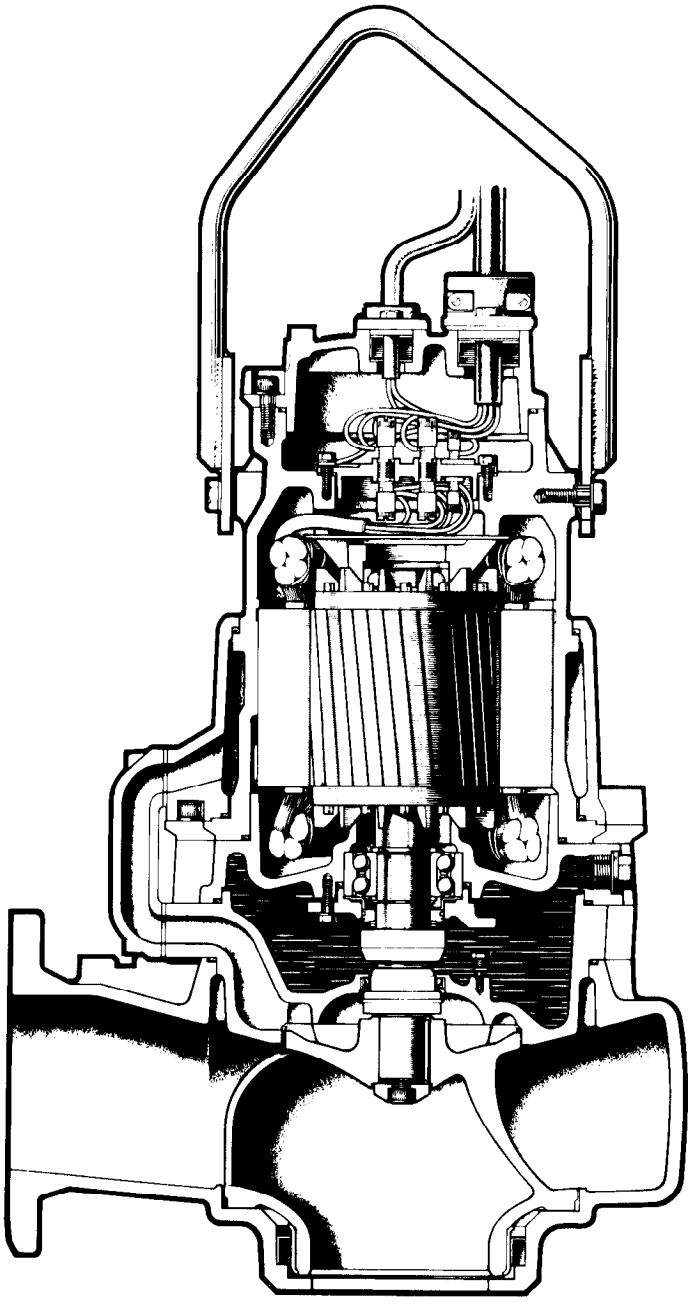
3152

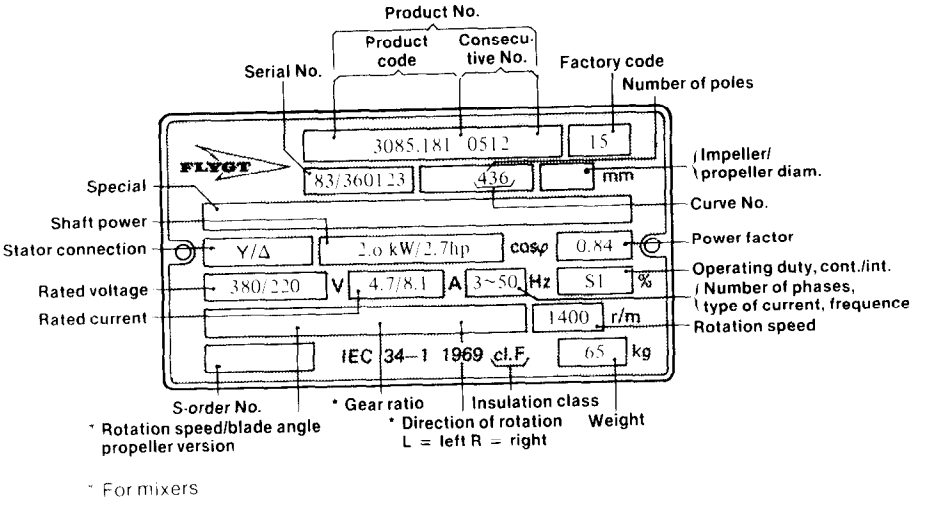
Workshop manual

FLYGT

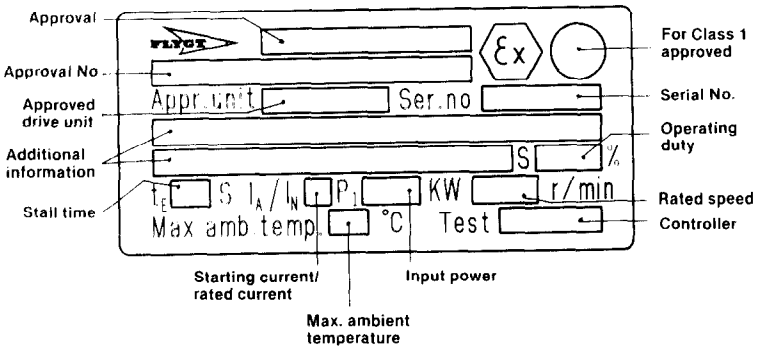


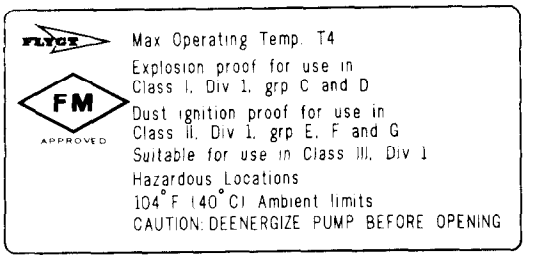
DATA PLATE INTERPRETATION

Standard plate



Approval plates





How to read the workshop manual

Instructions are provided on foldout pages at the back of this workshop manual. The pictures can be followed with the appropriate foldout page visible.

The workshop manual describes a disassembly/assembly sequence. The best work procedure for service on the pump may be different. The construction of the pump, recommended techniques and special tools are shown here.

NOTE! This workshop manual also describes the specially approved variants of the pump. For identification, see the pump's data plate and approval plate.

In order for the pump to meet the requirements and obtain the approval of the authorities, genuine Flygt parts shall always be used for repairs.

Only Flygt or workshop personnel authorized by Flygt are allowed to work on specially approved pumps.

Dimensions shall always be checked on critical parts before assembly, see the section entitled "Specially approved pumps".

The assembled pump shall always be insulation-tested and test-run before delivery.

Contents

Technical data

For weights, amperages, voltages, power ratings, rpm, see the pump's data plate.

Tightening torques:

Impeller screw	80—100 Nm	(59.0—73.8 ft lb)
Oil screws	100 Nm	(73.8 ft lb)
Inspection screw	10— 20 Nm	(7.38—14.75 ft lb)

Oil volume 5 litres (5.3 US quarts)

Winding resistances at 20°C (68°F)

Stator No.	ohm per phase	Stator No.	ohm per phase	Stator No.	ohm per phase	Stator No.	ohm per phase
381 26 12	0,15Ω*	381 33 28	0,35Ω	426 83 12	0,25Ω***	431 40 28	0,15Ω
381 26 12	0,30Ω**	381 33 29	0,40Ω	426 83 28	0,3 Ω	431 40 29	0,16Ω
381 26 12	0,15Ω***	381 33 30	1,20Ω	426 83 29	0,35Ω	431 40 32	0,19Ω
381 26 28	0,18Ω	381 33 32	0,46Ω	426 83 30	1,00Ω	431 40 34	0,22Ω
381 26 29	0,20Ω	381 33 34	0,52Ω	426 83 32	0,37Ω	431 40 35	0,51Ω
381 26 30	0,60Ω	381 33 35	1,28Ω	426 83 34	0,45Ω	431 40 37	0,12Ω***
381 26 32	0,23Ω	381 33 37	0,26Ω***	426 83 35	1,15Ω	431 40 38	0,65Ω
381 26 34	0,26Ω	381 33 38	1,60Ω	426 83 38	1,34Ω	431 40 40	0,57Ω
381 26 35	0,68Ω	381 33 40	1,4 Ω	426 83 40	1,18Ω	431 40 44	0,80Ω
381 26 38	0,80Ω	381 33 44	2,00Ω	426 83 44	1,67Ω	431 40 50	1,0 Ω
381 26 40	0,70Ω	381 33 52	3,00Ω	426 83 52	2,55Ω	431 40 55	1,4 Ω
381 26 44	1,00Ω	381 33 58	4,8 Ω	426 83 58	4,1 Ω	431 40 58	2,0 Ω
381 26 52	1,46Ω						
381 26 58	2,40Ω						

* main phase 1-phase
** auxiliary phase 1-phase
*** per half phase

Tools

Order No	Description
82 30 90	Lifting eye M10
82 30 91	Lifting eye M12
84 12 30	Triangular box wrench—Ex Version
84 13 60	Puller
84 13 62	Puller—removal of main bearing
84 15 66	Torque wrench 0—137 Nm (0—100 ft lb)
84 20 48	Puller—removal of support bearing
216 68 00	Seal tool—removal of rotating seal
309 32 00	Allen key
332 91 00	Seal tool—removal of tension spring
394 69 00	Stator lifting device
462 30 00	LP gas torch
438 58 00	Hex screw
398 22 00	Assembly sleeve
398 57 00	Assembly sleeve
398 58 00	Assembly sleeve
400 39 00	Assembly sleeve
400 29 01	Heating dowel
400 29 02	Heating dowel
400 40 00	Drift
400 41 00	Ball bearing drift

Impeller pullers

Order No	Fits impeller No.
398 80 00	Curve No. 610—614
398 80 02	Curve No. 616—618, 620—624
397 11 00	Curve No. 430
402 10 00	Curve No. 431, 432
399 22 00	Curve No. 434, 436
398 71 00	Curve No. 450—454
398 78 00	Curve No. 460, 462
84 13 63	Curve No. 263—269, 470, 471
396 70 00	Curve No. 490—496. To be used when the impeller screw is not broken.
438 58 00	Curve No. 490—496. To be used when the broken-off impeller screw remains in the end of the shaft.
84 20 48	Curve No. 490—496—removal of sleeve.

Lubricants

Order No.	Description
90 20 53	Bearing grease 1 kg (Chevron Industrial Grease Heavy)
90 17 51	Standard oil, see care and maintenance instructions for further details.
90 17 52	Mobil Whiterex or equivalent paraffin oil. For raw or clean water pumping.

Specially approved pumps

Work on specially approved pumps may only be done by Flygt or workshops/personnel authorized by Flygt.

Pumps with special approval shall be handled with extra care.

On a specially approved (Ex d) pump, the gaps between different parts, for example between the stator casing and the junction box, shall prevent any sparks from the interior of the pump from getting out and igniting surrounding gases.

All joint widths and gaps shall be measured with sufficiently accurate and well calibrated instruments. All joint surfaces shall be inspected. There may be no scratches, tool marks or the like.

Failure to meet the above requirements may render the special approval invalid. Note that the work requires experienced and trained personnel.

Dissassembly

The parts for which dimensions are to be checked are noted in the parts list. It is very important that the joint surfaces on these parts are not damaged during disassembly.

Assembly

Measure gaps and joint widths.

Inspect the joint surfaces and smear them with grease to prevent corrosion.

If a part does not meet the requirements on dimensional accuracy or surface finish, it must be discarded and a new specially approved part procured. The new part must also be inspected.

Observe caution during assembly so that the joint surfaces are not damaged.

	Minimum width of joint	Gap
∅ A	17 mm	—
∅ B-C	27 mm	≤0,141 mm
∅ D-E	16 mm	≤0,194 mm
∅ F	—	0,200
∅ G	—	Shrink fit
∅ H-I	26 mm	0,210—0,286 mm
∅ J-K	33 mm	≤0,005 mm
∅ L-M	33 mm	≤0,160 mm

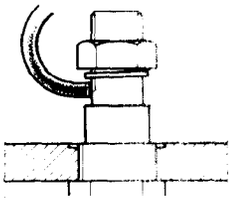
Electrical connections

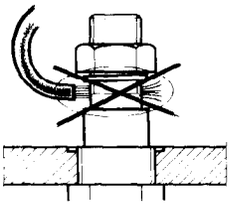
In order to prevent flashover (arcing) and sparking when the motor cable is connected to the terminal board, it is important to observe the following:

Make sure the insulation on the leads is whole, from the cable entry to the terminal.

Make sure that the bare copper wires on the leads are not too long.

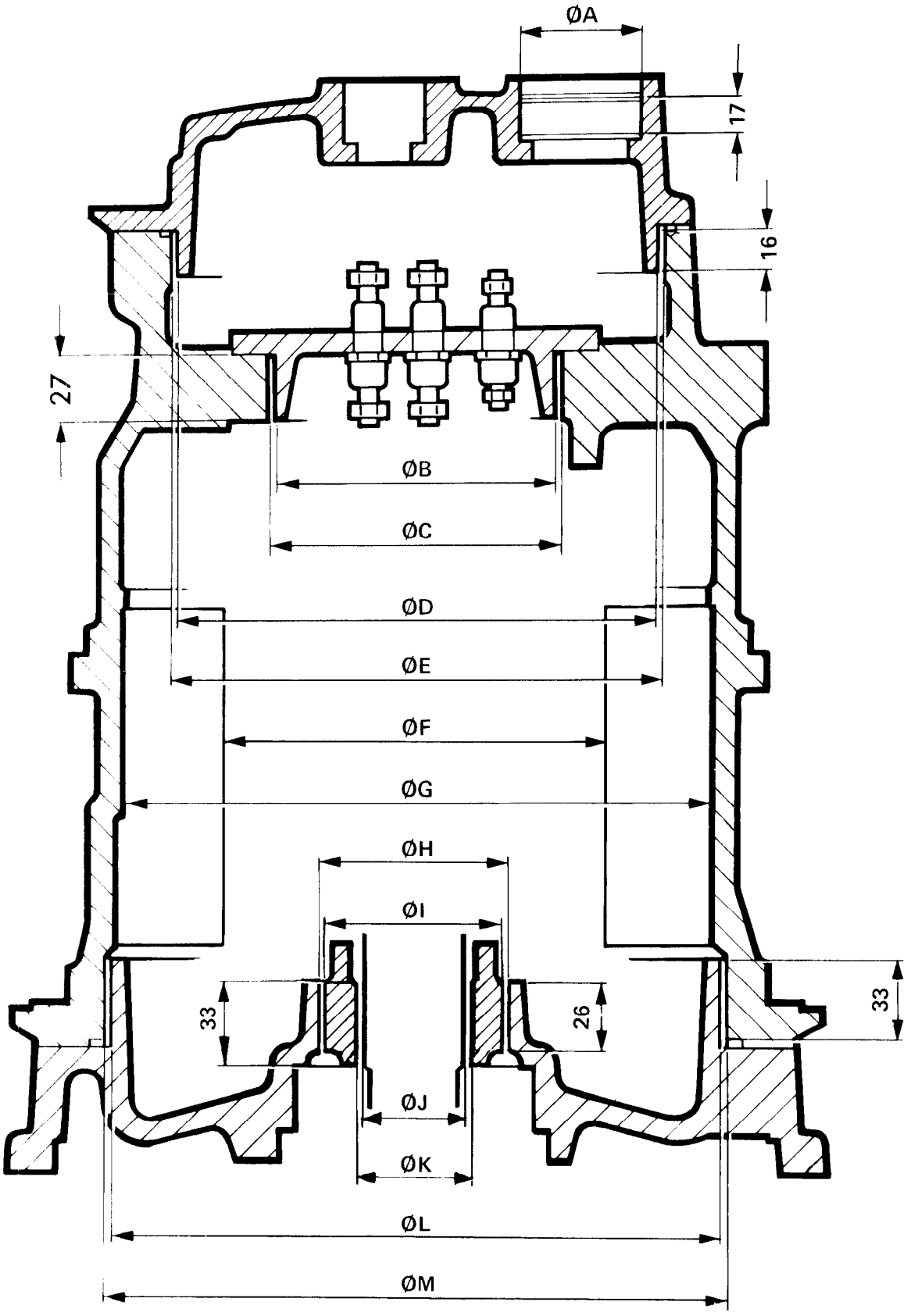
This also applies to stator and control leads.





When the pump is assembled, check the insulation resistance of the stator.

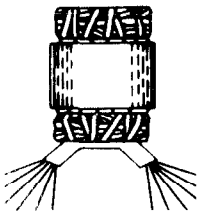
Use an insulation tester. With a 1 000 V megger, the insulation between the phases and between any phase and earth shall be >1 MΩ.


ØA
17
16
27
ØB
ØC
ØD
ØE
ØF
ØG
ØH
ØI
33
26
33
ØJ
ØK
ØL
ØM

Electrical connections

Stator connection
The stator leads are colour-coded as follows:

U1 - Red
V1 - Brown
W1 - Yellow
U2 - Green
V2 - Blue
W2 - Black
U5 - Red
V5 - Brown
W5 - Yellow
U6 - Green
V6 - Blue
W6 - Black

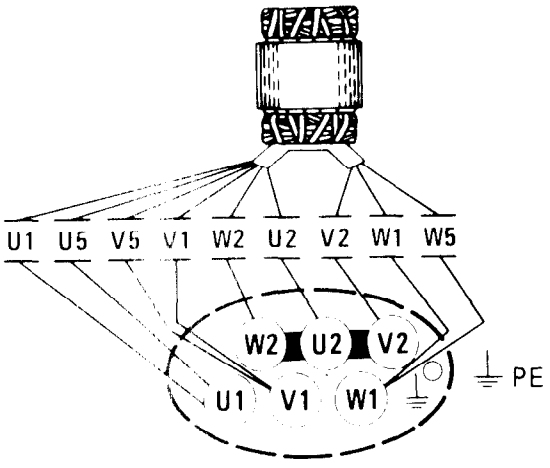


Connect the thermal cutouts to T1 and T2 on the terminal board.

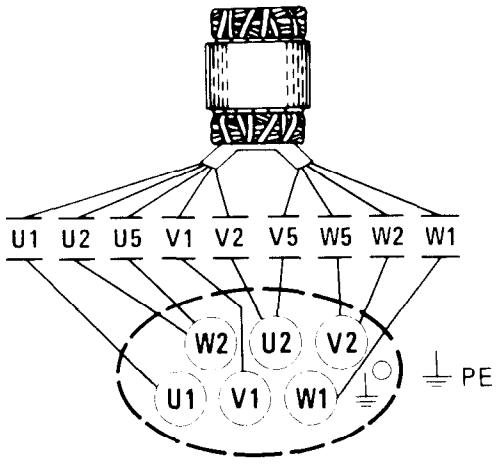
9 stator leads

The stator leads are connected to the terminal board as illustrated in the figures.

230V Y II



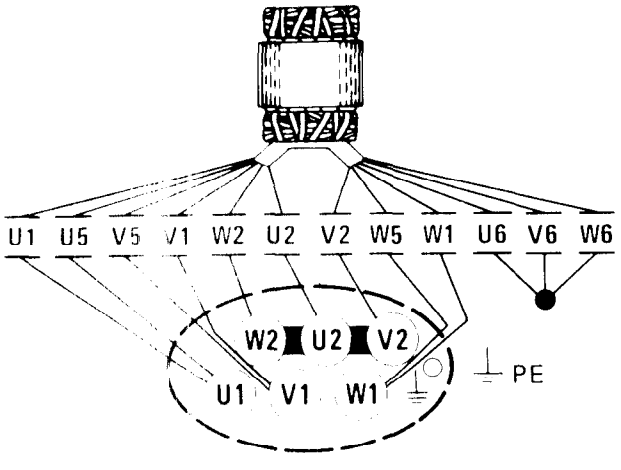
460V/Y Ser.



12 stator leads

The stator leads are connected to the terminal board as illustrated in the figures.

230V Y II



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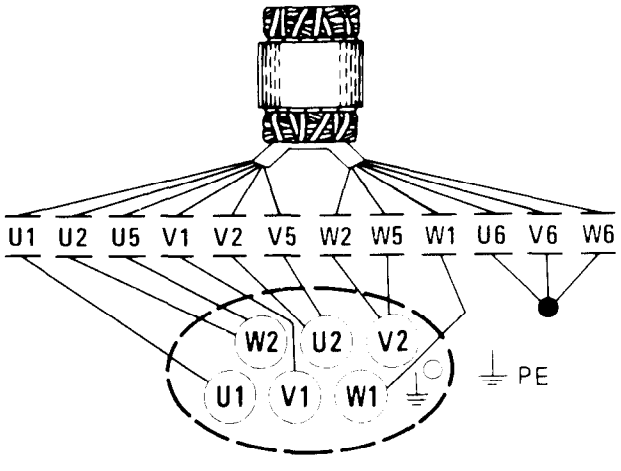
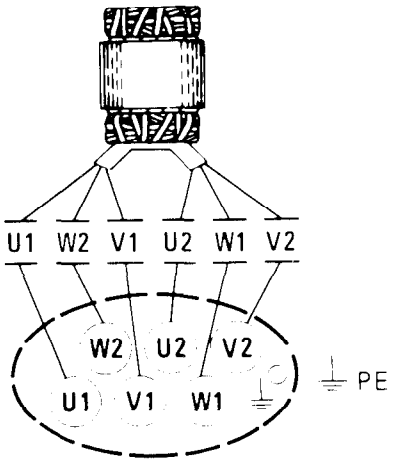


6 stator leads

The stator leads are connected to the terminal board as illustrated in the figure.

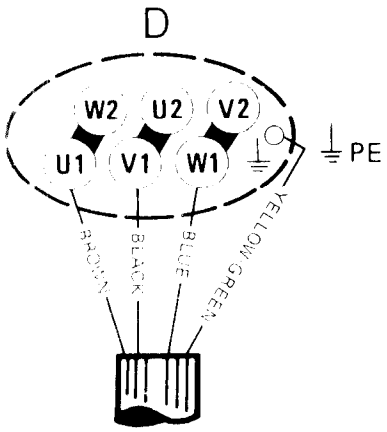


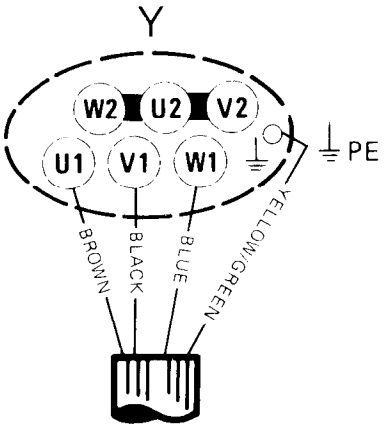
Connection of motor cable

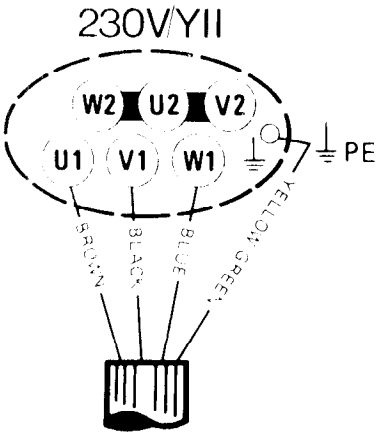
Connect the motor cable to the terminal board as illustrated in the figures. For safety reasons, the earth lead should be approx. 70 mm (2.8") longer than the phase leads. If the motor cable is jerked loose by mistake, the earth lead should be the last lead to come loose from its terminal.

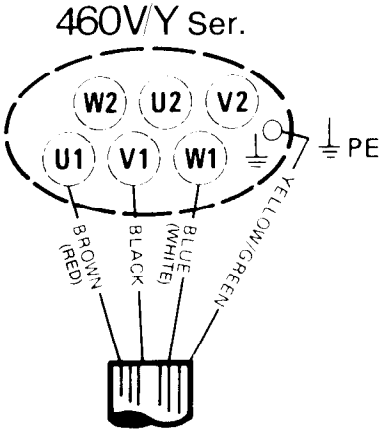
Connect the control lead from the starter's motor control circuit to T1 and T2.

Check on the data plate which connection, Y or D, is right for the line (mains) voltage in question. Then arrange the closing links on the terminal board for Y or D connection, see figure.

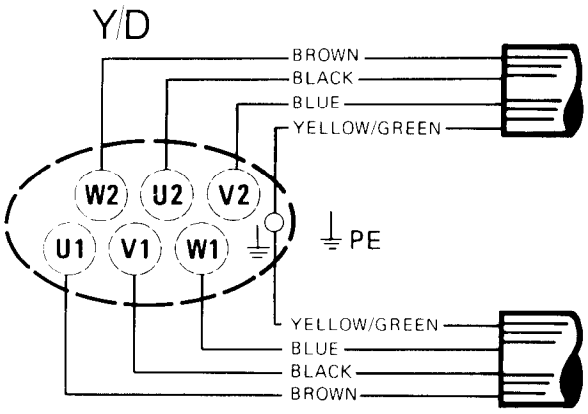








If Y/D start is used, connect both motor cables as shown below. Closing links are not used with Y/D start.



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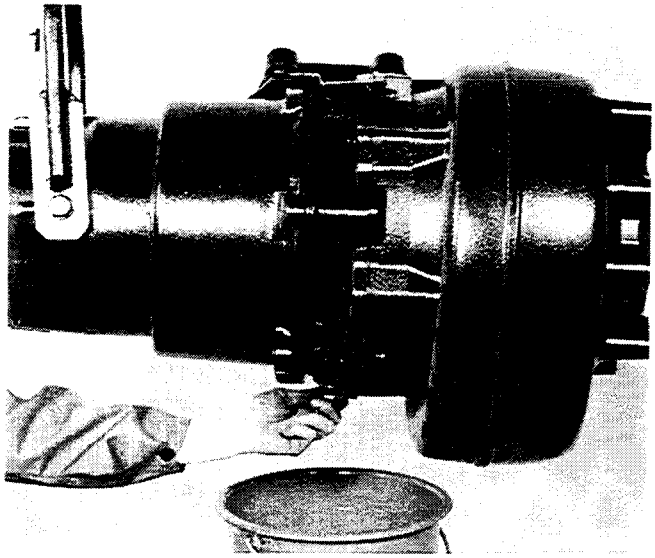

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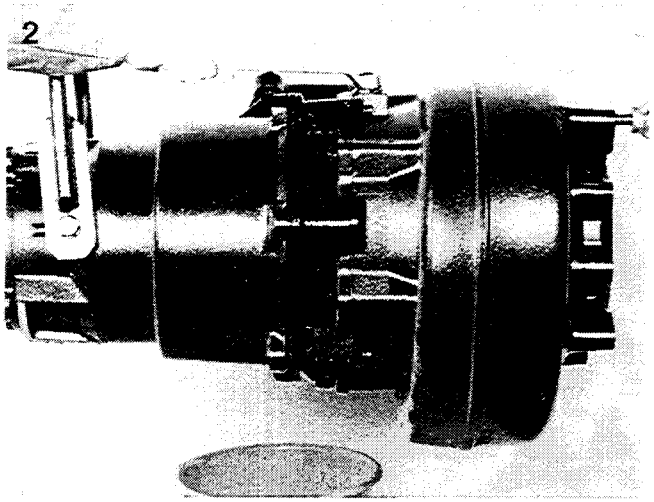

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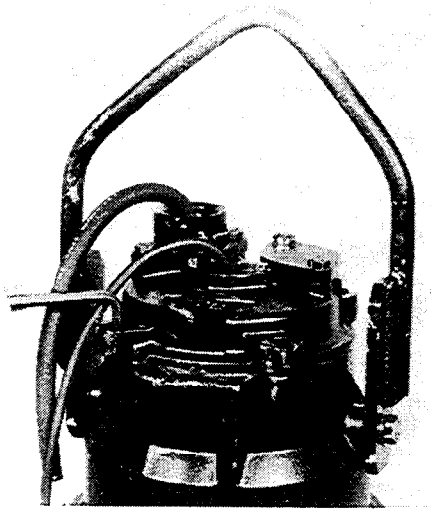

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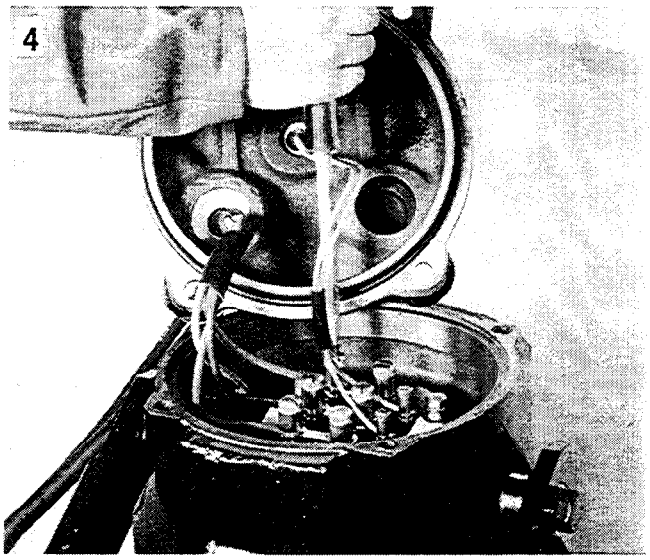

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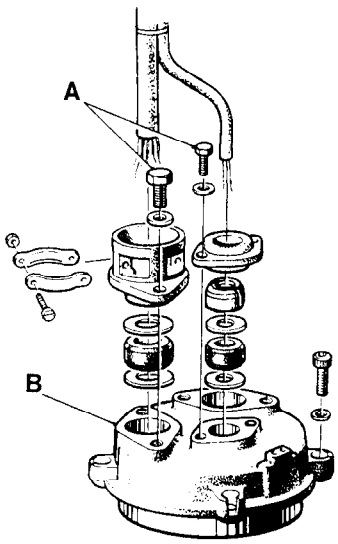

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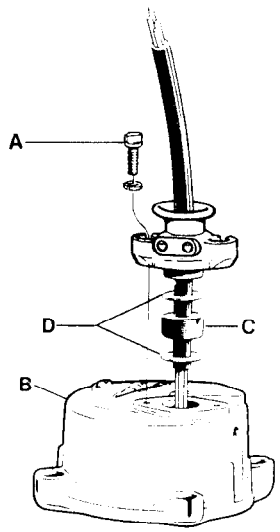

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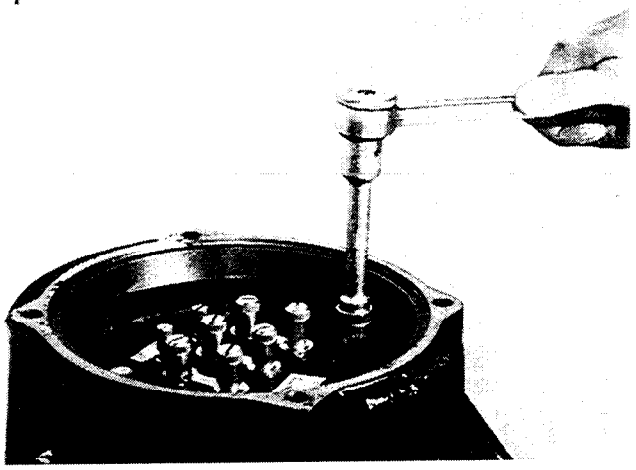

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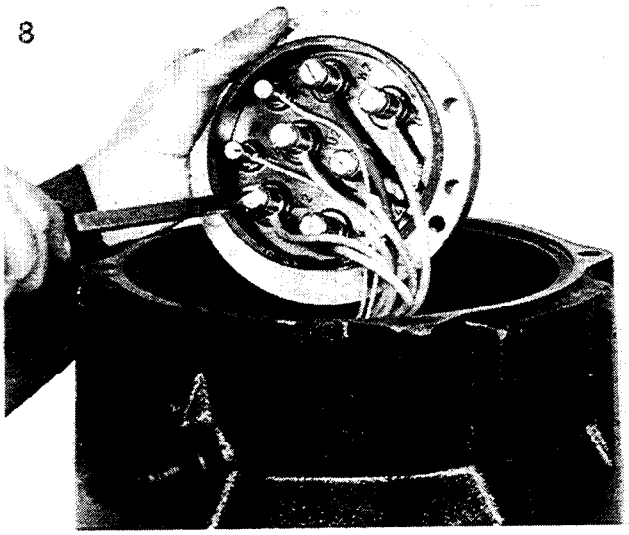

C, D, HS

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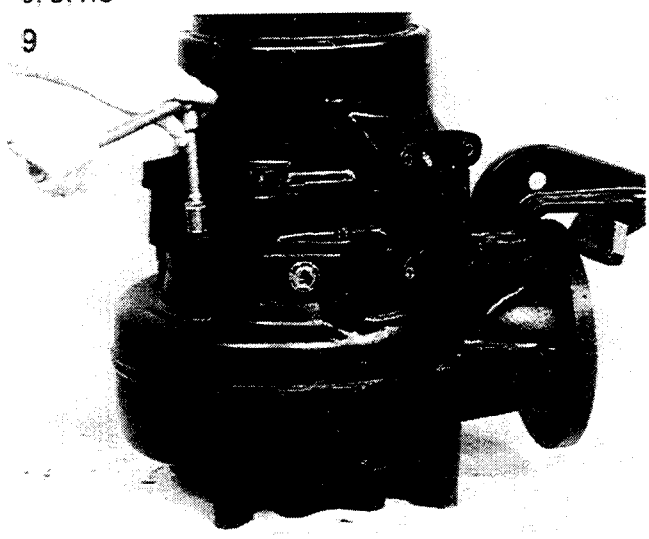

C, D, HS

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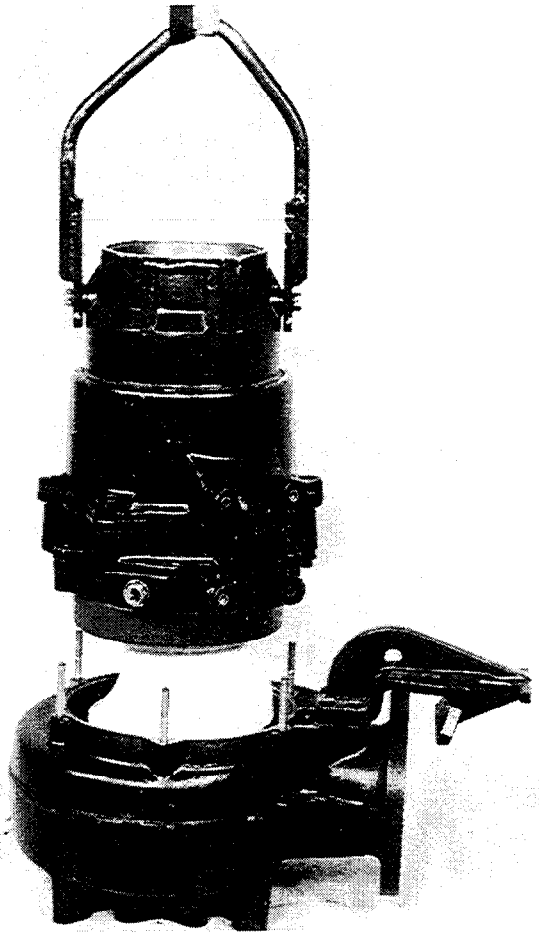

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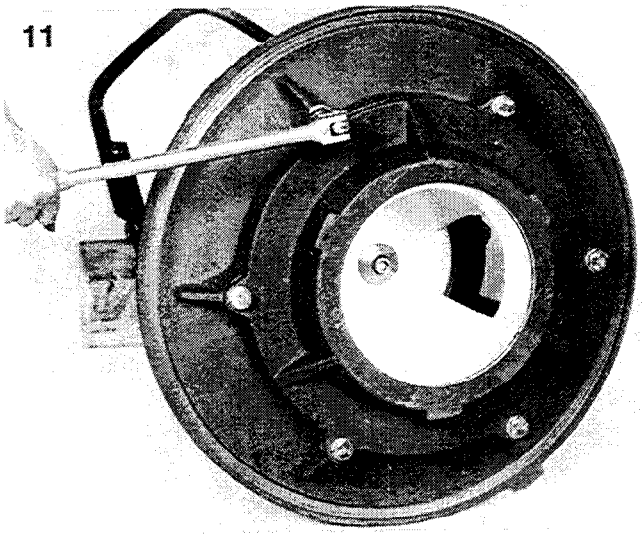

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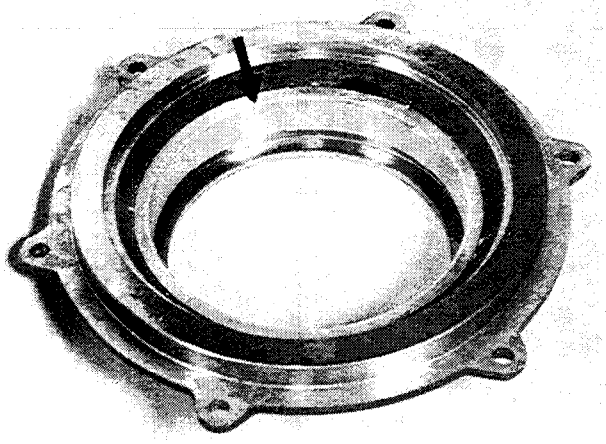

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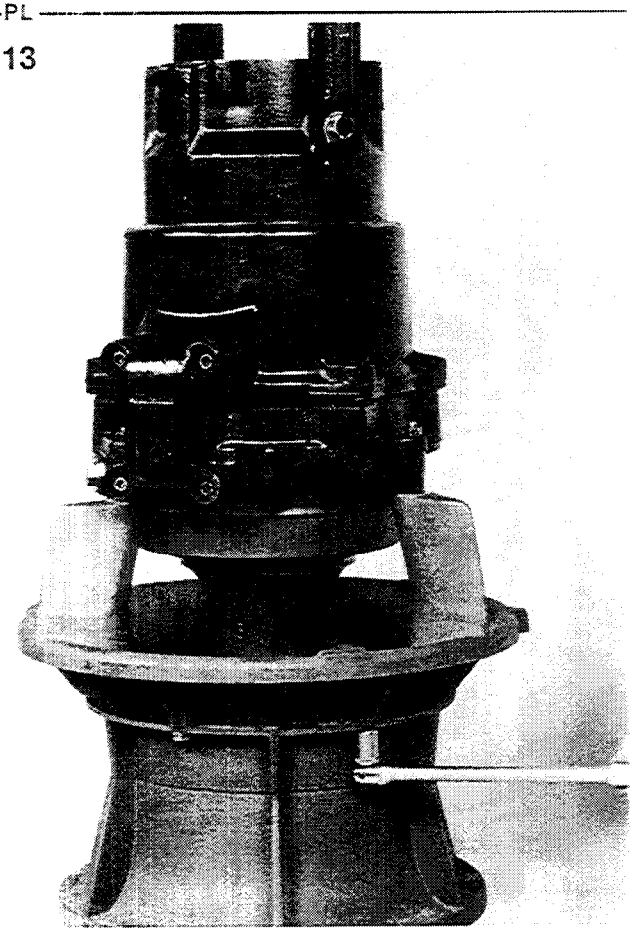

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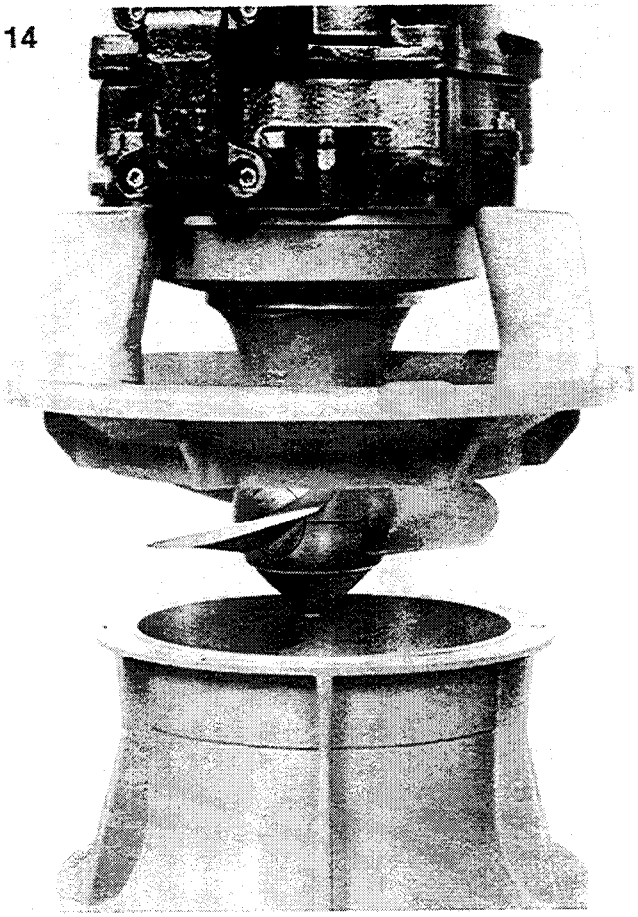

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C

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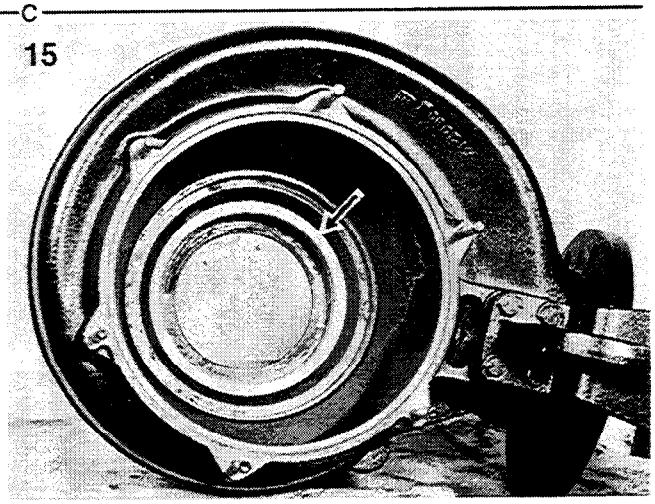

ST

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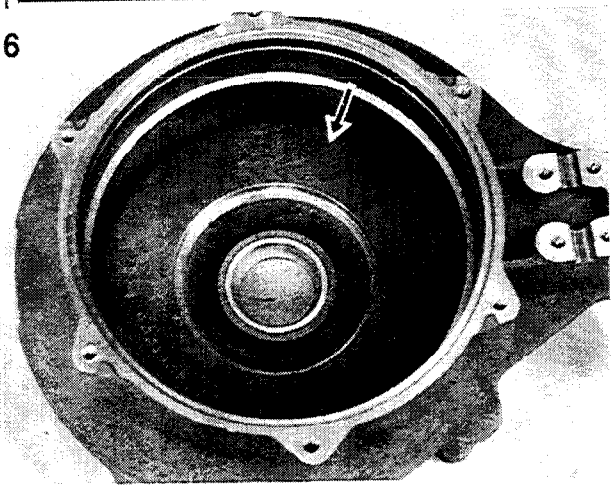

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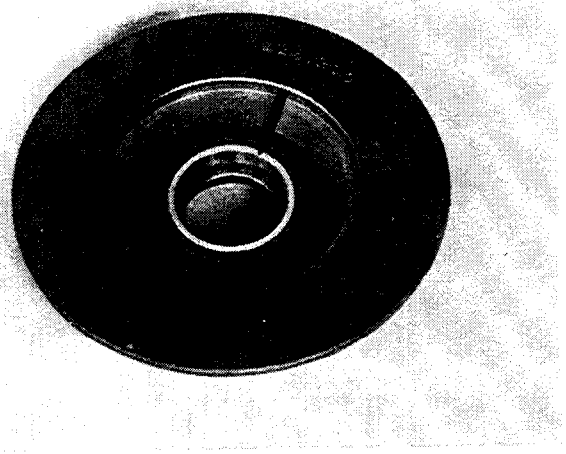

HS

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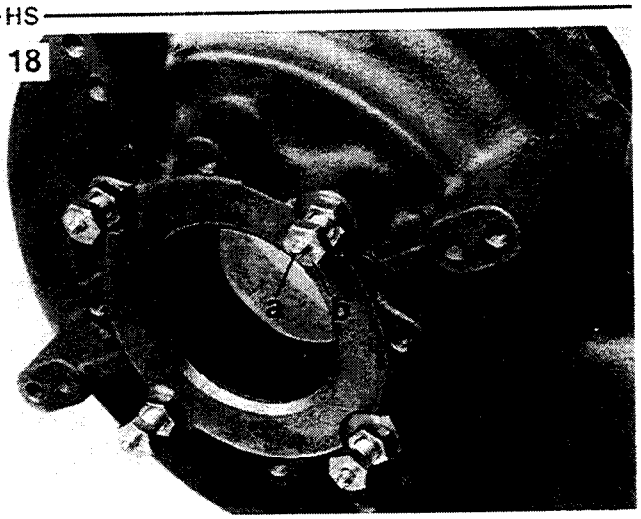

HS

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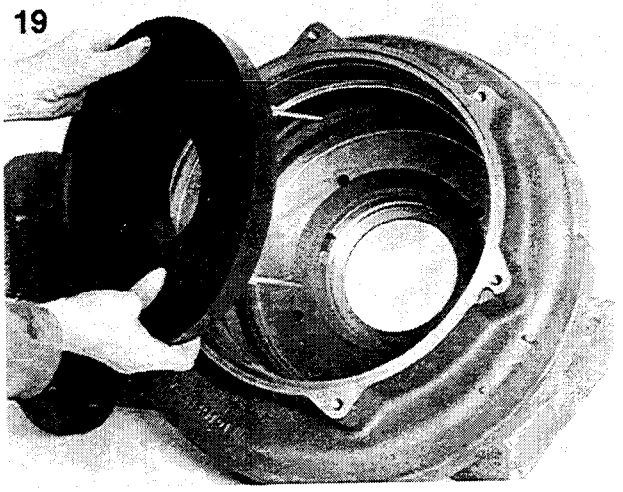

C,D,HS

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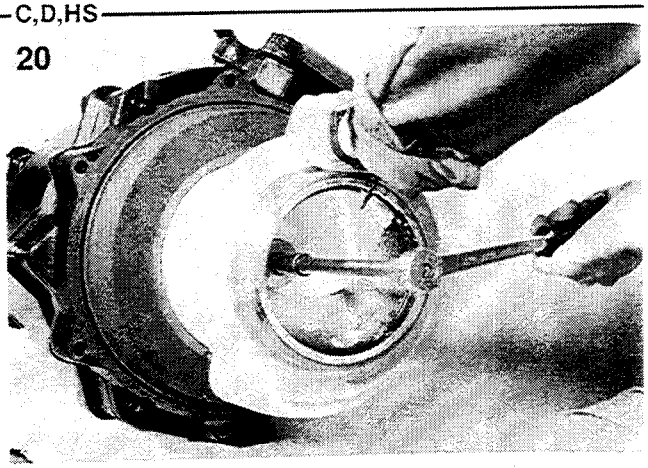

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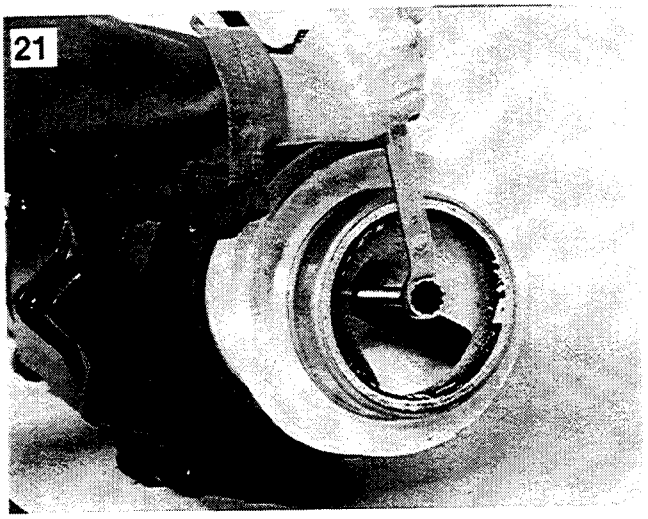

ST, HS

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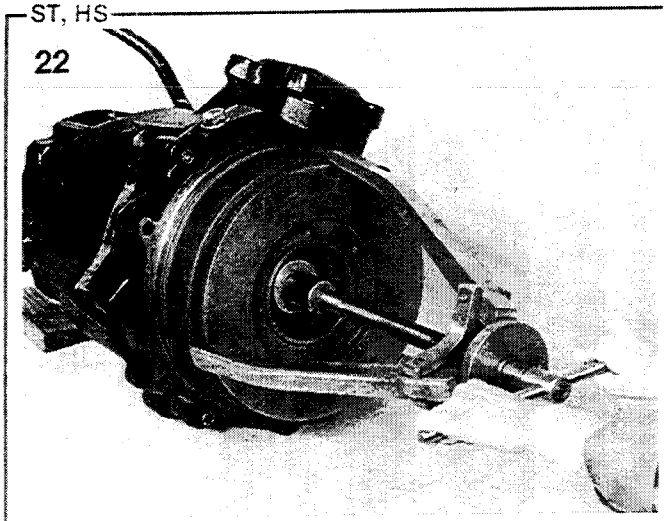

LT, MT, HT

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F

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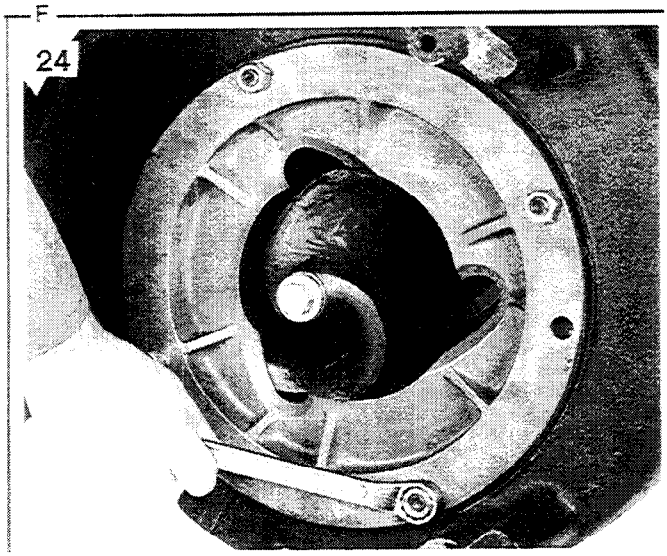

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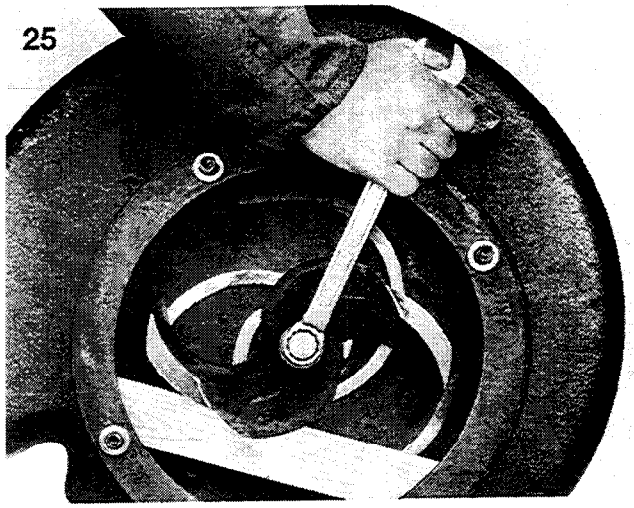

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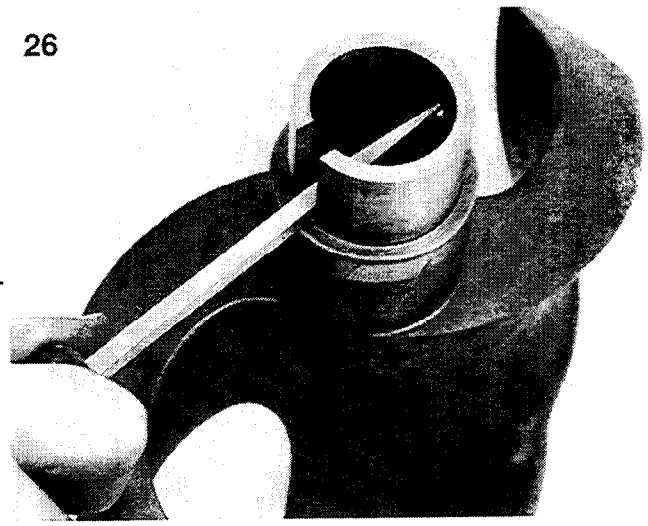

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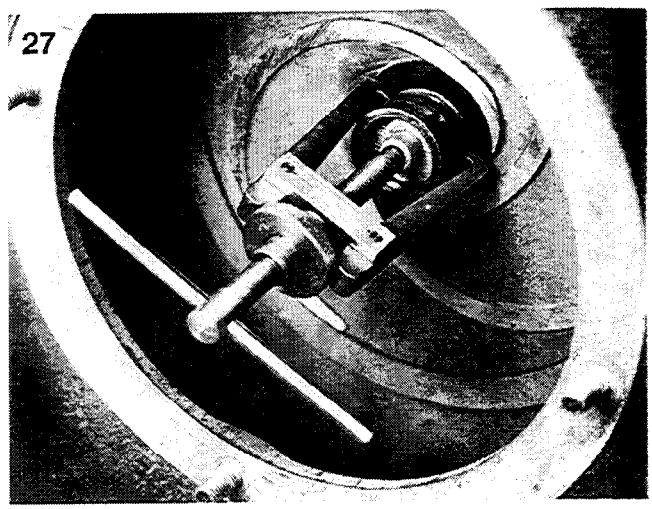

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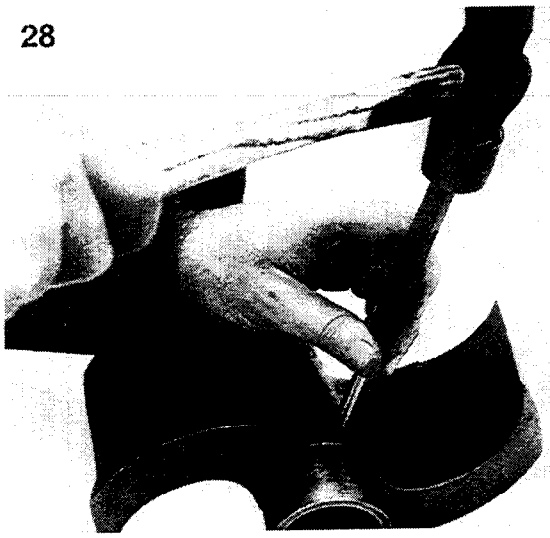

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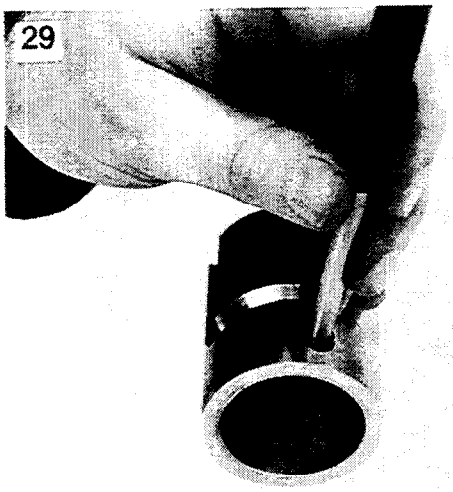

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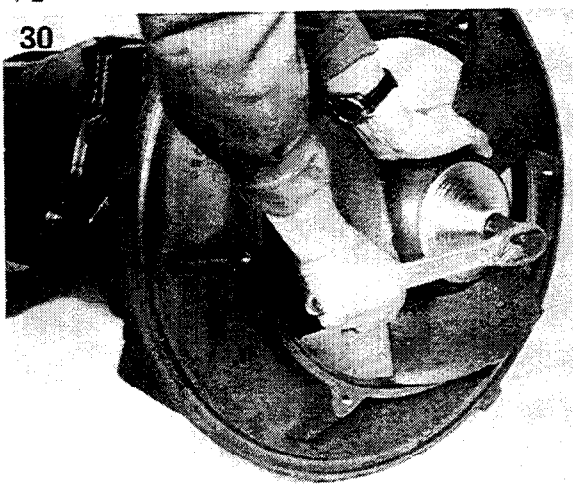

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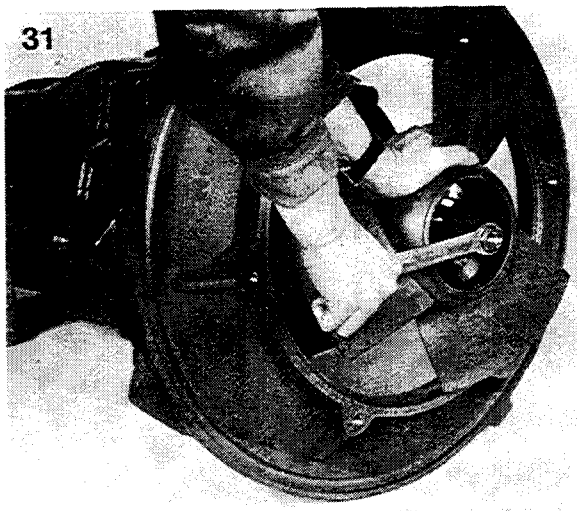

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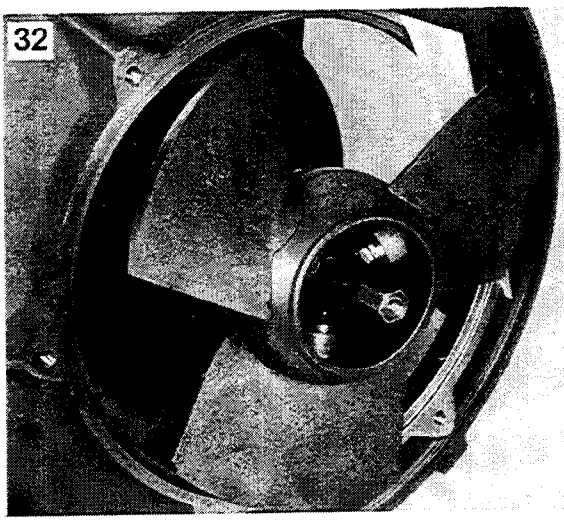

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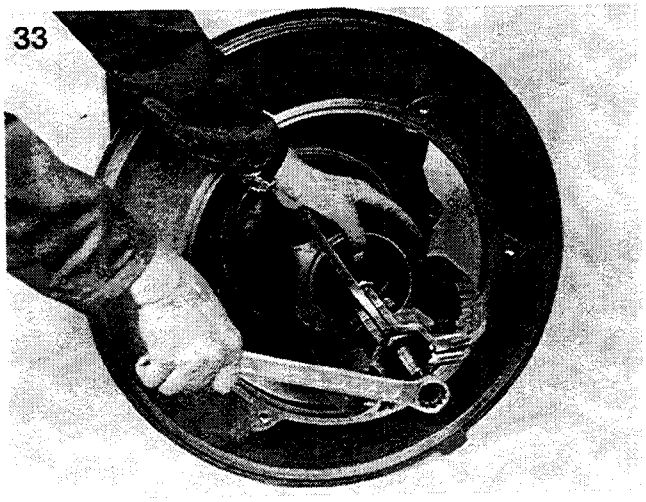

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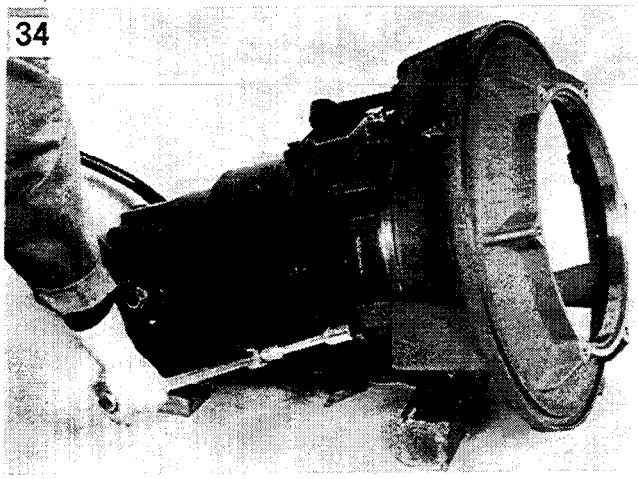

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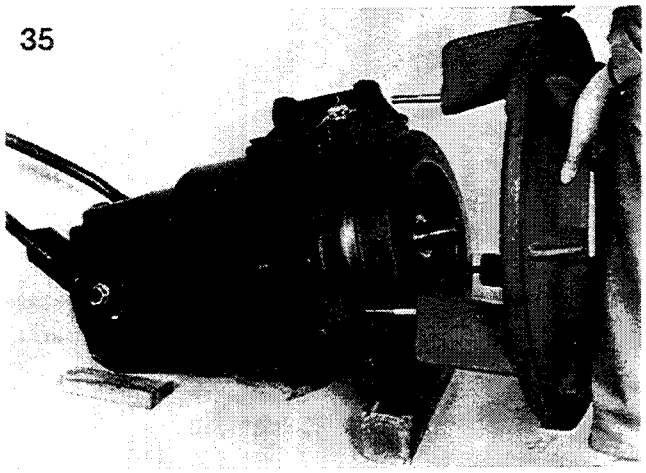

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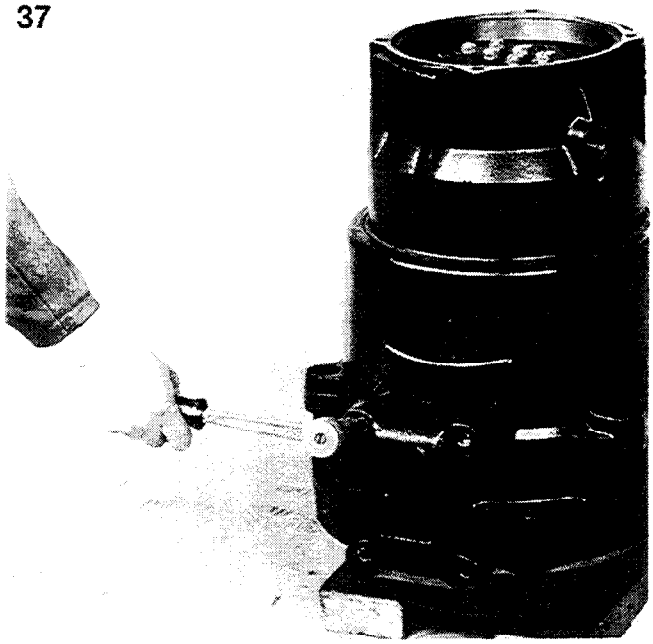

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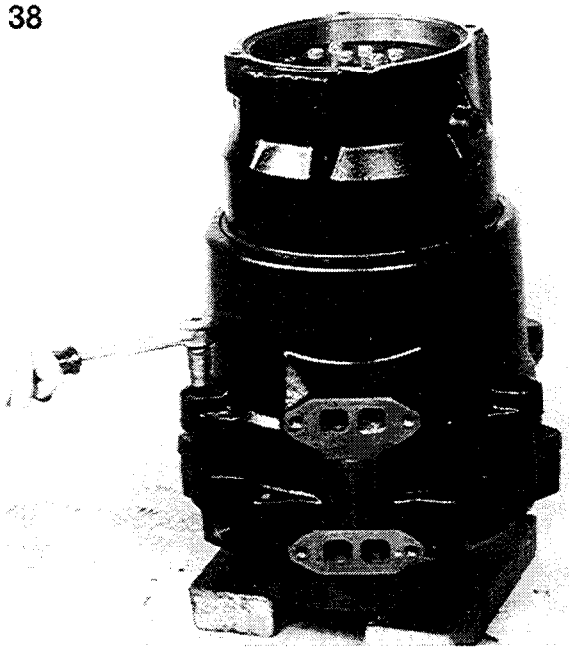

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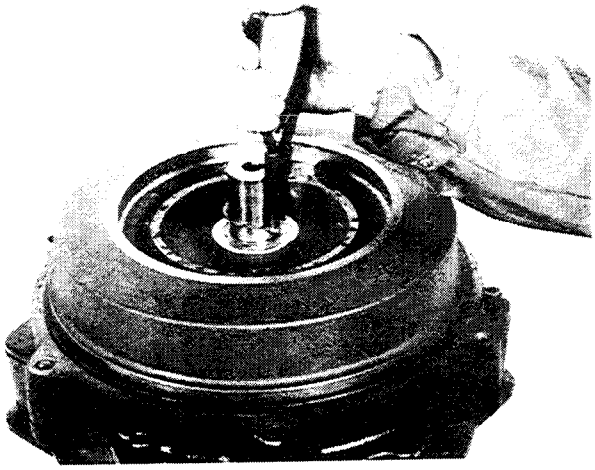

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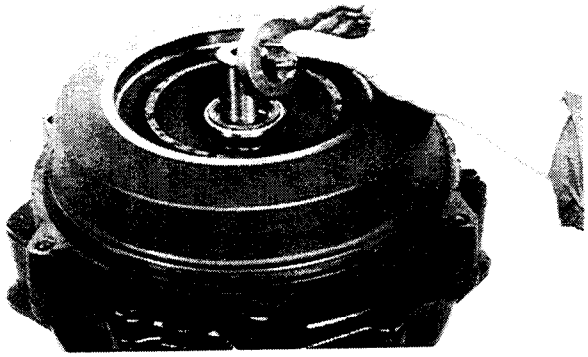

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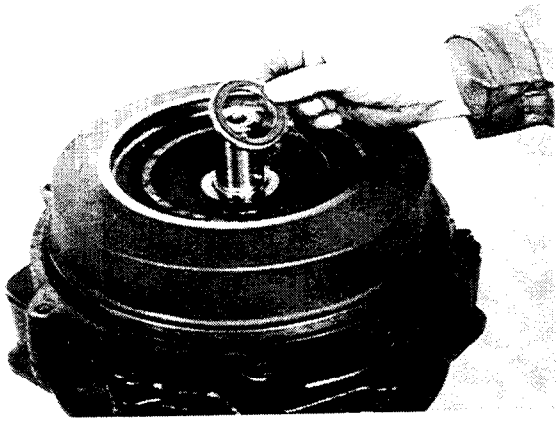

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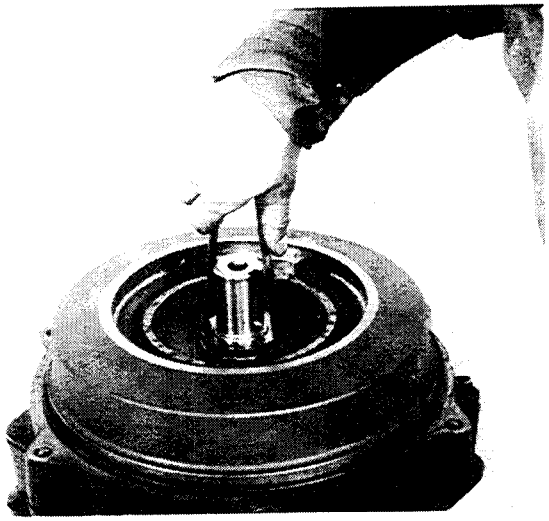

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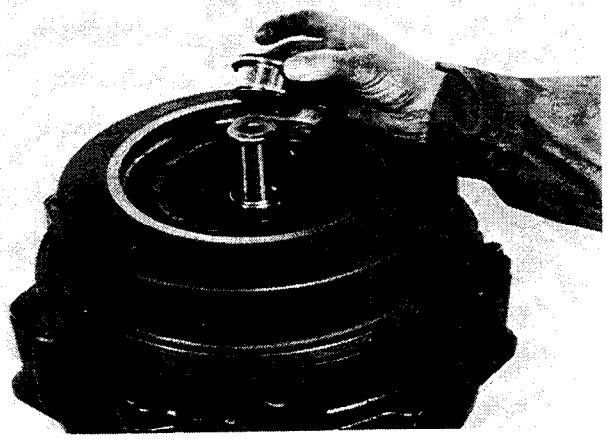

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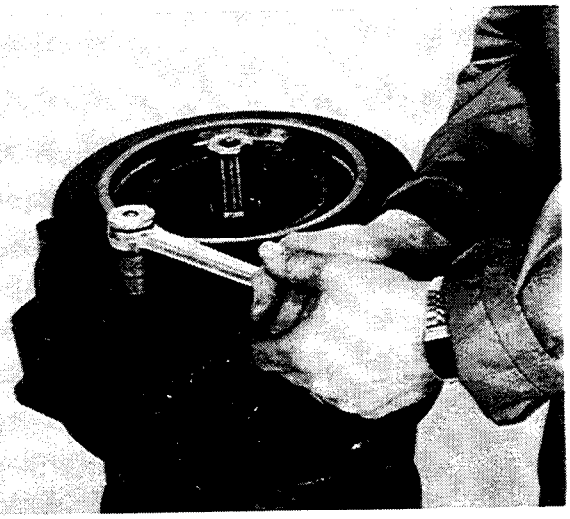

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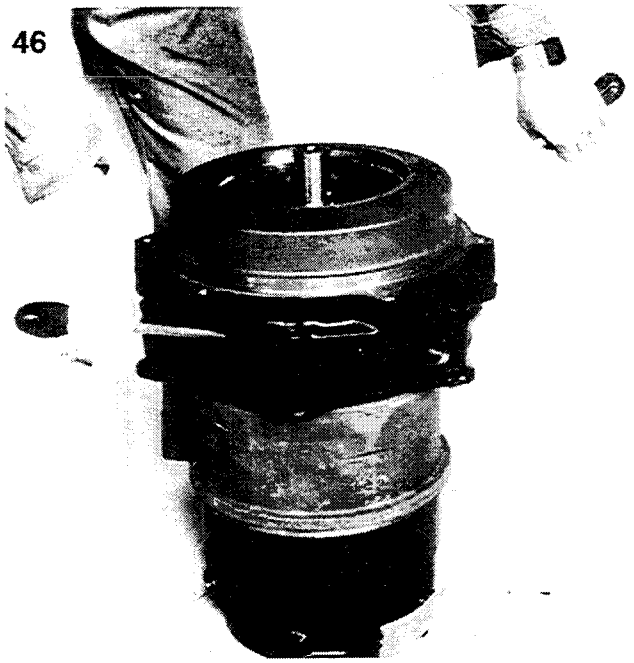

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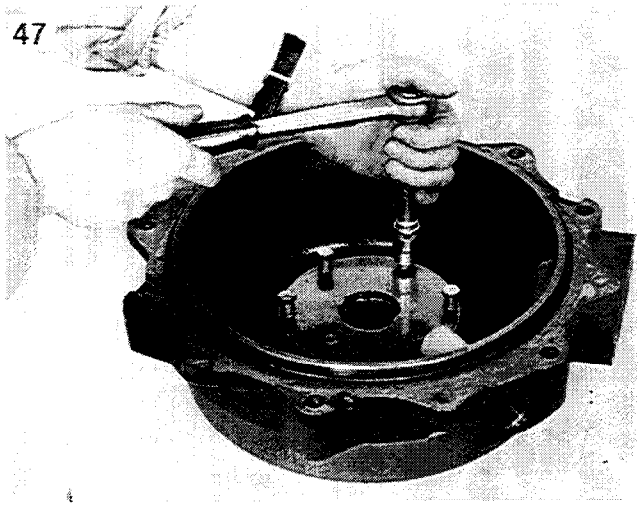

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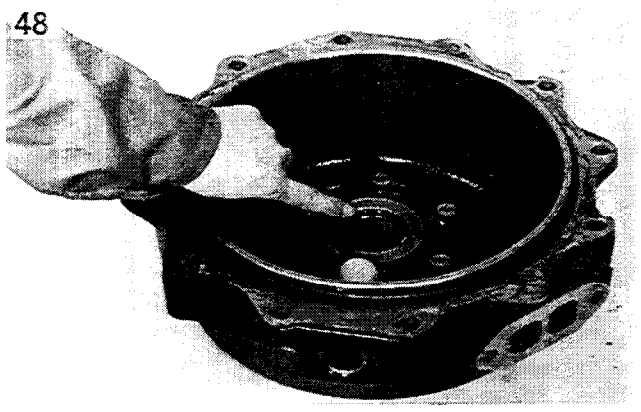

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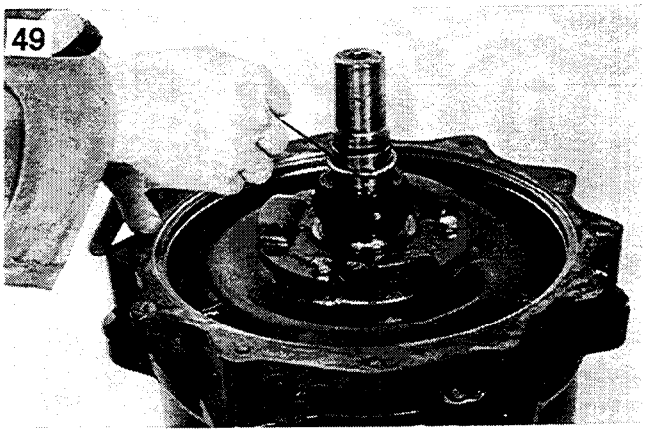

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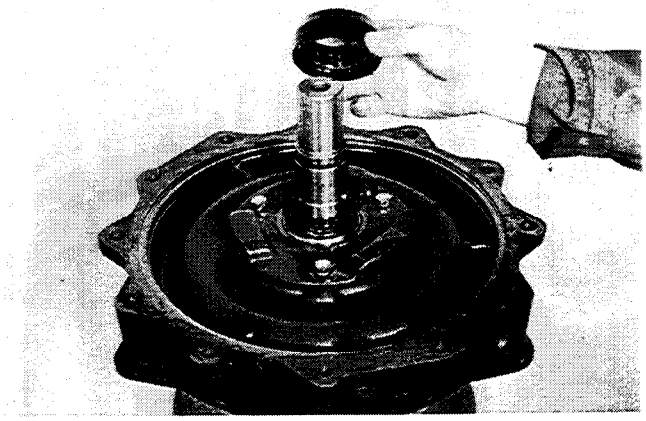

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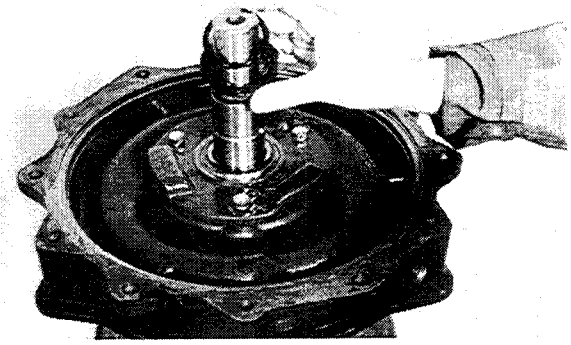

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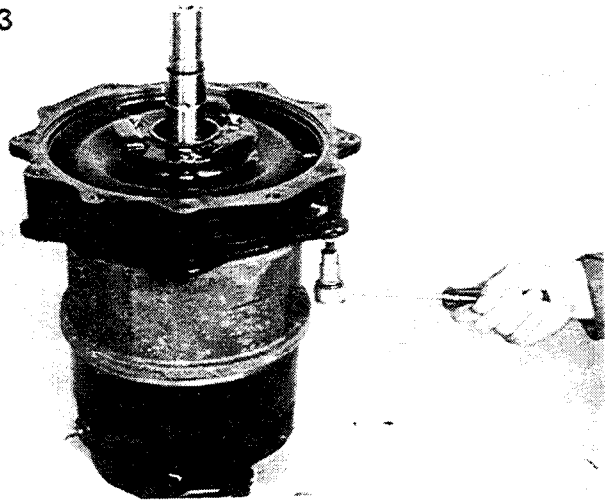

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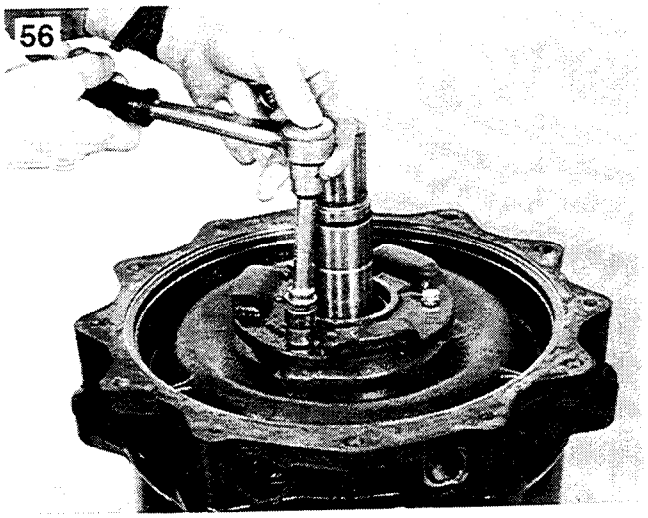

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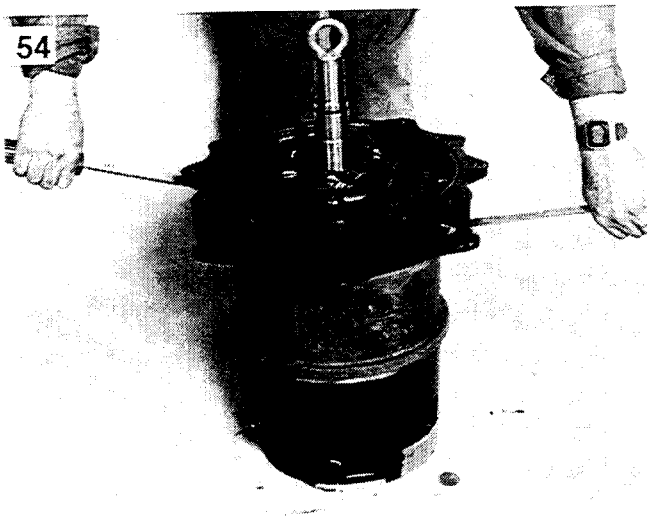

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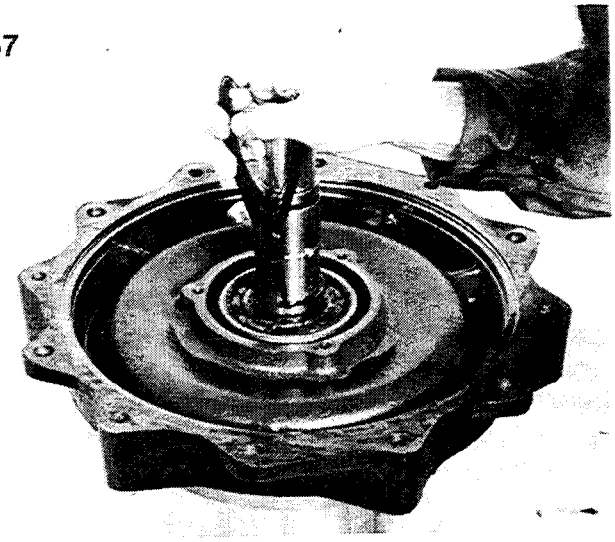

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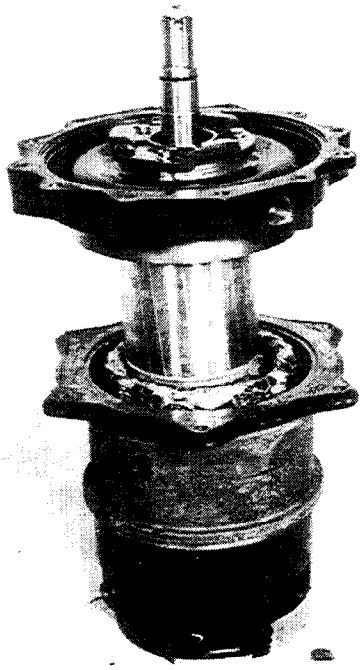

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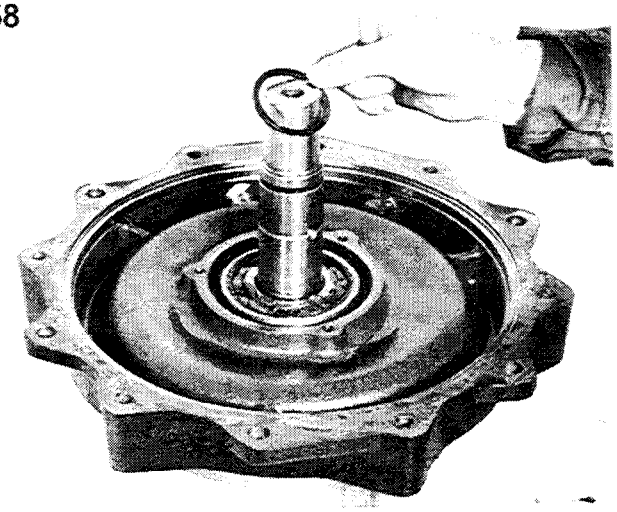

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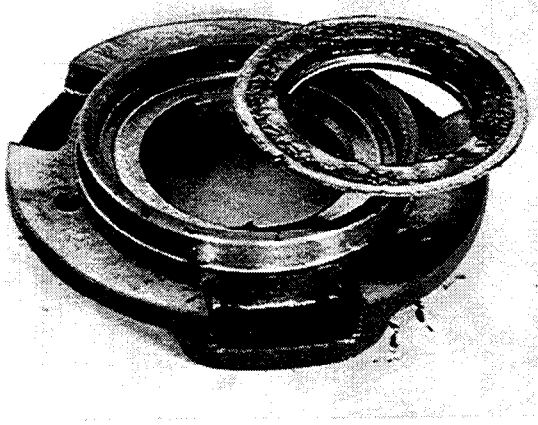

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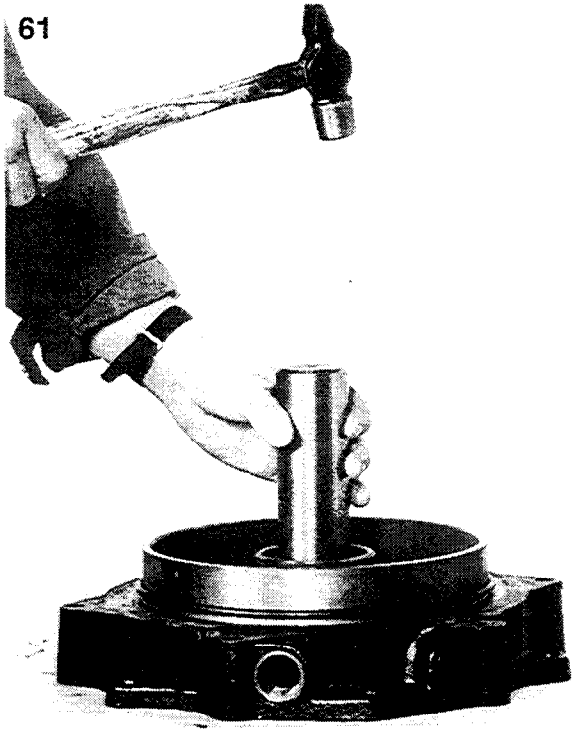

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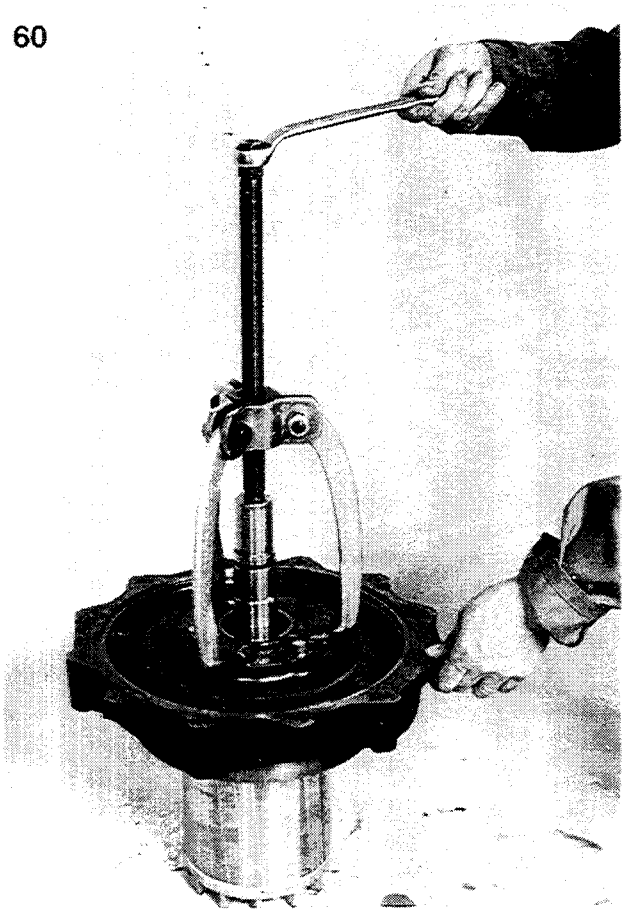

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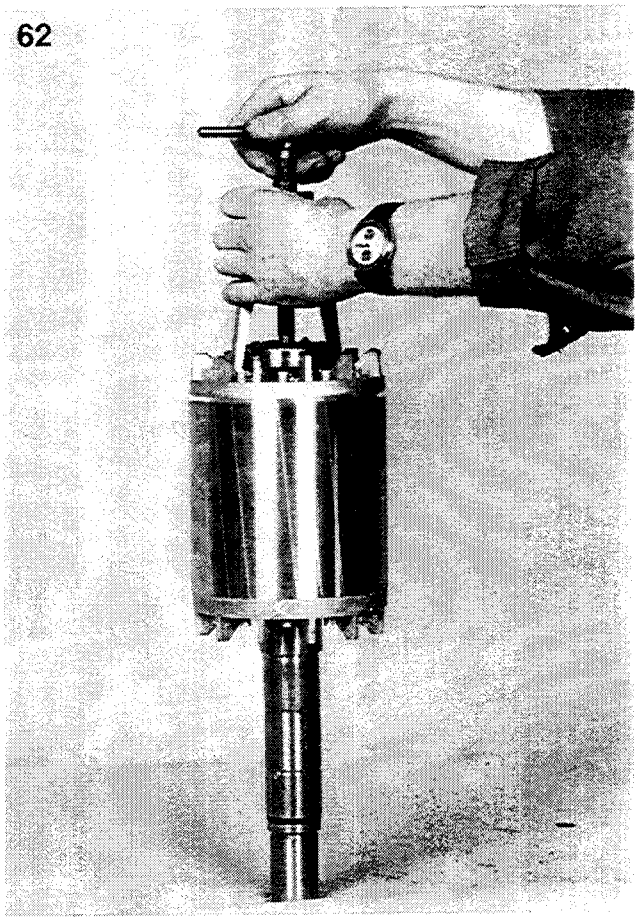

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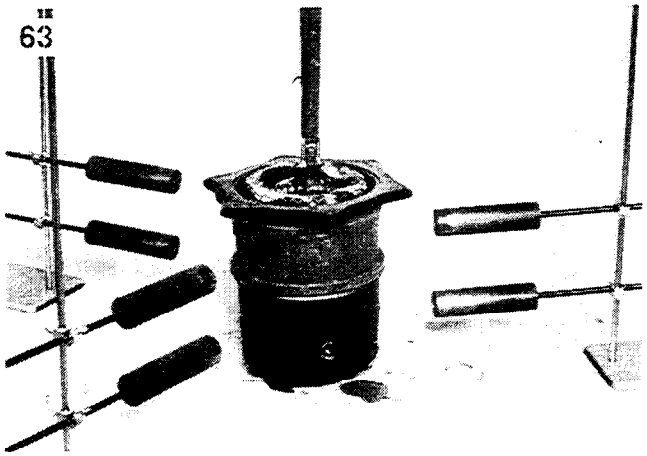

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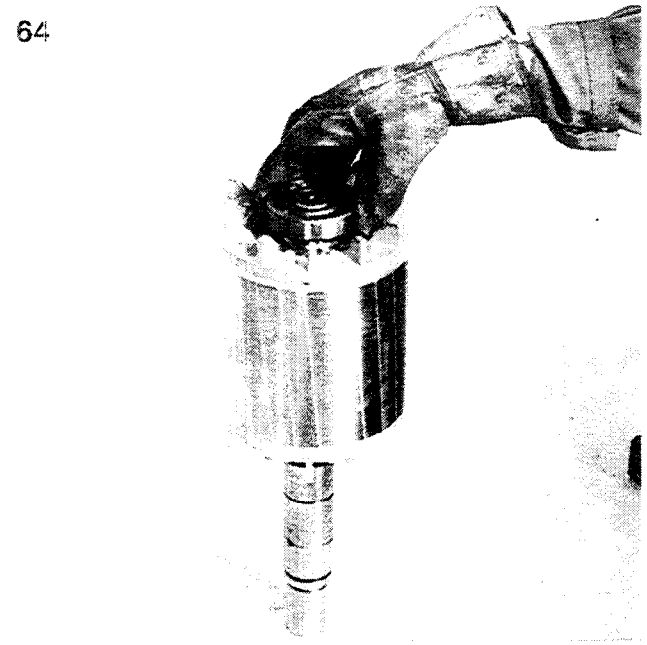

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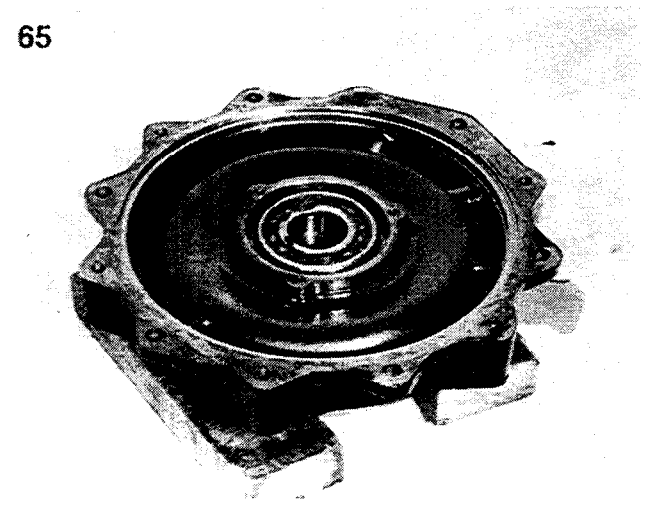

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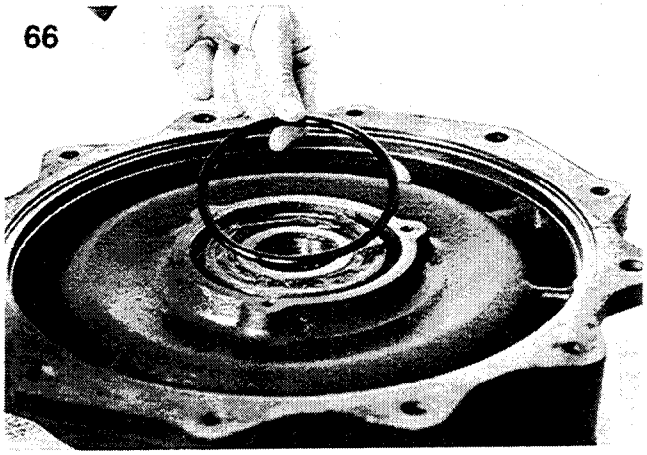

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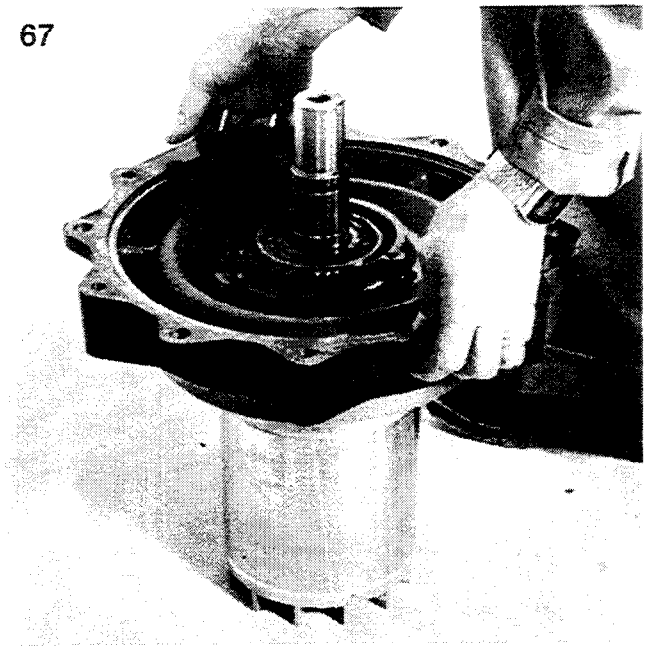

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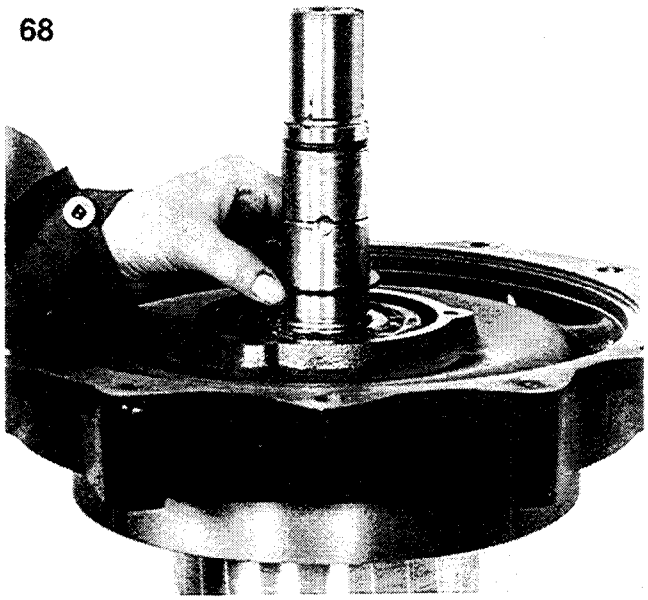

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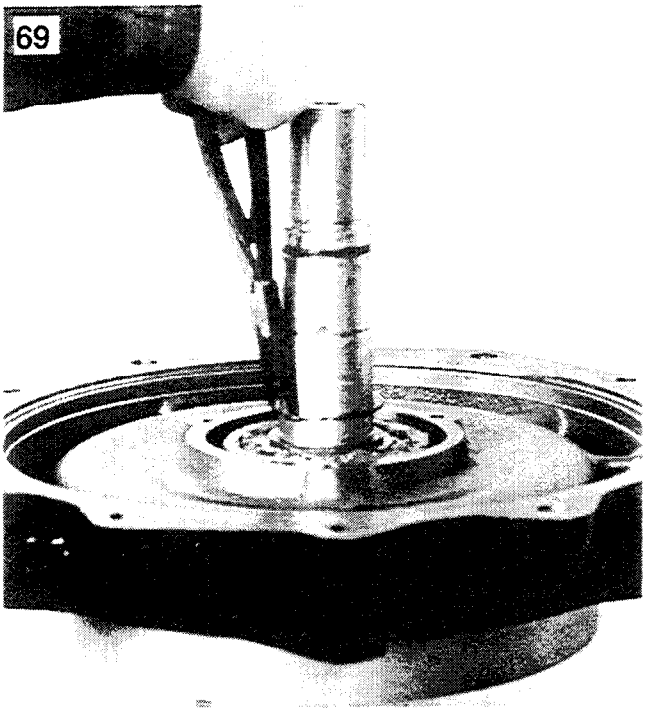

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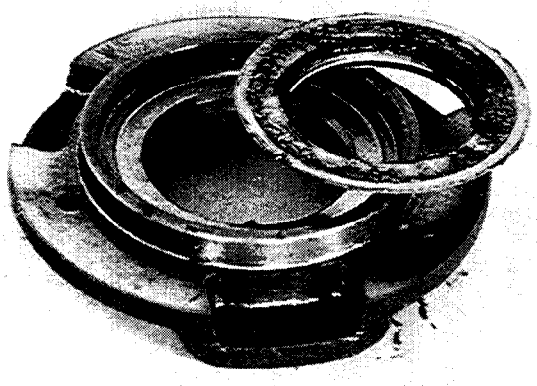

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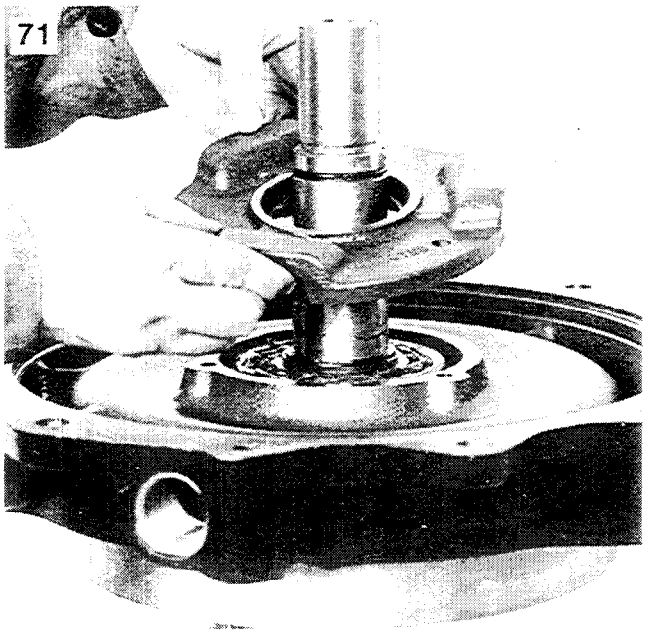

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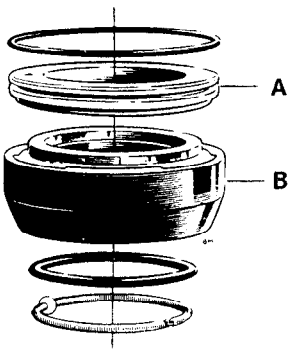

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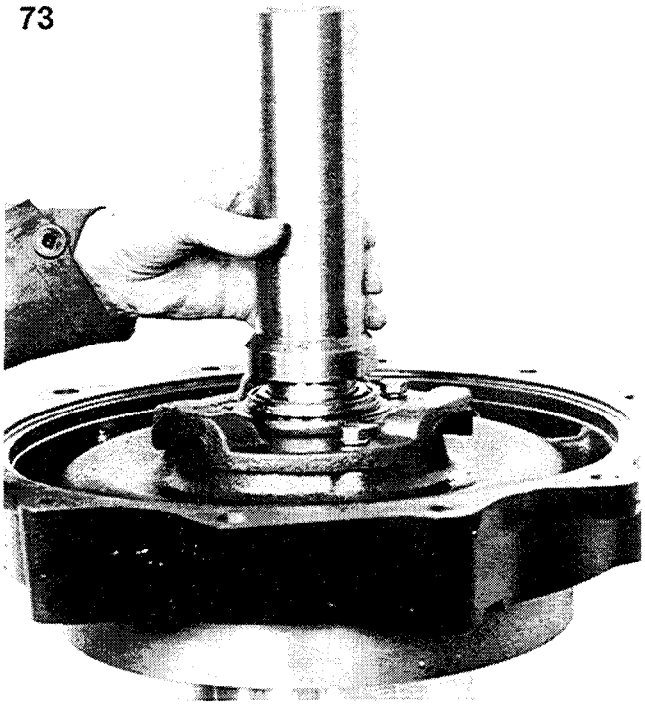

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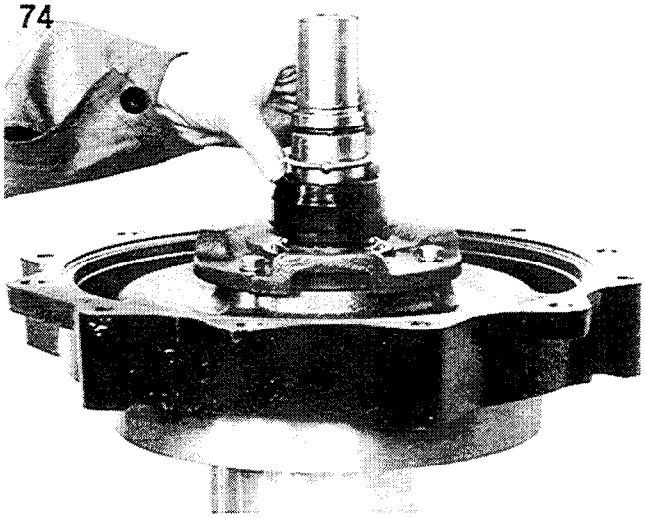

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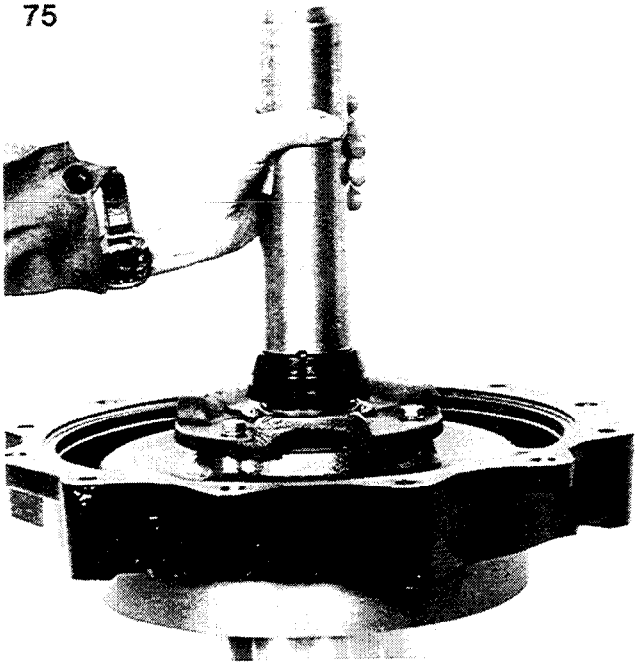

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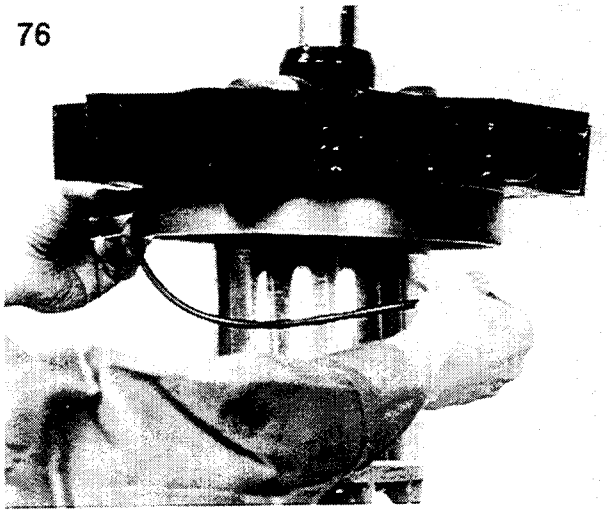

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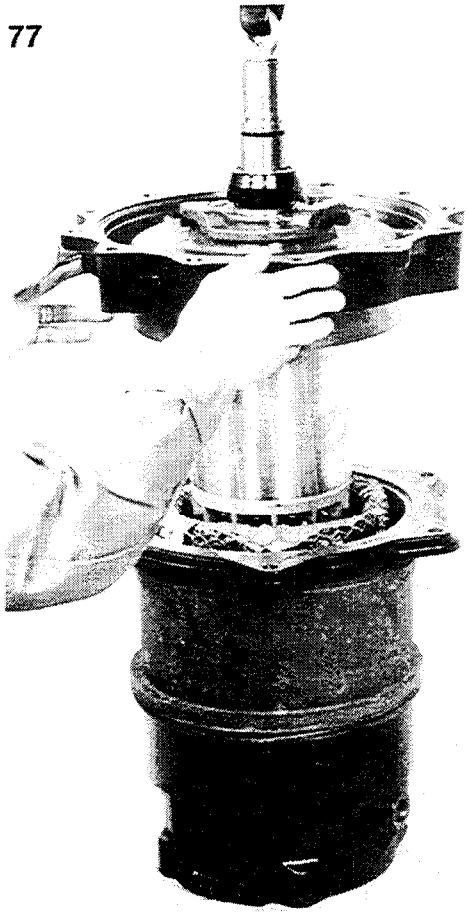

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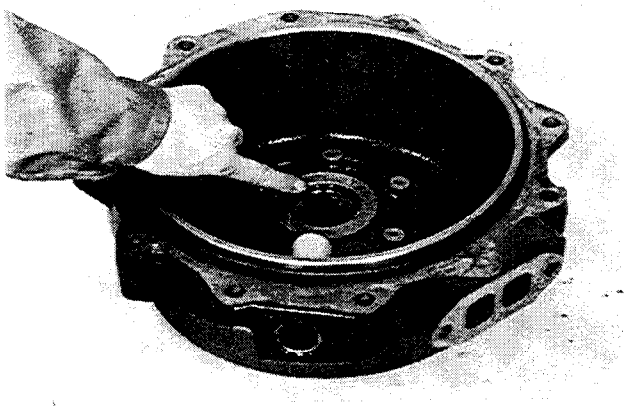

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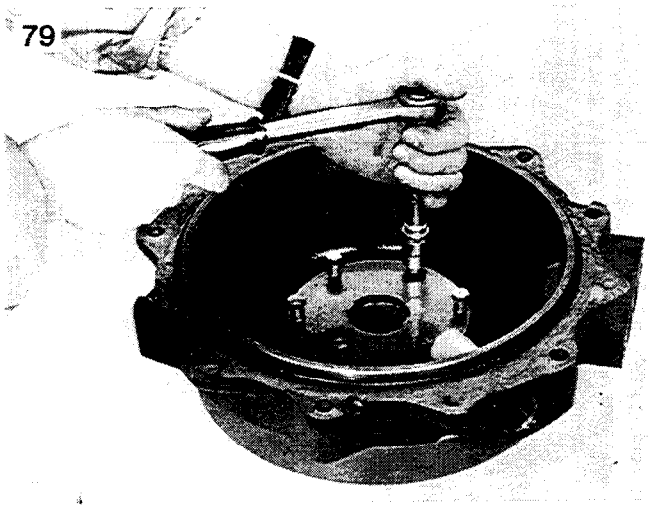

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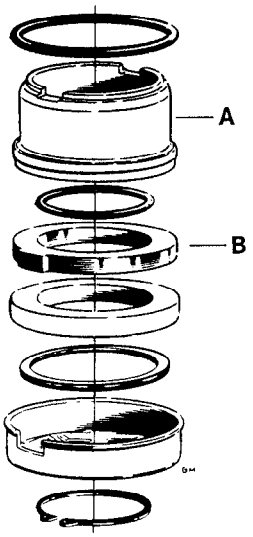

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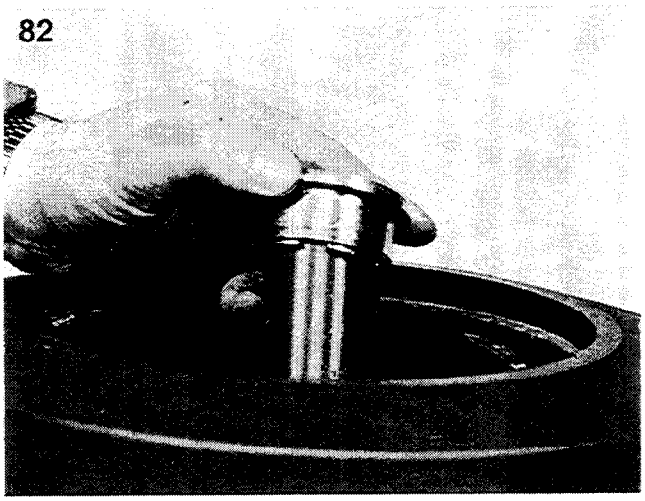

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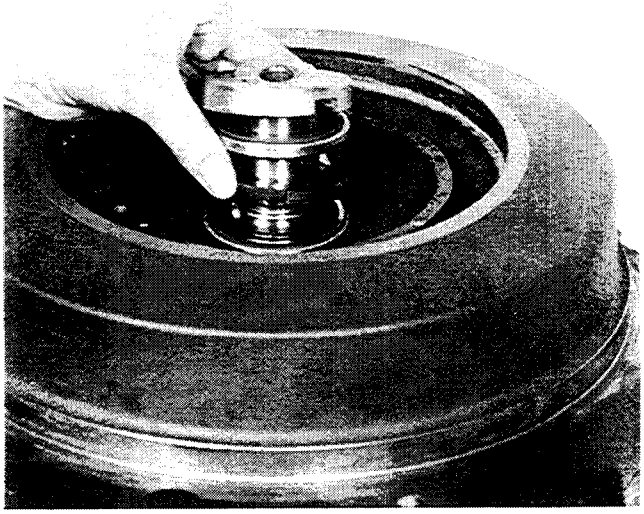

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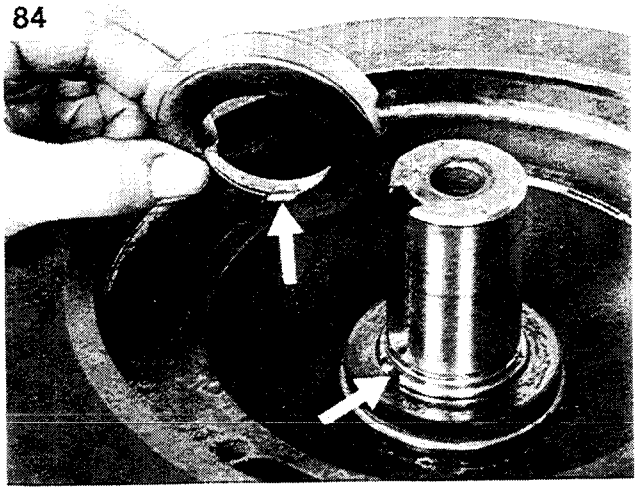

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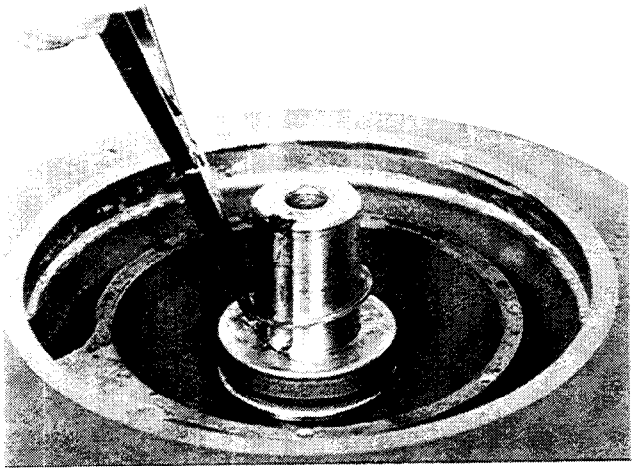

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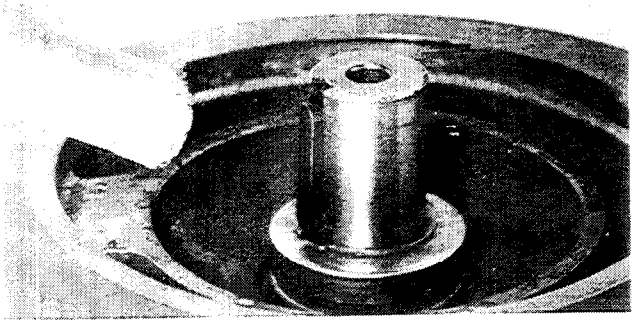

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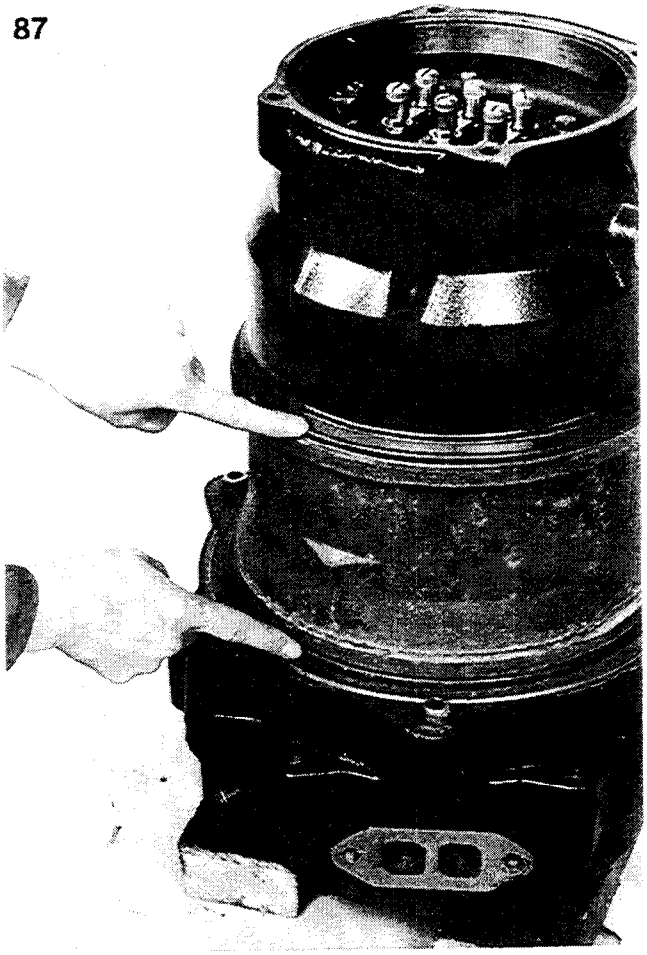

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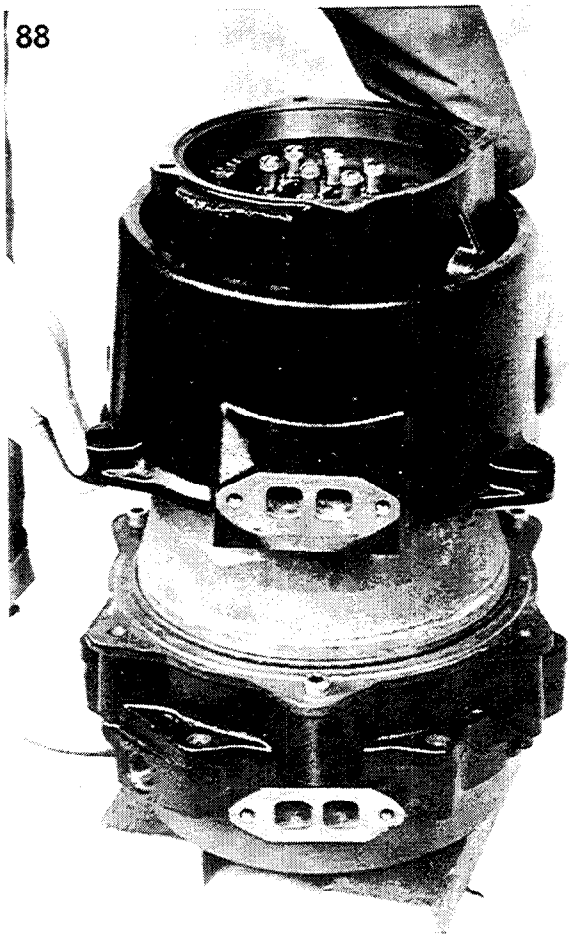

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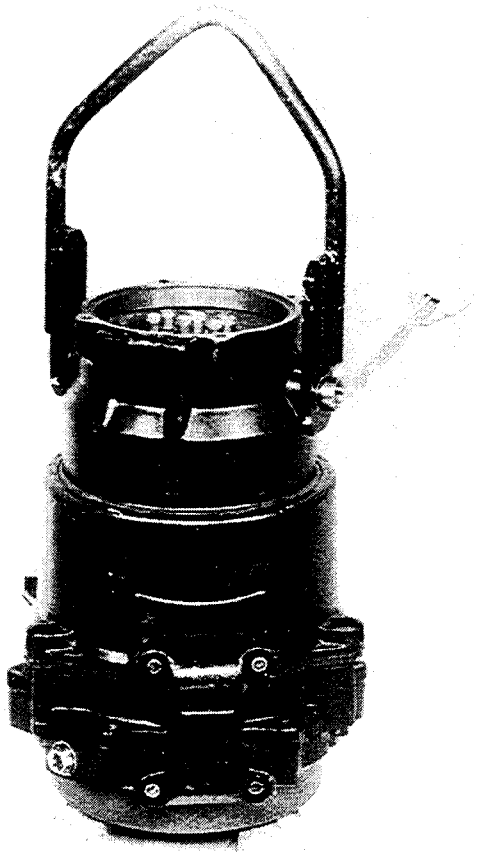

ST

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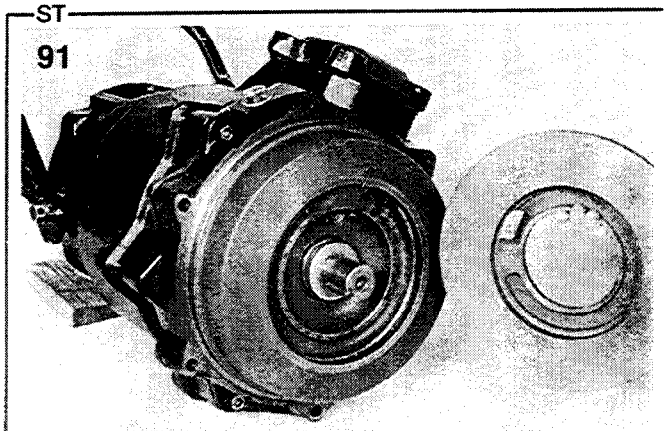

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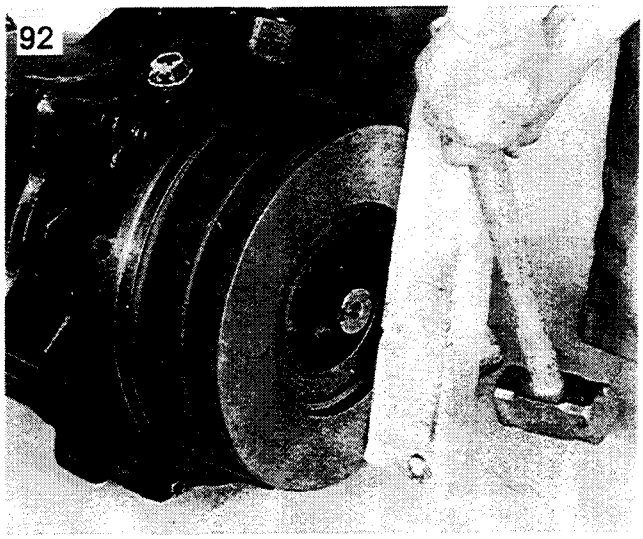

HS

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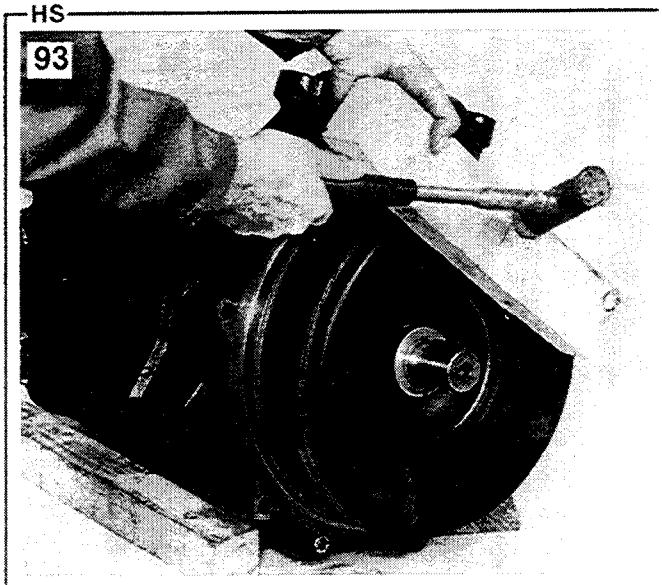

LL, PL

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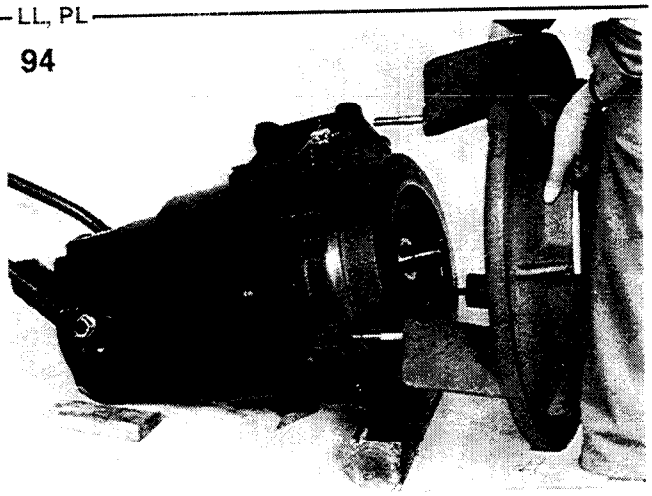

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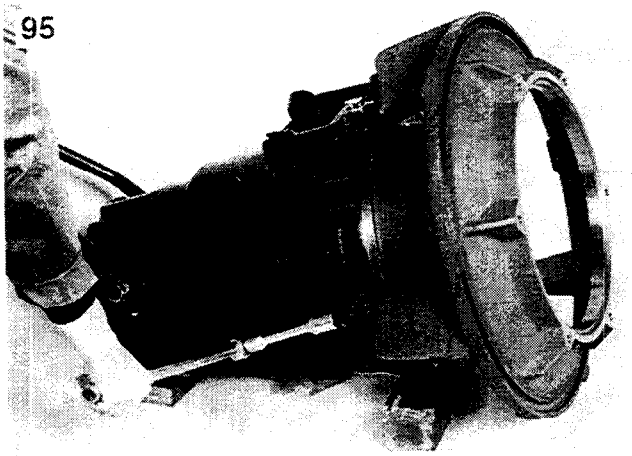

LT, MT, HT

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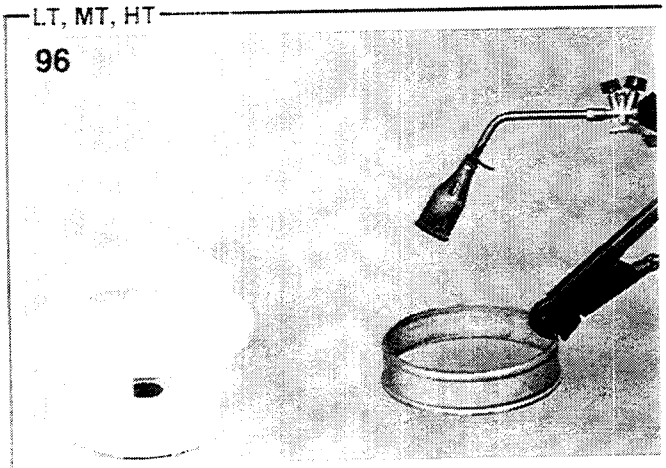

C, D, HS

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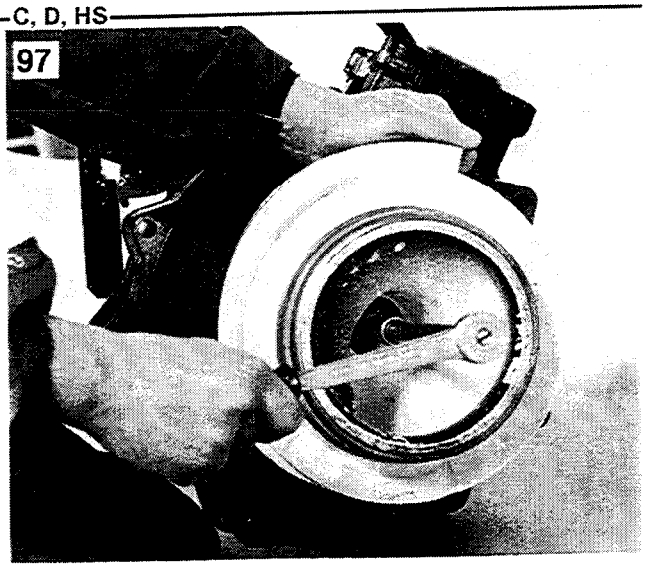

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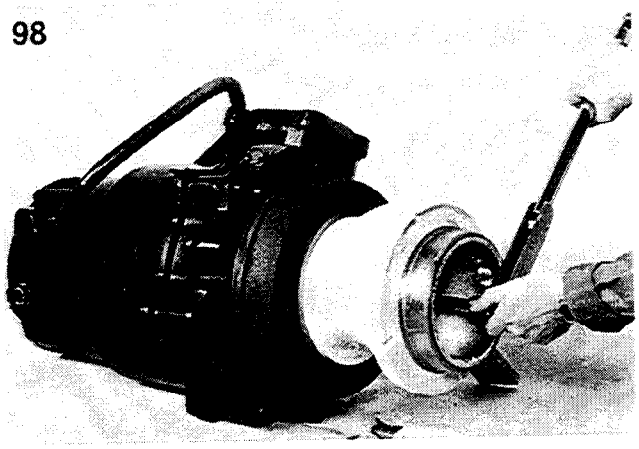

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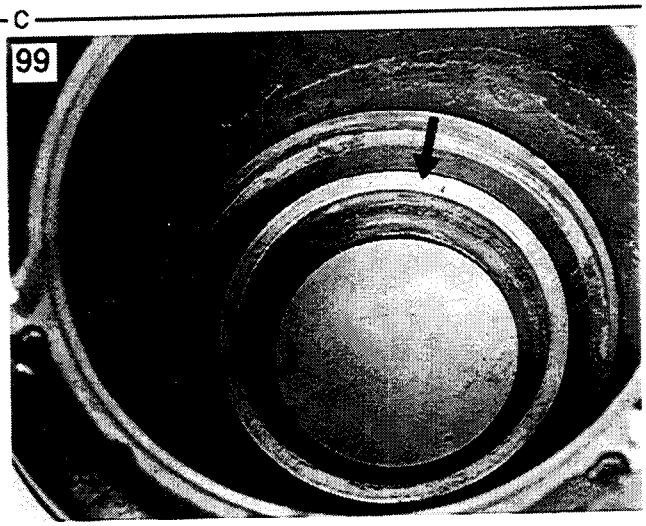

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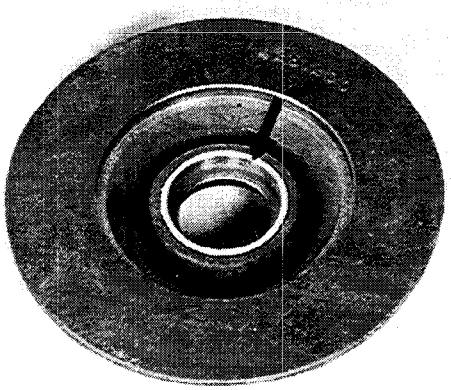

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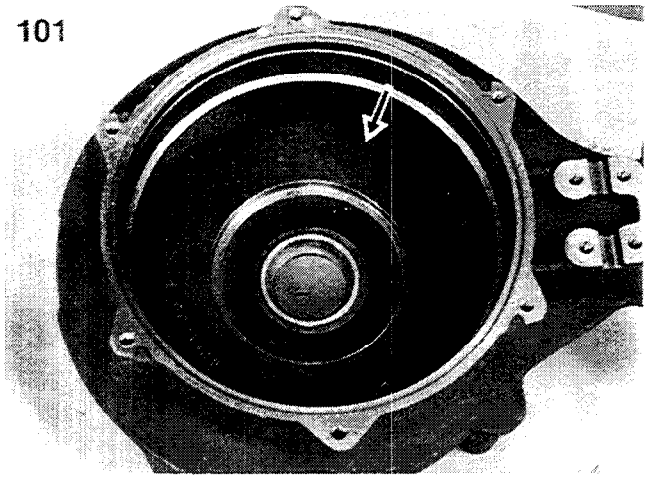

HS

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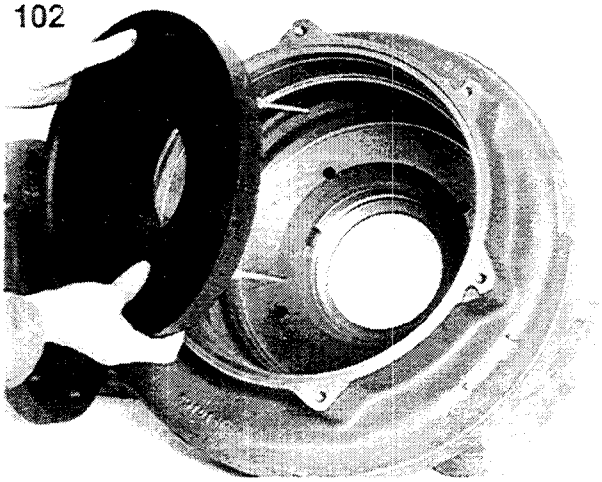

HS

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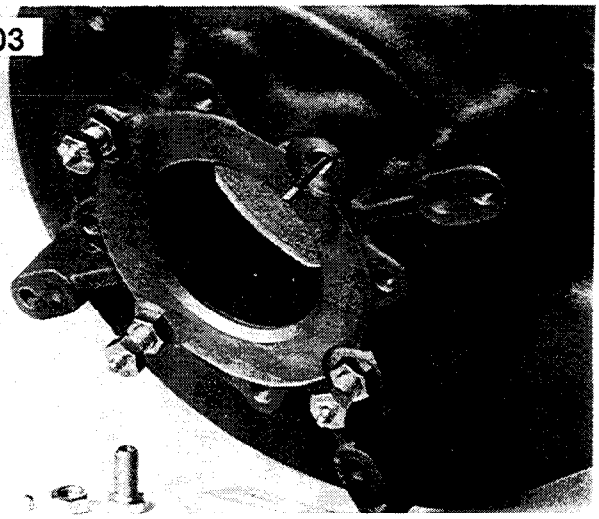
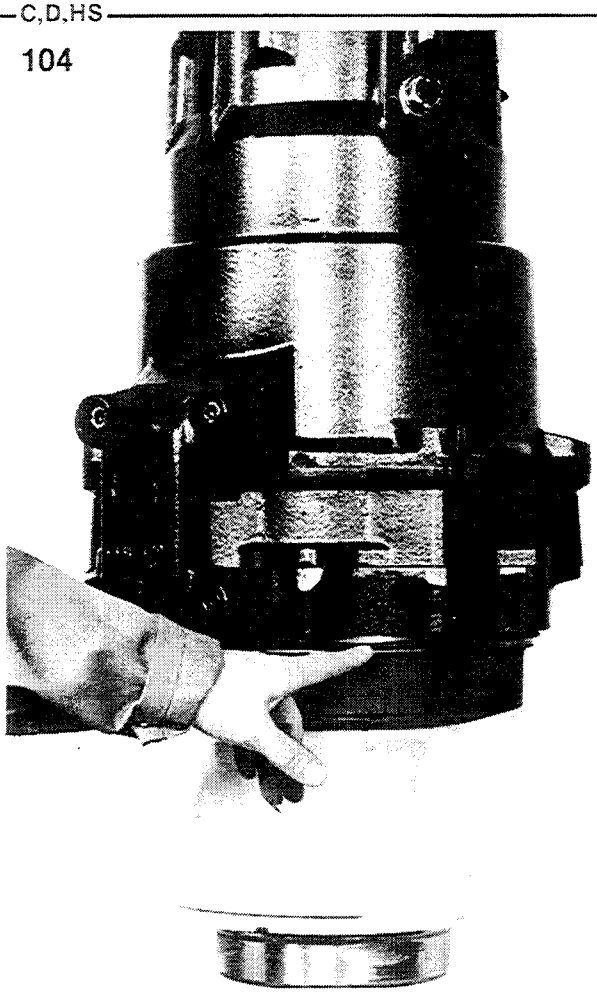


C,D,HS

104



C, D, HS

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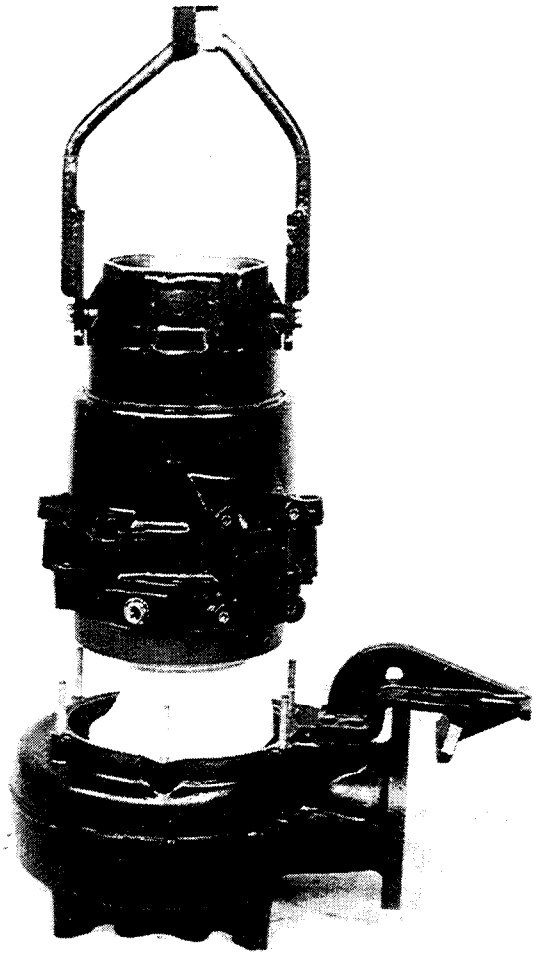

HS

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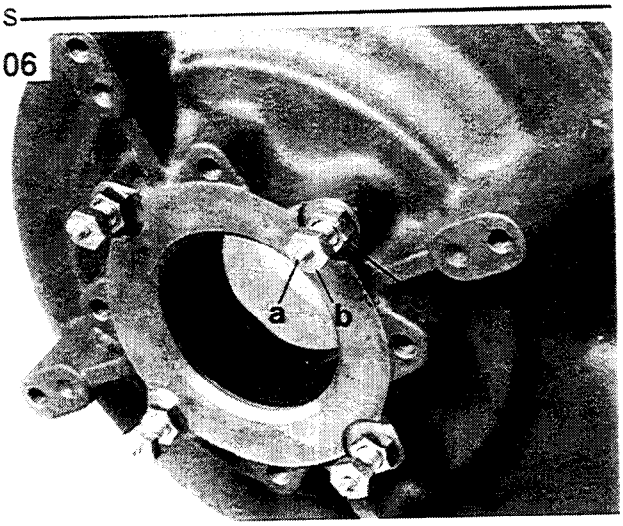

LL

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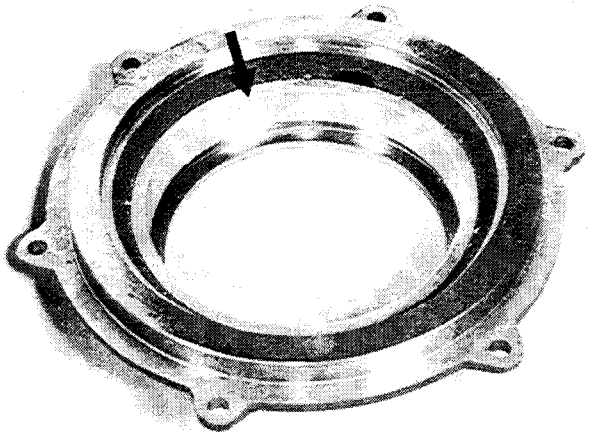

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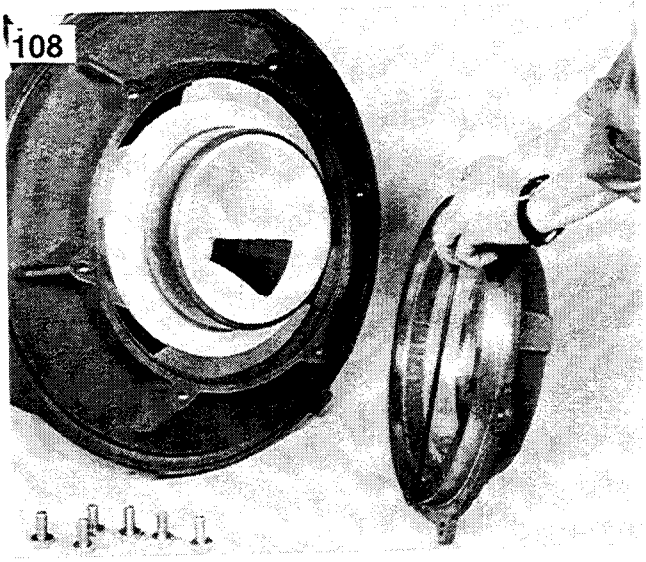

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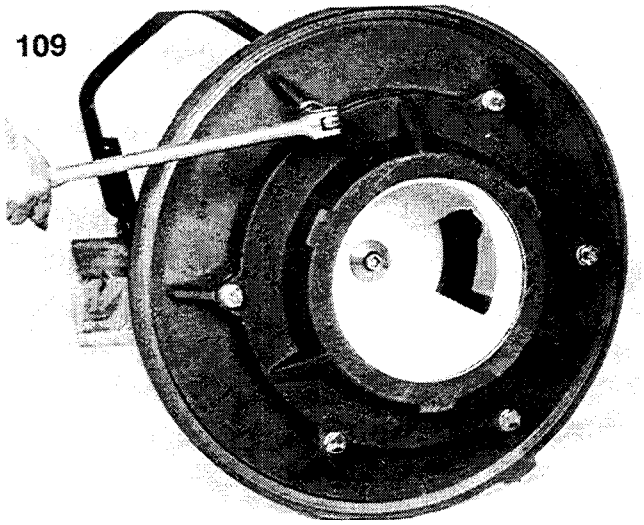

F

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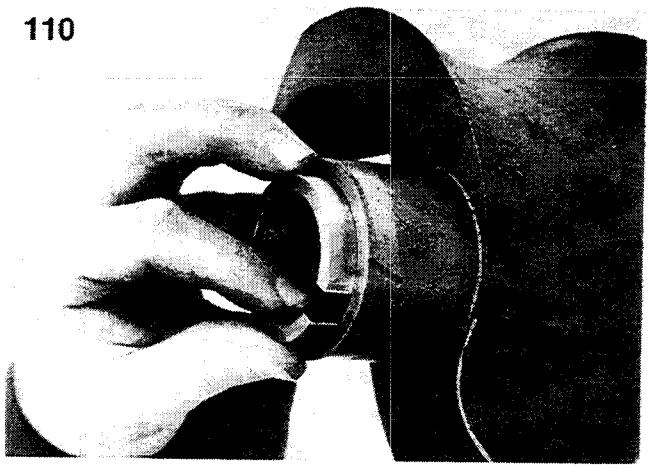

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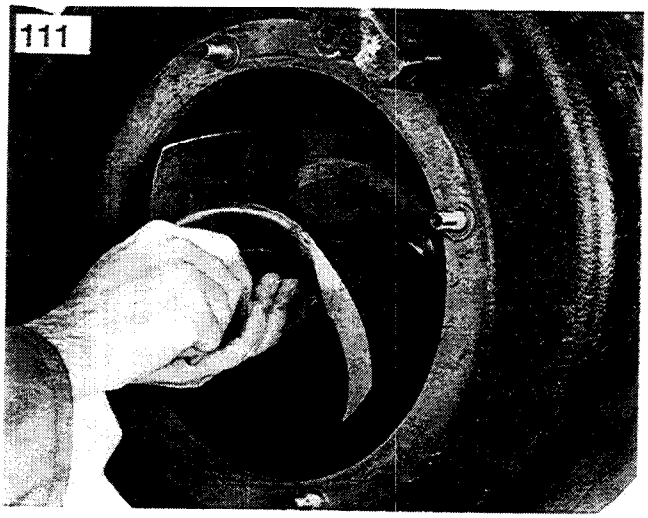

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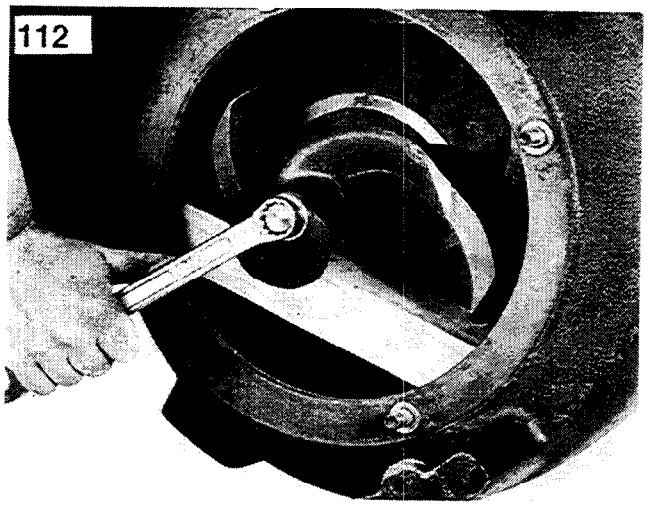

F

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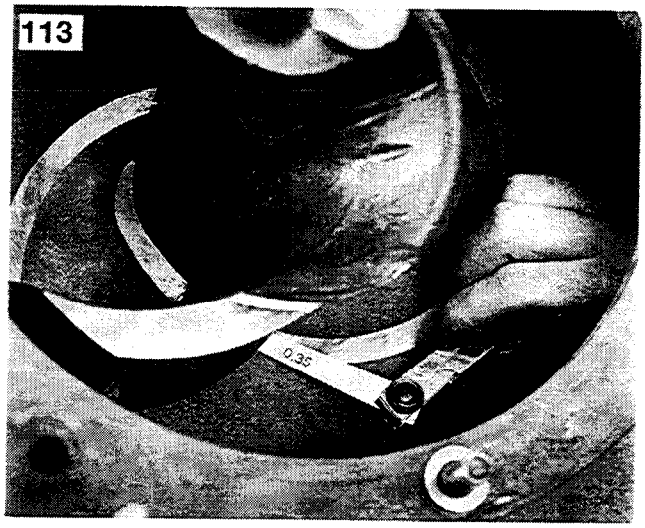

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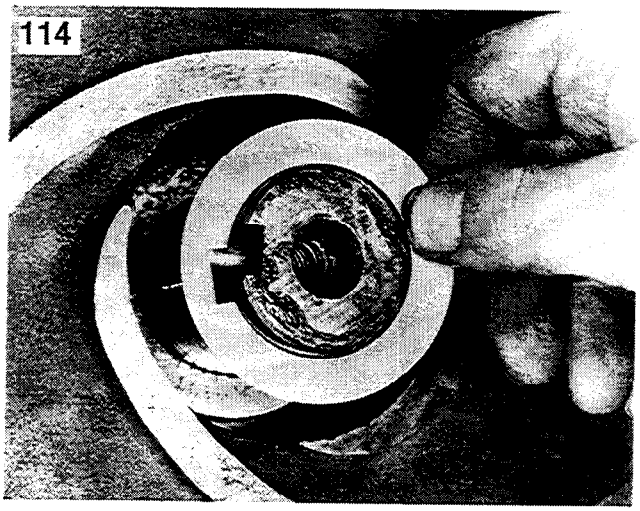

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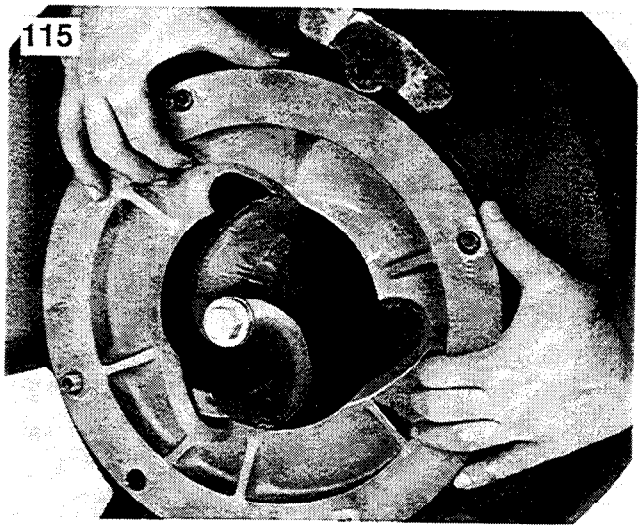

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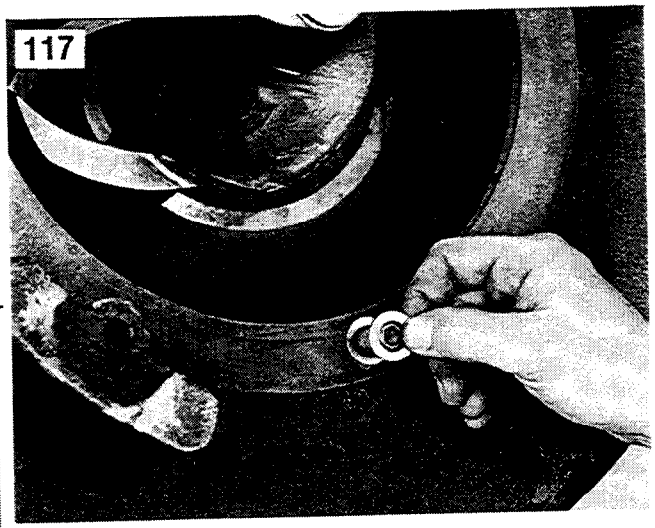

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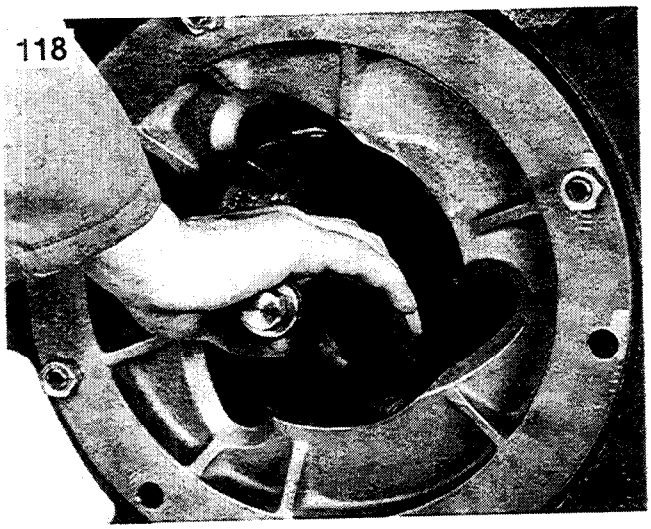

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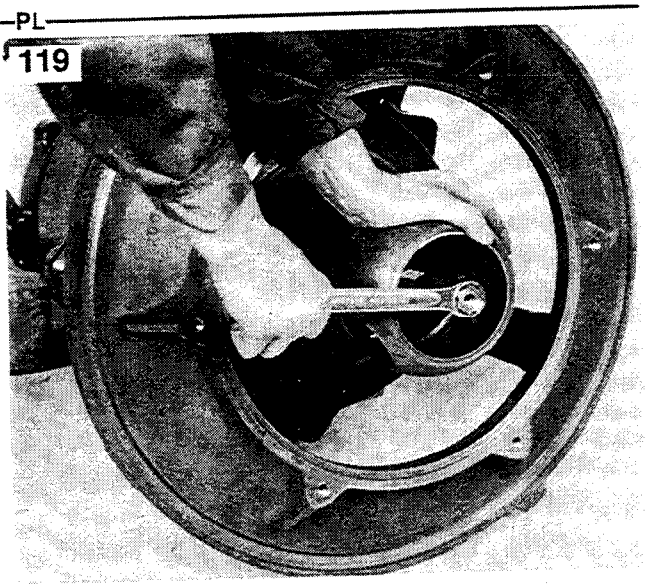

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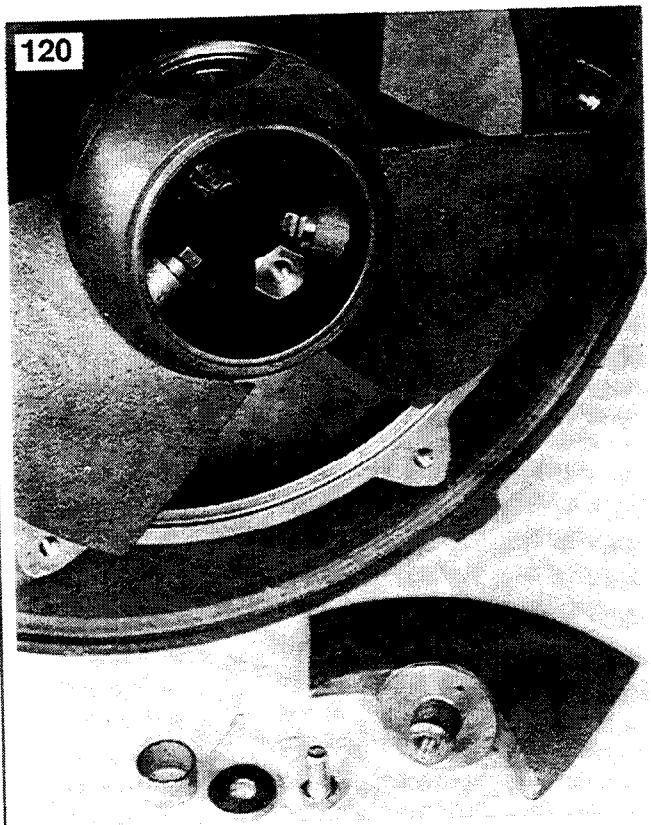

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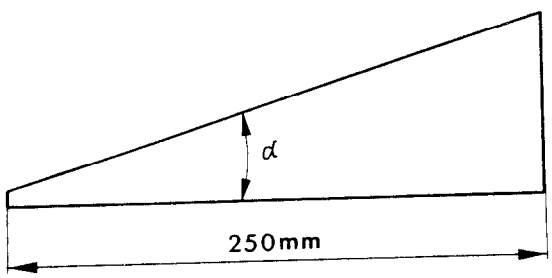

α = 7°, 9°, 11°, 13°, 15°, 17°

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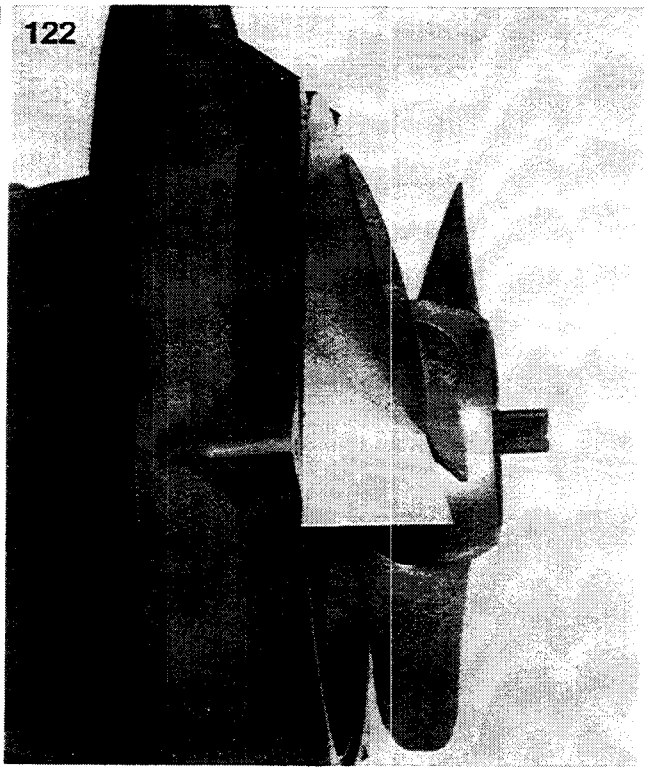

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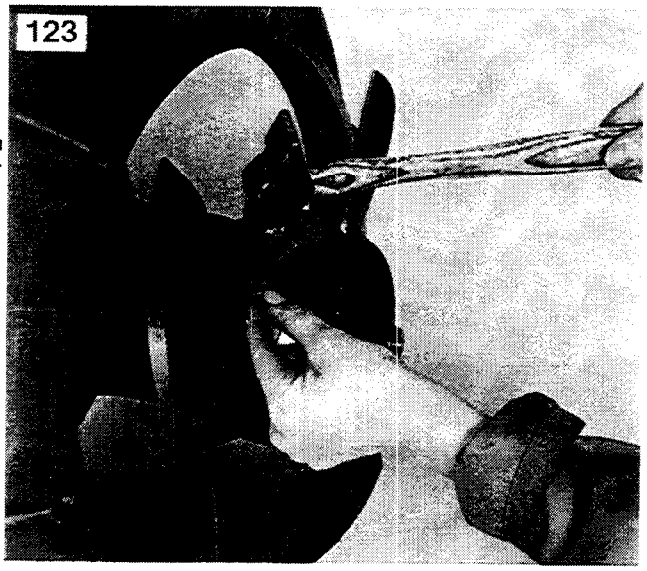

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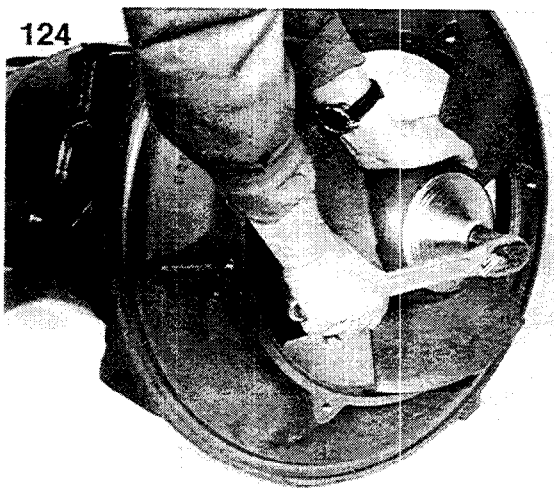

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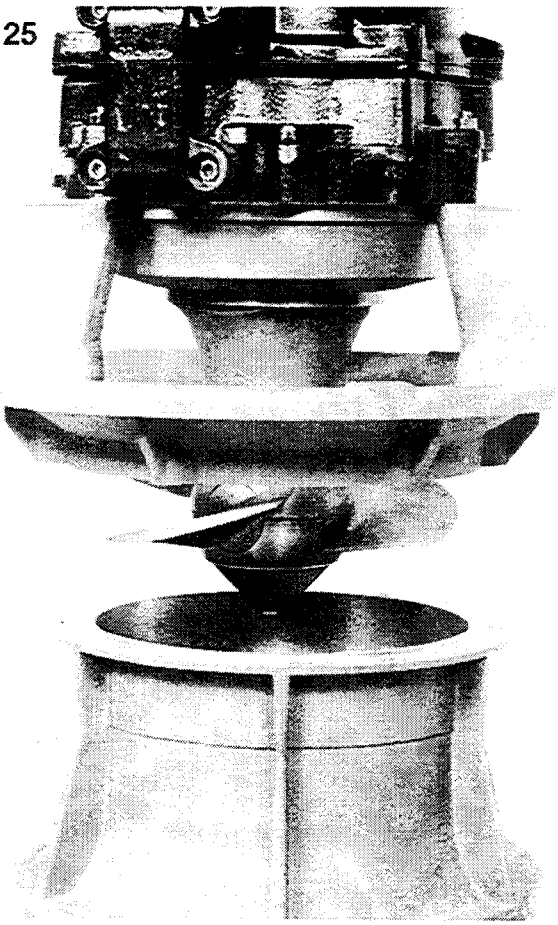

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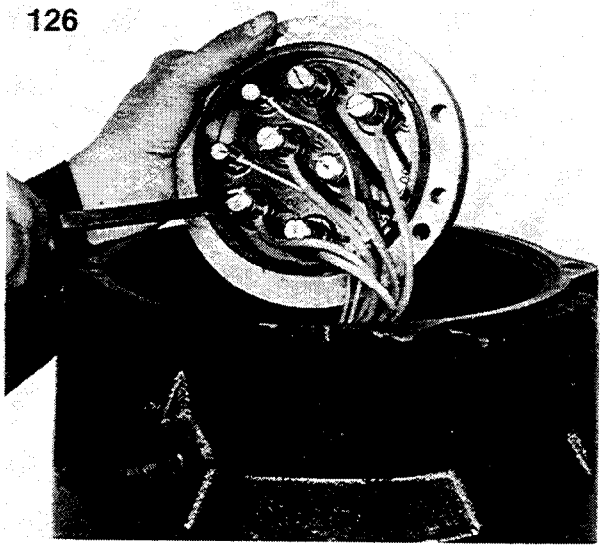

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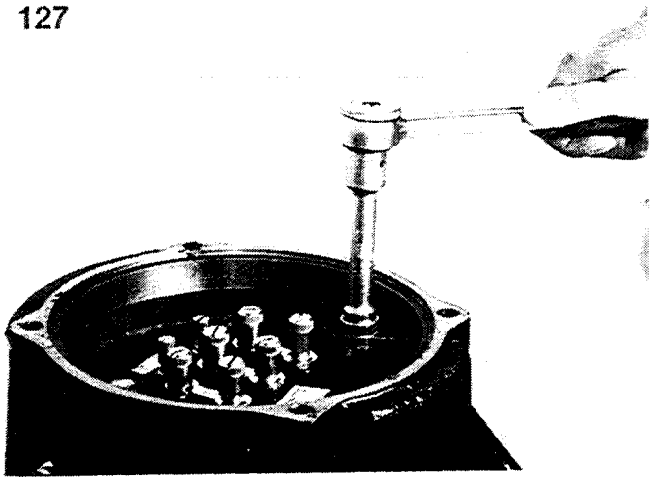

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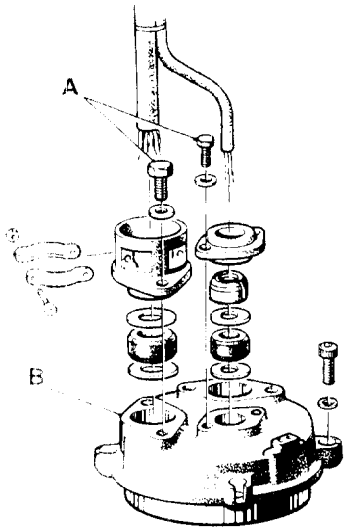

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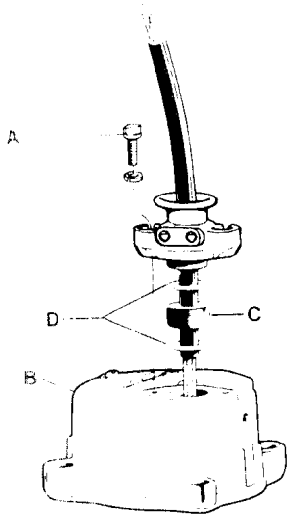

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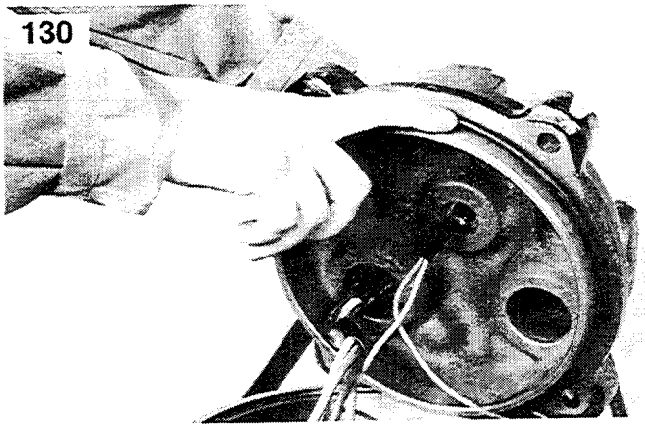

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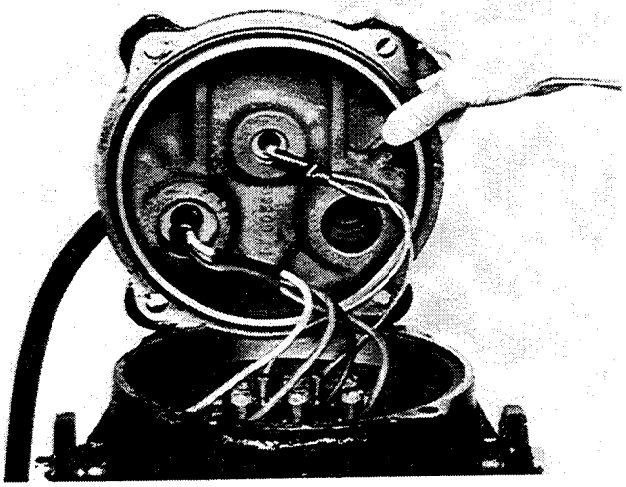

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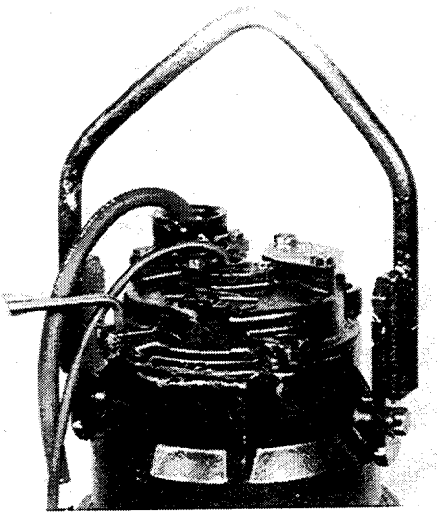

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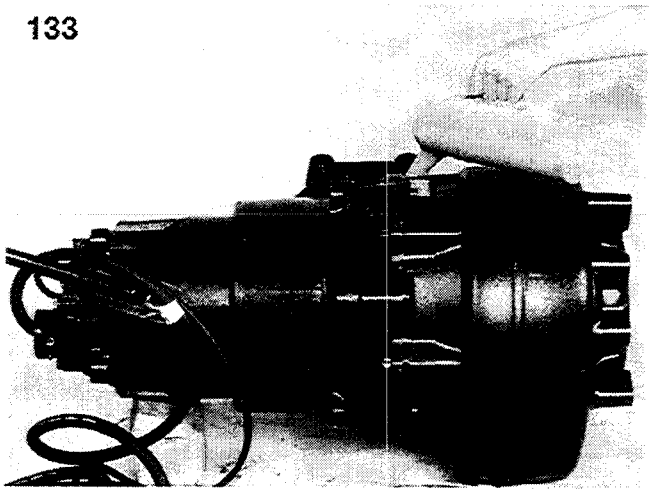

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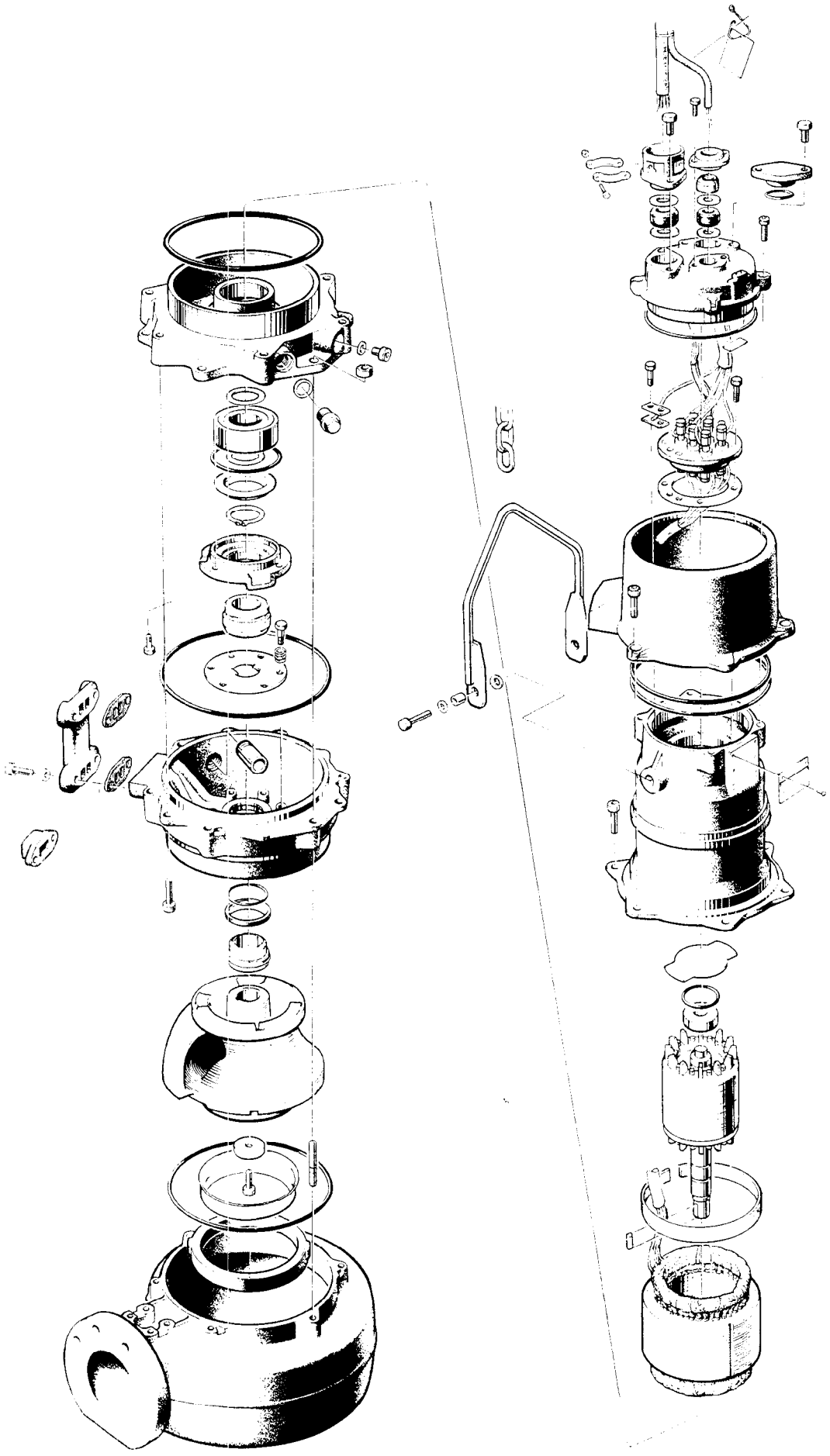

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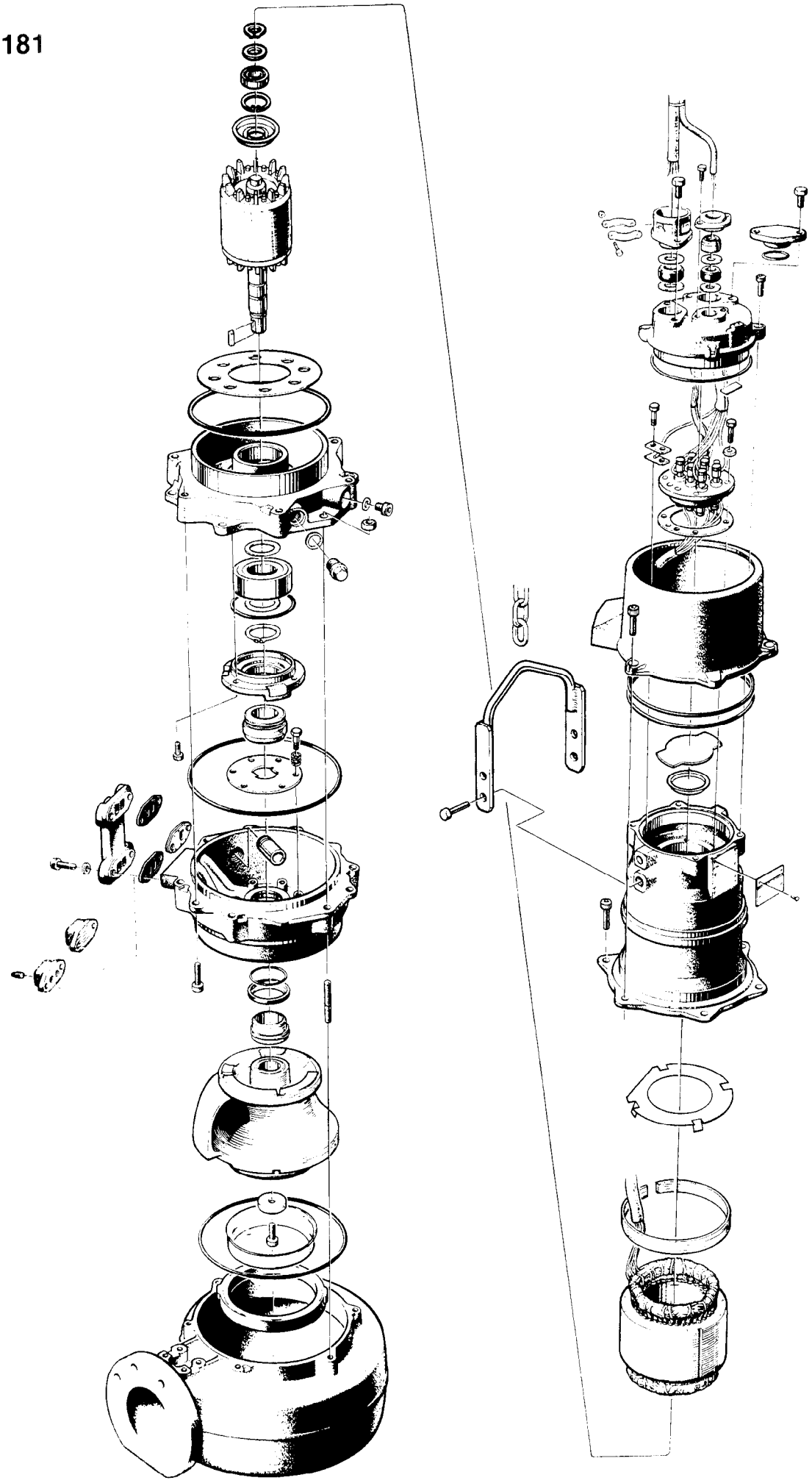

Disassembly

Before starting work on the pump, make sure that all tools, O-rings and any other parts that are to be replaced are on hand.

When different disassembly procedures are used for the different hydraulic units, the procedure for each unit is described.

Basic model: C with standard impeller LT, MT, HT and super-high-head impeller ST
D with vortex impeller
HS with wear-resistant version

Cutter model: F with cutting impeller

Lift model: LL with impeller (LT impeller)
PL with propeller

In order to facilitate subsequent assembly, it is a good idea to note during disassembly how the different parts are assembled in relation to each other and where screws, bolts and O-rings are located. Be careful not to damage threads, O-ring grooves and seals. Be careful not to touch the seal surface.

If the pump is specially approved, certain parts must be handled with particular care, see the section entitled "Specially approved pumps".

1—2 Isolate the pump from the mains power supply. Hang the pump vertically from an overhead travelling crane and lay it on a couple of trestles with the oil hole downwards. Remove the oil casing screw (OIL). The oil will drain more easily if the other oil casing screw located opposite is also removed.

Warning! The oil casing may be under pressure. Hold a rag over the oil hole when undoing the screw.

3—4 Unscrew and lift off the junction box cover. Mark and disconnect the motor cable and control cable leads from the terminal board.

5—6 Disconnect the motor cable and control cable from the junction box cover. Figure 6 shows the Ex version.

7—8 Unscrew the terminal board. Mark and disconnect the stator leads.

C, D, HS

9—10 Remove the nuts for the pump casing. Lift off and lay the motor unit on its side.

LL

11 Lay the pump on its side. Remove the screws and lift off the lower diffuser.

12 Knock the wear ring out of the lower diffuser.

PL

13—14 Remove the screws for the bellmouth. Lift off and lay the motor unit on its side.

Pump casing

C

15 Knock out the wear ring with a chisel.

ST

16 If necessary, knock the lower diffuser out of the pump casing.

17 Knock out the wear ring with a chisel.

HS

18 Lay the pump on its side, unscrew the four cap nuts A and sleeve screws B, incl. the nuts C.

19 Pull out the lower wear protection.

Impeller

C, D, HS

20 Undo and remove the impeller screw and the washer.

21 Pull off the impeller using an impeller puller. See table page 5. Do not prize off the impeller, since it can easily be damaged. In case of a severely worn ST impeller, use protection padding.

ST, HS

22 Remove the upper ring/wear protection, using puller 84 13 62 for ST, 84 13 60 for HS.

LT, MT, HT impeller

23 Knock off the impeller's wear ring. Removal of the wear ring can be facilitated by sawing a slit in the wear ring with a hack saw or by heating the wear ring with an LP gas torch.

F

24 Undo the nuts and remove the cutter.

25 Undo the screw for the impeller. Prevent the impeller from turning by inserting a piece of wood through the pump outlet. If the screw has broken, it is held in the impeller by an O-ring. Pull out the screw.

26 If the sleeve remains in the pump, take it out with a screwdriver.

27 If the sleeve remains on the motor shaft, insert an M12 screw to protect the shaft journal thread. Pull off the sleeve with a jaw puller.

28 If the impeller is not damaged or very worn, remove any remains of the shear pin.

29 Check that the sleeve is not damaged. Remove the remains of the shear pin.

Raise the pump upright. Undo the screws to the pump casing, lift off the motor unit. See figure 10. Remove the casing cover from the pump casing.

Propeller

PL

30 Unscrew the screw. Remove the nose cone.

31 Unscrew the propeller nut, remove the washer, screw back the propeller nut.

32 Remove the propeller blades.

33 Pull off the propeller hub. Use puller as specified in table on page 5. Do not prize off the hub, since it may easily be damaged.

LL, PL

34—35 Block up the motor unit so that the diffuser is above the floor. Unscrew the nuts and lift off the diffuser.

36—37 Remove the handle and discharge pipe.

38 Undo the screws and remove the cooling jacket. Fit a couple of eyebolts in the holes for the handle and turn over the motor unit.

39 Knock out the key.

40 Remove the circlip.

41—42 Remove the rotating seal ring. Use tool 216 68 00.

43—44 Carefully loosen the stationary seal ring. Use tool 216 68 00 or a pair of screwdrivers and carefully prize up the seal.

45—46 Undo and lift off the oil casing bottom. Use the prizing grooves between the stator casing and the oil casing bottom.

47 Remove the screws, springs and washer.

48 Knock off the wear protection in the oil casing bottom.

49 Press down the rotating seal assembly and remove the tension spring with tool 332 91 00.

50—51 Remove the rotating seal assembly and its O-ring.

52 Carefully prize up the stationary seal assembly and its O-ring with tool 216 68 00 or a couple of screwdrivers.

Bearing and motor

53—55 Undo the screws between the stator casing and the oil casing. Lift off the oil casing, including the rotor unit. Use the prizing grooves between the stator casing and the oil casing.

56—58 Remove the cover. Remove the circlip and O-ring.

59 Carefully knock the washer out of the cover. Put back the cover.

60 Apply puller 84 13 62 to the cover. Pull off the bearing housing, including ball bearing.

61 Remove the cover. Knock the ball bearing out of the bearing housing using a suitable sleeve.

62 Apply puller 84 20 48 and pull off the support bearing.

63 Apply tool 394 69 00 to the stator. Lift the stator, including stator casing, about 10 mm from the floor. Heat the stator casing rapidly to about 150° (300°F) with an LP gas torch until the stator comes loose. Lift out the stator.

Assembly

This section is organized in the same manner as the disassembly section.

When different procedures are used for assembling the different hydraulic units, they are described for the different variants.

Basic model: C with standard impeller LT, MT, HT and superhigh-head impeller ST
I with vortex impeller
HS with wear-resistant version

Cutter model: F with cutting impeller

Lift model: LL with impeller (LT)
PL with propeller

Always replace O-rings and worn parts. Clean threads and O-ring grooves. Grease screws and smear O-rings with oil.

Do not touch or scratch the seal surfaces.

63 Check the stator's winding resistance. Apply tool 394 69 00 in the stator. Heat the stator casing to about 150° C (300°F). Lower the stator into the stator casing. There is a pin that prevents the stator from rotating; make sure that it fits into the groove in the stator casing. IMPORTANT! If the stator has been rewound, voltage testing shall be carried out in accordance with local regulations.

64 Heat the support bearing to about 100°C (210°F) by means of bearing heater 400 29 01 and a hot plate. Put the bearing in place with its rubber gasket towards the rotor. Apply 50 g of grease in and around the bearing. Should preferably be done before the rotor assembly is installed in the stator casing.

65 Heat the bearing housing or cool the bearing. Put the bearing in place.

> If the pump is specially approved, the gap between the bearing housing and the stator casing and between the bearing housing and the shaft shall be measured as described in the section "Specially approved pumps" on page 6.

66—67 Heat the bearing in the bearing housing to about 100°C (210°F) by means of bearing heater 400 29 02 and a hot plate. Put the inner protective washer on the shaft. Place the O-ring around the bearing, fit the bearing housing including bearing on the shaft. Make sure that it is firmly seated. Apply 50 g of grease in and around the bearing.

68—69 Place the outer protective washer on the shaft. Put the circlip in place.

70 Fit the washer in the cover.

71 Fit the cover.

72 **Inner mechanical seal assembly.** A = Stationary ring. B = Rotating ring.

73 Oil the seal surfaces. Press down the stationary seal ring, including the O-ring, into its seat using an assembly sleeve.

74—75 Place the rotating seal assembly and the tension spring on the shaft. Make sure that the slot in the shaft, the slot in the seal assembly and the ball are aligned. Press down the seal assembly and the tension spring so that it is fixed in the right position. Use assembly sleeve 398 22 00.

76 Put the O-ring in place. Apply 50 g of grease in and around the support bearing if this has not been done during assembly of the bearing.

77 Lift in and fit the rotor assembly in the stator casing.

> If the pump is specially approved, the gap between the stator casing and the bearing housing shall be measured as described in the section "Specially approved pumps", page 6.

Oil casing bottom

78 If the wear protection has been removed, make sure that the seat is clean. Carefully tap a new wear protection in place. Make sure that it is positioned in the bottom of its seat.

79 Fit screws and washers in the oil casing bottom. Make sure that the screws do not break when they are tightened all the way down.

80 Put the O-ring in position. It is supposed to seal between the oil casing bottom and the stator casing. Fit the oil casing bottom.

81 **Outer mechanical seal assembly.** A = Stationary ring. B = Rotating ring.

82 Fit the O-ring that seals against the oil casing bottom. Fit the stationary seal ring. Make sure that the slots are aligned.

83—84 Fit the rotating seal ring and the O-ring. Make sure that the slot in the seal ring is aligned with the pin on the shaft. Hold the rotating seal ring together while putting it in place with your thumb and index finger, since the silicone ring may be difficult to keep in place during assembly.

85 Fit the circlip. Press down the seal assembly in its seat while fitting the circlip in its groove with the aid of assembly sleeve 398 57 00.

86 Carefully tap the key in place. Turn over the motor unit and stand it on a couple of boards so that the shaft doesn't touch the floor.

87 Fit the O-rings that seal against the cooling jacket.

88 Fit the cooling jacket. Make sure that the discharge pipe is correctly positioned.

89 Fit the discharge pipe with gaskets.

90 Fit the handle. Don't forget bushings and washers. Note the orientation of the handle.

Lay down the motor unit.

ST

91—92 Tap the ring in place using a piece of wood to cushion the blows. Make sure that the hole in the ring and the hole in the motor unit are aligned.

HS

93 Put the upper wear protection in position. Make sure that it is firmly seated.

LL, PL

94—95 Block up the bottom end of the motor unit about 5—10 cm off the floor. Screw the studs into the diffuser. Fit the diffuser on the motor unit. Take away the block.

Impeller

LT, MT, HT impeller

96 Fit the wear ring on the impeller. Heat the wear ring with an LP gas torch and put it in position.

C, D, HS

97—98 Make sure that the end of the shaft is free of burrs. Polish off any burrs. Check that the key is seated in the keyway on the shaft. Grease the end of the shaft and the hub. Put the washer on the impeller screw. Press the impeller onto the shaft using the impeller screw. It will be easier to fit the impeller if it is first heated to about 100°C (210°F). Tighten the screw, tightening torque 80—100 Nm (59.0—73.8 ft lb). Check that the impeller can be rotated by hand after assembly.

Pump casing

C

99 Drive the wear ring into the pump casing. It will be easier to fit the ring if it is first cooled or the housing is heated.

ST

100 Cool the wear ring and put it in place in the lower diffuser. Make sure that it is firmly seated.

101 Fit the lower diffuser in the pump casing. Heat the pump casing or cool the lower diffuser.

HS

102—103 Lay the pump casing on its side. Put the lower wear protection in position. Place the nuts on the sleeve screws screw in the sleeve screws. Screw on the cap nuts. Carefully raise the pump casing upright.

C, D, HS

104 Place the O-ring on the motor unit.

105 Fit the motor unit on the pump casing. NOTE! Make sure that the pump casing is properly oriented.

HS. Adjustment of lower wear protection

106 Lay down the pump, remove the cap nuts.

Screw in the sleeve screws evenly all around until the wear protection fits snugly against the impeller. Back off the sleeve screws B a quarter turn. Tighten the lock nuts C. Screw on and tighten the cap nuts A. Check that the impeller can be rotated by hand.

Adjust the wear protection regularly to ensure maximum pump capacity.

LL

107 Drive the wear ring into the lower diffuser. The wear ring will be easier to fit if it is first cooled or the lower diffuser is heated.

108—109 Put a new O-ring on the lower diffuser. Fit the lower diffuser on the diffuser.

Don't forget the G-ring when installing the pump unit.

F

Put the O-ring in position in the pump casing cover. Place the pump casing cover in the pump casing. Assemble the motor unit and the pump casing together. NOTE the orientation, see figure 105. Lay the pump on its side.

Installing and adjusting the cutter and impeller

110 Oil the sleeve, the shaft and the inside of the impeller hub. Insert the sleeve and make sure that it can move freely. Insert the sleeve so far that the shear pin can be driven from the outside through the hole in the impeller into the sleeve. The shear pin shall be flush with the inside of the sleeve.

111 Fit the impeller. Make sure that the shear pin doesn't fall out of position and get jammed against the shaft.

112 Before the screw is fitted, the O-ring has to be slipped over. This prevents the screw from falling out. Tighten the screw.

113 Check with a feeler gauge that the distance between the pump casing cover and the impeller is 0.4 ± 0,2 mm.

114 If the distance is not correct, remove the impeller and adjust the distance by changing the number of adjusting washers on the shaft. Fit the impeller and check that it can rotate freely.

115 Place the adjusting washers on the studs and fit the cutter. Tighten the nuts.

116 Check with a feeler gauge that the distance between the cutter and the impeller is 0.4 ± 0.2 mm.

117 If the distance is not correct, adjust by changing the number of adjusting washers.

118 Tighten the cutter. Check that the impeller can rotate freely.

PL

119 Screw the stud into the shaft. Place the hub on the shaft. Press in place with washer and propeller nut. This will be easier if the hub is first heated (100°C, 210°F).

Tighten the nut. Tightening torque 80—100 Nm (59.0—73.8 ft lb). It shall be possible to rotate the hub by hand after assembly.

120 Insert the propeller blades. Slip the sleeve over the propeller blade's shaft. Put the washer on the screw and lock the propeller blade.

121 Make a template out of cardboard with the desired angle 7°—17°.

122 Adjust the angle of the blades with the aid of the template. One blade at a time. Tighten the screw.

123 Drill a 3 mm H12 hole in the propeller hub through the hole in the blade. Fit the retaining pin.

124 Fit the nose cone.

125 Fit the bellmouth. Don't forget the G-ring when installing the pump unit.

126 Connect the stator leads. See section entitled "Electrical connections" on page 8.

If the pump is specially approved, read the section "Specially approved pumps" on page 6 before starting work on the electrical connections.

127 Fit the terminal board.

If the pump is specially approved, the gap between the terminal board and the junction box shall be measured as described in the section "Specially approved pumps" on page 6.

128—129 Fit the motor and control cables in the junction box cover. Figure 129 shows the Ex version.

Parts for specially approved pumps, see the parts list.

Cut off a piece of the cable so that the seal sleeve closes around a new point on the cable. Tighten the entry all the way.

130 Put the O-ring in place.

131 Connect the motor and control cables. See "Electrical connections", page 9.

132 Fit the junction box cover.

If the pump is specially approved, the gap between the junction box and the junction box cover shall be measured as described in the section "Specially approved pumps", page 6.

133 Fit the oil casing screw opposite OIL IN. Make sure that the O-ring is flawless. Tightening torque 100 Nm (73.8 ft lb).

Fit the inspection screw with flawless O-ring. Tool 385 66 01 is used for the Ex version. Tightening torque 10—20 Nm (7.38—14.75 ft lb).

Lay the pump down on its side. Fill with 5 litres (5.3 US quarts) of oil. For oil grade, see care and maintenance instructions. Fit the oil screw with flawless O-ring. Tightening torque 100 Nm (73.8 ft lb).

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