If the Hammer is fitted with the new type of cord entry, twist the conductors of the Cord together and thread them through the Cord Guard and the Mains Lead Grommet, so that the outer sheathing of the Cord is just projecting beyond the end of the Mains Lead Grommet. Fit the Cord Grip, and untwist the conductors ready for connection to the Switch.

8.2.6 When an earth wire is fitted, this should be fed back through the Switch Box Liner and the Motor Casing and connected to the earth socket.

8.2.7 Connect the supply leads to the Switch terminals furthest from the handle and the Field Coil leads to the terminals at the other end. (When Radio and T.V. interference suppressors are fitted, refer to typical wiring diagrams shown in Figure 4, and Section 7.8. These vary according to National requirements. In case of doubt refer to the nearest Kango Agent).

8.2.8 If necessary, fit a new Silicone Rubber Band. Locate the Switch on the Switch Support Pads or Terminal Housings, locate the Switch Clamping Pad Clip and Switch Locating Bushings (if required).

8.2.9 Enter and tighten the Switch Locating Screws.

8.2.10 DO NOT fit the Switch Clamping Pads and the Switch Cover Plate at this stage.

8.3 Refitting the Handle and Switch Cover Plate

8.3.1 Lightly grease the bore and outside diameter of the Top Bearing outer race with B.P. Energrease LS.3 and check for a sliding fit in the bearing housing in the Motor End Plate. Leave it in its housing.

8.3.2 Mount the Motor Casing in a smooth-jawed vice, as detailed in Section 8.1.4.

8.3.3 Offer the Motor End Plate Assembly to the Motor Casing, so that the Terminal Pads (or Terminal Lead Clamps) rest on the Terminal Housings and the Small Locating Pin enters one of the locating holes in the Brush Holder Housing.

Place the Plastic Handle over the Motor End Plate Assembly and enter the four Plastic Handle Screws. Tighten these screws as follows:

(1) With the Pozidriv Screwdriver 02391 turn two diagonally opposite screws alternately and a little at a time until tight, checking periodically that the Armature is free to rotate.

(2) Spin down the other two screws until tight.

(3) Finally tighten all four screws using only sufficient pressure to pull the flange of the Plastic Handle down until it contacts the flange of the Motor Casing.

This procedure is necessary to prevent the powerful spring load exerted by the Waved Washer Pair damaging the Plastic Handle.

8.3.4 Remove the Pinion Mask 02323, grip the Pinion with the fingers and check that the Armature is free to turn.

If the Armature cannot be turned quite freely the handle must be removed and the cause

8.3.5 Fit the Carbon Brushes (see Section 3.3), Inner Brush End Caps, Outer Brush End Caps and End Cap Spring Rings.

8.3.6 Gently squeeze the operating trigger and engage the Lock Button. If the switch is heard to 'click over' before the button engages, no adjustment is necessary. If the switch has not 'clicked over' before the lock button engages, the Rocker Grubscrew must be adjusted with the Allen Key 02307 by turning it in a clockwise direction until the switch 'clicks over'. Give the screw a further half turn to compensate for future wear and settling. Before replacing the Switch Cover, connect the Hammer to the supply and Switch on and off several times to ensure that the motor runs freely.

8.3.7 Fit the Switch Clamping Pads (if required) and Switch Cover Plate complete with Liner and Switch Box Seal.

SECTION 9 DISMANTLING THE GEAR CARRIER INTO SUB-ASSEMBLIES

The various parts are illustrated in Figures 15 and 16

Note: All parts should be thoroughly cleaned in a suitable degreasing solution and must be carefully dried before re-assembly.

9.1 Removing the Crank Disc (Type 900 only)

9.1.1 Remove the Small Assembly Screw securing the 19-Tooth Gear Clamp Plate and remove the Bearing Keeper.

9.1.2 Slide the Crank Disc out of the bearings in the Gear Carrier, but do not allow the Crank Disc Thrust Bearing, Crank Disc Thrust Races or Crank Disc Shims to fall to the floor.

9.1.3 If the Crank Pin Bush needs renewing, engage the Allen Key 02309 in the Crank Pin Screw and, with the Socket Adaptor 02367, unscrew the Crank Pin Nut. Note that the nut has a left-hand thread.

9.2 Removing the Crank Disc and 19-Tooth Gear (Type 950 only)

9.2.1 Remove the Small Assembly Screw securing the 19-Tooth Gear Clamp Plate and draw the 19-Tooth Gear off the Crank Disc shaft. Take care not to lose the Key.

9.2.2 Slide the Crank Disc out of its bearings in the Gear Carrier but do not allow the Crank Disc Thrust Bearing, Crank Disc Thrust Races or Crank Disc Shims to fall to the floor.

9.2.3 If the Crank Pin Bush needs renewing, engage the Allen Key 02309 in the Crank Pin Screw and with the Socket Adaptor 02367, unscrew the Crank Pin Nut. Note that the nut has a left-hand thread.

9.3 Removing the Clutch and Drive Shaft (Type 950 only)

9.3.1 Release and remove the four Clutch Bearing Cap Screws and remove the Clutch Bearing Cap and clutch assembly. This also releases the Drive Shaft which may be withdrawn complete with the Drive Shaft Thrust Bearing and Thrust Race.

9.3.2 Withdraw the small end of the Clutch Shaft from its bearing in the Clutch Bearing Cap, taking care that the Clutch Thrust Bearing, Thrust Race and Clutch Shaft Shims do not fall to the floor.

SECTION 10 INSTRUCTIONS ON GEAR CARRIER SUB-ASSEMBLIES

The various parts are illustrated in Figures 5, 15 and 16

10.1 Checking Piston and Striker

To check the clearance of the Piston in the Striker the Piston should be assembled to the Connecting Rod and offered to the Striker bore. It should not be possible to assemble the Piston to the Striker when a 0.20mm (0.008") feeler gauge is lying in the Striker bore. If it is possible to assemble the two parts with the feeler in place it will be necessary to renew one or both parts and the old Piston should be offered to a new Striker, and vice versa, to determine which of the worn components should be replaced to bring the Striker/Piston clearance within limits. Examine the Piston Seal for wear and damage (it is generally recommended to renew this part as a matter of course).

10.2 Dismantling and Re-assembling the Non-adjustable Clutch (Type 950 only)

10.2.1 Mount the Allen Key 02308 in a vice with about 6mm (¼") of the key projecting above the vice jaws and place the hexagon socket at the toothed end of the Clutch Shaft over the key.

10.2.2 Engage the Clutch Spanner 02329 in the two spannering holes in the back face of the Clutch Bush and unscrew the Clutch Bush from the Clutch Shaft.

10.2.3 Remove the Clutch Plates, 39-Tooth Gear, Waved Washer Pack and the Clutch Plate Driver from the Clutch Bush.

10.2.4 Using Kango Hammer Grease, lightly grease the shaft of the Clutch Bush, the facings of the Clutch Plates and the bore and faces of the 39-Tooth Gear.

10.2.5 Slide a Clutch Plate over the Clutch Bush with its plain side towards the flange of the Clutch Bush and engage the driving pins in the Clutch Bush with the matching holes in the Clutch Plate.

10.2.6 Slide the 39-Tooth Gear up to the Clutch Plate, followed by a second Clutch Plate with its stepped face against the gear.

10.2.7 Fit the Clutch Plate Driver to the Clutch Shaft with the driving pins towards the small end of the shaft.

10.2.8 Locate the Waved Washer Pack (comprising 11 washers) on the Clutch Plate Driver and slide the Clutch Bush, complete with Clutch Plates and 39-Tooth Gear, over the Clutch Shaft and engage the first two threads.

10.2.9 Pass the Clutch Alignment Pin 02328 through the alignment holes in the Clutch Plate Driver and the nearest Clutch Plate.

10.2.10 Mount the Allen Key 02308 in a vice with 6mm (¼") of the key protruding. Locate the hexagon in the head of the Clutch Shaft on it and fully tighten the Clutch Bush to the Clutch Shaft with the Clutch Spanner 02329.

10.3 Dismantling and Re-assembling the Adjustable Clutch (Type 950 only)

10.3.1 Bend back the Clutch Lock Washer tab to release the Clutch Lock Nut.

10.3.2 Grip the Lock Nut lightly in a vice and unscrew the assembly using the Clutch Spanner 02329.

10.3.3 Remove the Clutch Spring, Clutch Plates and 39-Tooth Gear from the Clutch Bush.

10.3.4 Unscrew the Clutch Shaft from the Clutch Bush using the 3/16" Allen Key 02308. Note that it is not necessary to separate these components unless one of the two parts has to be renewed. Similarly, it is not necessary to dismantle the clutch in order to renew the Clutch Shaft.

10.3.5 If necessary, remove and renew the Bearing in the 39-Tooth Gear as detailed in Section 12.9.

10.3.6 To assemble the clutch, first smear all the parts with grease, then place one Clutch Plate on the Clutch Bush with its sintered bronze face away from the Bush shoulder.

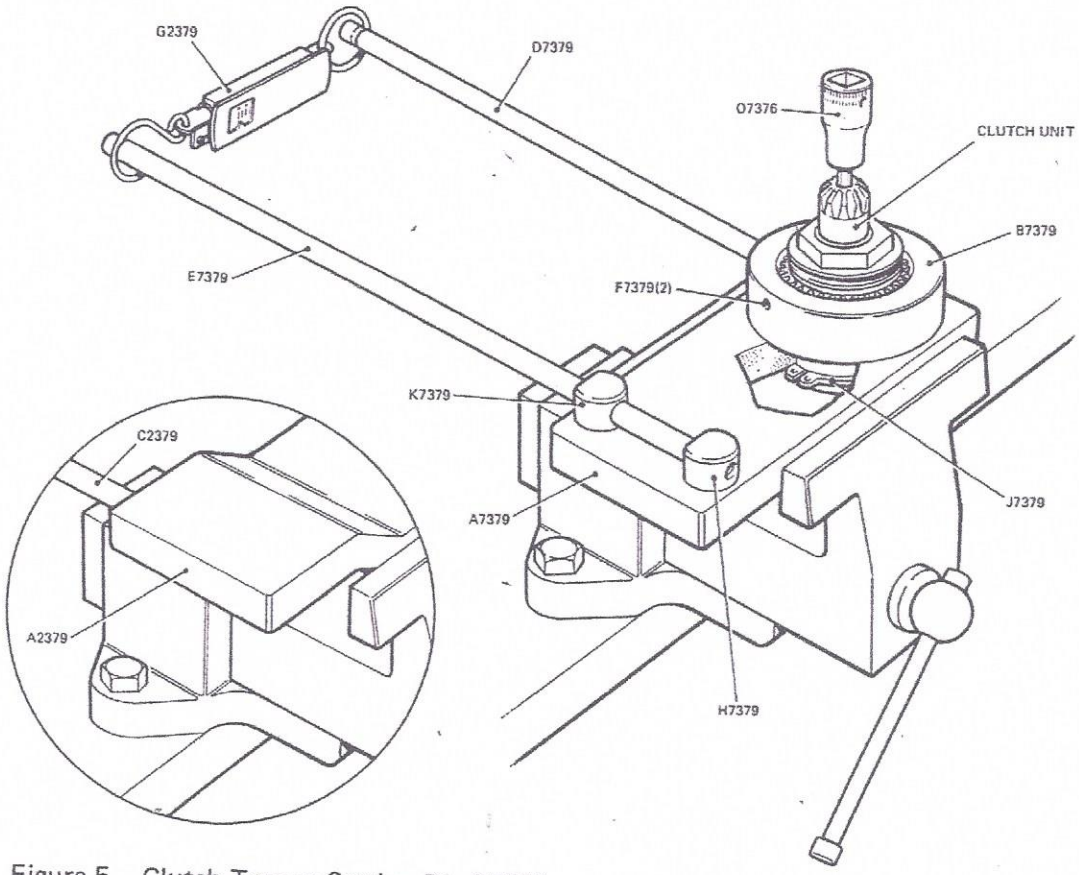


Figure 5 Clutch Torque Setting Rig 07379

Note: Inset shows alternative 'Modified 2379 Rig' parts (see Section 18.4).

10.3.7 Slide the 39-Tooth Gear onto the Bush, followed by the second Clutch Plate with the sintered bronze face adjacent to the Gear.

10.3.8 Place the Clutch Spring in position with its concave side facing the Clutch Plate.

10.3.9 Place the Lock Washer against the Clutch Spring and screw on the Clutch Lock Nut.

10.3.10 Screw the Clutch Shaft into the Clutch Bush and tighten using the 3/16" Allen Key 02308 and the Clutch Spanner 02329.

10.3.11 Adjust the clutch torque in accordance with Section 10.4.

10.4 Adjusting the Clutch (Type 950 only)

10.4.1 Place the clutch assembly in the Body B7379 in the Torque Setting Rig 07379 with the Clutch Lock Nut uppermost, as shown in Figure 5.

10.4.2 Place the Spring Balance G2379 in position and place the Adaptor 07376 in the hexagon socket in the end of the Clutch Shaft.

10.4.3 Locate the Torque Wrench 02366 in the Adaptor and rotate in a clockwise direction at a steady speed. Note the Spring Balance reading, and tighten the Lock Nut to increase the load until a steady reading of 7 lb (3.2kg) is achieved. Note that if there is a requirement for the clutch to slip at a higher torque, it is possible to adjust it up to a maximum of 8 lb (3.6kg).

10.4.4 When the setting is correct, remove the assembly from the Rig and bend the Lock Washer up to lock against one of the flats on the Lock Nut.

SECTION 11 RE-ASSEMBLING THE GEAR CARRIER

The various parts are illustrated in Figures 14, 15 and 16

11.1 Meshing the Crank Disc with the Pinion

11.1.1 Lightly grease the shaft of the Crank Disc with Kango Hammer Grease and locate the following components on the shaft in the order given:

One Crank Disc Thrust Race
The Crank Disc Thrust Bearing
The second Crank Disc Thrust Race

11.1.2 Slide the Crank Disc into its bearing in the Gear Carrier.

11.1.3 Locate the Gear Carrier over the projecting end of the Pinion Bearing Cartridge on the Motor Casing and secure it with three Small Assembly Screws in alternate holes.

11.1.4 Insert a feeler gauge between the Crank Disc Thrust Race and the back of that part of the Crank Disc which is in mesh with the Pinion and, rotating the Crank Disc to several different positions, assess the amount of shimming required to reduce the backlash to a minimum. Insert the appropriate Crank Disc Shims between the Thrust Race and the Gear Carrier. The mesh should then be checked all round the Crank Disc and over six or seven revolutions of the Crank Disc to determine the tightest spot. The crank disc shimming should be adjusted until barely perceptible backlash exists at the tightest spot. The gears MUST NOT be assembled entirely without backlash.

11.1.5 Remove the Small Assembly Screws and lift the Gear Carrier away from the Motor Case.

11.2 Refitting the Crank Pin Bush, Crank Disc and Gear Carrier

11.2.1 Remove the Crank Disc from the Gear Carrier, taking care that the Crank Disc Shims and thrust bearing components are not dropped.

11.2.2 Offer the Crank Pin Screw through the back face of the Crank Disc, ensuring that the head of the screw seats fully and does not protrude. Pass the Crank Pin Bush over the screw and fit the Crank Pin Nut with the grooved end leading. The left-hand threaded nut should be tightened to a torque loading of 1.9kgm (165 lbs. ins). In order to ensure that the Crank Pin Nut is properly seated it is recommended that it should be tightened three times i.e. tighten to 1.9kgm (165 lbs. ins) back it off, retighten, back it off again and finally tighten to 1.9kgm (165 lbs. ins). Note that the Crank Pin Bush may be fitted to the Crank Disc before meshing the Crank Disc and Pinion, if required.

11.2.3 After ensuring that the Crank Disc Shims and thrust bearing components have been correctly replaced, slide the Crank Disc into the Gear Carrier.

11.2.4 Locate the Gear Carrier on the projecting portion of the Pinion Bearing Cartridge. Attach the Gear Carrier to the Motor Casing using the six Small Assembly Screws fitted with Spring Washers.

Note: Replacement Motor Casings are supplied with nylon plugs in two of the holes. These plugs should be unscrewed and discarded before fitting the Gear Carrier.

11.3 Refitting the Bearing Keeper and 19-Tooth Gear Clamp Plate (Type 900 only)

11.3.1 Assemble the Bearing Keeper and the 19-Tooth Gear Clamp Plate on the end of the Crank Disc shaft. Insert and tighten the Small Assembly Screw.

11.3.2 Apply a grease gun (filled with Kango Hammer Grease) to the 4.5mm (3/16") hole in the side of the Gear Carrier and pump grease in until it is seen to come out at both ends of the Crank Disc shaft.

11.4 Meshing the Clutch and Drive Shaft Bevel Gears and Refitting the 19-Tooth Gear (Type 950 only)

11.4.1 Lightly grease the back face and journal diameter behind the bevel gear on the Drive Shaft. Do not put any grease into the Drive Shaft Bearing at this stage (see Section 15.1).

11.4.2 Locate the Drive Shaft Thrust Bearing and Thrust Race and engage the Drive Shaft in its bearing in the Gear Carrier.

11.4.3 Lightly grease the bearing surfaces at both ends of the clutch assembly and fit a 0.018" Clutch Shaft Shim against the face of the Clutch Bush. Fit one of the Clutch Shaft Thrust Races against the shim followed by the Thrust Bearing and the second Thrust Race.

11.4.4 Place the clutch assembly in its housing so that the bevel teeth engage with those on the Drive Shaft. Fit the Clutch Bearing Cap so that the side with a curved cut-out is in line with the 19-Tooth Gear and secure it with a Clutch Bearing Cap Screw at each of two opposite corners.

11.4.5 Fit the Dummy Hammer Casing 02327 to the Motor to ensure correct alignment of the Drive Shaft whilst meshing. Alternately rotate the Drive Shaft and adjust the shimming until barely perceptible backlash exists at the tightest spot. When checking the mesh, press lightly with one finger against the teeth of the 39-Tooth Gear to load the clutch against the Clutch Thrust Bearing.

Note: These gears must never be assembled without backlash and the mesh should be checked over several revolutions after each adjustment of the shimming.

11.4.6 Remove the Dummy Hammer Casing, Drive Shaft and clutch assembly. See Section 15.1 for final assembly of the Clutch and Drive Shaft.

11.4.7 Slide the 19-Tooth Gear on to the end of the Crank Disc Shaft and align the keyways. Tap in the 19-Tooth Gear Key, fit the Clamp Plate and insert and tighten the Small Assembly Screw. Wedge a screwdriver between the Pinion and the Crank Disc to prevent rotation whilst the screw is tightened hard.

11.5 Refitting the Piston, Striker and Connecting Rod to the motor

11.5.1 Lightly grease the seal groove in the Piston with Kango Hammer Grease and fit the Piston Seal without the use of any tools whatsoever. Rotate the Seal in its groove several times to ensure that it is properly settled.

11.5.2 Lightly grease the gudgeon pin bores in the Piston and Connecting Rod with Kango Hammer Grease and fit the Gudgeon Pin. Smear the Piston with grease and fill the cavity in the skirt to form a reservoir for the lubrication of the little end. Take care not to fill the groove round the Piston nor the grooves running down the skirt or difficulty may be experienced in getting the Hammer to strike blows on completion of assembly.

11.5.3 Grease the bore of the Striker and put a small blob of grease (about 1 cubic centimetre) in the base of the Striker. Take care not to fill the recesses in the Striker walls with grease, or difficulty may be experienced in getting the Hammer to strike blows on completion of assembly. Offer the Piston complete with Seal to the Striker bore. A slight twisting action will assist the Seal to enter the bore.

11.5.4 Slide the Striker over the Piston. The Piston should slide back and forth in the bore without excessive drag.

11.5.5 Grease the Crank Pin Bush and fill the Big-End Bearing with grease. Slide the big-end of the Connecting Rod onto the Crank Pin Bush. Fit the Crank Pin Washer onto the Crank Pin Nut and secure it against the end of the Crank Pin Bush by springing the Crank Pin Circlip into the groove on the nut.

Note that the Connecting Rod has an offset big-end bush. The Rod should be fitted so that it does not foul the Crank Disc gear teeth when the Rod is hanging down and the Crank Disc is rotated.

The motor is now ready for assembly to the hammer end.

SECTION 12 BEARINGS

12.1 General Comments on Removal and Refitting

12.1.1 To cover the whole range of needle roller and plain bearings used in Kango Hammers a small arbor press is required. The press should be in good condition, capable of exerting a load of 230kg (500 lb) and should be large enough to accommodate a 230mm (9") stack between the nose of the ram and the table. A small drill press will be required for the Drive Shaft Bearings in the Type 950 Hammer.

12.1.2 Ensure that the contact surfaces on the press, the dismantling tools and the Hammer castings are free from burrs and swarf. It will not otherwise be possible to fit the bearings squarely in their housings, and out of square bearings rapidly fail.

12.1.3 Before fitting a new needle roller bearing, examine it for missing rollers and swarf adhering to the bearing needles.

12.1.4 Always apply pressure to the lettered face of a needle roller bearing, never to the other face as this will collapse the bearing shell.

12.1.5 If a bearing offers undue resistance to pressing in, examine it for skewed rollers and trapped swarf. Also check for burrs and bruising in the bearing housing.

12.1.6 Never hammer a bearing into position. This is very liable to damage the thin outer shell of a needle roller bearing and lead to early failure.

12.1.7 The lettered face of a needle roller bearing must always lie just below flush after fitting. This does not apply to the Clutch Shaft Head Bearing, but the correct use of the tools provided will ensure the correct positioning of this bearing.

12.1.8 Bearings should always be checked after fitting by locating a new mating component in the bearing and ensuring that it allows free rotation.

12.2 Big End Bearing

12.2.1 To press out this bearing, stand the Mandrel Base 02342 on the table of the press, with the large bore uppermost, as shown in Figure 6(a).

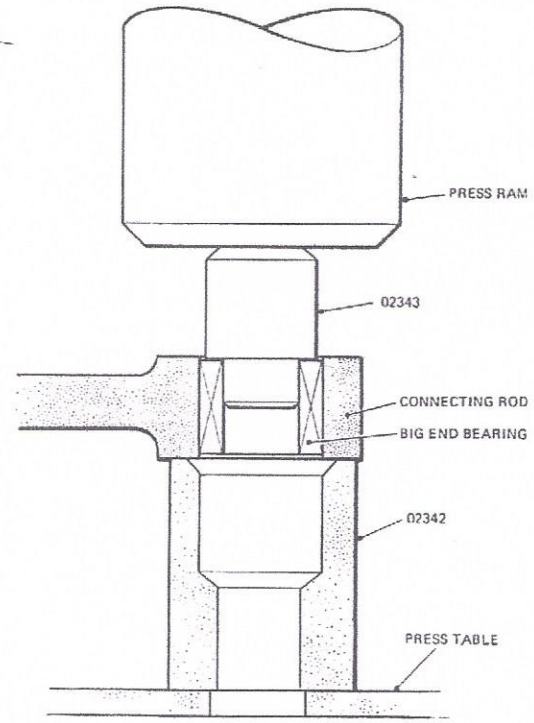


Figure 6(a) Removal of the Big End Bearing

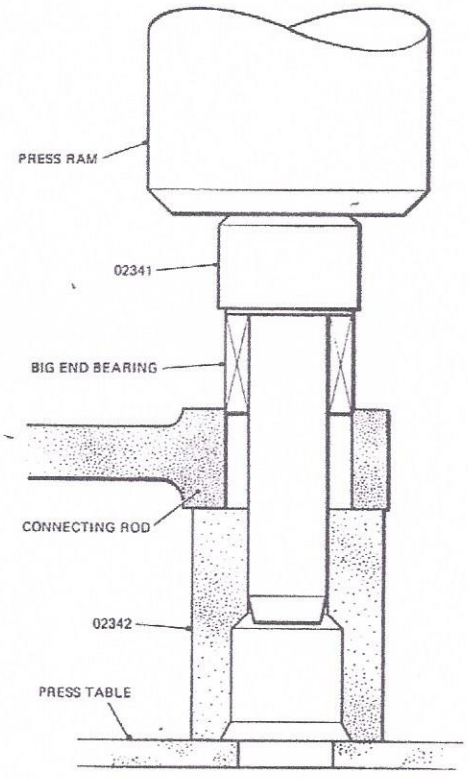


Figure 6(b) Insertion of the Big End Bearing

12.2.2 Insert the Bearing Ejector 02343 into the bore of the bearing and position the bearing directly above the mandrel base bore. Centralise the assembly under the ram of the press and press the bearing out. DO NOT attempt to press the bearing out in one movement, but move it about 1.5mm (1/16") at a time until it begins to move smoothly.

12.2.3 To fit a new bearing, slide it onto the shank of the Bearing Mandrel 02341 (note paragraph 12.1.4), pass the shank through the big end eye face downwards, and locate the shank in the smaller bore of the Mandrel Base 02342, as shown in Figure 6(b).

12.2.4 Centralise the assembly under the ram of the press and square up the lower face of the big end eye on the Mandrel Base. Press down steadily until the head of the Bearing Mandrel stops against the face of the big end eye.

12.3 Crank Disc Bearings

12.3.1 To remove these bearings, stand the Gear Carrier on the Mandrel Base 02331, as shown in Figure 7 (a), so that the bore of the Mandrel Base is directly below the bores of the Crank Disc Bearings.

12.3.2 Slide the 16mm (5/8") long Collar 02332 onto the Crank Disc Mandrel 02330 with the stepped face of the collar against the head of the mandrel.

12.3.3 Slide the Ejector Collar 02334 on to the Crank Disc Mandrel. Slide the mandrel, carrying the two collars, through the bores of the Crank Disc Bearings and into the Mandrel Base.

12.3.4 Centralise the assembly under the ram of the press and bear down until the Crank Disc Rear Bearing is released.

12.3.5 Withdraw the mandrel and remove the Bearing and Spacer.

12.3.6 Replace the mandrel and the two collars and press the second Bearing out.

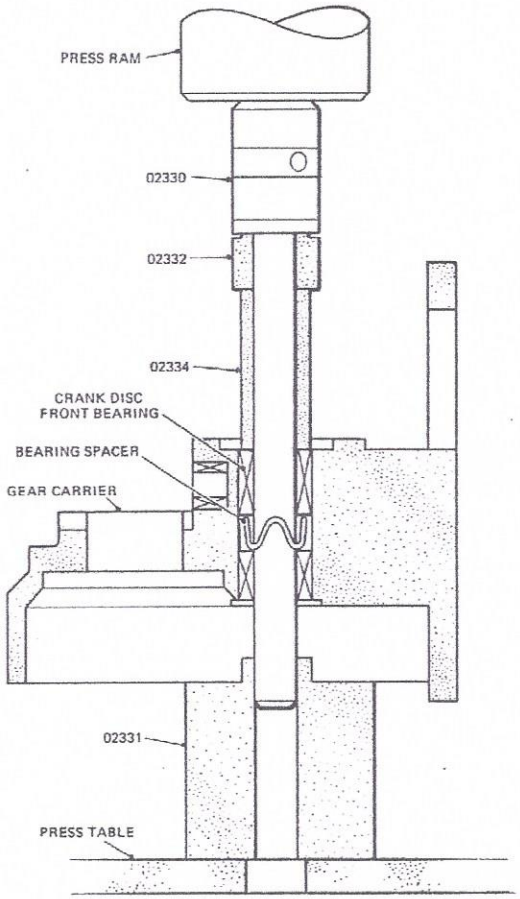


Figure 7(a) Removal of the Crank Disc Bearings

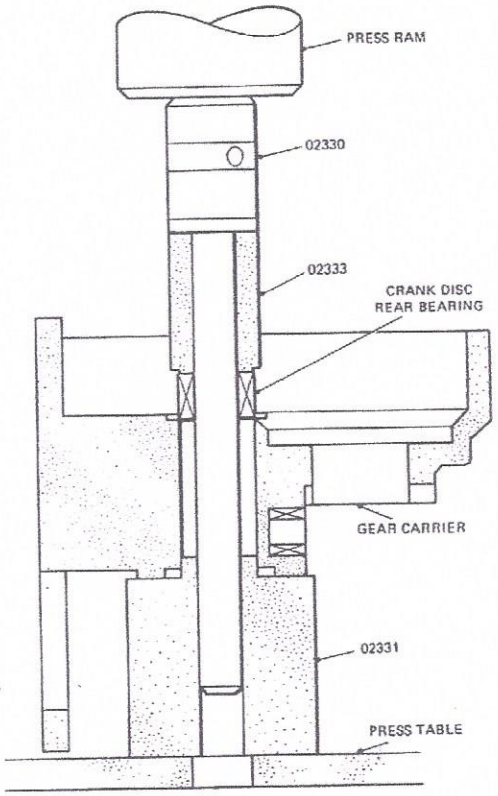


Figure 7(b)
Insertion of the Crank Disc Rear Bearing

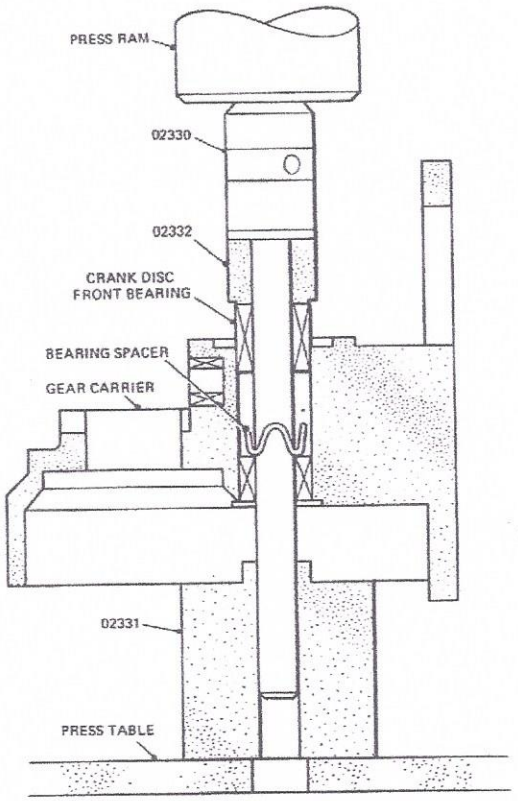


Figure 7(c)
Insertion of the Crank Disc Front Bearing

12.3.7 *Notes:* (1) If the Drive Shaft Bearing in the gear carrier requires renewal DO NOT replace the Crank Disc Bearings until this work has been carried out because the Drive Shaft Bearing cannot be removed unless the crank disc bore is clear to accept the Crank Disc Support Bar 02335.

(2) The following sequence of work set out for pressing in the Crank Disc Bearings must be adhered to, i.e. the rear bearing first, then the front bearing.

12.3.8 To fit the Crank Disc Rear Bearing, place the Gear Carrier on the Mandrel Base, as shown in Figure 7(b), ensuring that the snout of the Mandrel Base is located in the crank disc bearing bore.

12.3.9 Slide the 38mm (1½") long Collar 02333 on to Mandrel 02330 with the plain face of the Collar against the head of the mandrel.

12.3.10 Slide the bearing on to the mandrel (note paragraph 12.1.4) and pass the mandrel through the bore in the Gear Carrier until the end of the mandrel engages the bore of the Mandrel Base.

12.3.11 Press the bearing in until the stepped face of the Collar stops against the Gear Carrier.

12.3.12 Refit the spacer.

12.3.13 To fit the Crank Disc Front Bearing, place the Gear Carrier on the Mandrel Base 02331 as shown in Figure 7(c).

12.3.14 Slide the 16mm (5/8") long Collar 02332 on to the Mandrel 02330 with the plain face of the Collar against the head of the mandrel. Slide the bearing on to the mandrel (note paragraph 12.1.4). Note that the Front Bearing is longer than the Rear Bearing.

12.3.15 Pass the shank of the mandrel through the Gear Carrier and the bore of the Crank Disc Rear Bearing until it registers in the bore of the Mandrel Base.

12.3.16 Centralise the assembly under the press ram and press the bearing in until the stepped face of the Collar stops against the Gear Carrier.

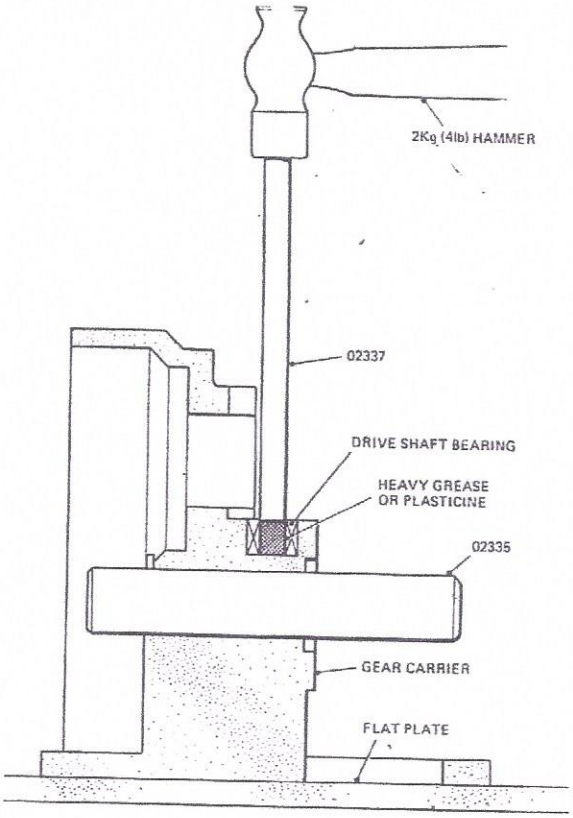


Figure 8(a) Removal of the Drive Shaft Bearing from the Gear Carrier

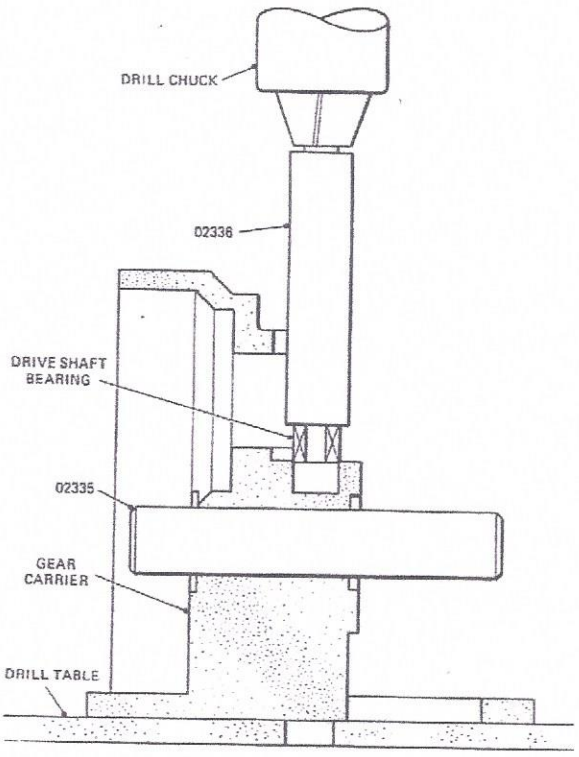


Figure 8(b) Insertion of the Drive Shaft Bearing into the Gear Carrier

12.4 Drive Shaft Bearing in Gear Carrier (Type 950 only)

Warning: Do not attempt to eject the Drive Shaft Bearing until Support Bar 02335 has been fitted. Failure to observe this precaution may result in serious damage to the Gear Carrier and necessitate its renewal.

12.4.1 Fit the Support Bar 02335 to the Gear Carrier and stand it on a clean, flat surface, as shown in Figure 8(a).

12.4.2 Fill the bore of the bearing with very thick grease or plasticine and locate Ejector Punch 02337 in the mouth of the bearing bore.

12.4.3 Ensure that the punch is vertical, then strike it by allowing a 2kg (4 lb) hammer head to fall freely through a distance of 300mm (12") to 375mm (15"). Do not assist the fall of the hammer head or damage may be done to the gear carrier. After each hammer blow, replace any grease or plasticine which may have spewed out of the bearing.

12.4.4 Repeat until the bearing has been ejected.

Note: If plasticine has been used, a new bearing must be fitted.

12.4.5 To fit a new bearing, grip the 6.35mm (¼") dia. extension of the Drive Shaft Bearing Mandrel 02336 in the chuck of a small drilling machine, and check for true running.

12.4.6 Slide the new bearing on the 7.5mm (3/8") dia. extension of the Mandrel (note paragraph 12.1.4), using a little Kango Hammer Grease to keep the bearing from falling off.

12.4.7 Locate the Gear Carrier under the mandrel, as shown in Figure 8(b), and press the bearing in until the face of the mandrel stops against the Gear Carrier.

12.5 Drive Shaft Bearing in Transmitter Housing (Type 950 only)

12.5.1 To remove the Drive Shaft Bearing, first dismantle the Transmitter and remove the Transmitter Housing as described in Section 13.1.

12.5.2 Place the Transmitter Housing on a flat, solid surface and drive the bearing out, using the same method as detailed for removing the Drive Shaft Bearing from the Gear Carrier (see paragraphs 12.4.2 to 12.4.4).

12.5.3 Fit the replacement bearing as detailed in paragraphs 12.4.5 to 12.4.7.

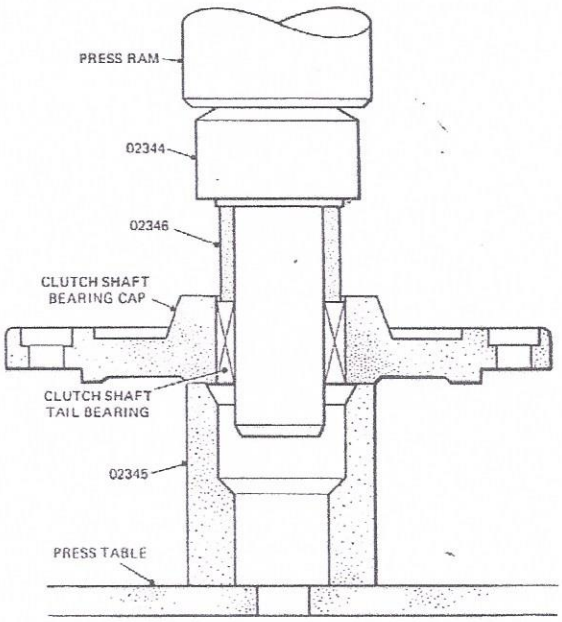


Figure 9(a)
Removal of the Clutch Shaft Tail Bearing

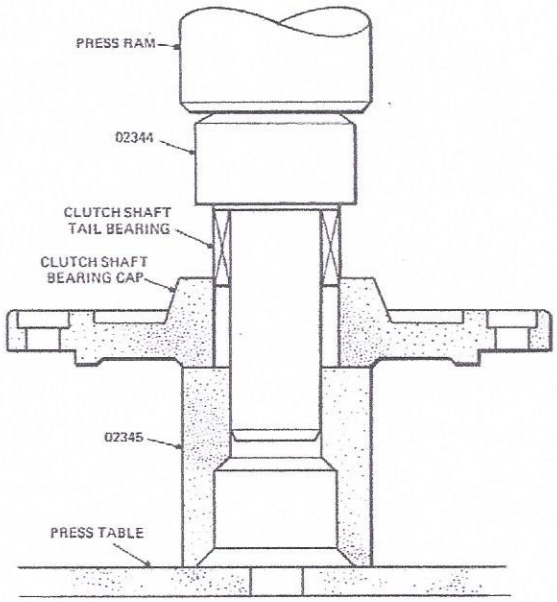


Figure 9(b)
Insertion of the Clutch Shaft Tail Bearing

12.6 Clutch Shaft Tail Bearing (Type 950 only)

12.6.1 To press the old bearing out, stand the Mandrel Base 02345 on the press base with the larger bore uppermost as shown in Figure 9(a). Slide Ejector Bush 02346 onto the shank of the Bearing Mandrel 02344.

12.6.2 Locate the Clutch Shaft Bearing Cap on the mandrel base, machined face downwards, and centralise the bearing over the clearance hole in the mandrel base.

12.6.3 Pass the bearing Mandrel through the bore of the bearing and centralise the assembly under the press ram. Press the bearing out in steps of 1.5mm (1/16") at a time until it moves freely.

12.6.4 To fit the new bearing, stand the Mandrel Base 02345 on the press with its smaller bore uppermost. Place the Clutch Shaft Bearing Cap on the mandrel base, machined face downwards, as shown in Figure 9(b).

12.6.5 Slide the bearing onto the Bearing Mandrel 02344 (note paragraph 12.1.4), pass the shank of the mandrel through the Clutch Shaft Bearing Cap and into the bore in the mandrel base.

12.6.6 Centralise the assembly under the press ram and press the bearing in until the head of the mandrel stops against the Clutch Shaft Bearing Cap.

12.7 Clutch Shaft Head Bearing (Type 950 only)

Warning: When pressing the Clutch Shaft Head Bearing in or out any apertures in the centre of the press base must be covered by a flat plate of reasonable size, otherwise the shank of the Bearing Mandrel 02338 may overtravel.

12.7.1 To remove the bearing, stand the Bearing Mandrel Bolster 02340, recess uppermost, on the base of the press or on a suitable flat plate (see Warning above) as shown in Figure 10(a).

12.7.2 Stand the Gear Carrier on the Mandrel Base 02339, ensuring that the male register on the Mandrel Base is seated snugly in the clutch bearing cap register in the Gear Carrier.

12.7.3 Pass the Bearing Mandrel 02338 through the bore of the bearing and into the Mandrel Base. Place the assembly on the Bearing Mandrel Bolster and swivel the Gear Carrier about to ensure that it is seated squarely on the Bearing Mandrel Base.

12.7.4 Centralise the complete assembly under the press ram and press down until the shank of the Bearing Mandrel makes contact with the base of the press or the flat plate.

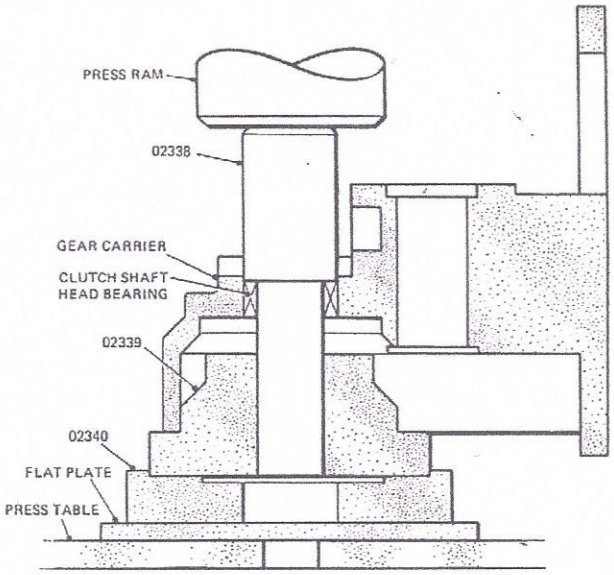


Figure 10(a)
Removal of the Clutch Shaft Head Bearing

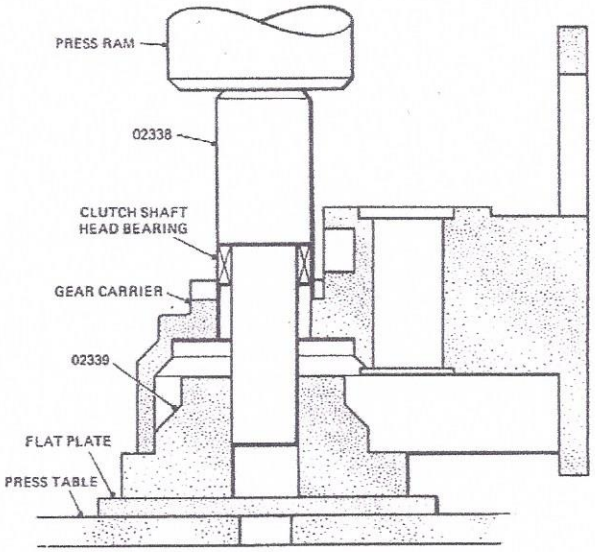


Figure 10(b)
Insertion of the Clutch Shaft Head Bearing

12.7.5 To fit a new bearing, slide it onto the Bearing Mandrel 02338 (note paragraph 12.1.4). Stand the Gear Carrier on the Mandrel Base 02339, ensuring that the register on the base is seated snugly in the clutch bearing cap register in the Gear Carrier as shown in Figure 10(b).

12.7.6 Pass the mandrel through the Gear Carrier and into the bore of the Mandrel Base and stand the assembly on the base of the press or a flat plate if the base is pierced.

12.7.7 Centralise the assembly under the press ram and swivel the Gear Carrier around to ensure that it is seated squarely. Press the bearing in until the shank of the mandrel makes contact with the base of the press or the flat plate.

12.8 39-Tooth Gear Bearing for Non-adjustable Clutch (Type 950 only)

12.8.1 Register the 39-Tooth Gear in the secondary recess in the Mandrel Bolster 02340 (this tool is shown in Figure 10(a)). Stand the bolster on the press base and insert the Ejector Punch 02348 in the bearing bore. Press the bearing out.

12.8.2 To fit a new bearing, start it squarely in the bore of the 39-Tooth Gear by hand. Provided that a block of hardwood or fibre is placed on top of the bearing to protect it, the bearing may be started by light hammer blows.

12.8.3 With a press or smooth-jawed vice in good condition, press the bearing home flush with the face of the gear. After fitting, the bearing should be a close sliding fit on the Clutch Bush.

Note: The bore of the 39-Tooth Gear Bearing must not be scraped or reamed. To do so will severely shorten its life.

12.9 39-Tooth Gear Bearing for Adjustable Clutch (Type 950 only)

12.9.1 To remove the Bearing, centralise the 39-Tooth Gear over a suitable bolster, such as the Pinion Mask 02323. Locate the larger end of the Assembly and Dismantling Tool 07348 in the Bearing, centralise under the press ram, and press the Bearing out.

12.9.2 To fit a new Bearing, place the 39-Tooth Gear on a flat surface under the ram (Note the warning in Section 12.7).

12.9.3 Slide the new Bearing onto the larger end of the Assembly and Dismantling Tool, and locate the other end of the Tool in the press ram. Centralise the Gear under the ram, and press the Bearing in until the end of the Tool bottoms on the flat surface.

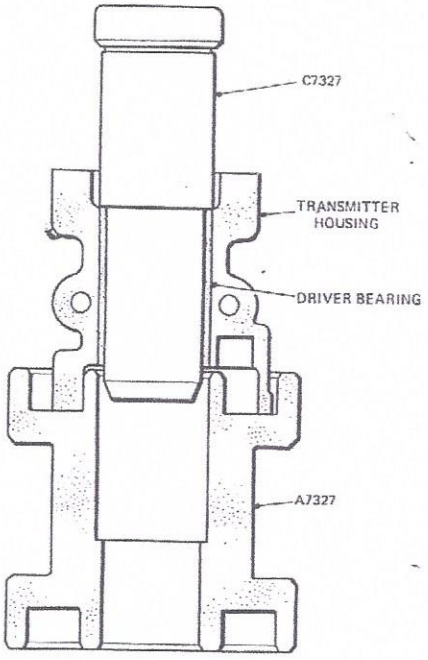


Figure 11(a)
Removal of the Driver Bearing

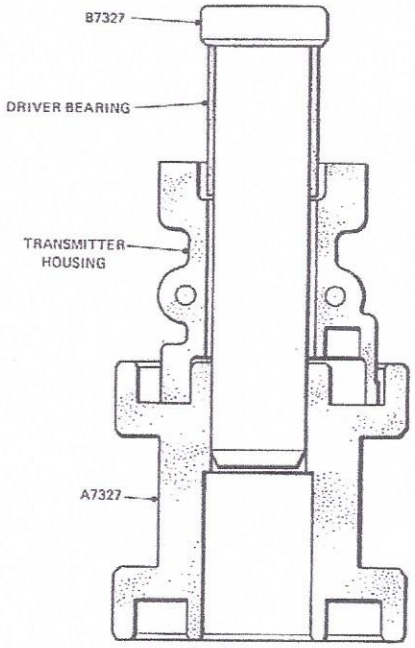


Figure 11(b)
Insertion of the Driver Bearing

12.10 Driver Bearing (Type 950 only)

12.10.1 To remove the Bearing, stand the Assembly and Dismantling Base A7327 on the press base with the larger bore uppermost, as shown in Figure 11(a).

12.10.2 Locate the Transmitter Housing on the Base with its nosepiece end uppermost.

12.10.3 Pass the Dismantling Mandrel C7327 through the bore of the Bearing, centralise the assembly under the press ram and press the Bearing out.

12.10.4 To fit a new Bearing, place the Base A7327 on the press base with the smaller bore uppermost, as shown in Figure 11(b).

12.10.5 Locate the Transmitter Housing on the Base with its nosepiece end uppermost.

12.10.6 Place the new Bearing on the Assembly Mandrel B7327. Note that the grease grooves in the Bearing break out at one end only. This end must be furthest away from the shoulder of the Assembly Mandrel.

12.10.7 Pass the shank of the Mandrel through the Transmitter Housing and into the bore of the Base, centralise the assembly under the press, and press the Bearing in until the head of the Mandrel stops against the Transmitter Housing.

SECTION 13 DISMANTLING THE HAMMER END

The various parts are illustrated in Figures 15, 17 and 18

13.1 Removing the Transmitter from the Hammer Casing (Type 900 only)

13.1.1 Mount the assembly on a locked shank implement gripped firmly in a vice.

13.1.2 Remove the Forward Handle.

13.1.3 Release and remove the six Transmitter Screws and Spring Washers. Lift the Hammer Casing off the transmitter assembly.

13.1.4 Remove the Buffer Housing. Inspect the Recoil Buffer and Buffer Housing Ring and renew if necessary. The stem of the Anvil should be gripped firmly by the Buffer Housing Ring when it is installed in the Buffer Housing.

13.1.5 Pull the Anvil together with the Recoil Transfer Ring out of the Transmitter Housing Sleeve. Lift out the Stepped Ring. Inspect the Anvil Rings and renew if necessary.

13.1.6 Lift the assembly off the implement, turn upside down and tap on a wooden block to remove the Transmitter Housing Sleeve, together with the Compression Ring. Inspect the Compression Ring and renew if necessary. If the Transmitter Housing Sleeve is fitted with the discontinued Wiper Ring 1540, this ring should be removed and discarded.

13.1.7 Lightly grip the top flange of the Transmitter Housing in a vice and remove the Nosepiece Screws. Separate the Nosepiece from the Transmitter Housing.

13.1.8 Inspect the Junk Ring for wear; renew if necessary. The Junk Ring may be removed from the Sleeve by driving it out from below with a screwdriver blade.

13.2 Removing the Transmitter from the Hammer Casing (Type 950 only)

13.2.1 Mount the assembly on a locked shank implement gripped firmly in a vice.

13.2.2 Remove the Forward Handle.

13.2.3 Release and remove the four Transmitter Screws and Spring Washers. Lift the Hammer Casing off the transmitter assembly.

13.2.4 Remove the Recoil Buffer Housing. Inspect the Recoil Buffer and Buffer Housing Ring and renew if necessary. The stem of the Anvil should be gripped firmly by the Buffer Housing Ring when it is installed in the Recoil Buffer Housing.

13.2.5 Remove the Driver from the Transmitter Housing, and pull the Anvil and Recoil Transfer Ring out of the Driver. Inspect the Anvil Rings and renew if necessary.

13.2.6 Inspect the Junk Ring for wear, and renew if necessary. The Junk Ring may be removed from the Driver by driving it out from below with a screwdriver blade.

13.2.7 Lift the assembly off the implement, and lightly grip the top of the flange of the Transmitter Housing in a vice. Release the Nosepiece Screws and remove the Nosepiece.

13.2.8 Inspect the Driver Sealing Felt and renew if necessary.

13.2.9 Inspect the Driver Bearing and renew if necessary, as detailed in Section 12.10.

13.2.10 Inspect the Drive Shaft Bearing and renew if necessary, as detailed in Section 12.5.

13.3 Dismantling the Lever Latch Pin (obsolete)

13.3.1 With the Pin Punch 02372 drive the Retaining Pin into the hexagonal bore of the Nosepiece, at the same time retaining a pressure on the outer end of the Guide Pin to prevent it being ejected by the Latch Spring. Remove the Retaining Pin.

13.3.2 Extract the Guide Pin, Latch Spring and Index Plunger.

13.3.3 Pull the Latch Pin out of its housing.

13.3.4 Replacement parts for the obsolete Lever Latch are no longer available, but the Bar Latch can be fitted in the same Nosepiece instead.

13.4 Dismantling the Bar Latch

13.4.1 With the Pin Punch 02372 drive the Retaining Pin into the hexagonal bore of the Nosepiece, at the same time maintaining pressure on the end of the Abutment Pin to prevent it being ejected by the Latch Spring. Remove the Retaining Pin.

13.4.2 Extract the Abutment Pin, Latch Spring and Detent Ball.

13.4.3 Pull the Latch Bar out of the Nosepiece.

SECTION 14 RE-ASSEMBLING THE HAMMER END

The various parts are illustrated in Figures 15, 17 and 18.

14.1 Refitting the Lever Latch Pin

14.1.1 Grip the Nosepiece in a smooth-jawed vice, grease the Lever Latch Pin and slide it into its bore in the Nosepiece, ensuring that it is positioned with the Thumb Lever on the same side of the Nosepiece as the Latch Spring bore.

14.1.2 Insert the Index Plunger in the Latch Spring bore, small end foremost, followed by the Latch Spring and then the Guide Pin.

14.1.3 Using a screwdriver, press on the head of the Guide Pin until the groove in its head lines up with the hole for the Retaining Pin. Tap the Retaining Pin home.

14.1.4 Check that the Lever Latch Pin will rotate.

14.2 Refitting the Bar Latch

14.2.1 Grip the Nosepiece in a smooth-jawed vice, grease the Latch Bar and slide it into its bore in the Nosepiece with one or other of the recesses in the milled flat in line with the hole in the Nosepiece for the Latch Spring.

14.2.2 Into the hole for the Latch Spring fit first the Detent Ball, then the Latch Spring followed by the Abutment Pin.

14.2.3 Using a screwdriver, press on the head of the Abutment Pin until the groove in its head lines up with the hole for the Retaining Pin. Tap the Retaining Pin home.

14.2.4 Check that the Latch Bar will move to and fro.

14.3 Re-assembling the Transmitter (Type 900 only)

14.3.1 Lightly grip the top flange of the Transmitter Housing in a vice. Fix the Nosepiece onto the Housing, taking care to align it so that the thumb lever on the latch, or the projecting end of the Latch Bar when in the open position, is on the opposite side to the flat face against which the Forward Handle fits.

14.3.2 Hold a locked shank implement firmly in a vice, projecting upwards for about 125mm (5") above the jaws, and place the Nosepiece over it.

14.3.3 Place the Compression Ring into the Transmitter Housing, pressing it down to rest on the Nosepiece. Take care to see that it is seated correctly.

14.3.4 If a new Junk Ring is to be fitted, it should be held in the mouth of the sleeve, flat side downwards, and tapped with a copper mallet until it is flush with the top of the sleeve, the Anvil may then be used as a drift to drive it home.

14.3.5 Lower the Transmitter Housing Sleeve into the housing.

14.3.6 Lightly grease the Anvil and enter it into the sleeve. Place the Recoil Transfer Ring over the stem of the Anvil, flat face upwards.

14.3.7 Place the Stepped Ring into the Transmitter Housing to rest on the end of the sleeve, stepped face upwards.

14.3.8 Liberally grease the Recoil Buffer and place into its seating in the Buffer Housing.

14.3.9 Clean the mating faces of the Buffer Housing and Hammer Casing and fit new gaskets.

14.3.10 Lower the Buffer Housing over the Anvil stem onto the Transmitter Housing.

14.3.11 Place the Hammer Casing on to the Buffer Housing so that the thumb lever on the latch, or the projecting end of the Latch Bar when in the open position, is to the right hand side of the casing. Enter the Transmitter Screws, complete with their Spring Washers, and tighten fully.

14.3.12 Refit the Forward Handle, tightening the Forward Handle Locknuts to 3 kg.m (22 lb. ft).

14.4 Re-assembling the Transmitter (Type 950 only)

14.4.1 Lightly grip the top flange of the Transmitter Housing in a vice. Place the Driver Sealing Felt in position in the Housing, with the felt side facing outwards.

14.4.2 Fix the Nosepiece onto the Housing, taking care to align it so that the latch is on the same side as the Drive Shaft Bearing (see Figure 17).

14.4.3 Hold a locked shank implement firmly in a vice, projecting upwards for about 125mm (5") above the jaws, and place the Nosepiece over it.

14.4.4 If a new Junk Ring is to be fitted, it should be held in the mouth of the Driver, flat side downwards, and tapped with a copper mallet until it is flush with the top of the Driver. The Anvil may then be used as a drift to drive it home.

14.4.5 Lightly grease the Driver Bearing and outer surface of the Driver, and slide the Driver into the Bearing.

14.4.6 Lightly grease the bore of the Driver and the surface of the Anvil, complete with Rings, and press the Anvil into the Driver. Place the Recoil Transfer Ring over the stem of the Anvil, flat face upwards.

14.4.7 Fill the space around the Driver gear teeth with grease, and pack grease into the Drive Shaft Bearing.

14.4.8 Grease the Buffer Housing Ring and fit it in the Recoil Buffer Housing.

14.4.9 Liberally grease the Recoil Buffer and place into its seating in the Recoil Buffer Housing.

14.4.10 Place the Transmitter Housing Gasket in position and lower the Recoil Buffer Housing over the Anvil stem and onto the Transmitter Housing.

14.4.11 Place the Buffer Housing Gasket in position and lower the Hammer Casing onto the Housing.

14.4.12 Enter the four Transmitter Screws complete with Spring Washers and Dee Washers, and tighten fully.

14.4.13 Refit the Forward Handle, tightening the Forward Handle Locknuts to 3 kg.m (22 lb. ft).

SECTION 15 FINAL ASSEMBLY

The various parts are illustrated in Figures 14, 15, 16 and 17

15.1 Refitting the Clutch and Drive Shaft (Type 950 only)

Note: Liberally grease all parts with Kango Hammer Grease before assembly.

15.1.1 Place the Drive Shaft Thrust Bearing on the Drive Shaft followed by the Thrust Race. Fill the Drive Shaft Bearing in the Gear Carrier with grease and insert the Drive Shaft, expelling any surplus grease.

15.1.2 Locate the Clutch Unit in the Gear Carrier. Fit the shim pack determined during the meshing of the clutch and drive shaft bevels (see Section 11.4) against the back of the Clutch Bush, followed by one Thrust Race, the Thrust Bearing and the second Thrust Race.

15.1.3 Fit the Clutch Bearing Cap and secure it with the four Clutch Bearing Cap Screws.

15.1.4 Apply the grease gun to the upper 4.5mm (3/16") hole in the side of the Gear Carrier and pump in grease until it is seen to come out at both ends of the crankshaft. (If this has already been done in the course of assembly it is not necessary to repeat the operation now).

15.1.5 Apply the grease gun to the lower hole in the side of the Gear Carrier (in the housing enclosing the clutch) and pump grease in until it is seen to be coming out of the openings. Using a piece of clean rag, stop up the openings and continue to pump grease into the housing until it is seen to come out of both the Clutch Shaft Head Bearing and the Clutch Shaft Tail Bearing.

15.2 Assembling the Motor End to the Hammer End

15.2.1 Push the Anvil as far into the hammer as it will go, then put Kango Hammer Grease into the bottom of the Hammer Casing up to the level of the top of the Anvil. Liberally grease the teeth of all exposed gears and pinions.

15.2.2 Position a Hammer Casing Gasket on the end face of the Motor Casing, using a smear of grease to retain it in position.

15.2.3 With the hammer end mounted on a chisel or point held firmly in a vice, lower the Motor Casing, complete with Piston and Striker, (and in the case of the 950 Hammer, the Drive Shaft) on to the hammer end. Carefully guide the striker into its bore (and the drive shaft into its duct – Type 950 only) and continue lowering until the joint faces meet.

Note: (Type 950 only). It may be found that the joint faces will not meet by about 13mm (½''); this is due to the gear at the bottom of the drive shaft not meshing with its mating gear in the transmitter. This may be overcome by inserting a small screwdriver blade through the ventilating ports and rotating the Fan. Owing to the considerable reduction ratio between the Armature and the Drive Shaft, it may be necessary to rotate the Fan for more than one revolution before the gears will engage.

15.2.4 Insert the six Main Assembly Screws, complete with Spring Washers. Initially tighten them in diagonal sequence with the Long Allen Key 02313 and finally tighten with the Standard Allen Key 02308.

SECTION 16 REPACKING THE HAMMER WITH GREASE

The various parts are illustrated in Figures 13, 14, 15, 16 and 17

Note: The ball bearings supporting the armature of the electric motor are lubricated with B.P. Energrease LS.3. All other parts of the Hammer mechanism are lubricated with Kango Hammer Grease or Mobilplex 47. No other grease is approved for the lubrication of the Hammer mechanism.

16.1 Dismantling

16.1.1 Thoroughly clean the outside of the Hammer.

16.1.2 Remove the six Main Assembly Screws.

16.1.3 Lift the Motor straight off the Hammer Casing until the Striker is clear of the flutes in the Hammer Casing. This will prevent any strain being put on the Connecting Rod or Crank Pin.

Note: The Connecting Rod can be easily bent if the motor is wrongly removed from the Hammer Casing, therefore if the motor will not lift off when the Main Assembly Screws have been removed, refer to the instructions given in Section 4.2.

16.1.4 Spring the Crank Pin Circlip off the Crank Pin Nut, remove the Crank Pin Washer and slide the big-end off the Crank Pin. Pull the Piston out of the Striker.

16.1.5 Remove all traces of old jointing from both the Motor Case and Hammer Case flanges.

16.2 To Repack with Grease (Type 900 only)

Note: A total amount of 6oz (170 grams) of Kango Hammer Grease and a small amount of B.P. Energrease LS.3 is required.

16.2.1 Clean the Top Bearing and repack with B.P. Energrease LS.3.

16.2.2 Dismantle the Pinion Bearing Cartridge (see Section 6.6.1 or 6.6.2), and clean the parts.

16.2.3 Grease all the washers with B.P. Energrease LS.3 and re-assemble into the Pinion Bearing Cartridge, as detailed in Section 6.6.4 to 6.6.11. Note that if a shielded Bearing is fitted it should not be re-lubricated.

16.2.4 Ensure that all parts of the Gear Carrier are clean and lightly greased with Kango Hammer Grease, then assemble it to the Motor Casing. Check and correct the mesh of the Pinion to the Crank Disc as detailed in Section 11.1.

16.2.5 Apply the grease gun (filled with Kango Hammer Grease) to the 4.5mm (3/16") hole in the Gear Carrier and pump grease in until it is seen to be coming out at both ends of the crankshaft.

16.2.6 Smear Kango Hammer Grease liberally over the teeth of the Crank Disc and Pinion.

16.2.7 Pack the Big End Bearing with grease and smear some over the Crank Pin Bush.

16.2.8 Pack the cavity in the back of the Piston with grease and smear some over the outside of the Piston. Take care not to fill the groove around the Piston, nor the three grooves running down the skirt or difficulty may be experienced in getting the Hammer to strike blows on completion of assembly.

16.2.9 Smear the Striker with grease, both inside and out, and put a small quantity (about 1 cubic centimetre) of grease inside the Striker. Take care not to fill the recesses in the wall of the Striker with grease, or difficulty may be experienced in getting the Hammer to strike blows on completion of assembly.

16.2.10 Having dismantled and cleaned the complete Transmitter Assembly (see Section 13.1), rebuild it in accordance with Section 14.3, filling the cavity around the Recoil Buffer completely with Kango Hammer Grease.

16.2.11 When the transmitter has been assembled to the Hammer Casing, push the Anvil in to its uppermost position then put grease into the bottom of the Hammer Casing up to the level of the top of the Anvil. Do not put too much grease into the bottom of the Hammer Casing or difficulty may be experienced in getting the Hammer to strike blows on completion of assembly.

16.2.12 Place the remainder of the 6oz (170 grams) of Kango Hammer Grease in the wider part of the Hammer Casing at the top of the fluted bore in which the Striker slides.

16.2.13 Re-assemble the Motor end to the Hammer end as detailed in Section 15.2.

16.3 To Repack with Grease (Type 950 only)

Note: A total of 8oz (225 grams) of Kango Hammer Grease and a small amount of B.P. Energrease LS.3 is required.

16.3.1 Clean the Top Bearing and repack it with B.P. Energrease LS.3.

16.3.2 Dismantle the Pinion Bearing Cartridge (see Section 6.6.1 or 6.6.2), and clean the parts.

16.3.3 Grease all the washers with B.P. Energrease LS.3 and re-assemble into the Pinion Bearing Cartridge, as detailed in Section 6.6.4 to 6.6.11. Note that if a shielded Bearing is fitted it should not be re-lubricated.

16.3.4 Ensure that all parts of the Gear Carrier are clean and lightly greased with Kango Hammer Grease and then assemble it to the Motor Casing. Check and correct the mesh of the Pinion to the Crank Disc as detailed in Section 11.1.

16.3.5 Clean and grease all parts of the Clutch and Drive Shaft, including the Drive Shaft Thrust Bearing and Races.

16.3.6 Check and correct the mesh of the Clutch Shaft with the Drive Shaft as detailed in Section 11.4, then fill the Drive Shaft Bearing in the Gear Carrier with Kango Hammer Grease and insert the Drive Shaft, expelling any surplus grease.

16.3.7 Apply the grease gun (filled with Kango Hammer Grease) to the upper 4.5mm (3/16") hole in the Gear Carrier and pump grease in until it is seen to come out at both ends of the crankshaft.

16.3.8 Apply the grease gun to the lower 4.5mm (3/16") hole in the Gear Carrier and pump grease in until it is seen to be coming out through the bearings at each end of the Clutch Shaft. To achieve this it will be necessary to use a piece of clean, lint-free rag to prevent grease escaping past the 19-Tooth Gear and the edge of the Clutch Shaft Bearing Cap.

16.3.9 Smear Kango Hammer Grease liberally over the teeth of the Crank Disc, Pinion, Clutch Shaft and Drive Shaft.

16.3.10 Pack the Big End Bearing with grease and smear some over the Crank Pin Bush.

16.3.11 Pack the cavity in the back of the Piston with grease and smear some over the outside of the Piston. Take care not to fill the groove around the Piston, nor the two grooves running down the skirt, or difficulty may be experienced in getting the Hammer to strike blows on completion of assembly.

16.3.12 Smear the Striker with grease, both inside and out, and put a small quantity (about 1 cubic centimetre) of grease inside the Striker. Take care not to fill the recesses in the inside wall of the Striker with grease, or difficulty may be experienced in getting the Hammer to strike blows on completion of assembly.

16.3.13 Having dismantled and cleaned the complete Transmitter Assembly (see Section 13.2) rebuild it as detailed in Section 14.4 filling all cavities with Kango Hammer Grease.

16.3.14 When the transmitter has been re-assembled to the Hammer Casing push the Anvil in to its uppermost position, then put grease into the bottom of the Hammer Casing up to the level of the top of the Anvil. Do not put too much grease into the bottom of the Hammer Casing or difficulty may be experienced in getting the Hammer to strike blows on completion of assembly.

16.3.15 Place the remainder of the 8oz (225 grams) of Kango Hammer Grease in the wider part of the Hammer Casing at the top of the fluted bore in which the Striker slides.

16.3.16 Re-assemble the Motor end to the Hammer end as detailed in Section 15.2.

SECTION 17 FINAL TESTS ON RE-ASSEMBLED HAMMERS

17.1 Mechanical Tests

Note: All tests must be carried out at the voltage shown on the data plate on the hammer.

17.1.1 Starting from cold

Being grease lubricated, the Hammer may be sluggish in delivering blows when first switched on in cold weather.

Keep the tool pressed against the work and let the motor run. Blows may be weak at first but as the hammer warms up they will become progressively stronger.

If no blows at all are struck or the blows cease, switch off and on at intervals allowing the mechanism to come to rest before switching on again, always keeping the tool pressed against the work.

If the hammer cannot be made to strike blows by this procedure, the probable cause is that the recesses in the walls of the Striker and the grooves in the Piston have been filled with grease. The motor must be taken off and the surplus grease removed.

17.1.2 Idling

When the Hammer has been warmed up by hammering on a point or chisel on concrete etc., lift the tool away from the work. Blows should cease at once and the motor speed increase slightly i.e., the Hammer should 'idle'. Now apply the Hammer to work again and switch off whilst blows are being struck; invert the Hammer and switch on. The tool should be thrown out into the idling position and stay there. Light tapping may be heard but there should be no heavy blows.

17.1.3 'Pick-up'

Let the Hammer run idle and then apply the tool to the work with firm pressure. Blows should start at once and the motor speed decrease slightly i.e. the Hammer 'pick-ups' the load.

17.1.4 **Performance**

With the Hammer thoroughly warmed up and driving a point or chisel into concrete, it should take from 850 to 900 watts. Do not let the point of the tool become wedged into the concrete or an unduly low reading may be obtained.

When used on drilling the Type 950 will take 900 watts or more, depending on the diameter of the drill and the depth of the hole.

17.2 Testing the Clutch (Type 950 only)

17.2.1 The Clutch is provided to protect both the operator and the Hammer mechanism if the drill should jam in a hole e.g., owing to reinforcing bars in concrete.

17.2.2 Correct operation of the Clutch should be checked as follows: Whilst the Hammer is still warm, fit a worn out drill, not less than 25mm (1") diameter, and engage it in a previously drilled hole. Switch on and allow the Hammer to run for a few seconds, then pull the Hammer to one side until the clutch slips, i.e., the drill no longer turns. The watts input should then be 1300 to 1500 watts.

17.3 Electrical Tests

17.3.1 Check the operation of the Lock Button as described in Section 8.3.6.

17.3.2 Test the complete Hammer for electrical strength as described in Section 7.4.

17.3.3 Test for insulation resistance as described in Section 7.5.

17.3.4 In the case of Hammers with a 3-core lead, test for earth continuity as described in Section 7.6.

SECTION 18 ILLUSTRATED LIST OF SERVICE TOOLS (See Figure 12)

18.1 Items from Basic Service Kit

	Part No.	*Name*	*For Use With*
	02307	Standard Allen Key (3/32")	01910
	02308	Standard Allen Key (3/16")	01901 – 01301 – 01942
	02309	Standard Allen Key (5/32")	01906 – 01907 – 01940
	02312	Standard Allen Key (7/32")	01932 – 01965 – 01998
	02313	Long Allen Key (3/16")	01901
	02314	Short Allen Key (5/32")	01906 – 01907 – 01940
	02315	Top Bearing Puller	02101 Top Bearing
	02317	Motor Dismantling Tool	00610 – 00621 Motor Casings
	02320	Fan Spanner	00404 Fan
	02321	Cartridge Ejector	00711 Pinion Bearing Cartridge
	02322	Cartridge Ejector Base	00711 Pinion Bearing Cartridge
	02323	Pinion Mask	00610 – 00621 Motor Casings
	02324	Top Bearing Assembly Tool	02101 Top Bearing
	02325	Rocker Pivot Drift	02273 Rocker Pivot
	02326	Alignment Bar	00302 Brush Holder
•	02327	Dummy Hammer Casing	01309 Drive Shaft
•	02328	Clutch Alignment Pin	– Clutch Assembly (Non-adjustable)
•	02329	Clutch Spanner	01306 (and 01356) Clutch Bush
	02330	Crank Disc Bearing Mandrel	02121 – 02122 Crank Disc Bearing
	02331	Crank Disc Bearing Mandrel Base	02121 – 02122 Crank Disc Bearing
	02332	5/8" Long Collar	02121 – 02122 Crank Disc Bearing
	02333	1½" Long Collar	02121 Crank Disc Bearing
	02334	Crank Disc Bearing Ejector Collar	02121 – 02122 Crank Disc Bearing
•	02335	Crank Disc Bore Support Bar	01107 Gear Carrier
•	02336	Drive Shaft Bearing Mandrel	02116 Drive Shaft Bearing
•	02337	Drive Shaft Bearing Ejector Punch	02116 Drive Shaft Bearing
•	02338	Clutch Shaft Head Bearing Mandrel	02114 Clutch Shaft Head Bearing
•	02339	Clutch Shaft Head Bearing Mandrel Base	02114 Clutch Shaft Head Bearing
•	02340	Clutch Shaft Head Bearing Bolster	02114 Clutch Shaft Head Bearing
	02341	Big End Bearing Mandrel	02120 Big End Bearing
	02342	Big End Bearing Mandrel Base	02120 Big End Bearing
	02343	Big End Bearing Ejector	02120 Big End Bearing
•	02344	Clutch Shaft Tail Bearing Mandrel	02115 Clutch Shaft Tail Bearing
•	02345	Clutch Shaft Tail Bearing Mandrel Base	02115 Clutch Shaft Tail Bearing
•	02346	Clutch Shaft Tail Bearing Ejector Bush	02115 Clutch Shaft Tail Bearing
•	02348	39-Tooth Gear Bearing Ejector Punch	02118 39-Tooth Gear Bearing
	02362	Tool Kit Box (not illustrated)	To hold service tools

18.2 Item from Supplementary Service Kit 'A'

02369	Armature Bearing Circlip Pliers (not illustrated)	02251 Armature Bearing Circlip

18.3 Item from Supplementary Service Kit 'B'

07305	Set of feeler gauges (not illustrated)	Meshing gears. Piston/Striker clearance

18.4 Items from Supplementary Service Kit 'D'

Part No.	*Name*	*For Use With*
02391	Pozidriv Screwdriver No. 3 Point	01939 Plastic Handle Screws
• 07327	Driver Bearing Service Tool Comprising:	02130 Driver Bearing
	A7327 Body	
	B7327 Assembly Mandrel	
	C7327 Dismantling Mandrel	
• 07348	39-Tooth Gear Bearing Assembly and Dismantling Tool	02123 39-Tooth Gear Bearing
• 07379	Clutch Torque Setting Rig Comprising:	Adjustable Clutch
	G2379 Spring Balance	
	07376 Adaptor (950)	
	A7379 Bracket	(or A2379 for modified 2379 Rig)
	B7379 Body (950)	
	D7379 Torque Arm (long)	
	E7379 Torque Arm (short)	(or C2379 for modified 2379 Rig)
	F7379 Pin (2 required)	
	H7379 Support Pillar	(not required for modified 2379 Rig)
	J7379 Circlip	
	K7379 Support Pillar (with hole)	(not required for modified 2379 Rig)

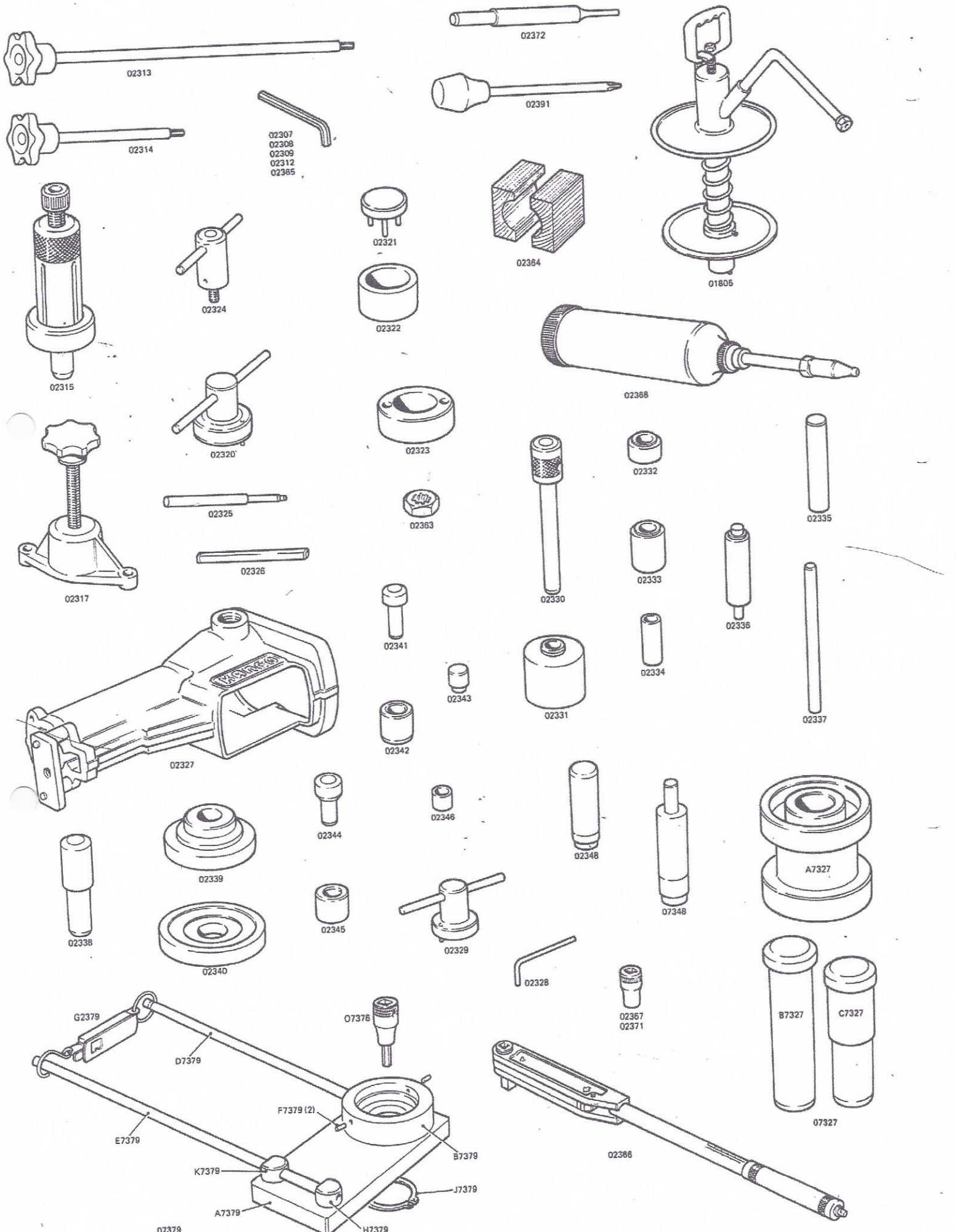
18.5 Items from Supplementary Service Kit 'X'

02363	Pinion Nut	00705 Pinion (9 helical teeth)
02364	Beechwood Blocks (pair)	Armatures 1-7/8" (47.5mm) dia.
02365	Allen Key (7/32" with Long Shank)	01932 – 01965
02366	Torque Wrench 0.5 – 3.2 kg.m (40 – 280 lbs-ins) x 3/8" square drive	02367 – 02371 – 07376 Socket Adaptors
02367	Socket Adaptor 3/8" A.F. x 3/8" square drive	01941 Crank Pin Nut (L.H. Thread)
02368	Grease Gun with ball-ended nozzle	01107 – 01197 Gear Carrier
02371	Socket Adaptor 9/16" A.F. x 3/8" square drive	00207 Lock Button
02372	1/8" Pin Punch	02295 Retaining Pin

18.6 Supplementary Miscellaneous Items

01805	Grease Pump	For dispensing grease from 28lb container of Kango Hammer Grease 01806
01806	Kango Hammer Grease (not illustrated) (28lb container)	For lubrication of Hammer mechanism

• *Not required for Type 900 Hammers*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B7327
C7327
07327
G2379
D7379
O7376
F7379 (2)
E7379
B7379
K7379
J7379
A7379
H7379
02379
02366

SECTION 19 ILLUSTRATED LIST OF PARTS

19.1 Handle and Switch Parts (Illustrated in Figure 13)

HANDLE AND TOP BEARING

00105	Spring Seating Washer and Buffer
00106	Top Bearing Thrust Washer
00116	Motor End Plate Assembly (c/w 00123, 02223, 04320 (2))
00123	Motor Insulating Plate
00164	Plastic Handle (Blue)
01939	Plastic Handle Screw (4)
02001	Top Bearing Spring
02101	Top Bearing
02221	Top Bearing Spring Ring
02223	Small Locating Pin
02273	Rocker Pivot
04320	Terminal Pad (2)

SWITCH AND SWITCH MOUNTING (OLD TYPE) (Not Illustrated)

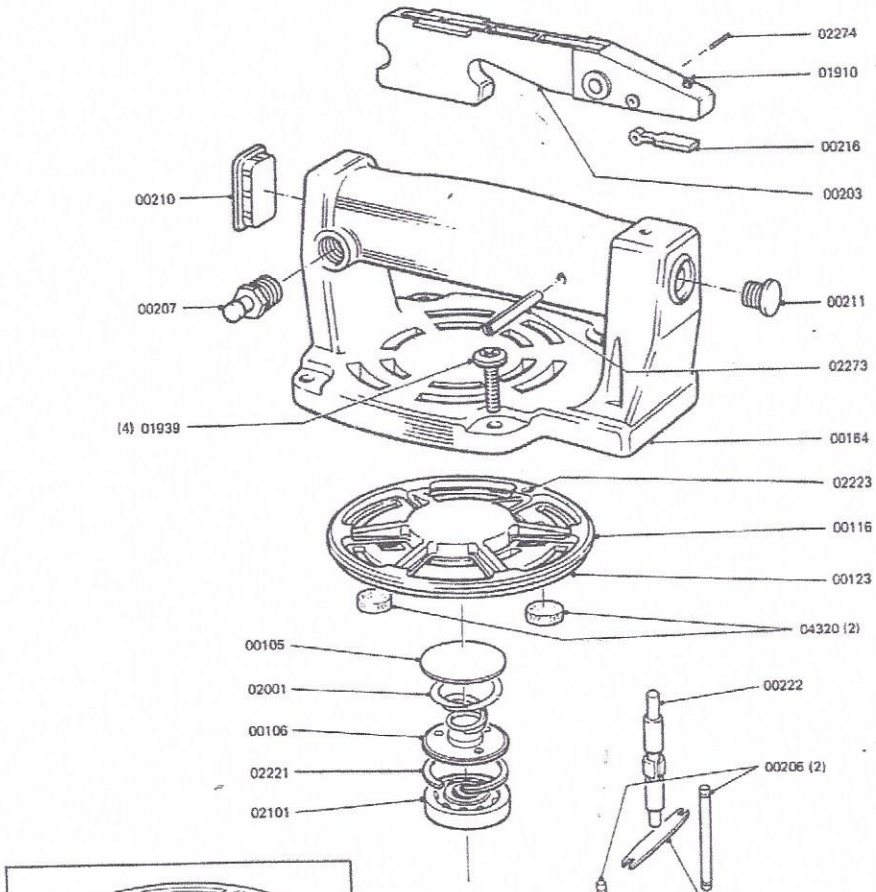
00802	Switch Cover Plate
00804	Switch Locating Bushing (2)
00805	Switch Locating Plate (2)
00806	Switch Support Pad (4)
00807	Switch Clamping Pad (2)
00809	Field Lead Grommet (2)
00810	Switch Cover Plate Liner
00811	Switch Clamping Pad Clip
00812	Silicone Rubber Band
00813	Switch Box Seal
00814	Switch Box Liner
* 00818	Switch Box Gasket
00821	Switch (100-125v)
01908	Switch Cover Screw (4)
* 01909	Spring Washer (4)
01925	Switch Locating Screw (2)
02501	Switch (200-240v)

SWITCH OPERATING LINKAGE

00203	Rocker Assembly (c/w 00216, 01910, 02274)
00205	Plunger Abutment Plate (2)
00206	Push Rod (2)
00207	Lock Button Assembly
00210	Handle Plug (Large)
00211	Handle Plug (Small)
00216	Pressure Plate
00222	Plunger (c/w clip)
01910	Rocker Grub Screw
02274	Pressure Plate Pin

SWITCH AND SWITCH MOUNTING (NEW TYPE)

00802	Switch Cover Plate (for use without 06295)
00809	Field Lead Grommet (2)
00810	Switch Cover Plate Liner
00811	Switch Clamping Pad Clip
00812	Silicone Rubber Band
00813	Switch Box Seal
* 00818	Switch Box Gasket
00821	Switch (100-125v)
00822	Switch Cover Plate (for use with 06295)
00824	Switch Box Liner
00945	Suppressor Kit (not illustrated)
01915	Plate Fixing Screw (4)
01927	Spring Washer (2) (use with suppressors)
02501	Switch (200-240v)
02506	Terminal Housing (2)
04016	Suppressor Terminal (2) (use with suppressors)
06295	Caution Plate
* 06908	Terminal Screw (2) (use with suppressors)
06909	Switch Cover Screw (4)
06917	Switch Locating Screw (2)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01910
00216
00203
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00211
00207
02273
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00184
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00123
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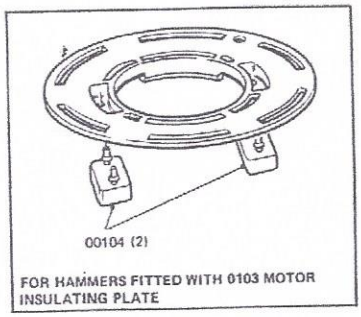
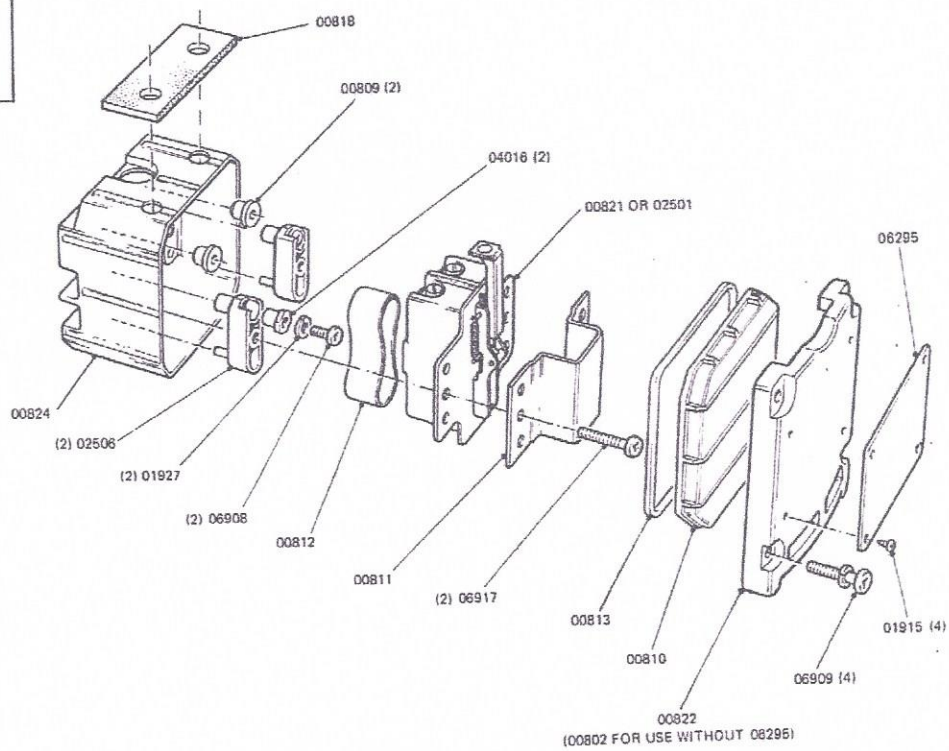
00105
02001
00106
02221
02101
00222
00206 (2)
00205 (2)


00104 (2)
FOR HAMMERS FITTED WITH 0103 MOTOR INSULATING PLATE


00818
00809 (2)
04016 (2)
00821 OR 02501
06295
00824
(2) 02506
(2) 01927
(2) 06908
00812
00811
(2) 06917
00813
00810
01915 (4)
06909 (4)
00822
(00802 FOR USE WITHOUT 06295)

19.2 Motor Parts (Illustrated in Figure 14)

BRUSH GEAR

	00302	Brush Holder c/w Terminal (2)
	00303	Brush Holder Retaining Strap (2)
	00304	Carbon Brush c/w Spring (2)
	00305	Terminal Housing (2)
	00306	Inner Brush End Cap (2)
	00307	Outer Brush End Cap (2)
	00311	Brush Holder Housing
*	01917	Brush Holder Retaining Screw (4)
	01919	Terminal Screw (2)
	01919	Earth Screw (for 3-core cords),
	01927	Spring Washer (for 3-core cords)
	02202	End Cap Spring Ring (2)

ARMATURE AND FAN

	00403	Bearing Shroud
	00404	Fan
+	00440	Armature 100v
+	00441	Armature 110/115v
+	00443	Armature 125v
+	00444	Armature 200v
+	00445	Armature 220v
+	00447	Armature 240v

FIELD COIL

+	00540	Field Coil 100v
+	00541	Field Coil 110v
+	00542	Field Coil 115v
+	00543	Field Coil 125v
+	00544	Field Coil 200v
+	00545	Field Coil 220v
+	00547	Field Coil 240v

MOTOR CASING AND FIELD MOUNTING

	00604	Pressure Ring
	00605	Main Insulating Liner
	00610	Motor Casing (for new-type Nameplates)
	00621	Motor Casing (for old-type Nameplates)
	02004	Waved Washer Pair (Large)
	02224	Liner Locating Pin
*	02225	Hammer Casing Gasket

OIL SEAL AND PINION BEARING HOUSING

	00702	Notched Washer
	00705	Pinion
	00711	Pinion Bearing Cartridge
	01911	Cartridge Locating Screw (2)
	02008	Dished Washer (Thin)
	02009	Dished Washer (Thick) (2)
	02158	Pinion Bearing
	02251	Armature Bearing Circlip

CORD AND CORD ENTRY

	00911	3m, 2-core cord with moulded plug
	00917	Mains Lead Grommet
	01908	Cord Guard Housing Screw (2)
	01976	Cord Grip Screw (2)
	02228	Grommet Pin
	04003	Cord Guard
	04004	Cord Grip
	04012	Cord Guard Housing
	04013	Insulating Bush

MOTOR END SUNDRIES

	01068	Warning Plate (110v Hammers Only)
*	01915	Plate Fixing Screw (8)

** Only available in packs of five*

+ Not used on other Kango Hammers

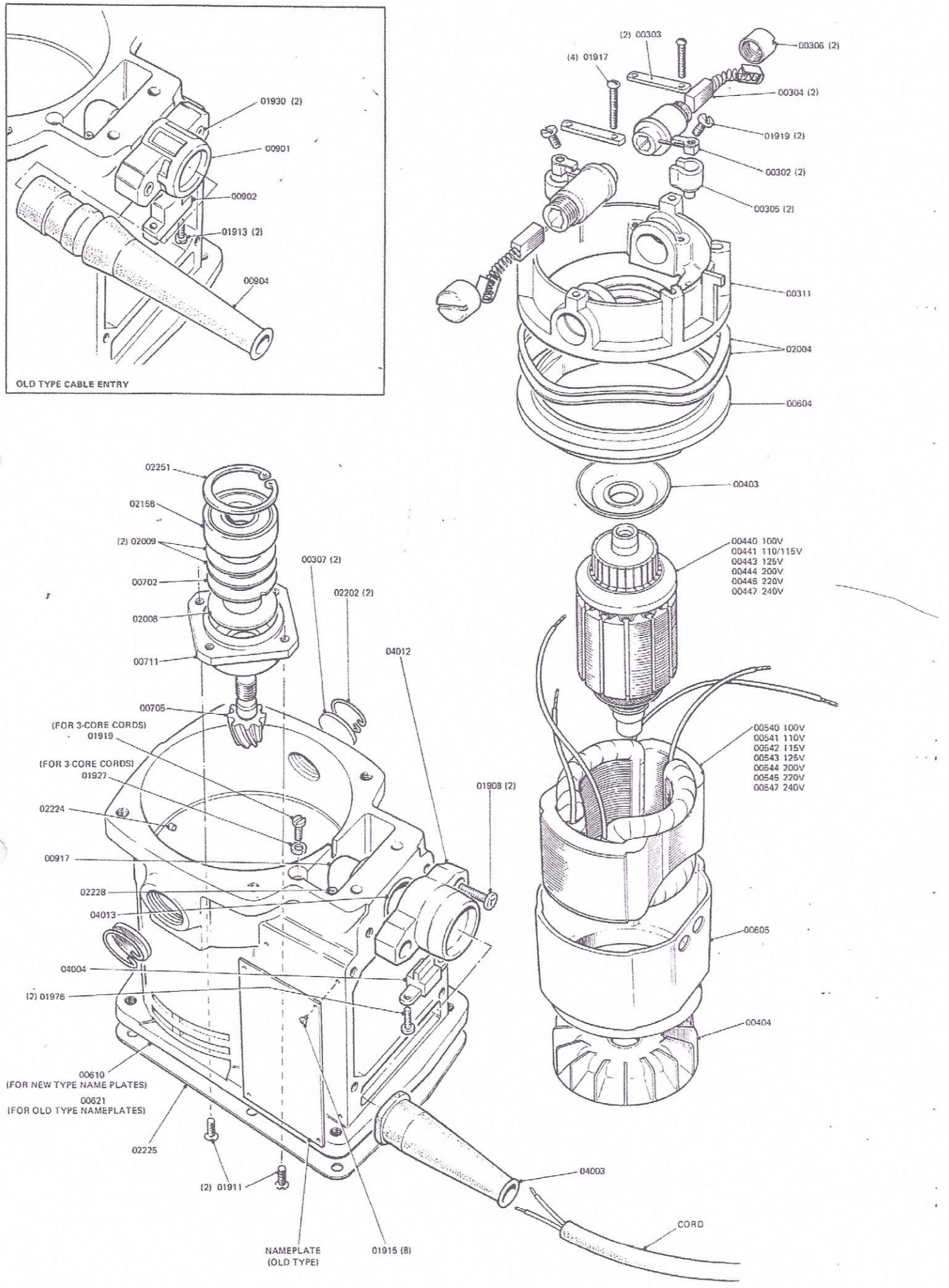


Figure 14 — Motor Parts

19.3 Hammer End Complete, Type 900 (Illustrated in Figure 15)

GEAR CARRIER AND CRANK DISC

	01105	19-Tooth Gear Clamp Plate
	01111	Crank Disc
+	01114	Bearing Spacer
▲	01197	Gear Carrier
▲	01198	Bearing Keeper
	01906	Small Assembly Screw (7)
*	01909	Spring Washer (7)
	02105	Crank Disc Thrust Bearing
	02119	Crank Disc Thrust Race (2)
	02121	Crank Disc Rear Bearing
+	02122	Crank Disc Front Bearing
*	02207	Crank Disc Shim 0.009"
*	02208	Crank Disc Shim 0.012"
*	02209	Crank Disc Shim 0.015"
*	02210	Crank Disc Shim 0.018"
*	02211	Crank Disc Shim 0.020"
*	02234	Crank Disc Shim 0.004"
*	02235	Crank Disc Shim 0.006"
*	02236	Crank Disc Shim 0.008"

CONNECTING ROD AND STRIKER

	01201	Crank Pin Bush
	01207	Connecting Rod
	01208	Crank Pin Washer
▲	01290	Piston
▲	01292	Gudgeon Pin
+▲	01294	Striker
	01940	Crank Pin Screw (L.H. Thread)
	01941	Crank Pin Nut (L.H. Thread)
	02120	Big End Bearing
	02217	Crank Pin Circlip
▲	02281	Piston Seal

HAMMER CASING AND BUFFER HOUSING

+	01431	Recoil Transfer Ring
+▲	01440	Stepped Ring
+▲	01441	Buffer Housing
▲	01590	Hammer Casing
	01594	Recoil Buffer
	01901	Main Assembly Screw (6)
*	01903	Spring Washer (12)
+▲	01942	Transmitter Screw (6)
+	02241	Buffer Housing Ring
*▲	02298	Buffer Plate Gasket

TRANSMITTER HOUSING AND NOSEPIECE

+	01530	Nosepiece
+	01533	Junk Ring
+	01534	Anvil
+▲	01538	Transmitter Housing Sleeve
+▲	01539	Transmitter Housing
	01614	Latch Bar
	01615	Abutment Pin
	01616	Detent Ball
*	01933	Spring Washer (4)
+	01965	Nosepiece Screw (4)
	02010	Latch Spring
+▲	02240	Compression Ring
+	02242	Anvil Ring (2)
*+▲	02249	Transmitter Gasket
+	02295	Retaining Pin (Gold)

** Only available in packs of five*
\+ Not used on other Kango Hammers
▲ Not required for Type 950 Hammers

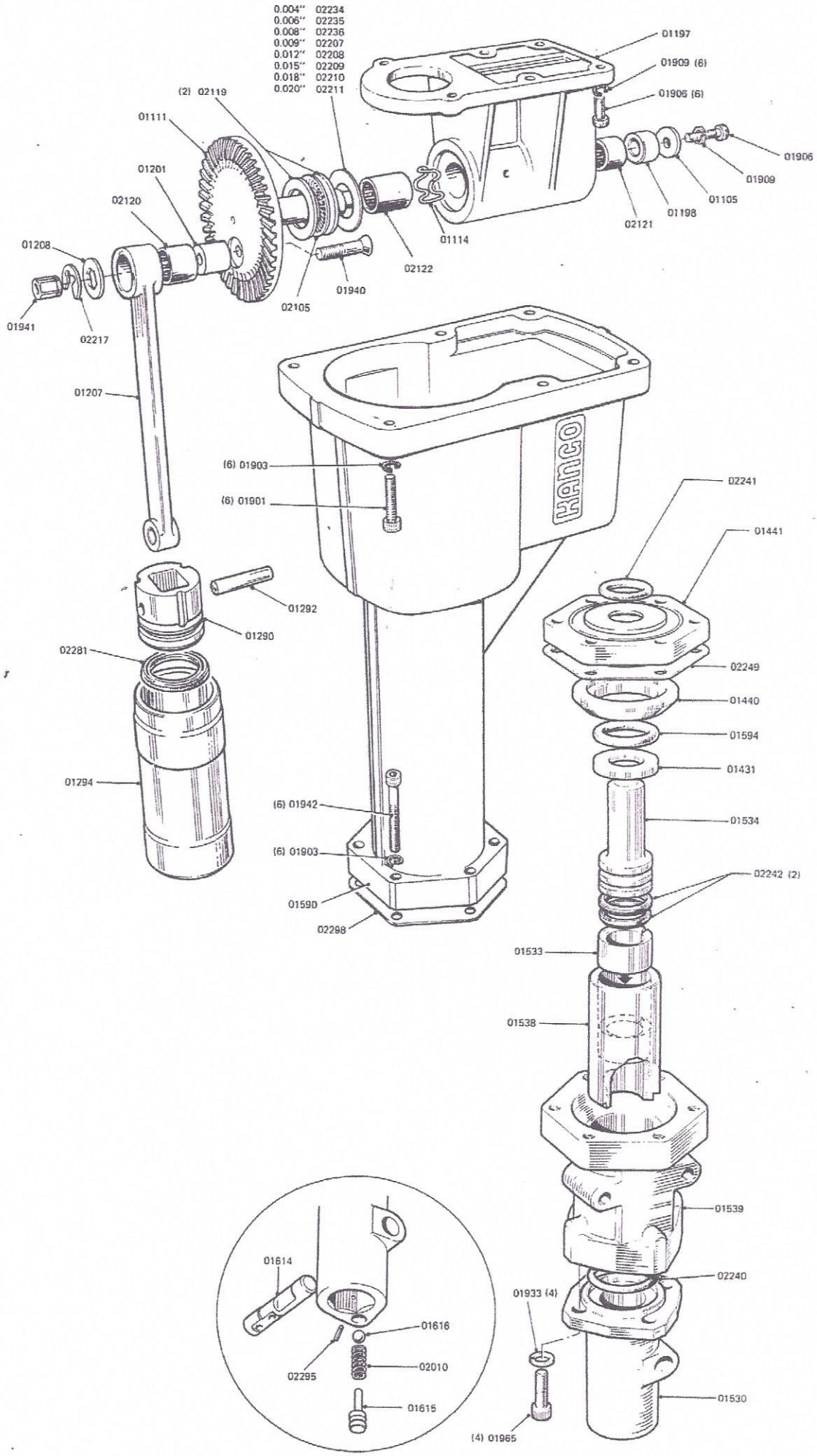


Figure 15 Hammer End Complete (Type 900 only)

19.4 Hammer Mechanism and Drill Drive, Type 950 (Illustrated in Figure 16)

GEAR CARRIER, CRANK DISC AND DRIVE SHAFT

•	01104	19-Tooth Gear
	01105	19-Tooth Gear Clamp Plate
•	01107	Gear Carrier
	01111	Crank Disc
+	01114	Bearing Spacer
•	01309	Drive Shaft
	01906	Small Assembly Screw (7)
*	01909	Spring Washer (7)
	02105	Crank Disc Thrust Bearing
•	02109	Drive Shaft Thrust Bearing
•	02110	Drive Shaft Thrust Race
•	02114	Clutch Shaft Head Bearing
•	02116	Drive Shaft Bearing
	02119	Crank Disc Thrust Race (2)
	02121	Crank Disc Rear Bearing
+	02122	Crank Disc Front Bearing
*	02207	Crank Disc Shim 0.009"
*	02208	Crank Disc Shim 0.012"
*	02209	Crank Disc Shim 0.015"
*	02210	Crank Disc Shim 0.018"
*	02211	Crank Disc Shim 0.020"
•	02222	19-Tooth Gear Key
*	02234	Crank Disc Shim 0.004"
*	02235	Crank Disc Shim 0.006"
*	02236	Crank Disc Shim 0.008"

CONNECTING ROD AND STRIKER

	01201	Crank Pin Bush
	01207	Connecting Rod
	01208	Crank Pin Washer
+•	01254	Gudgeon Pin
+•	01255	Piston
+•	01256	Striker
	01940	Crank Pin Screw (L.H. Thread)
	01941	Crank Pin Nut (L.H. Thread)
	02120	Big End Bearing
	02217	Crank Pin Circlip
•	02219	Piston Seal

ADJUSTABLE CLUTCH

•	01301	Clutch Shaft
•	01307	Clutch Shaft Bearing Cap
•	01350	Set of Clutch Parts (Comprising: 01354 (2), 01355, 01356, 01357, 01358, 02065, 02123)
•	01354	Clutch Plate (2)
•	01355	39-Tooth Gear
•	01356	Clutch Bush
•	01357	Clutch Lock Nut
•	01358	Clutch Lock Washer
•	01907	Clutch Bearing Cap Screw (4)
•	02065	Clutch Spring
•	02107	Clutch Thrust Bearing
•	02108	Clutch Thrust Race (2)
•	02115	Clutch Shaft Tail Bearing
•	02123	39-Tooth Gear Bearing
*•	02212	Clutch Shaft Shim 0.009"
*•	02213	Clutch Shaft Shim 0.012"
*•	02214	Clutch Shaft Shim 0.015"
*•	02215	Clutch Shaft Shim 0.018"
*•	02216	Clutch Shaft Shim 0.020"
*•	02244	Clutch Shaft Shim 0.004"
*•	02245	Clutch Shaft Shim 0.006"
*•	02246	Clutch Shaft Shim 0.008"

NON-ADJUSTABLE CLUTCH

•	01301	Clutch Shaft
•	01303	Clutch Plate Driver (c/w Pins)
•	01304	Clutch Plate (2)
•	01305	39-Tooth Gear
•	01306	Clutch Bush (c/w Pins)
+•	02015	Waved Washer Pack
•	02118	39-Tooth Gear Bearing

** Only available in packs of five*
\+ Not used on other Kango Hammers
• Not required for Type 900 Hammers

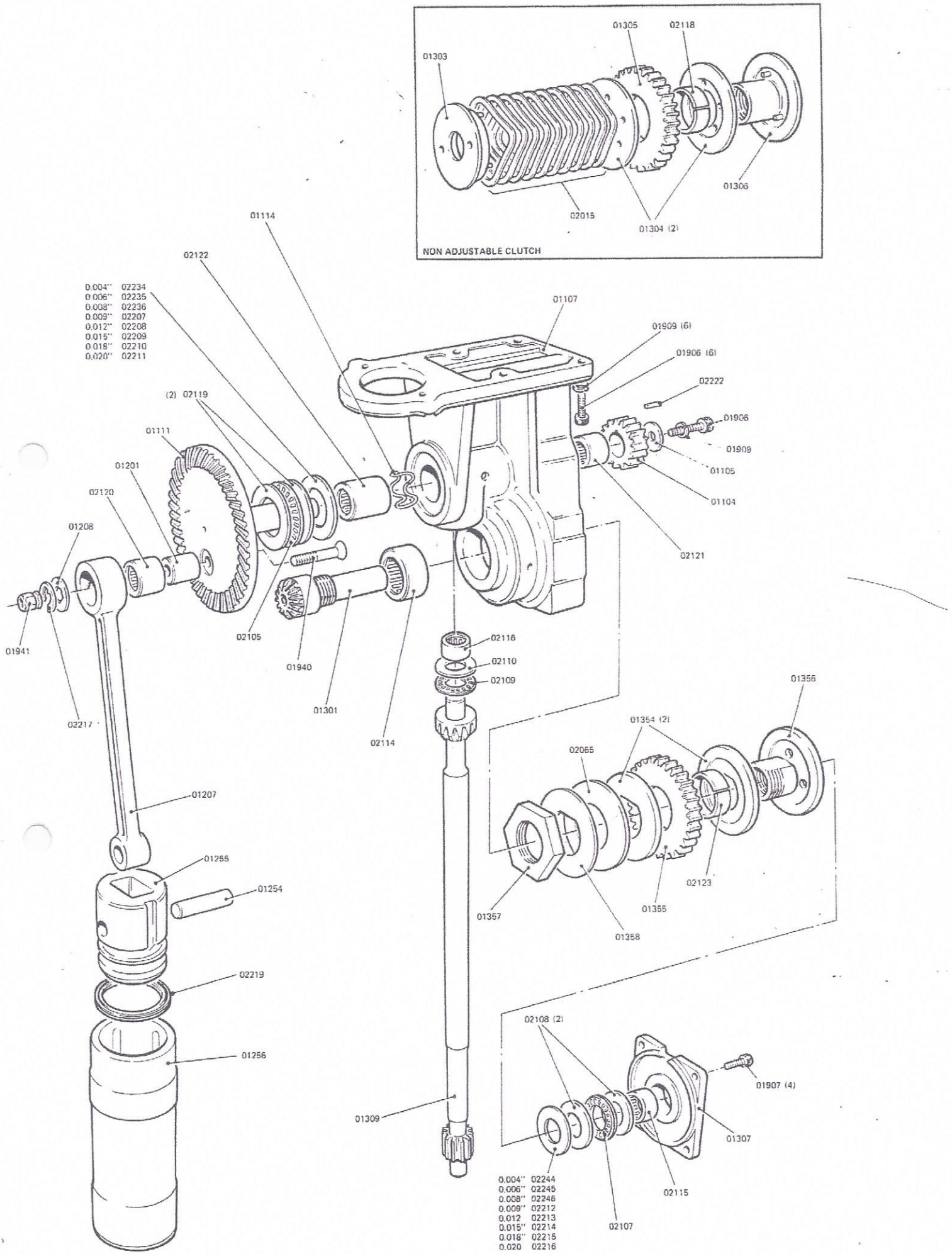


Figure 16 Hammer Mechanism and Drill Drive (Type 950 only)

19.5 Hammer Casing and Transmitter, Type 950 (Illustrated in Figure 17)

HAMMER CASING AND BUFFER HOUSING

+●	01430	Buffer Housing
+	01431	Recoil Transfer Ring
●	01516	Hammer Casing
●	01518	Dee Washer (4)
	01594	Recoil Buffer
	01901	Main Assembly Screw (6)
*	01903	Spring Washer (6)
●	01932	Transmitter Screw (4)
*	01933	Spring Washer (4)
*●	02232	Buffer Housing Gasket
+	02241	Buffer Housing Ring

TRANSMITTER HOUSING AND NOSEPIECE

+	01530	Nosepiece
+●	01531	Transmitter Housing
+●	01532	Driver
+	01533	Junk Ring
+	01534	Anvil
	01614	Latch Bar
	01615	Abutment Pin
	01616	Detent Ball
*	01933	Spring Washer (4)
+	01965	Nosepiece Screw (4)
	02010	Latch Spring
●	Q2116	Drive Shaft Bearing
+●	02130	Driver Bearing
*●	02229	Transmitter Housing Gasket
+	02242	Anvil Ring (2)
+●	02248	Driver Sealing Felt
+	02295	Retaining Pin (Gold)

** Only available in packs of five*
\+ Not used on other Kango Hammers
● Not required for Type 900 Hammers

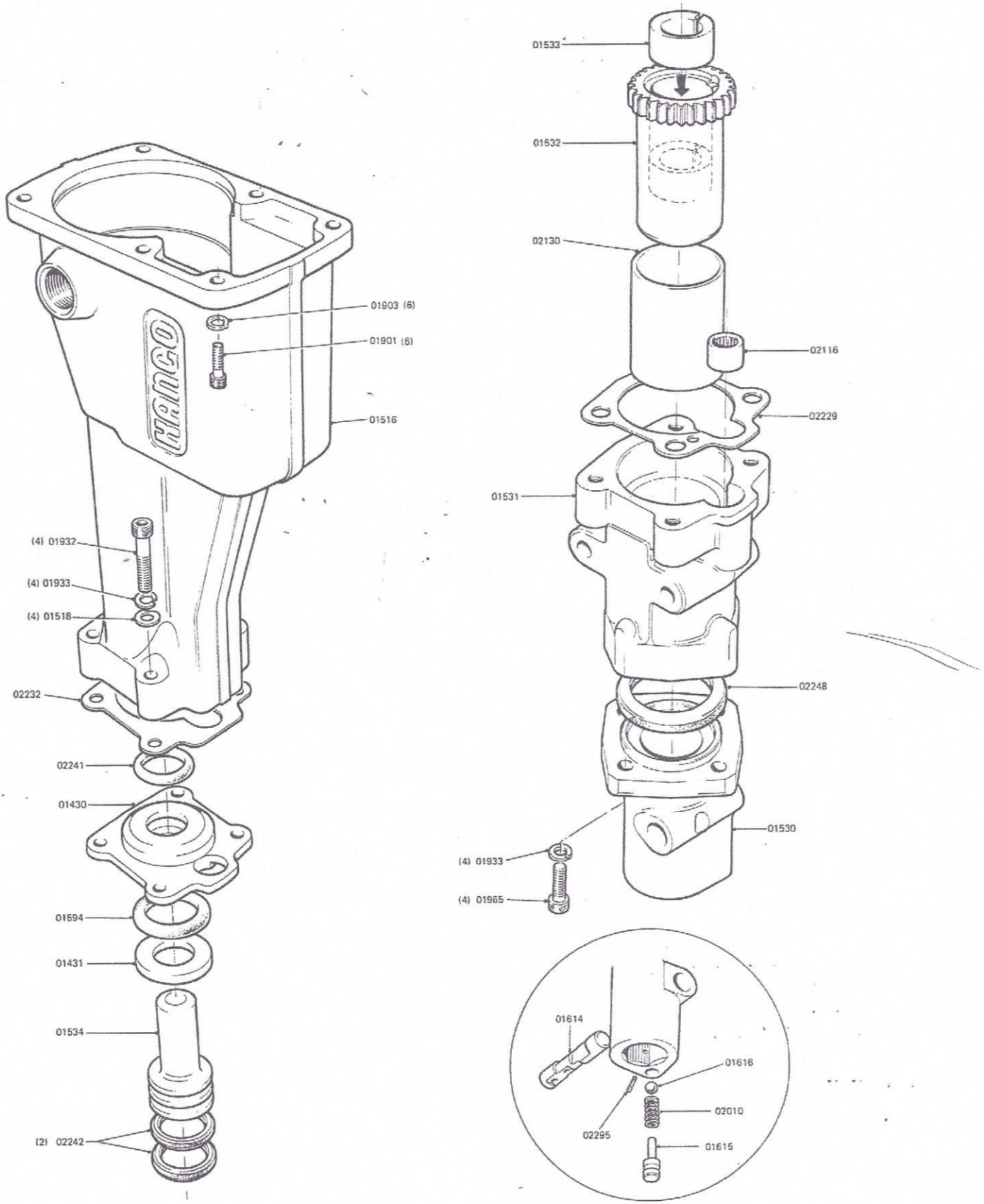


Figure 17 Hammer Casing and Transmitter (Type 950 only)

19.6 **Detachable Handles** (Illustrated in Figure 18)

•	01704	Depth Gauge Body
•	01705	Depth Gauge Rod
+	01732	Forward Handle Assembly (Comprising: 01758, 01759, 01761 (2), 01765 (2), 01785, 01788 (2), 01789, 01997 (2), 01998 (2), 02203 (2))
•	01737	Depth Gauge Bracket
	01758	Forward Handle Grip Bolt
	01759	Forward Handle Grip Nut
	01761	Forward Handle Grommet (2)
	01765	Forward Handle Grommet Washer (3/32" Thick) (2)
	01785	Forward Handle Casting
+	01788	Forward Handle Insulator (Blue) (2)
+	01789	Forward Handle Grip (Blue)
+•	01791	Drilling Handle (Blue)
•	01922	Depth Gauge Locknut
•	01924	Depth Gauge Clamp Screw
	01997	Forward Handle Locknut (2)
	01998	Forward Handle Screw (2)
*	02203	Forward Handle Washer (2)

* *Only available in packs of five*

\+ *Not used on other Kango Hammers*

• *Not required for Type 900 Hammers*

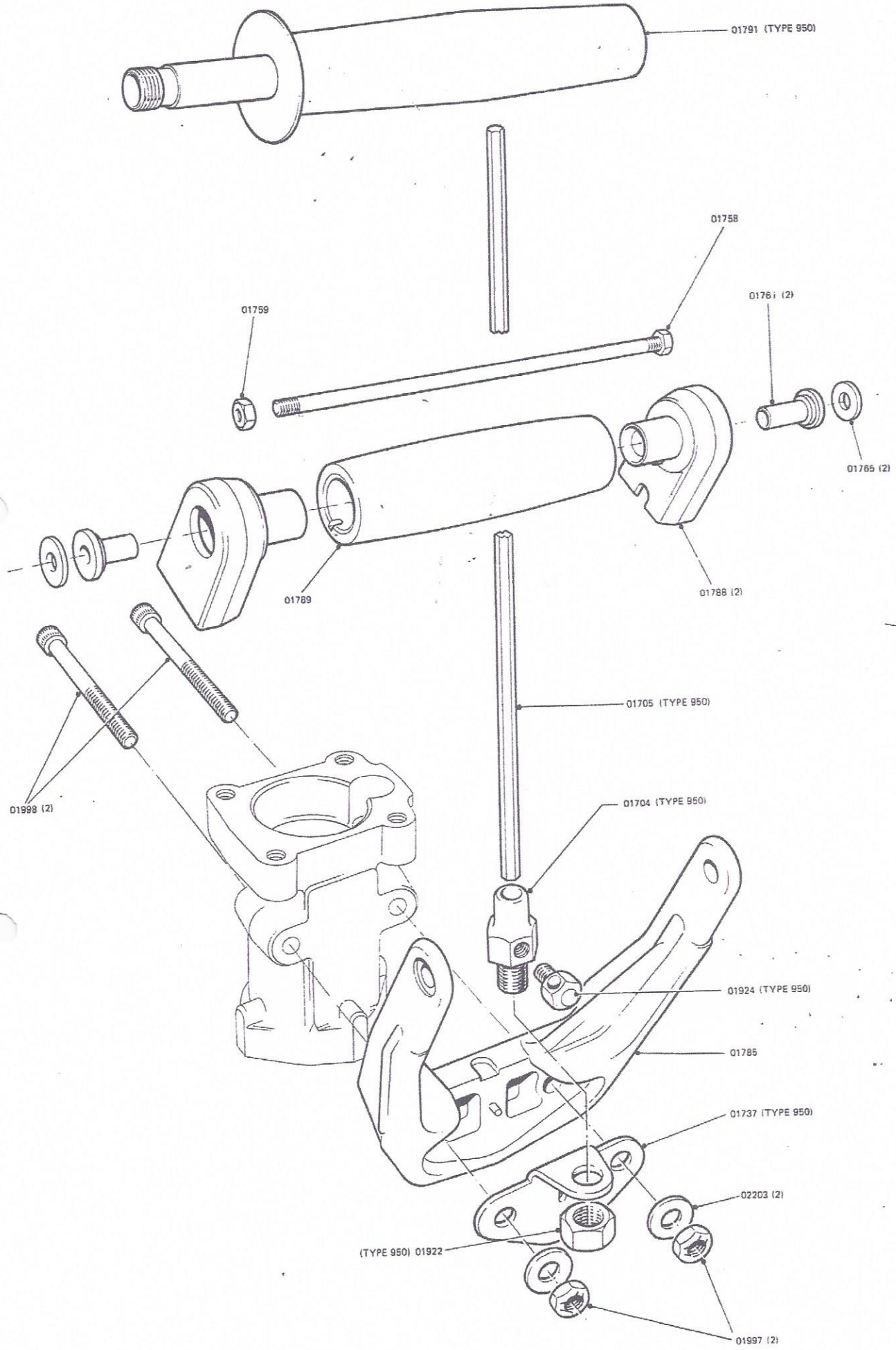


Figure 18 Detachable Handles

SECTION 20 LIST OF TORQUE SETTINGS

01941	Crank Pin Nut	1.9 kg.m (165 lb. in)
01997	Forward Handle Locknut	3 kg.m (22 lb. ft)
01350	Clutch Assembly (See Section 10.4)	'Run' at 7 lb. ft (Normal) (1.0 kg.m) 'Run' at 8 lb. ft (Maximum) (1.1 kg.m)

Note: For Types 750 and 750X the adjustable Clutch Assembly should be set to a maximum of 7½ lb. ft.

SECTION 21 IDENTIFICATION OF PARTS IN GROUPS 019, 020, 021, 022 and 072

21.1 Screws, Nuts and Washers (Group 019)

01901	Main Assembly Screw	¼"-28 U.N.F Cap Screw ¾" U.H
P1903	Spring Washer	¼" Spring Washer (Pack of five)
01906	Small Assembly Screw	No. 10-32 U.N.F Cap Screw ¾" U.H L-L
● 01907	Clutch Bearing Cap Screw	No. 10-32 U.N.F Cap Screw ½" U.H L-L
01908	Switch Cover Screw and Cord Guard Housing Screw	No. 10-32 U.N.F Pozi-Pan Screw ¾" U.H L-L
P1909	Spring Washer	3/16" Spring Washer (Pack of five)
01910	Rocker Grub Screw	No. 10-24 U.N.C Hex-Skt. Grub Screw ¼" O/all
01911	Cartridge Locating Screw	No. 10-32 U.N.F Csk. Screw ½" O/all
01913	Locking Bridge Screw	No. 6-40 U.N.F Ch. Hd High Tensile 9/16" U.H
P1915	Plate Fixing Screw	Pan-Head S/Tapping Screw Type B No.2, 3/16" U.H (Pack of five)
P1917	Brush-Holder Retaining Screw	S/Tapping Type Z No. 4 Pozi-Pan Screw ¾" U.H (Pack of five)
01919	Terminal Screw (Earth Screw)	3BA Special Terminal Screw
● 01922	Depth Gauge Lock Nut	½"-20 U.N.F Prevailing Torque Lock Nut
● 01924	Depth Gauge Clamp Screw	5/16"-24 U.N.F Special Screw-¾" O/all L-L
01925	Switch Locating Screw	No. 6-40 U.N.F Csk. 7/8" O/all
01927	Spring Washer	3-B.A Flat Section Phos-Bronze Spring Washer
01930	Cable Housing Screw	No. 10-32 U.N.F Pozi-Fillister ¾" U.H L-L
● 01932	Transmitter Screw	5/16"-24 U.N.F Cap Screw 1 ¾" U.H L-L
P1933	Spring Washer	5/16" Spring Washer (Pack of five)
01939	Plastic Handle Screw	¼"-28 U.N.F Pozi-Pan 7/8" U.H
01940	Crank Pin Screw (L.H. Thread)	¼"-28 U.N.F Hex-Skt Csk Screw 1¼" O/all (L.H. Thread) L-L
01941	Crank Pin Nut (L.H. Thread)	¼"-28 U.N.F (L.H. Thread) (3/8" A/F Hex)
▲ 01942	Transmitter Screw	¼"-28 U.N.F Cap Screw 1¾" U.H
+ 01965	Nosepiece Screw	5/16"-24 U.N.F Cap Screw 7/8" U.H L-L
01976	Cord Grip Screw	M4 x 16mm Pozi-Pan Screw
01997	Forward Handle Lock Nut	5/16"-24 U.N.F Self Locking Nut
01998	Forward Handle Screw	5/16"-24 U.N.F Cap Screw 2¾" U.H
P6908	Terminal Screw	M4 x 8mm Pozi-Pan Screw (Pack of five)
06909	Switch Cover Screw	No. 10-32 U.N.F Pozi-Pan Screw ¾" U.H with captive spring washer
06917	Switch Locating Screw	M5 x 25mm Pozi-Pan Screw

21.2 Springs, Waved Washers and Dished Washers (Group 020)

02001	Top Bearing Spring	Conical compression spring
02004	Waved Washer Pair (Large)	3-13/16" o.d by 3-7/16" i.d (two)
02008	Dished Washer (Thin)	1 ¼" o.d by 13/16" i.d by 0.016"
02009	Dished Washer (Thick)	1 ¼" o.d by 13/16" i.d by 0.025"
02010	Latch Spring	Parallel Compression Spring ¾" by 11/32" o.d
+● 02015	Waved Washer Pack (Clutch)	1-5/8" o.d by 1-5/16" i.d (eleven)
● 02065	Clutch Spring	Disc Spring 45mm o.d by 22.4mm i.d by 1.75mm thick

+ *Not used on other Kango Hammers*
● *Not required for Type 900 Hammers*
▲ *Not required for Type 950 Hammers*
Indicates screw with a nylon-locking patch

21.3 Bearings (Group 021)

	02101	Top Bearing — Special 12mm Magneto
	02105	Crank Disc Thrust Bearing — Torrington N.T.A-1220
●	02107	Clutch Thrust Bearing — Torrington N.T.A-815
●	02108	Clutch Thrust Race — Torrington T.R.A-815
●	02109	Drive Shaft Thrust Bearing — Torrington N.T.A-613
●	02110	Drive Shaft Thrust Race — Torrington T.R.B-613
●	02114	Clutch Shaft Head Bearing — Torrington B-126
●	02115	Clutch Shaft Tail Bearing — Torrington B86
●	02116	Drive Shaft Bearing — Torrington B65
●	02118	39-Tooth Gear Bearing — Special Plain Bearing, 7/8" o.d by ¾" i.d by ¼" long
	02119	Crank Disc Thrust Race — Torrington T.R.A-1220
	02120	Big End Bearing — Torrington J-78
	02121	Crank Disc Rear Bearing — Torrington J-88
+	02122	Crank Disc.Front Bearing — Torrington J-812
●	02123	39-Tooth Gear Bearing — Plain Bearing 1" o.d by 7/8" i.d by ¼" long
+●	02130	Driver Bearing — Special Bush 40mm o.d by 37mm i.d by 55mm long
	02158	Pinion Bearing — Ball Bearing, Double Shielded, ISO Ref 6201-ZZ

21.4 Spring Pins, Shims, Circlips, Gaskets etc. (Groups 022 and 072)

	02202	End Cap Spring Ring — Special Round Wire Circlip
	P2203	Forward Handle Washer — Plain washer ¾" o.d x 5/16" i.d (Pack of five)
	P2207	Crank Disc Shim 0.009" — 1 ¼" o.d x ¾" i.d (Pack of five)
	P2208	Crank Disc Shim 0.012" — 1 ¼" o.d x ¾" i.d (Pack of five)
	P2209	Crank Disc Shim 0.015" — 1 ¼" o.d x ¾" i.d (Pack of five)
	P2210	Crank Disc Shim 0.018" — 1 ¼" o.d x ¾" i.d (Pack of five)
	P2211	Crank Disc Shim 0.020" — 1 ¼" o.d x ¾" i.d (Pack of five)
●	P2212	Clutch Shaft Shim 0.009" — 13/16" o.d x ½" i.d (Pack of five)
●	P2213	Clutch Shaft Shim 0.012" — 13/16" o.d x ½" i.d (Pack of five)
●	P2214	Clutch Shaft Shim 0.015" — 13/16" o.d x ½" i.d (Pack of five)
●	P2215	Clutch Shaft Shim 0.018" — 13/16" o.d x ½" i.d (Pack of five)
●	P2216	Clutch Shaft Shim 0.020" — 13/16" o.d x ½" i.d (Pack of five)
	02217	Crank Pin Circlip — 9mm 'E' Clip
●	02219	Piston Seal — Nu-Lip Ring 1¼" o.d x 1" i.d
	02221	Top Bearing Spring Ring — Special flat section circlip
●	02222	19-Tooth Gear Key — ¼" x 3/32" square Key
	02223	Small Locating Pin — Spring Pin ½" x 1/8" o.d
	02224	Liner Locating Pin — Spring Pin 11/32" x 3/16" o.d
	P2225	Hammer Casing Gasket — Klinger Oilit 0.008" thick (Pack of five)
	02228	Grommet Pin — Spring Pin 7/8" x 5/32" o.d
●	P2229	Transmitter Housing Gasket — Klinger Oilit 0.008" thick (Pack of five)
●	P2232	Buffer Housing Gasket — Klinger Oilit 0.008" thick (Pack of five)
	P2234	Crank Disc Shim 0.004" — 1¼" o.d x ¾" i.d (Pack of five)
	P2235	Crank Disc Shim 0.006" — 1¼" o.d x ¾" i.d (Pack of five)
	P2236	Crank Disc Shim 0.008" — 1¼" o.d x ¾" i.d (Pack of five)
+▲	02240	Compression Ring — O-Ring 1½" o.d x 1¼" i.d
+	02241	Buffer Housing Ring — O-Ring 1-1/8" o.d x ¾" i.d
+	02242	Anvil Ring — Nu-Lip Ring 1-1/8" o.d x 7/8" i.d
●	P2244	Clutch Shaft Shim 0.004" — 13/16" o.d x ½" i.d (Pack of five)
●	P2245	Clutch Shaft Shim 0.006" — 13/16" o.d x ½" i.d (Pack of five)
●	P2246	Clutch Shaft Shim 0.008" — 13/16" o.d x ½" i.d (Pack of five)
+▲	02248	Driver Sealing Felt — Neoprene Backed Felt 1-13/16" o.d x 1½" i.d x 5/16" thick
+▲	P2249	Transmitter Gasket — Klinger Oilit 0.008" thick (Pack of five)
	02273	Rocker Pivot — Spring Pin 1-1/8" x ¼" o.d
	02274	Pressure Plate Pin — Spring Pin 7/16" x 1/16" o.d
▲	02281	Piston Seal — Nu-Lip Ring 1-7/16" o.d x 1-3/16" i.d
+	02295	Retaining Pin (Gold) — Spring Pin 7/16" x 1/8" o.d
▲	P2298	Buffer Plate Gasket — Klinger Oilit 0.008" thick (Pack of five)
	07214	Plunger Seal — O-Ring 11/32" o.d x 7/32" i.d

+ Not used on other Kango Hammers

● Not required for Type 900 Hammers