

GARDNER
OIL ENGINES

LK TYPE

**WORKSHOP TOOLS, EQUIPMENT,
and
INSTRUCTIONAL DRAWINGS**



Price 7/6 each

GARDNER
OIL ENGINES

LK Type

**WORKSHOP TOOLS, EQUIPMENT,
and
INSTRUCTIONAL DRAWINGS**

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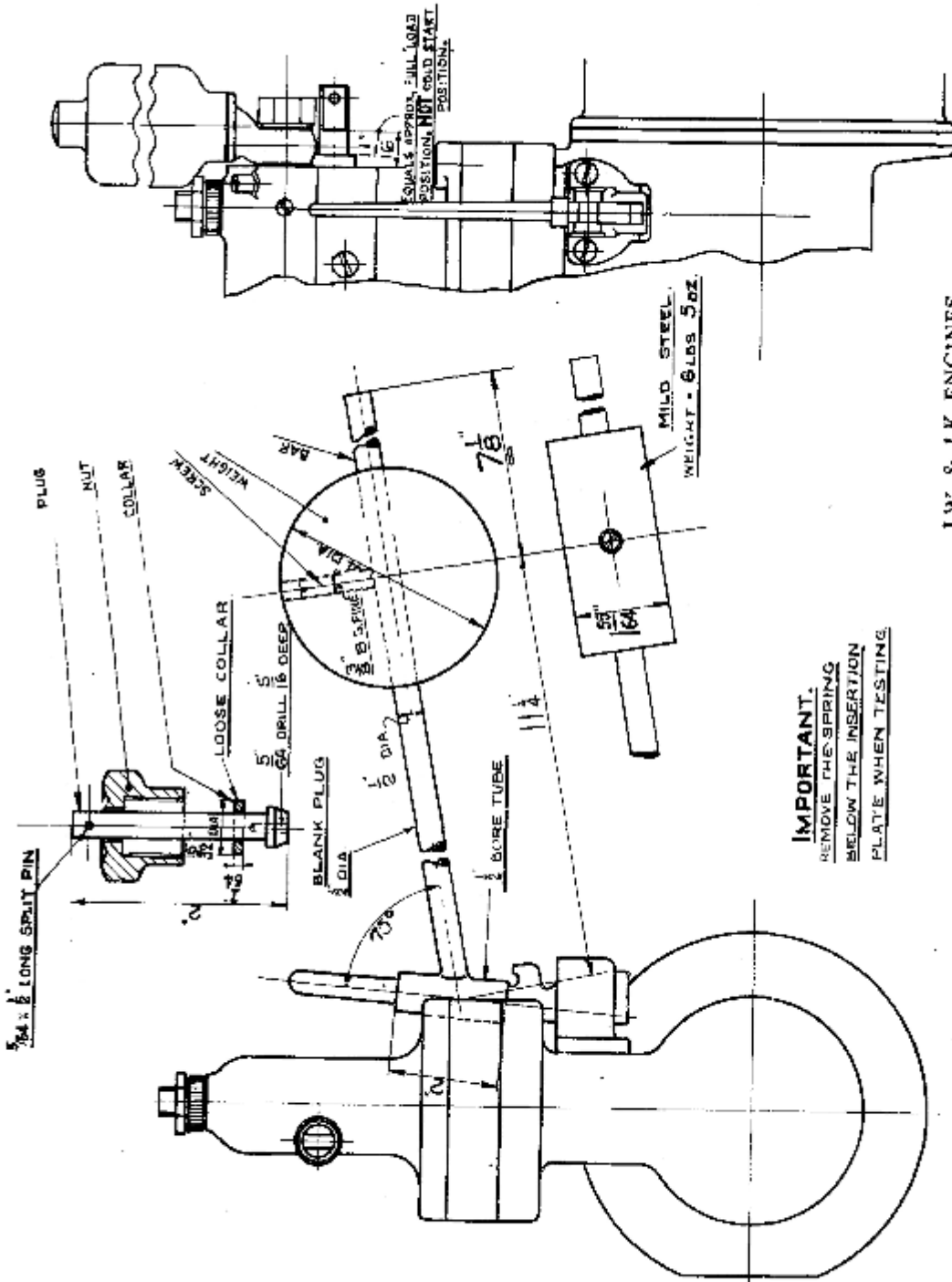
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I.W. & L.K. ENGINES

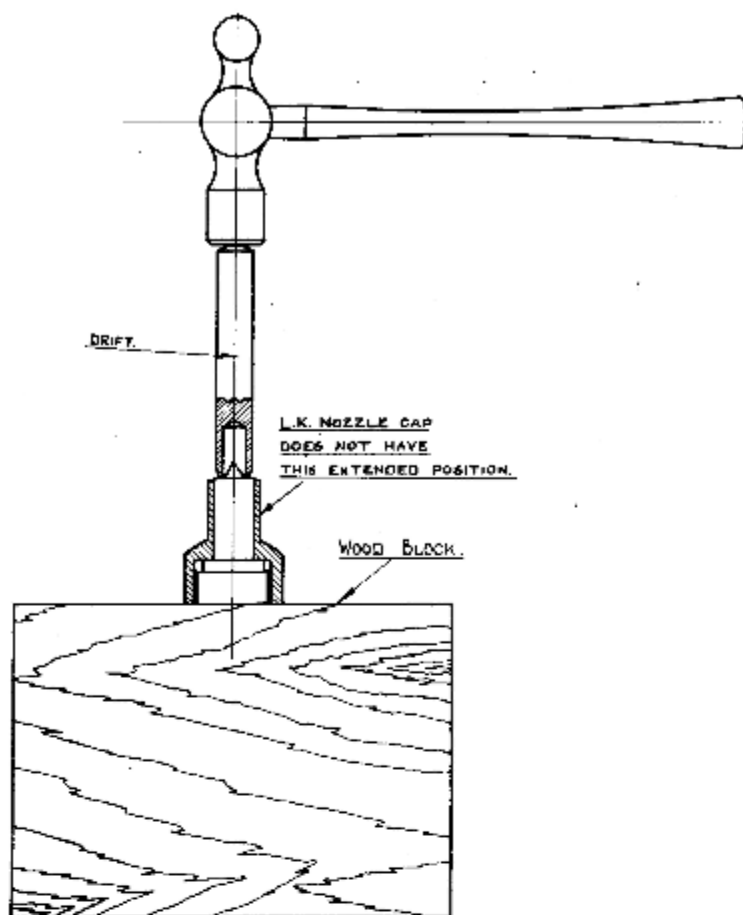
Fuel Pump Element Testing Tool

Illustration No. S.A. 2134

IN & LK ENGINESFUEL PUMP ELEMENT TESTING TOOLIllustration No. S.A. 2134

PURPOSE. For testing the fuel leakage past the ram in a worn element without dismantling the pump unit.

METHOD. Remove the pump from the cam box and remove the tappet spring from the lower side of the 1" thick insertion plate. Refit pump and insertion plate to cam box and couple up fuel pipe. Remove all air from fuel pump and operate priming lever until all air bubbles cease to flow from the delivery stock. Fit solid plug to delivery stock and tighten union nut. Set slider bar in position shown on page 4 and fit drop weight arm over priming lever. This weight will fall slowly until spill ports are uncovered, at this point the weight will fall rapidly. The slow portion of the travel represents the stroke of the ram used for the actual injection when piped up to the sprayer. The more wear which is present in an element the more rapidly will fuel leak from the delivery side to the suction side of the ram and, consequently, the more rapidly will the weight fall during this part of the stroke. This slow portion of the stroke should be timed on at least three tests and if the average time required is less than 10 seconds the element must be regarded as badly worn and requiring replacement.



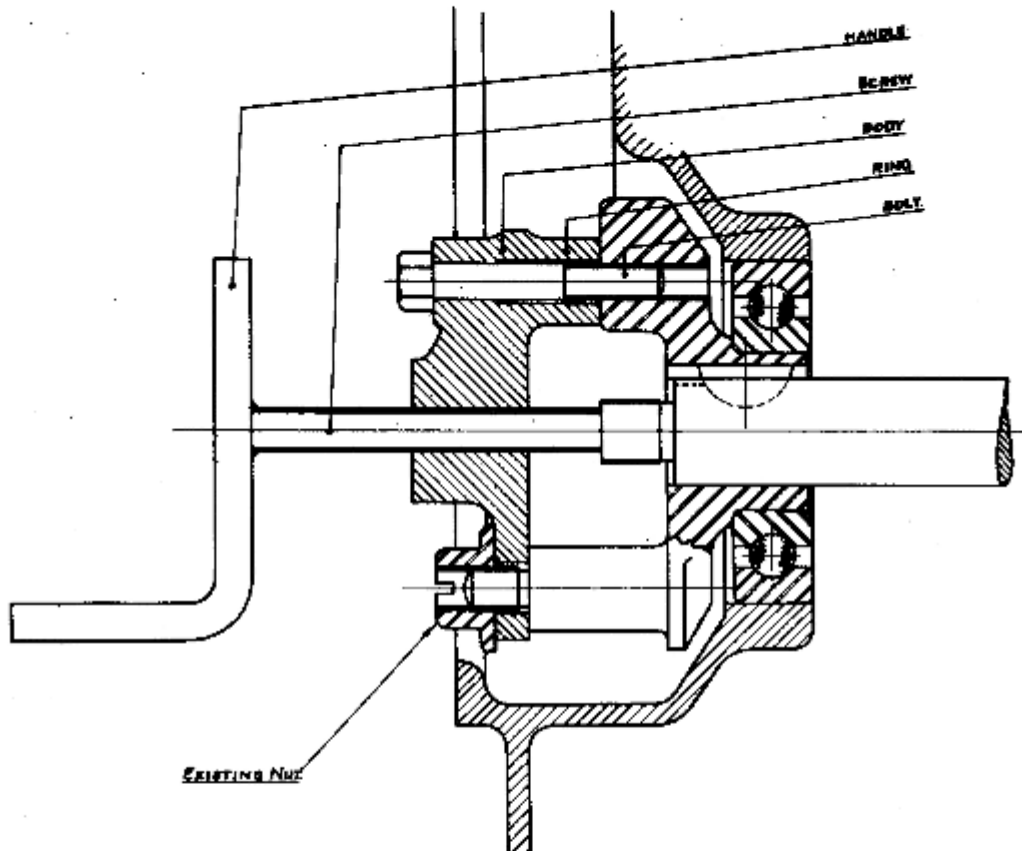
"L" TYPE ENGINES

SPRAYER NOZZLE DRIFT

Illustration No. S.A. 2729

PURPOSE. To drive the sprayer nozzle from the sprayer cap nut without damage to the spray holes.

METHOD. Place hollow end of drift against the sprayer nozzle and tap out. (with sprayer cap nut removed from sprayer.)



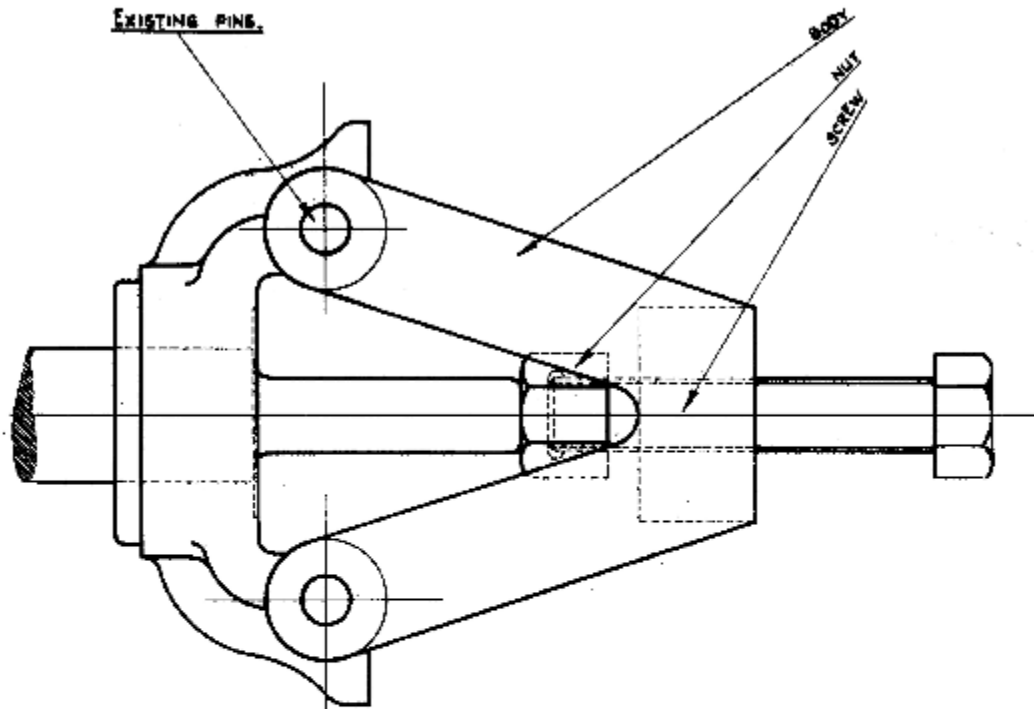
LK ENGINE

EXTRACTING TOOL FOR EXHAUSTER CRANK

Illustration No. S.A. 2970

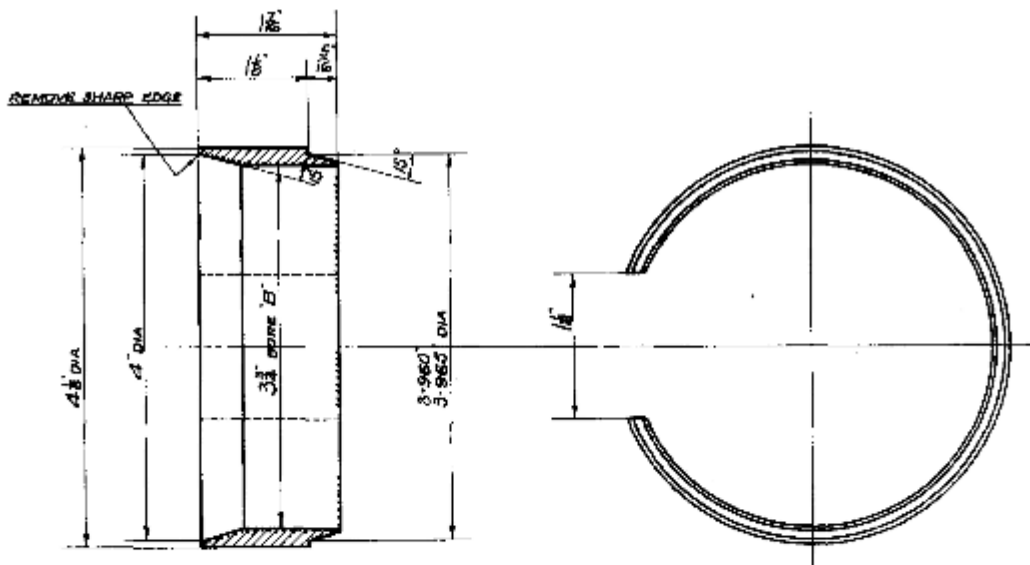
PURPOSE. Withdrawing exhaustor crank from valve camshaft.

METHOD. Remove camshaft nut, fit extractor as shown above, and draw crank off the shaft by means of the jacking screw.

**"L" TYPE ENGINES****GOVERNOR BODY WITHDRAWAL TOOL****Illustration No. S.A. 2728**

PURPOSE. For removing the governor body from the fuel pump camshaft.

METHOD. Remove the pointed set screw from governor body. Fit tool as shown above using the two governor weight hinge pins to connect the tool to the governor body and draw off by means of the jacking screw.



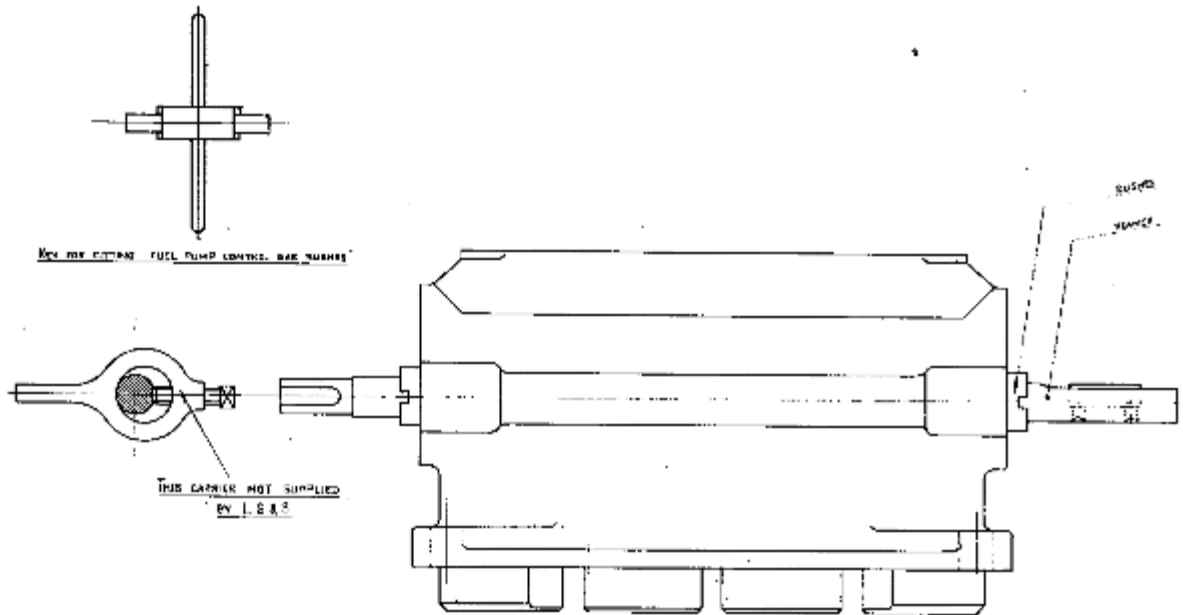
LK ENGINE

PISTON ENTERING GUIDE

Illustration No. J2780.

PURPOSE. To enter piston rings into cylinder block when the sump is not fitted to the engine.

METHOD. Fit the guides over the piston and lower the block on to the pistons, the guides are then pushed down on to the connecting rod, and can be removed from the lower side of the crank case. These guides can also be used for entering the pistons into the cylinder bores from the underside of the engine.



"L" TYPE ENGINES

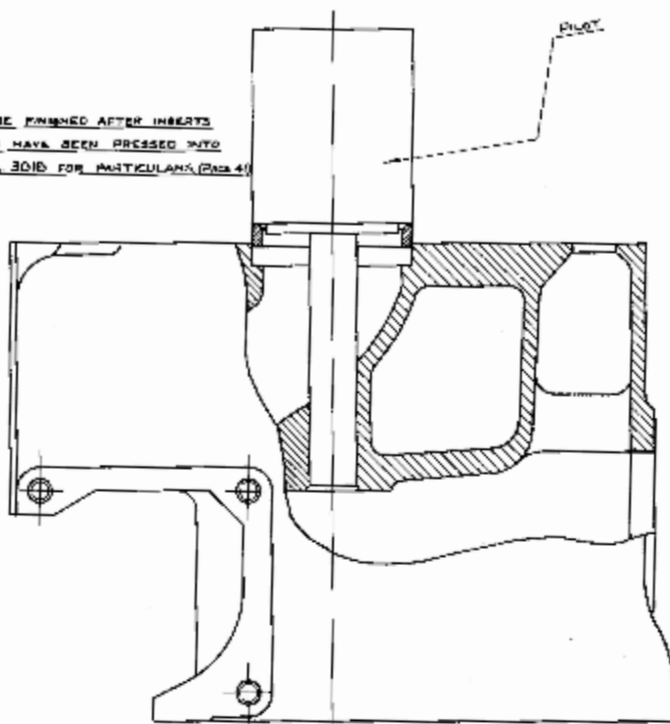
FUEL PUMP CONTROL BAR BUSH REAMER AND FITTING KEY

Illustration No. 2684F

PURPOSE. To fit and ream the control bar bushes to ensure that they are in alignment.

METHOD. Having screwed new bushes into pump body by means of the key shown above, enter the plain end of the reamer bar through both bushes until the bar projects from one end. Fit a carrier to this end of the bar and ream the bush at the other end, gradually drawing the bar through the body. When this bush has been reamed the carrier should be removed and the bar withdrawn from the body and entered at the other end to ream the second bush.

NOTE:-
VALVE SEATS TO BE FINISHED AFTER INSERTS
AND VALVE GUIDES HAVE BEEN PRESSED INTO
POSITION. SEE S.A. 301B FOR PARTICULARS (PAGE 4)



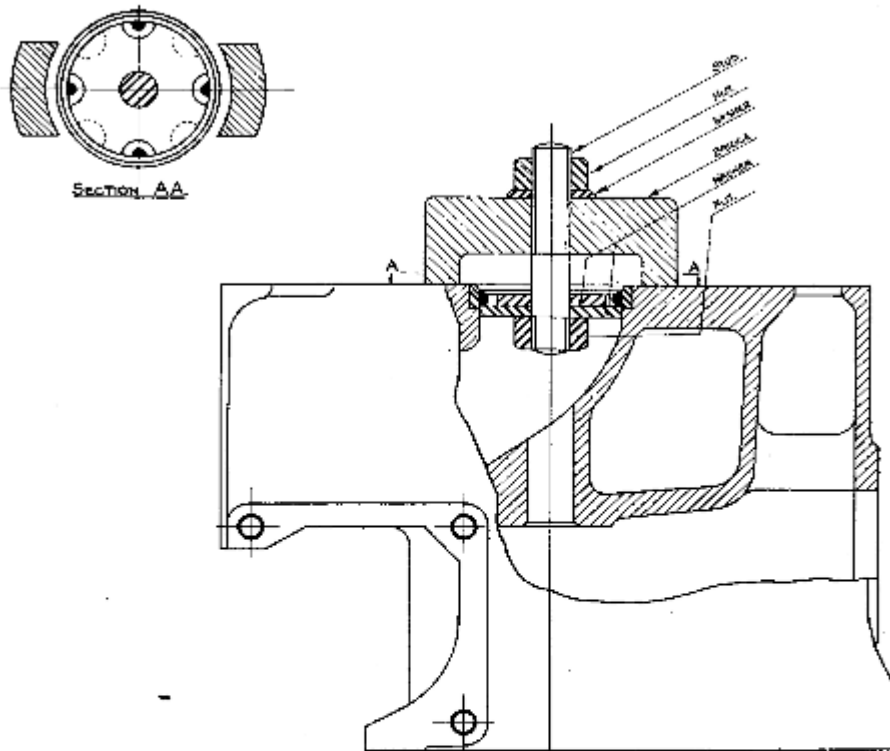
LK ENGINE

VALVE SEAT INSERT PILOT

Illustration No. 3241F.

PURPOSE. To ensure that valve seat insert is pressed in square to cylinder head.

METHOD. Remove valve guide and fit insert and pilot as shown above and press into position. When finally pressed in the pilot should be given a sharp blow whilst the weight of the press is still operating. This ensures that the insert stays in firm contact with the bottom of the recess.



LK ENGINE

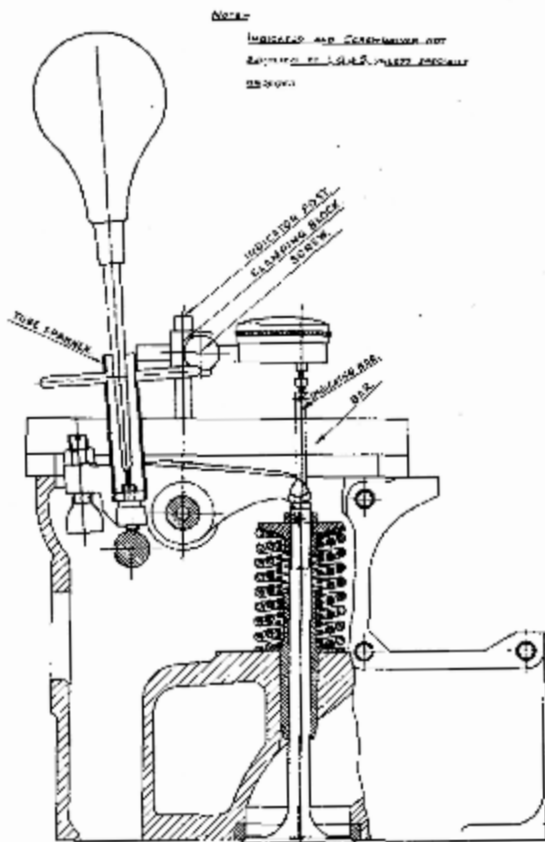
VALVE SEAT INSERT WITHDRAWAL TOOL

Illustration No. 5709F

PURPOSE. For withdrawing worn valve seat inserts from the cylinder head.

METHOD. By means of electric arc welding build up four nodules of welding stick in the bore of the insert. The nodules should be equispaced, and of a size that will allow the grooves in the outer diameter of the washers to pass over them, as shown in "section AA" above. Lower stud and one of the washers through insert, and rotate $\frac{1}{2}$ of a turn, so that when raised the washer will engage with the four nodules of weld. Fit 2nd. washer to stud, and down into bore of insert to centralise stud. Fit bridge, plain washer, and nut, and screw down until insert is withdrawn. Lubricate upper nut to reduce any tendency to turn, which the stud may develop.

- NOTE:**
1. Prolonged application of the arc is to be avoided.
 2. Only small projections of welding metal are necessary.
 3. Use 14th I.W.G. mild steel wire electrode.
 4. The bridge piece, bolt, (after removing disc, and reducing $\frac{5}{8}$ " diam. to $\frac{3}{8}$ ") nut, and washer, as supplied with the original withdrawal tool can be used with the modified equipment.



LK ENGINE

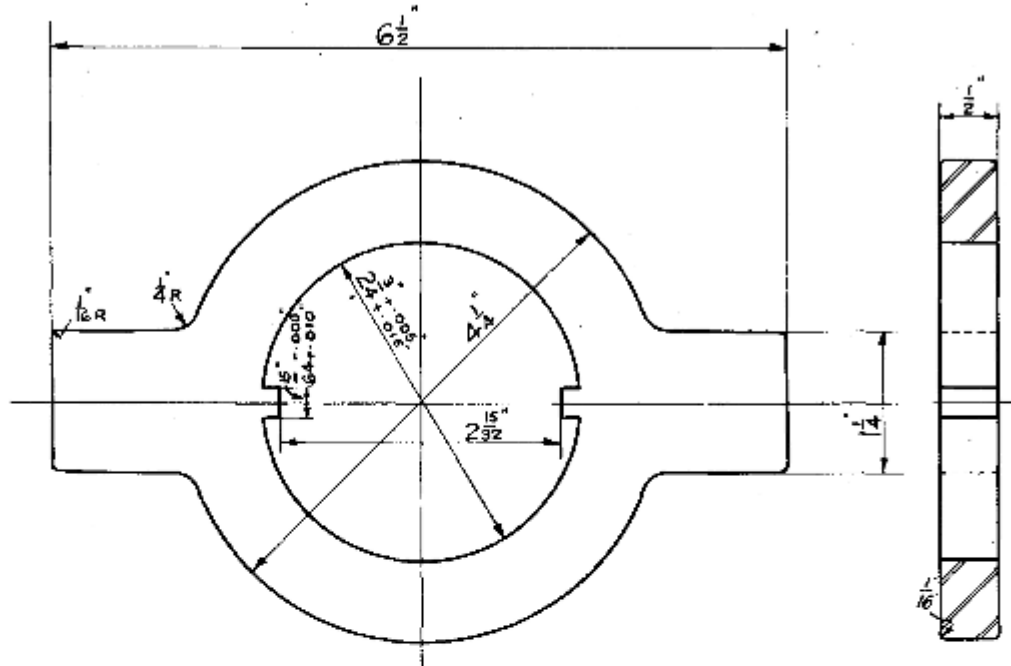
SPECIAL BOX SPANNER AND MEANS TO INDICATE DECOMPRESSION

LIFT OF INLET VALVE

Illustration No. 3168F

PURPOSE. To adjust lift of inlet valve for decompression and to provide convenient means of indicating lift.

METHOD. Rotate decompression shaft to correct position for decompression and slack off decompression screw until it is clear of the shaft. Apply dial type indicator and set to zero. Screw up decompression screw until the valve has lifted .020" as shown on the indicator and lock the nut.



LK ENGINE

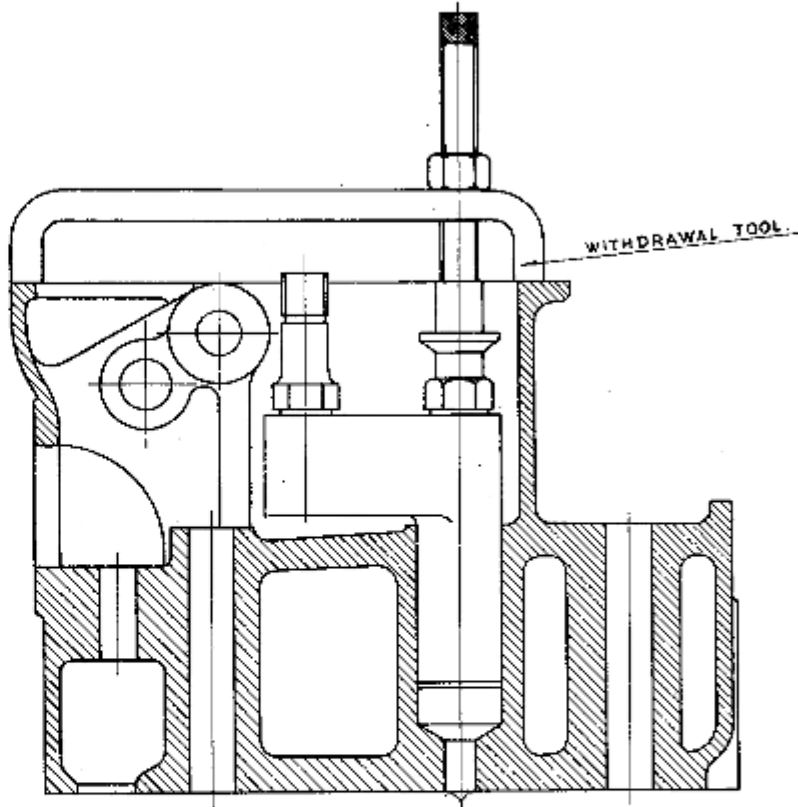
CRANKSHAFT SPROCKET NUT SPANNER

Illustration No. J8265

PURPOSE. To remove and retighten the large nut at the forward end of the crankshaft.

METHOD. In this engine the sprocket is held up against a square shoulder on the crankshaft so that the nut requires to be firmly knocked up solid and locked.

In spanners of this type it is always desirable to hold a heavy weight in contact with the face of the arm diagonally opposite to that being struck by the hammer.



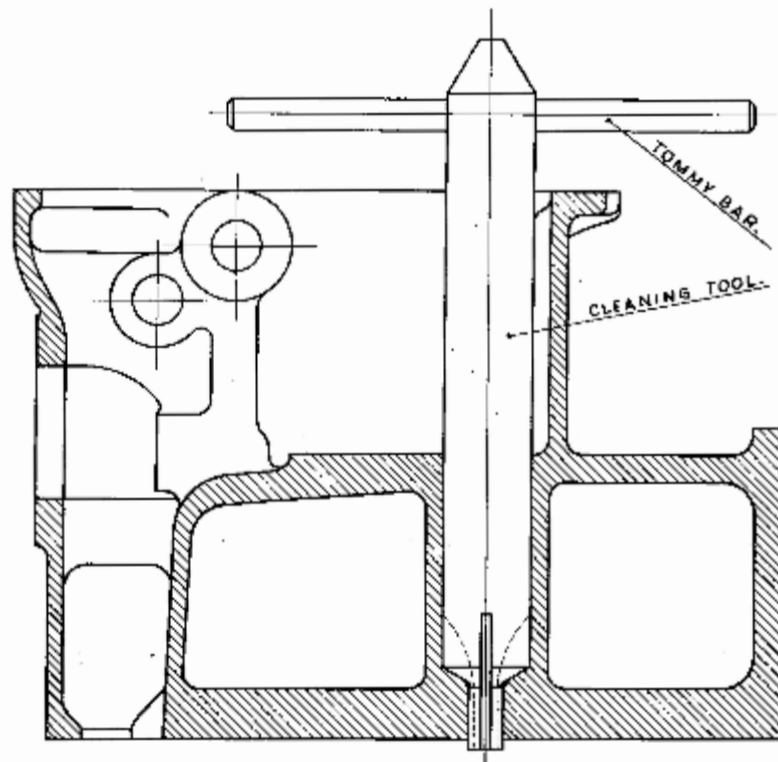
LK ENGINE

SPRAYER WITHDRAWAL TOOL

Illustration No. 3180F.

PURPOSE. To remove sprayer from cylinder head. (One of these tools is supplied in each engine kit)

METHOD. Remove all pipes to sprayer and sprayer clamp plate, lay flat bar across top of cylinder head, pass screwed rod through hole in bar and screw into leak stock. Screw down hexagon nut.



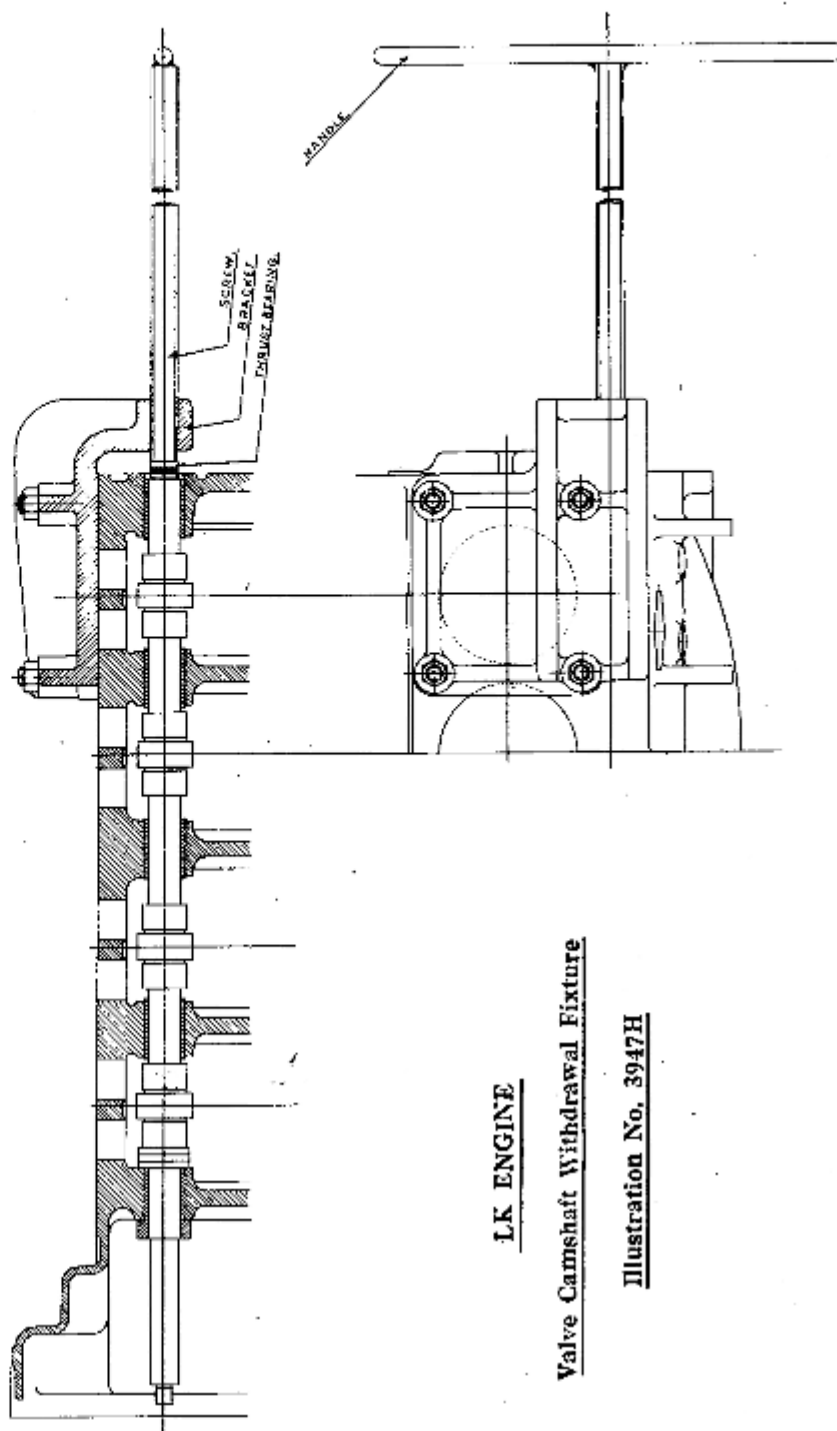
LK ENGINE

SPRAYER HOLE CLEANING TOOL

Illustration No. 3175F

PURPOSE. To remove carbon deposit from sprayer hole in the cylinder head prior to refitting of sprayer. (One of these tools is supplied in each engine kit)

METHOD. Insert tool in sprayer hole in head and rotate, to remove carbon from both diameters of the sprayer hole.



LK ENGINE

Valve Camshaft Withdrawal Fixture

Illustration No. 3947H

LK ENGINEVALVE CAMSHAFT WITHDRAWAL FIXTUREIllustration No. 3947H

PURPOSE. To remove valve camshaft after long service where carbon deposit and tight fit of cams on the shaft prevent the shaft being withdrawn by hand.

METHOD. Remove pointed setscrews from all cams and remove cover from camshaft bush at flywheel end of crankcase. Bolt cast iron bracket to top of crankcase at flywheel end as shown on page 18. Force out camshaft by means of jack screw. Keep screw thread lubricated.

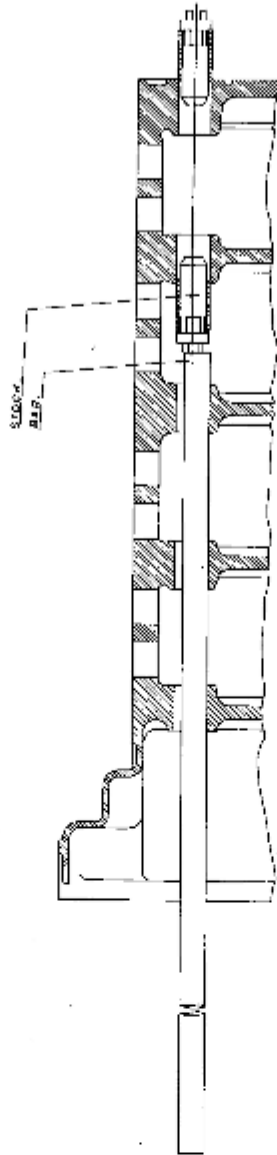


FIG. 11. CAMSHAFT BUSH EXTRACTING AND INSERTING STOCK AND BAR.

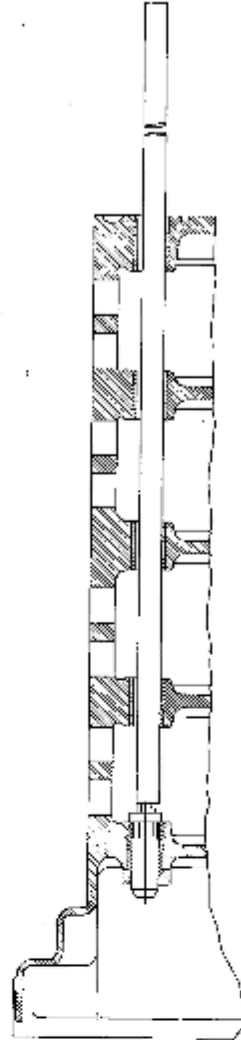


FIG. 12. CAMSHAFT BUSH EXTRACTING AND INSERTING STOCK AND BAR.

LK ENGINE

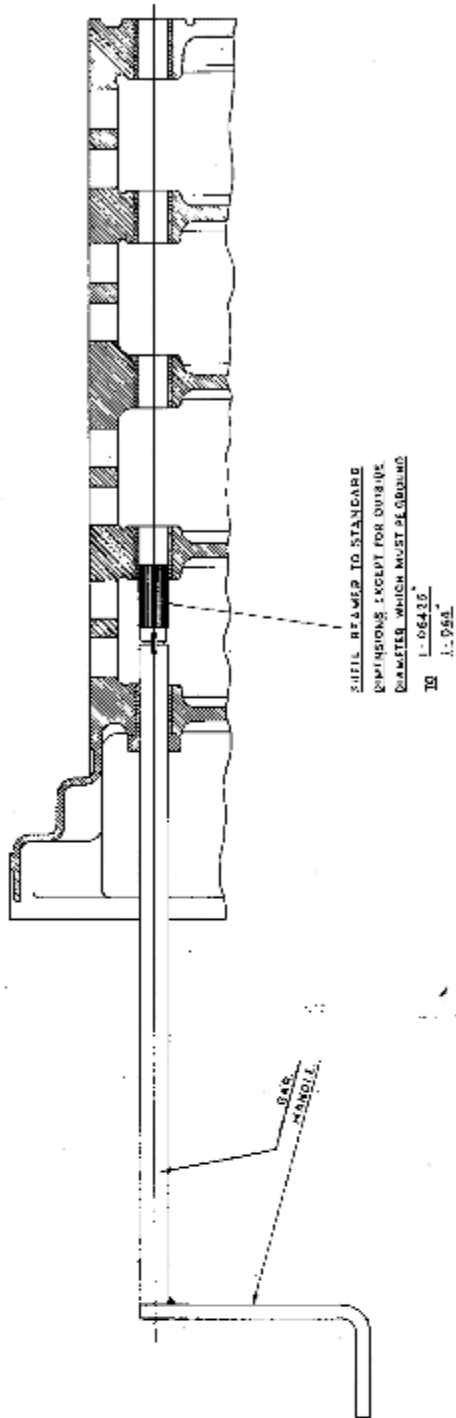
Valve Camshaft Bush Extracting and Inserting Stock and Bar

Illustration No. 3898H

LK ENGINEVALVE CAMSHAFT BUSH EXTRACTING AND INSERTINGSTOCK AND BARIllustration No. 3898H

PURPOSE. To remove and to fit camshaft bushes

METHOD. Remove all bush locating screws, fit hexagon head stock to each bush in turn and use bar to drive out. It should be noted that the key in the stock engages with the oil groove in the bush. When fitting new bushes use stock and bar as for removal but during this operation it is necessary to fit each bush so that its oil groove lies vertically upwards. The bushes can be turned to obtain this condition by means of the hexagon stock and a spanner applied while the bush is being pushed into position. Having set the bushes in their correct position it is then necessary to transfer the locating screw holes from the crankcase into the bushes.



LK ENGINE. VALVE CAMSHAFT BUSH REAMER AND BAR

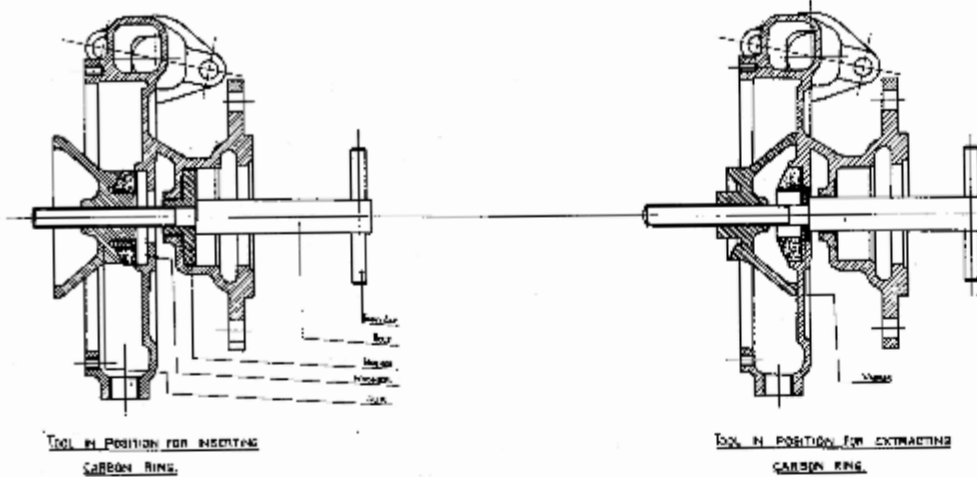
Illustration No. 3902H

PURPOSE. To ensure alignment of all bushes when fitted to crankcase.

METHOD. As all bushes are pre-finished in their bore and as there is only a small interference fit between the bushes and the crankcase there is very little white metal to be removed by this tool.

Pass bar only through forward end bush until it projects sufficiently to receive the shell reamer. By slowly rotating the bar and applying slight hand pressure pass the reamer through each bush. This operation is primarily to ensure that all bushes are in axial alignment.

NOTE: The reamer is not passed through the forward end bush.



LW, HLW, L2 & LK ENGINES

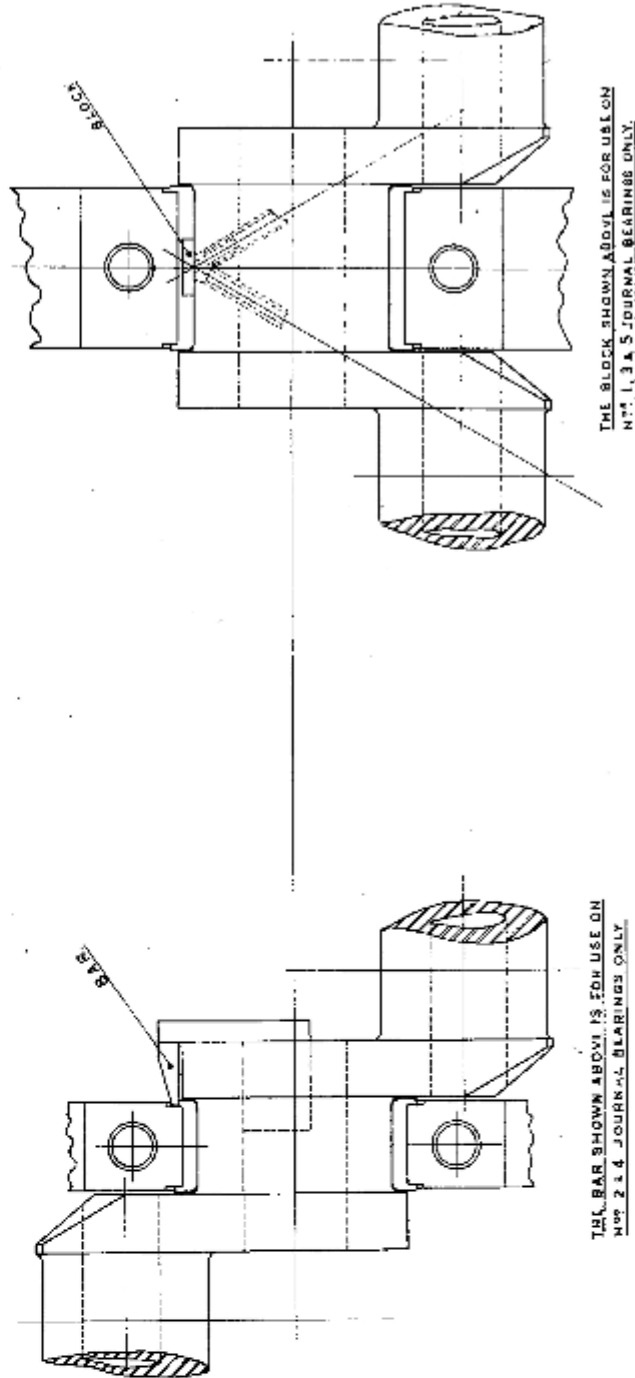
WATER PUMP CARBON GLAND FITTING AND EXTRACTING TOOL

Illustration No. 3496H

PURPOSE. For extracting and refitting carbon gland to water pump body.

METHOD. TO EXTRACT THE CARBON RING. Pass the small steel washer up the water drain opening on the engine side of the pump body and into position adjacent to carbon ring. Insert the tee handle bolt through ball race housing in pump body and through the steel washer. Screw cup, large side first, on to projecting bolt until it makes contact with the pump body, as shown in right hand view above. Screw in bolt until carbon ring is forced out.

TO FIT A NEW CARBON RING. Clean and paint recess in pump body and fit special plastic washer to bottom of recess. Fit large spigoted washer into ball race housing. Pass tee handle bolt through this washer and through carbon ring, which has been entered into this recess, by hand. Screw cup, small side first, on to projecting bolt until it makes contact with the carbon ring. Screw up bolt until carbon ring is forced up to the bottom of its recess.



LK ENGINE

Main Bearing Shell (Upper) Inserting and Extracting Tool

Illustration No 3892H

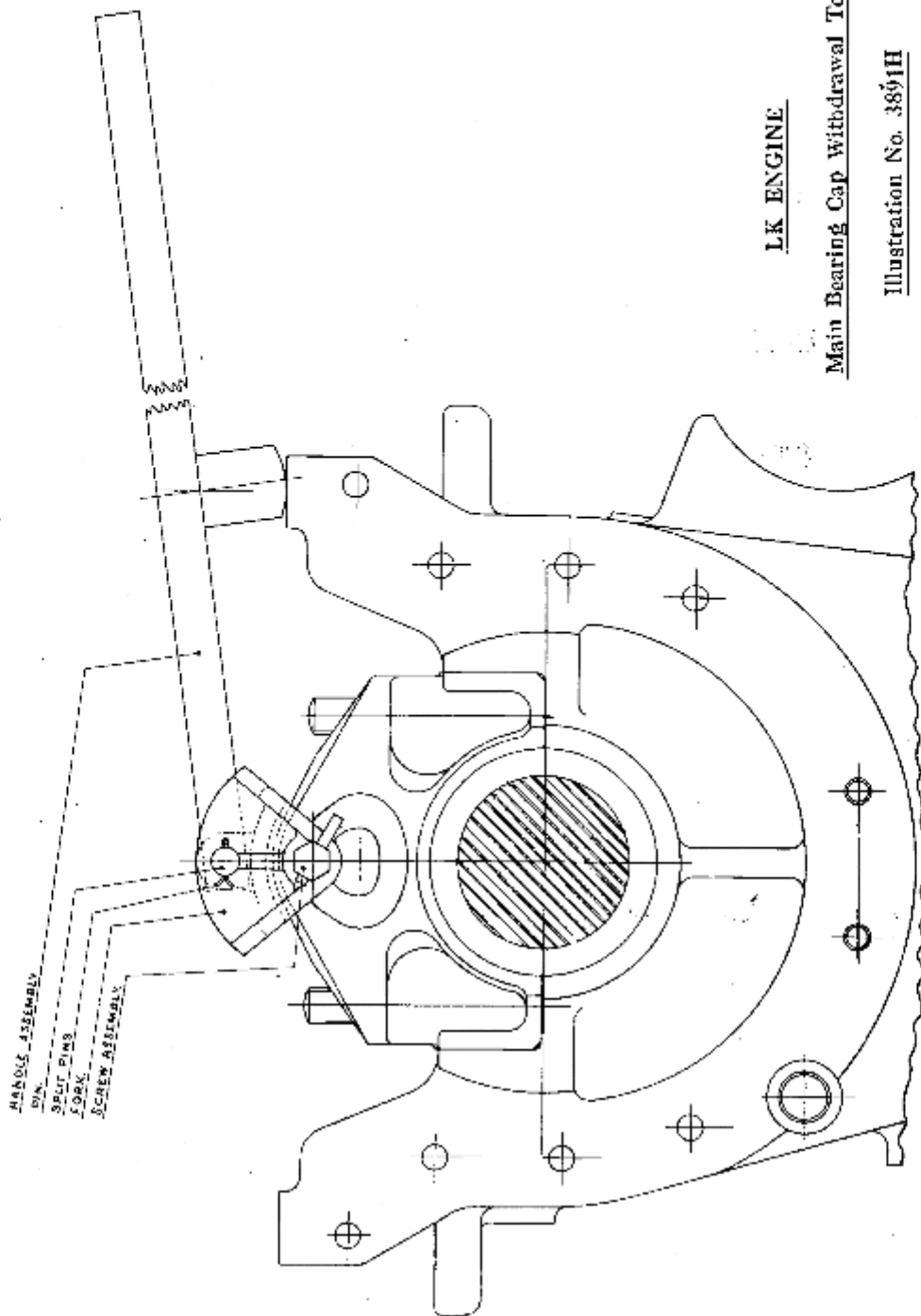
LK ENGINEMAIN BEARING SHELL (UPPER). INSERTING AND EXTRACTING TOOLIllustration No. 3892H

PURPOSE. To facilitate the extraction and refitting of main bearing shells during the bedding operation.

METHOD. NOS. 1, 3 & 5 BEARINGS. Remove bearing cap and lower half bearing. Fit block into oil hole in crankshaft journal and slowly rotate crankshaft until the block makes contact with the butt face of the bearing which will then rotate with the crankshaft until it can be lifted away.

NOS. 2 & 4 BEARINGS. Fit tool to hole in crankshaft as shown in left hand view on opposite page. Slowly rotate crankshaft so that end of crank web drives the arm into contact with flange of bearing shell when further rotation of shaft will turn bearing into position for removal.

TO REFIT BEARINGS REVERSE ABOVE PROCEDURE.



LK ENGINE

Main Bearing Cap Withdrawal Tool

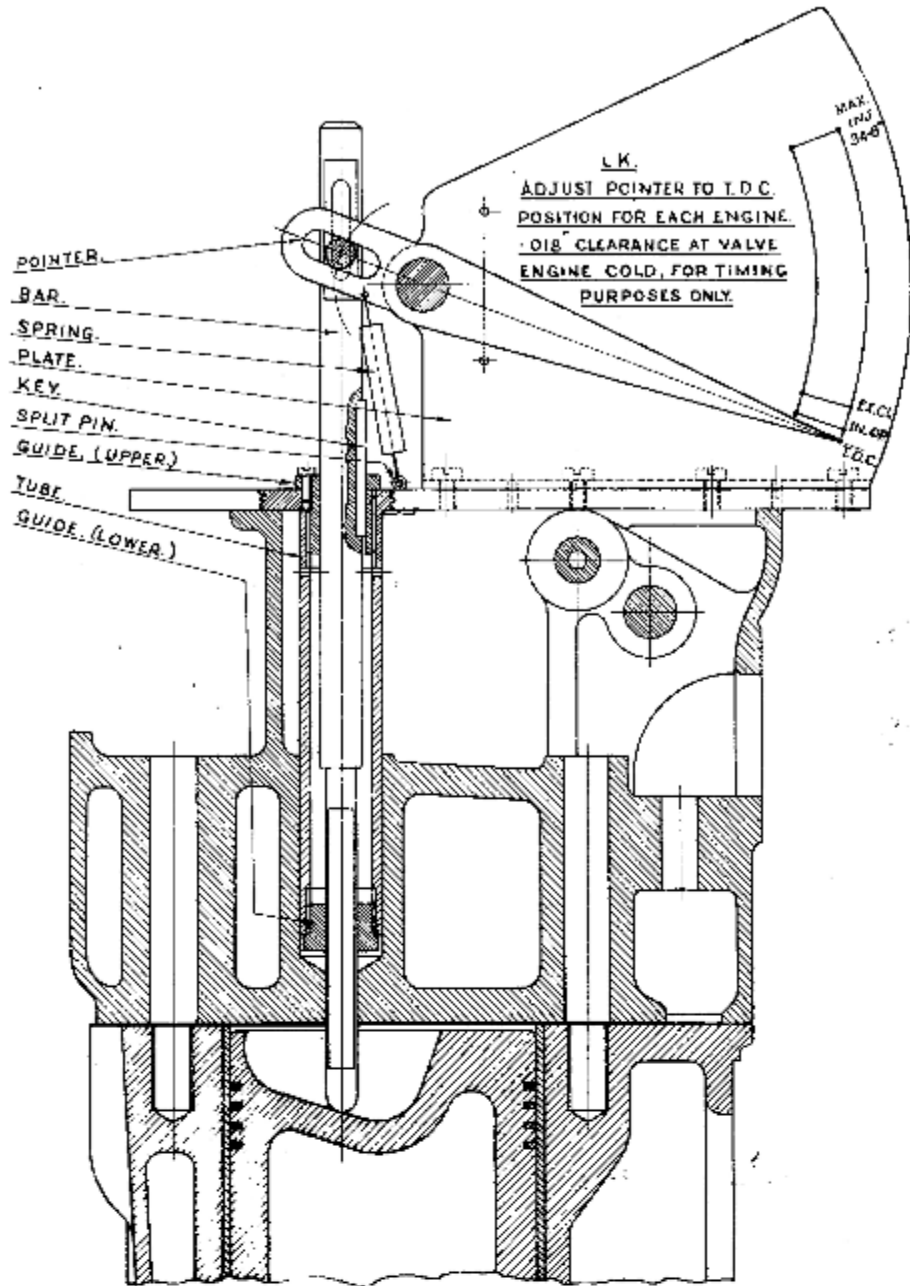
Illustration No. 3891H

LK ENGINEMAIN BEARING CAP WITHDRAWAL TOOLIllustration No. 3991H.

PURPOSE. For withdrawing main bearing caps from close fitting engagement in crankcase.

METHOD. Remove main bearing castle nuts. Fit extracting tool clamp plate over cap and screw pointed set screws into firm contact with the bearing cap. The short tommy bar provided in each screw provides ample leverage — a spanner should not be necessary.

Swing lever bar into contact with machined sump face at either side of crankcase and lever cap out of position.



LK ENGINE

Valve and Injection Timing Indicator

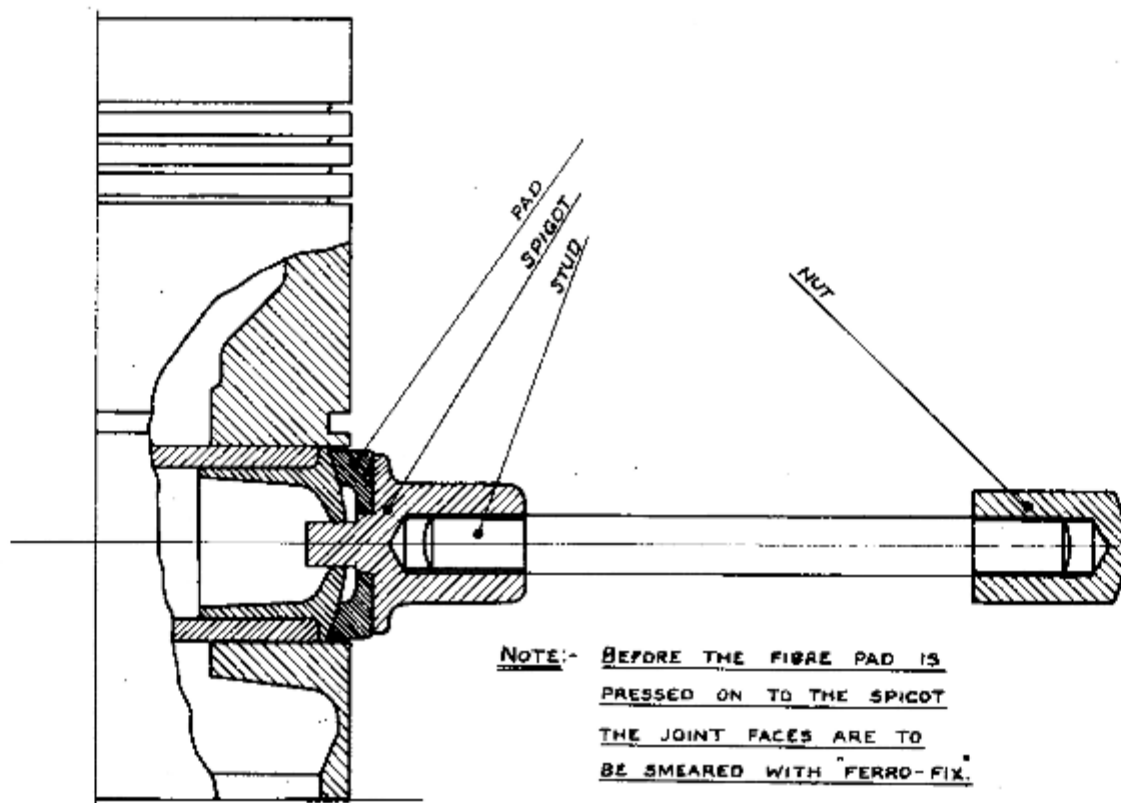
Illustration No. 3906H

LX ENGINEVALVE AND INJECTION TIMING INDICATORIllustration No. 3906H

PURPOSE. To obtain correct timing position of crankshaft where chassis considerations make it difficult or impossible to gain access to the timing marks on the flywheel.

METHOD. Remove No. 1 sprayer and fit indicator as shown on page 28. Set No. 1 piston at top dead centre, this is the position of the piston which produces the down-most travel of the pointer. With piston still in this position slacken the knurled nut and set the pointer exactly opposite the T.D.C. mark on the indicator plate and firmly retighten nut. The other timing positions can then be read off the indicator plate.

NOTE When checking valve timing Inlet and Exhaust Tappet clearances must be set to .018".



1K ENGINE

GUDGEON PIN DRIFT

Illustration No. S.A. 2973

PURPOSE. To remove gudgeon pins from pistons where prolonged service has produced carbon deposit, which tends to fasten the pin, when moved slightly from its working position.

METHOD. Use as an ordinary drift. Push the piston lightly against the connecting rod in the direction opposite to that in which the pin is being driven, thus relieving the connecting rod assembly of side strain.

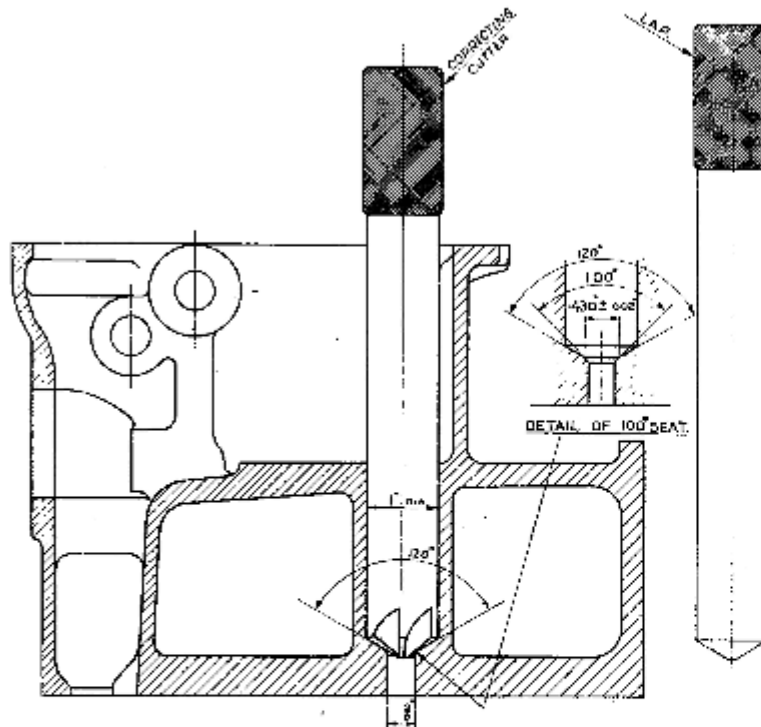
LK ENGINESPRAYER SEAT CUTTER AND LAP

Illustration No. 3178F

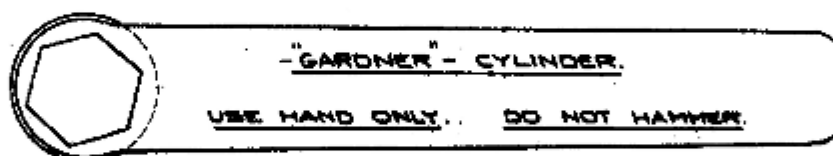
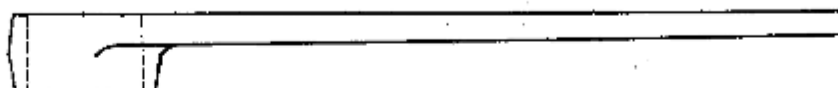
PURPOSE. To restore the sprayer seat at the point where it makes a gas-tight joint in the cylinder head

METHOD. Fit cutter to sprayer hole in the head and rotate with care in a clockwise direction. Cut away as little metal as is necessary to remove damaged portion of the seat. To finish seat use lap and ordinary valve grinding paste. It should be noted that this work does not represent routine attention and, in fact, will only be required under exceptional circumstances

If this tool has to be used, care must be taken to ensure that the amount of metal removed is not sufficient to materially reduce the diameter of the small 100° angle seat shown above adjoining the $\frac{3}{8}$ " nozzle bore.

If the diameter of the 100° angle seat is greatly reduced, the sprayer cap will not seat effectively, and the diameter must be restored by a special cutter which can be supplied on application to the works.

After such cutter is used this seat should also be lapped but using the pointed end of the sprayer hole cleaning tool shown on page 17.



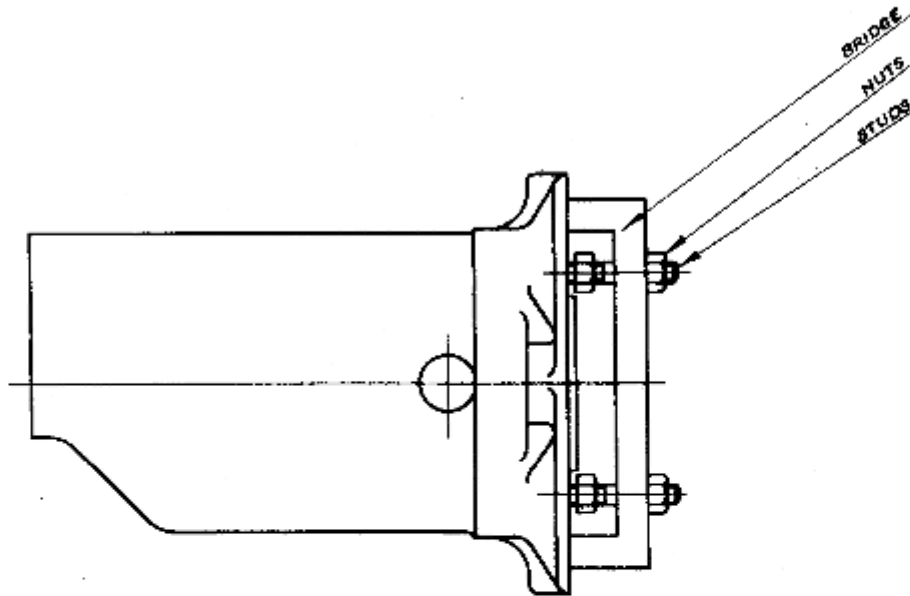
LK ENGINE

CYLINDER FOOT NUT SPANNER

Illustration No. J635

PURPOSE. For tightening, and undoing cylinder foot nuts

METHOD, Use as indicated on spanner



L TYPE ENGINES

EXTRACTOR FOR THERMOSTAT UNIT

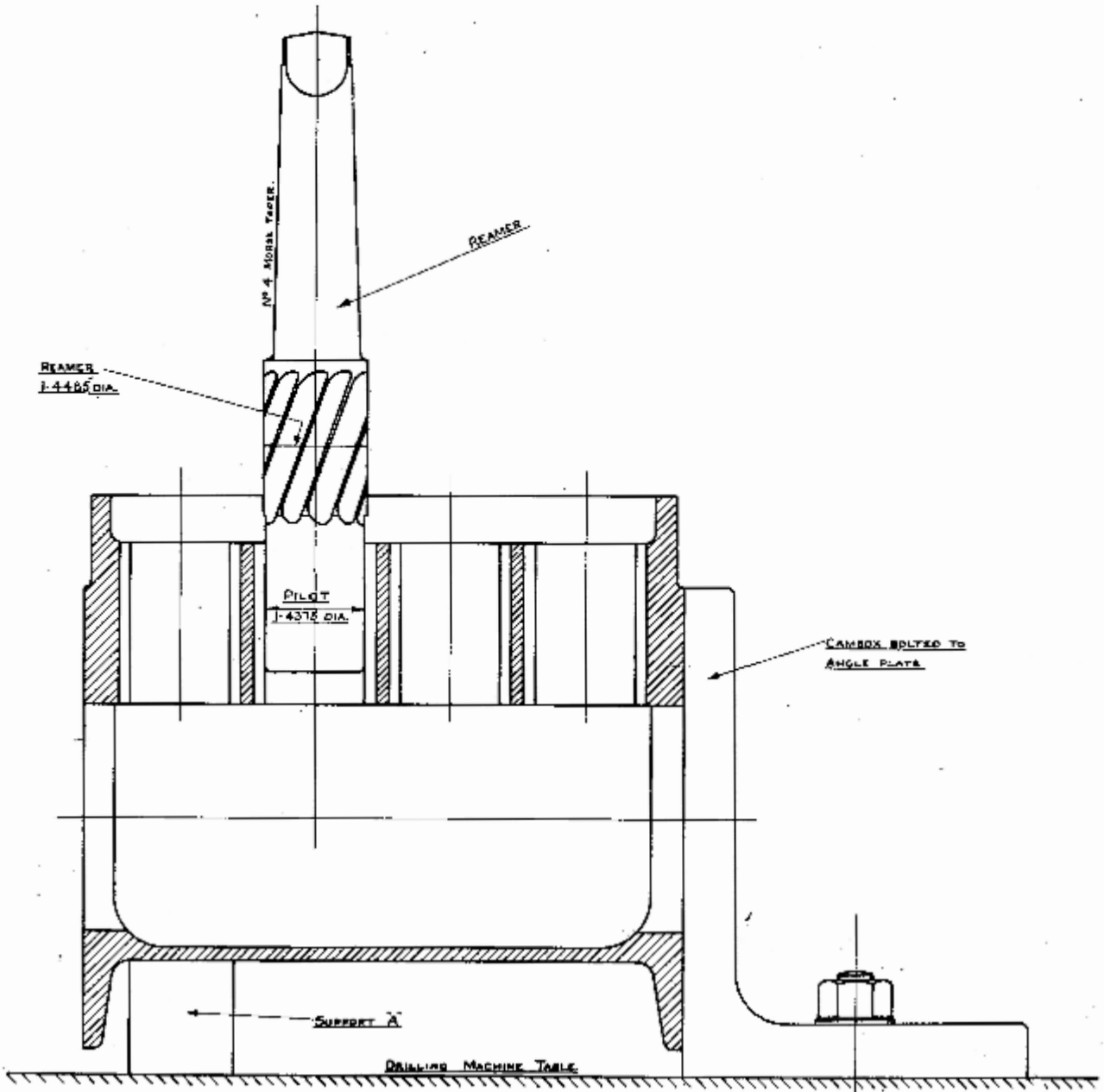
Illustration No. SA.2965

PURPOSE. For extracting thermostat unit from aluminium housing.

METHOD. Remove outlet hose connection from forward end of housing. Fit extractor as shown. Screw loose studs into tapped holes in brass thermostat unit.

Screw up outer nuts until unit is withdrawn.

NOTE: The two nuts shown adjacent to the unit are provided as a means to retain the studs when tool is not in use.



LW, HLW & LK ENGINES

Fuel Pump Cambox Reamer

Illustration No. 3971H

LW, HLW & LK ENGINESFUEL PUMP CAMBOX REAMERIllustration No. 3971H

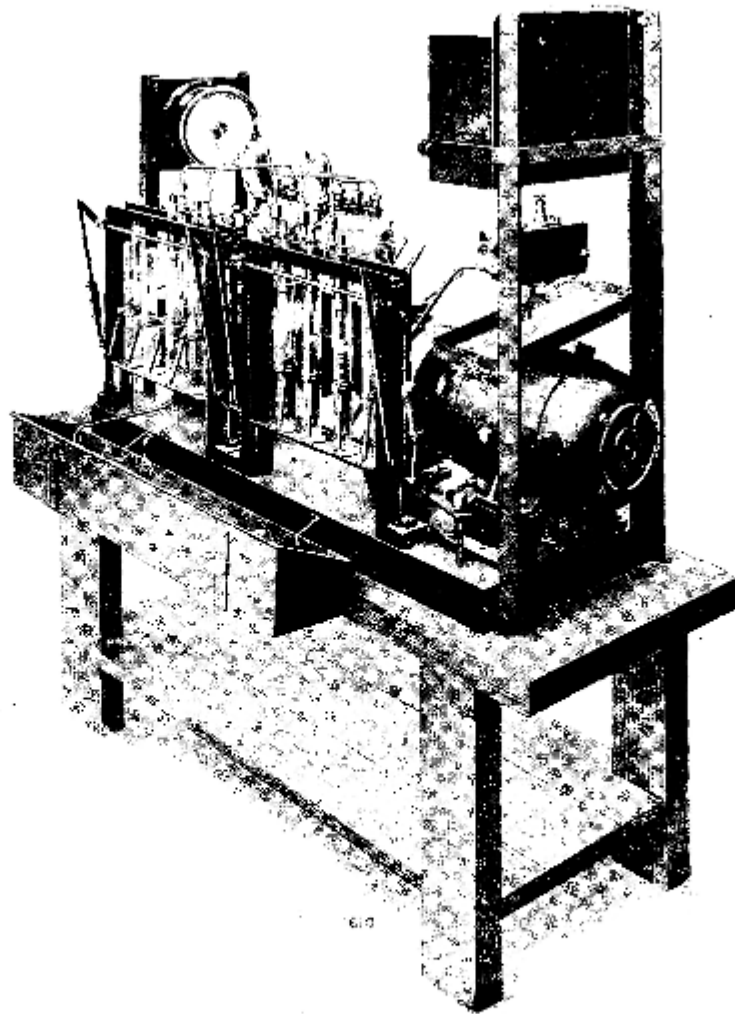
PURPOSE. For re-sizing worn cambox bores to receive .010" oversize fuel pump tappets. This process is desirable when wear is such that a new standard size tappet has .006" clearance in a worn bore.

METHOD. Mount the worn cambox on an angleplate as illustrated, on the table of a good vertical drilling machine with a support "A".

Before starting to remove metal, check that the reamer and drilling spindle are free to rotate by hand when the pilot portion of the reamer is fully entered into the tappet bore. This ensures that the reamer is in correct alignment with the original hole.

Use paraffin or fuel oil as a lubricant when cutting. When fitting the new .010" oversize tappets care must be taken to check that they are absolutely free to slide in the new bores just produced.

It may be found that the projecting flattened portions of the tappet roller pin are preventing free movement of the tappet due to slight interference with the sides of the keyway. In such cases the sides of the keyways should be carefully filed to permit free movement.



VIEW OF CALIBRATING MACHINE SHOWING MEASURING GLASSES, SPEED INDICATOR AND FUEL COLLECTING TROUGH.

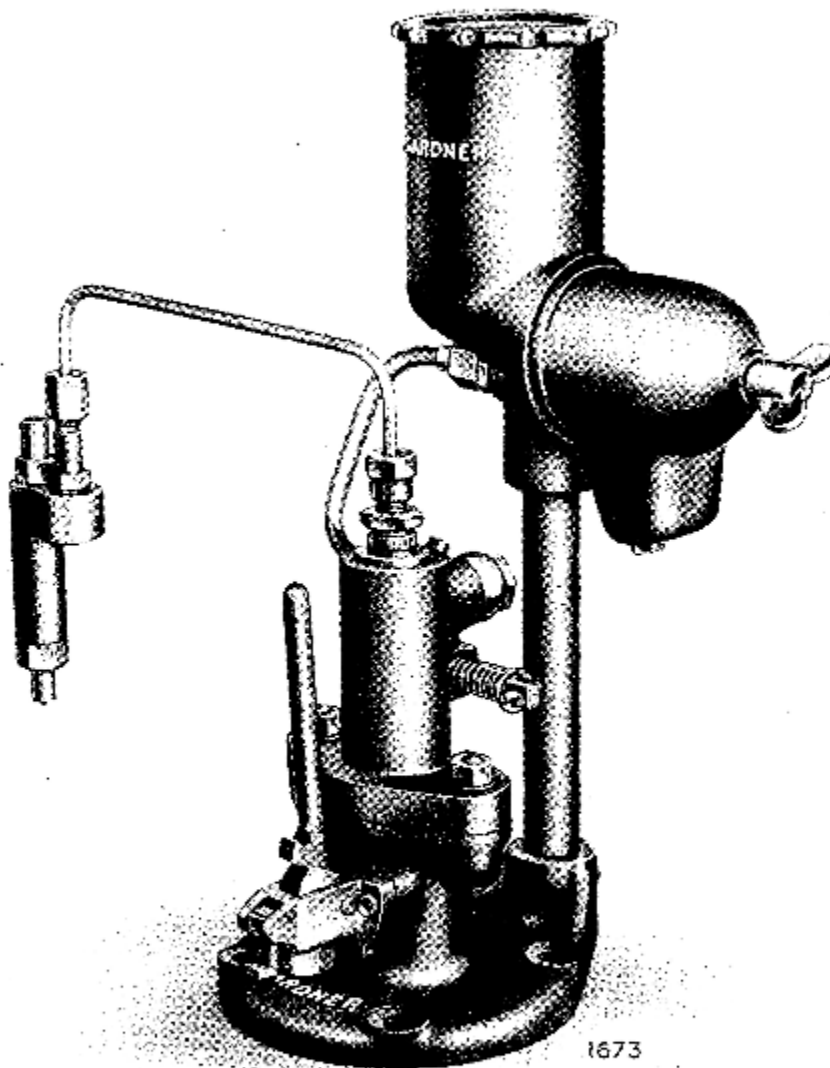
"L" TYPE ENGINES

FUEL INJECTION PUMP CALIBRATING MACHINE

Illustration No. 1610.

PURPOSE. For the calibration and setting of maximum output of fuel injection pumps.

METHOD. This is fully described in the Instruction Book supplied with each machine.



"L" TYPE ENGINES
SPRAYER TESTING APPARATUS

Illustration No. 1673

PURPOSE. For the hand testing of sprayers when on the bench.

METHOD. This is fully described in the Engine Instruction Book.



MOVEMENT OF FUEL PUMP SLIDER BAR IN THIS DIRECTION REDUCES FUEL SUPPLY AND IN OTHER DIRECTION INCREASES FUEL SUPPLY.

ADJUSTMENT PEG BOLTED THROUGH SLIDER BAR.

TRIGGER DIMENSION 'B' MAY BE INCREASED OR DECREASED BY THE FITTING OF A NEW TRIGGER OR BY THE FOLLOWING:

- ADDITION OF WELDED METAL TO THE END OF THE EXISTING TRIGGER.
- SHRINKING OR CAREFULLY SOLDERING A STEEL NAIL TO THE END OF THE EXISTING TRIGGER. (AFTER HEATING CARE MUST BE TAKEN TO ENSURE THAT THE 1/8" DIA. PEG, PRESSED AND BIVETTED IN THE TRIGGER, HAS NOT BECOME LOOSE)
- FITTING A NEW ENLARGED ADJUSTMENT PEG.

SO THAT A MEASUREMENT MAY BE USED TO ASSESS THE VARIATION DIMENSION 'B', IT IS NECESSARY TO INSERT A FITTING OR BALL, 1/4" DIA. IN THE HOLE IN THE TRIGGER. THE ORIGINAL DIMENSION 'B' IS STAMPED ON THE SIDE OF EACH TRIGGER.

DURING ENGINE TEST, A LINE IS DRAWN AND MARKED WITH A DRILL POINT BY L.O.S.S. ON TOP OF THE SLIDER BAR AT A DISTANCE OF 1 INCH FROM THE FUEL PUMP BODY WHEN THE ENGINE IS DEVELOPING 100% OF RATED B.H.P. OR 100% OF J.T.A. CLIMATE, DE-RATED B.M.R.

AMOUNT BY WHICH TRIGGER DIMENSION 'B' HAS TO BE INCREASED TO OBTAIN 100% B.H.P. TO BE INCREASED TO OBTAIN 100% B.H.P.

PERCENTAGE OF FULL POWER AVAILABLE AT APPROXIMATE TRIGGER DIMENSION 'B'	HLW (L.W.)	L.W. (L.W.)	L3 (1200 R.P.M.)	B.H.P. @ 100% B.H.P.
100	100	100	100	100
97.5	97.5	96.0	97.2	96.1
95.0	95.0	93.5	95.0	94.2
92.5	92.5	90.8	92.8	91.9
90.0	90.0	88.2	90.6	89.5
87.5	87.5	85.4	88.2	87.7
85.0	85.0	82.5	85.7	85.7
82.5	82.5	79.7	83.3	83.3
80.0	80.0	76.8	80.8	80.8
77.5	77.5	73.9	78.3	78.3
75.0	75.0	71.0	75.8	75.8
72.5	72.5	68.1	73.3	73.3
70.0	70.0	65.2	70.8	70.8
67.5	67.5	62.3	68.3	68.3
65.0	65.0	59.4	65.8	65.8
62.5	62.5	56.5	63.3	63.3
60.0	60.0	53.6	60.8	60.8
57.5	57.5	50.7	58.3	58.3
55.0	55.0	47.8	55.8	55.8
52.5	52.5	44.9	53.3	53.3
50.0	50.0	42.0	50.8	50.8
47.5	47.5	39.1	48.3	48.3
45.0	45.0	36.2	45.8	45.8
42.5	42.5	33.3	43.3	43.3
40.0	40.0	30.4	40.8	40.8
37.5	37.5	27.5	38.3	38.3
35.0	35.0	24.6	35.8	35.8
32.5	32.5	21.7	33.3	33.3
30.0	30.0	18.8	30.8	30.8
27.5	27.5	15.9	28.3	28.3
25.0	25.0	13.0	25.8	25.8
22.5	22.5	10.1	23.3	23.3
20.0	20.0	7.2	20.8	20.8
17.5	17.5	4.3	18.3	18.3
15.0	15.0	1.4	15.8	15.8
12.5	12.5	-1.5	13.3	13.3
10.0	10.0	-4.4	10.8	10.8
7.5	7.5	-7.3	8.3	8.3
5.0	5.0	-10.2	5.8	5.8
2.5	2.5	-13.1	3.3	3.3
0.0	0.0	-16.0	0.8	0.8

FOR CURVES SHOWING ENGINE PERFORMANCE AT HIGH ALTITUDE AND HIGH ATMOSPHERIC TEMPERATURES SEE S.A. 351/4.

NOTE:- A REDUCTION IN THE TRIGGER DIMENSION (OR INCREASE IN THE FUEL SUPPLY) MUST IN NO CIRCUMSTANCES BE EFFECTED.

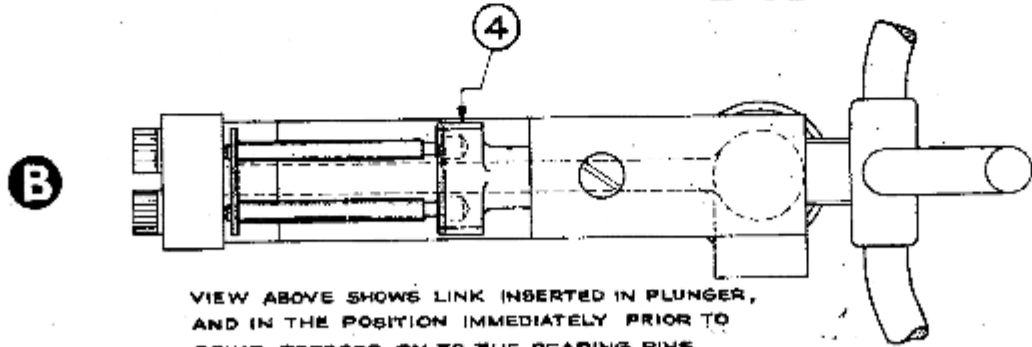
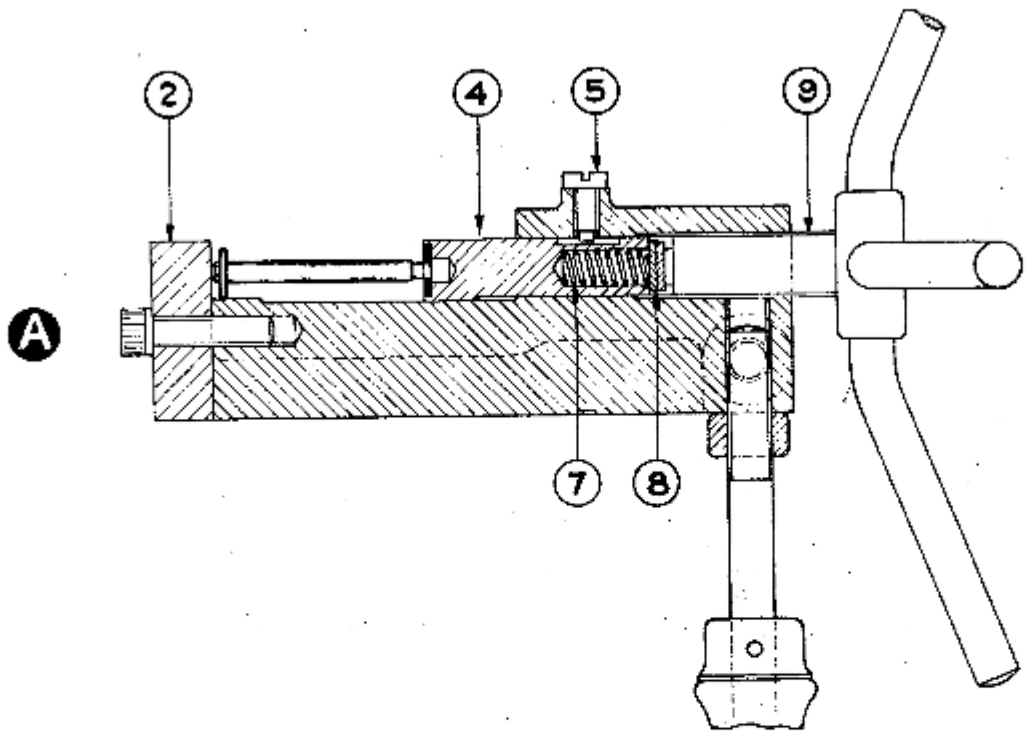
TYPE: HLW, L.W. & L.I. ENGINES.

DESCRIPTION: POWER REDUCTION BY LENGTHENING OF FUEL LIMITING TRIGGER.

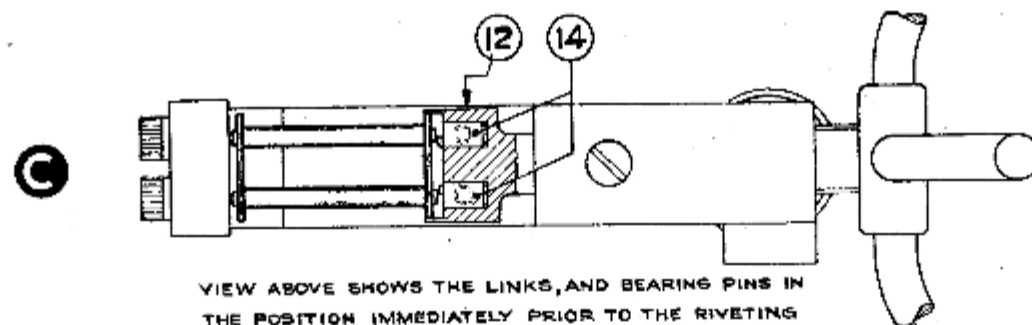
SCALE: FULL & TWICE FULL SIZE.

L. GARDNER & SONS LTD.
PATRICROFT
M. MARCHESTER

DWG. NO
3276F



VIEW ABOVE SHOWS LINK INSERTED IN PLUNGER, AND IN THE POSITION IMMEDIATELY PRIOR TO BEING PRESSED ON TO THE BEARING PINS.



VIEW ABOVE SHOWS THE LINKS, AND BEARING PINS IN THE POSITION IMMEDIATELY PRIOR TO THE RIVETING OVER OF THE INSIDE EDGE OF EACH PIN.

LK ENGINESTIMING CHAIN SIDE PLATE PRESS TOOL & STUD RIVETING TOOL.

PURPOSE: When joining the ends of a chain which has been fitted to an engine this tool should be used to press the side plate firmly and squarely up to the shoulders on the two studs. By changing press plunger for the riveting plunger the two stud ends can be riveted to provide additional means of retaining side plate in position.

METHOD (as PRESS TOOL):

Apply a little stiff grease to recess in end of plunger (4) and place side plate in this recess; the plate will be retained by grease.

The spring load on the plunger will press the side plate on to the ends of the two studs; by slight movement of the tool it will be felt when the two holes in the side plate have registered with the ends of the studs.

The plunger is spring loaded so that when it is pressed against the forward side of the chain, the plunger will recede into the boss of tool, allowing the end plate (2) to take up a position behind chain as shown at "B".

Having attained this position, force the plate on to the studs by means of the large fine thread screw (9) until the plate is felt to be firmly in contact with the shoulders on the studs. Release screw and remove tool.

METHOD (as RIVETING TOOL):

Remove retaining screw (5) in boss of tool, remove press plunger (4) and replace by riveting plunger (12), taking care to refit spring (7) and two hardened steel discs (8) as shown at "A". Apply tool to the chain in the same way as described for pressing side plate. Screw up fine thread screw, until definite resistance is felt, and rotate screw a further $\frac{1}{2}$ to $\frac{3}{4}$ of a turn. This forces the two punches (14) into the ends of the two studs sufficiently to turn over the metal at one point on the end of each stud. This provides a means, in addition to that of interference fit, of retaining the side plate.

NOTE 1: Where a number of engines are involved the operator may wish to have two tools, one permanently fitted with the press plunger, and the other permanently fitted with the riveting plunger.

NOTE 2: On the LK engine the tool can be applied to the chain at one point only, i.e. on the underside of the crankshaft sprocket; for access to this point the small splash door has to be removed.

NOTES:

- TO OBTAIN ACCURATE MEASUREMENT OF LENGTH CHAIN SHOULD BE WASHED & EITHER HUNG VERTICALLY OR Laid ON FLAT SURFACE WITH CORRECT LOAD APPLIED.
- THE METHOD SHOWN OF ANCHORING THE CHAIN & APPLYING THE MEASURING LOAD IS DIAGRAMMATIC. ANY OTHER CONVENIENT ARRANGEMENT MAY BE USED BUT BENDING OF THE PINS MUST BE AVOIDED.

IMPORTANT:
WHEN RECONDITIONING AN ENGINE FOR A FURTHER LONG PERIOD OF USE, IT IS RECOMMENDED THAT A NEW CHAIN BE FITTED IF THE LENGTH OF THE OLD CHAIN UNDER THE MEASURING LOAD EXCEEDS THAT GIVEN IN THE TABLE.

ENGINE TYPE	CHAIN			PIN DIAMETER D IN.	MEASURING LOAD W LB.	MICROMETER READING = $\frac{L_1 + L_2}{2}$	NEW POSITION		SINGLE IDLER DOUBLE IDLER
	NUMBER	PITCH IN.	NO. OF PITCHES				POSITION	READING	
LX	116310	.4875	92	.155	64	39.628	39.657	IN.	
2-4L2	110046	.50	94	.175	28	40.533	40.736	IN.	
5-6L2	114046	.50	68		56	38.325	38.493		
LW & L3	116046	.50	96	.175	64	47.325	47.563		
			98			48.325	48.568		

L. GARDNER & SONS, LTD.
PATRICROFT.

TYPE
LX, LW, L2 & L3

DESCRIPTION
PERMISSIBLE
CHAIN STRETCH

SCALE

MATERIAL

MACHINED

DATE 6. 4. 26

SA 1759

SUPPLEMENTED BY

DRAWN BY *GH*

TRACED BY *GH*

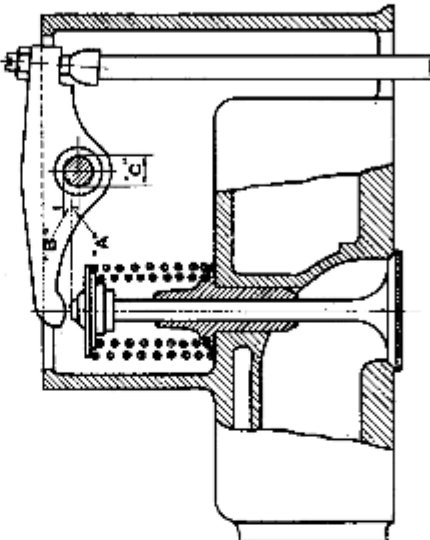
CHECKED BY *GH*

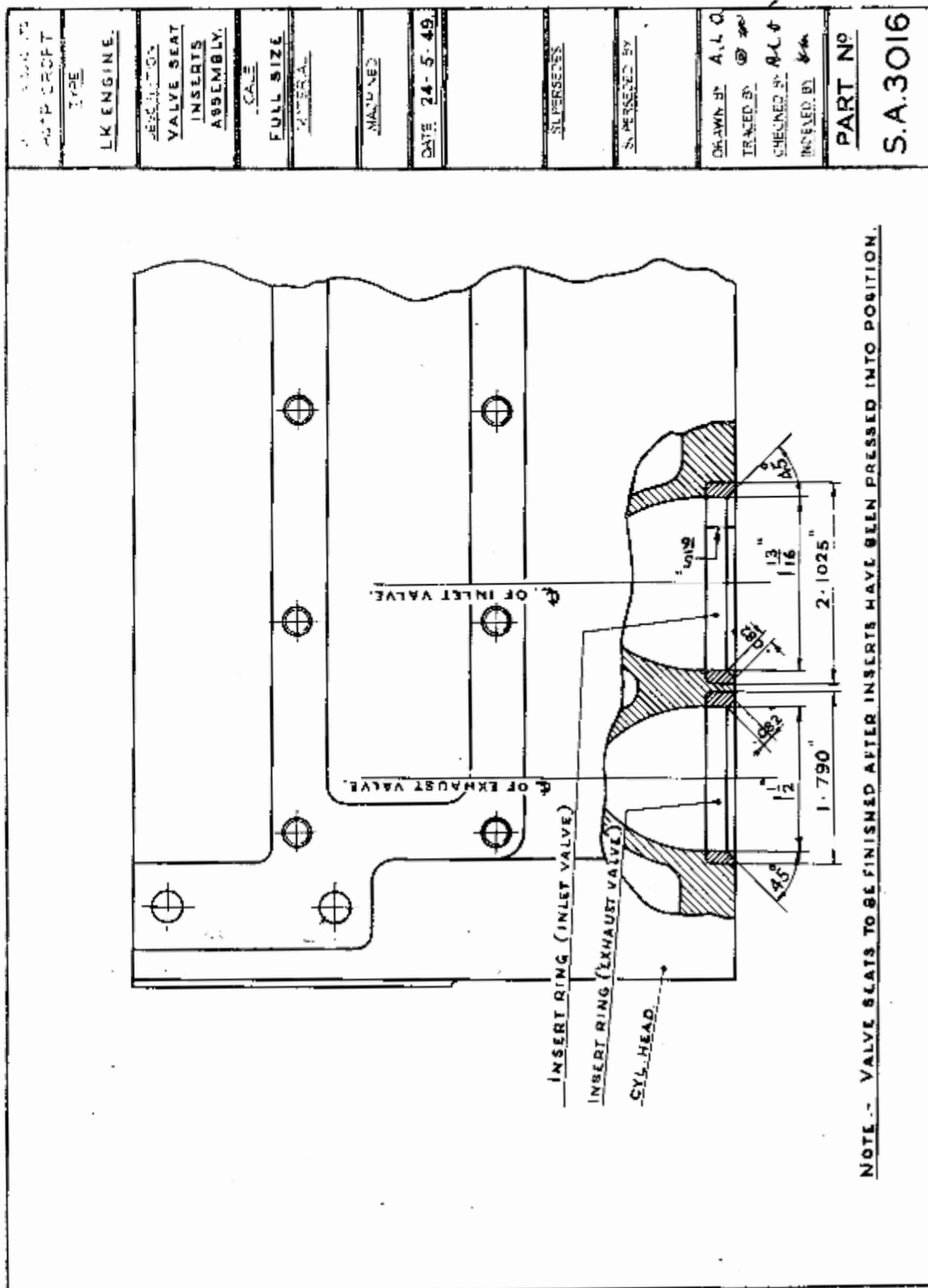
INDEXED BY *GH*

PART NO

SA1885



L. GARDNER & SONS, LTD. PATRIORFT.	TYPE L ENGINES.	DESCRIPTION RELATION OF END OF INLET AND EXHAUST VALVES TO ROCKER SHAFT	SCALE -	MATERIAL -	MACHINED -	DATE 8-5-39.	SUPERSEDED -	SUPERSEDED BY -	DRAWN BY T.H.P. TRACED BY S.M.P. CHECKED BY J.H.C. INDEXED BY J.	PART No S.A. 2206																																		
<div style="display: flex; justify-content: space-around; align-items: center;">  <table border="1" style="border-collapse: collapse;"> <thead> <tr> <th rowspan="2">ENGINE</th> <th rowspan="2">DIA. OF ROCKER SHAFT "C"</th> <th colspan="2">INLET VALVE.</th> <th colspan="2">EXHAUST VALVE.</th> </tr> <tr> <th>DIMENSION "A"</th> <th>DIMENSION "B"</th> <th>DIMENSION "A"</th> <th>DIMENSION "B"</th> </tr> </thead> <tbody> <tr> <td>L.K.</td> <td>9 16</td> <td>.222</td> <td>.059</td> <td>.183</td> <td>.098</td> </tr> <tr> <td>L.W.</td> <td>.</td> <td>.230</td> <td>.051</td> <td>.198</td> <td>.083</td> </tr> <tr> <td>L.2.</td> <td>.</td> <td>.198</td> <td>.085</td> <td>"</td> <td>"</td> </tr> <tr> <td>L.3.</td> <td>11 16</td> <td>.299</td> <td>.046</td> <td>.267</td> <td>.076</td> </tr> </tbody> </table> </div>											ENGINE	DIA. OF ROCKER SHAFT "C"	INLET VALVE.		EXHAUST VALVE.		DIMENSION "A"	DIMENSION "B"	DIMENSION "A"	DIMENSION "B"	L.K.	9 16	.222	.059	.183	.098	L.W.	.	.230	.051	.198	.083	L.2.	.	.198	.085	"	"	L.3.	11 16	.299	.046	.267	.076
ENGINE	DIA. OF ROCKER SHAFT "C"	INLET VALVE.		EXHAUST VALVE.																																								
		DIMENSION "A"	DIMENSION "B"	DIMENSION "A"	DIMENSION "B"																																							
L.K.	9 16	.222	.059	.183	.098																																							
L.W.	.	.230	.051	.198	.083																																							
L.2.	.	.198	.085	"	"																																							
L.3.	11 16	.299	.046	.267	.076																																							

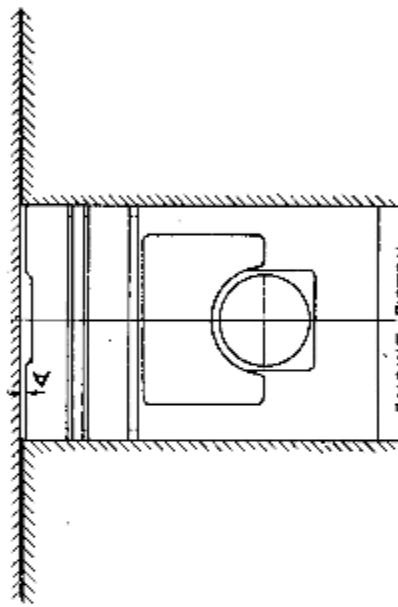


DRAWN BY TYPE LK ENGINE.	VALVE SEAT INSERTS ASSEMBLY.	FULL SIZE GENERAL	MADE BY DATE 24-5-49.	SUPERSEDES	CHECKED BY INSPECTED BY	PART No S.A.3016
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DRAWN BY A.L.Q.
 TRACED BY
 CHECKED BY A.C.G.
 INSPECTED BY

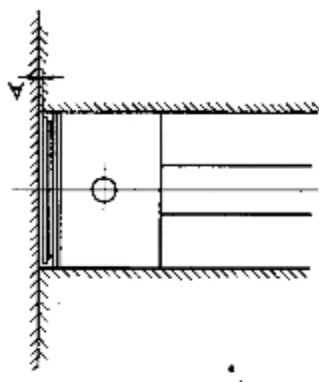


L. GARDNER & SONS, LTD.	PATRICROFT.		
TYPE	L TYPE ENGINES.		
DESCRIPTION	CYLINDER HEAD TO PISTON CLEARANCES.		
SCALE			
MATERIAL			
HEAT TREATMENT			
MACHINED			
DATE	6-4-55		
SUPERSEDES	DWC. S.A. 3025. IM. 3550.		
SUPERSEDED BY			
DRAWN BY	J.H.P.		
TRACED BY	H.A.		
CHECKED BY	J.M.P.		
INDEXED BY	J.Z.		
PART No.	S.A.3434		



ENGINE PISTON.

ENGINE	CYLINDER HEAD TO PISTON CLEARANCE (DIMENSION A)		
	NOMINAL	MAXIMUM	MINIMUM
L2	.0444	.0544	.0364
LW & HLW	.0444	.0514	.0384
L3	.083	.096	.072
LK	.0575	.0645	.0515



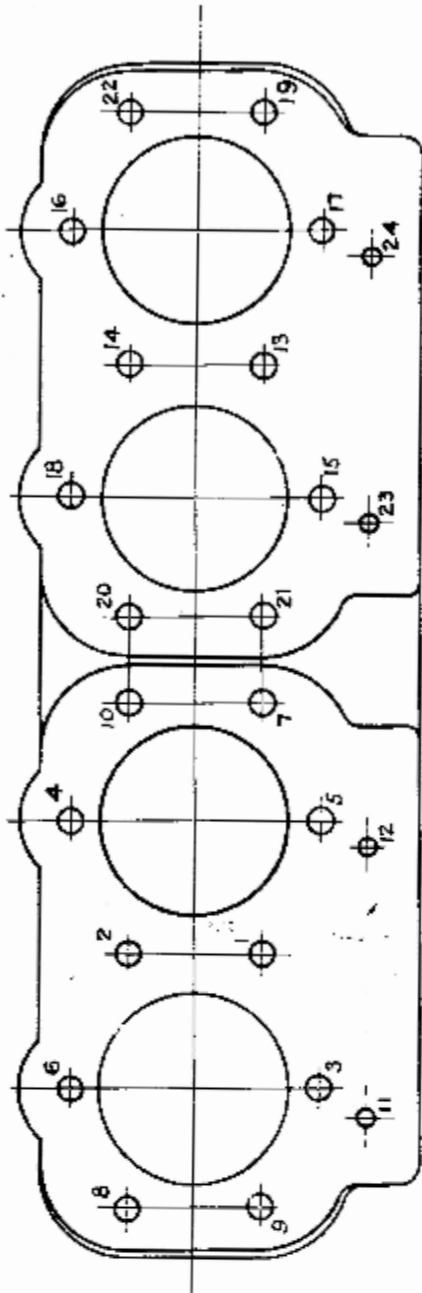
AIR EXHAUSTER PISTON.

ENGINE	CYLINDER HEAD TO PISTON CLEARANCE (DIMENSION A)		
	NOMINAL	MAXIMUM	MINIMUM
LW & HLW	.0156	.0266	.0116
LK	.0312	.0412	.0272

NOTE:- THE ABOVE CLEARANCES SHOULD OBTAIN WHEN THE PACKINGS QUOTED BELOW ARE FITTED.

ENGINE	CYLINDER HEAD PACKING THICKNESS	CYLINDER FOOT PACKING THICKNESS
L2	.0625	.004
LW & HLW	.013	.004
L3	NONE	.004
ALUM. 4LK CIL. BLOCK	.013	NONE
4LK CIL. BLOCK	.013	.004

GARDNER & SONS, LTD. PATRICROFT.	TYPE 4 LK ENGINE	DESCRIPTION ORDER OF TIGHTENING UP CYLINDER HEAD NUTS.	SCALE
MATERIAL	MACHINE	DATE 27-6-49	SUPERSEDED
SUPERSEDED BY	DRAWN BY A.L.O.	TRACED BY R.M.P.	CHECKED BY R.C.O.
INDEXED BY K.P.	PART No S A.3024		



NOTE:-

THE TIGHTENING UP MUST BE CARRIED OUT IN THREE STAGES
i.e. THREE DEGREES OF TIGHTNESS.

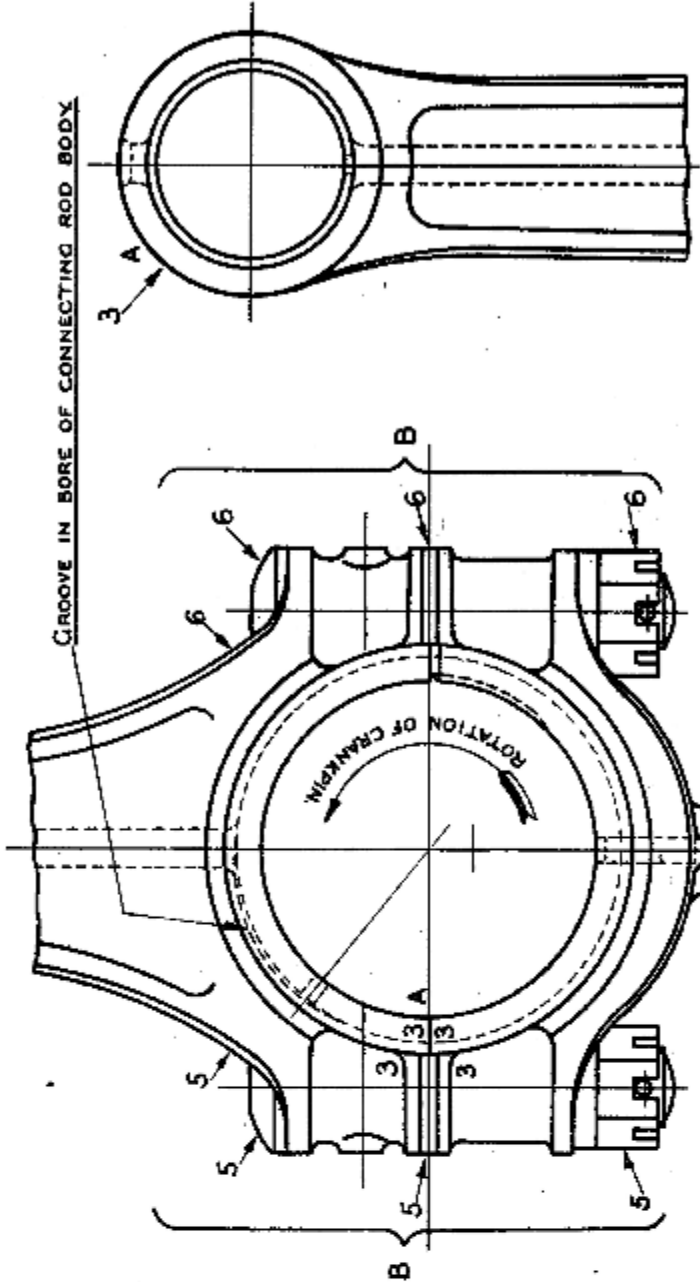
- 1ST. SCREW UP LIGHTLY IN ORDER STATED.
- 2ND " " " MEDIUM TIGHT IN ORDER STATED.
- 3RD " " " FINALLY TO 750 LB INCHES IN ORDER STATED.

THE TIGHTENING UP IS TO BE CARRIED OUT WHILST THE ENGINE IS
COLD. NO TIGHTENING UP IS TO BE DONE AFTER WARMING UP
THE ENGINE.



GARDNER & SONS, LTD. PATRICROFT
TYPE 4LK ENGINE.
DESCRIPTION CONNECTING ROD
LOCATING NUMBERS
SCALE
MATERIAL
MACHINED
DATE 22-6-49
SUPERSEDES
SUPERSEDED BY
DRAWN BY A.L.O.
TRACED BY M.J.
CHECKED BY A.L.O.
INDEXED BY
PART NO.
S.A. 3023

ASSEMBLY DWG. N° 1980H



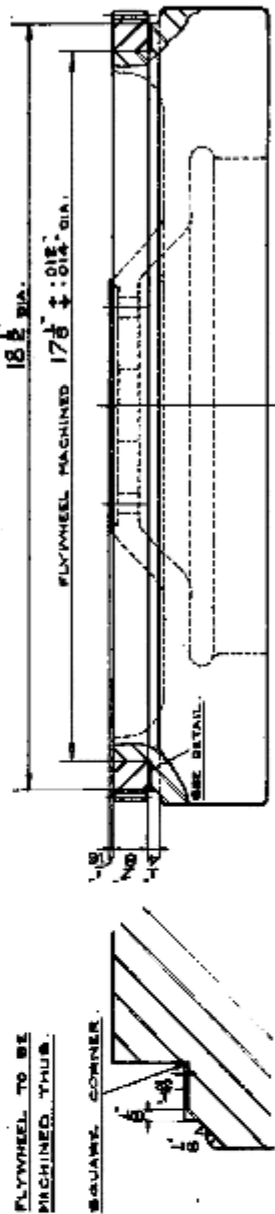
CONNECTING ROD SMALL END.

CONNECTING ROD BIG END.

BOLTS, NUTS & SHIMS.
 THESE ARE NUMBERED CONSECUTIVELY IN SETS AS SHOWN AT 'B' WITH CORRESPONDING MARKINGS ON THE CONNECTING ROD BODY ADJACENT TO THE BOLT HEAD TO FACILITATE REASSEMBLY INTO THEIR ORIGINAL POSITIONS. THUS IN A 4LK ENGINE THE NUMBERS ARE FROM 1-8.

CONNECTING ROD BODY CAP & BEARINGS.
 THE CYLINDER NUMBER TO WHICH THE ASSEMBLY BELONGS IS STAMPED IMMEDIATELY ABOVE AND BELOW THE SPLIT IN THE BIG END, AND ON THE OUTSIDE DIAMETER OF THE SMALL END, AS SHOWN AT 'A'. NO. 3 ROD IS SHOWN ABOVE.
 THE CONNECTING ROD IS TO BE ASSEMBLED INTO THE ENGINE WITH THESE MARKINGS ON THE TAPPET SIDE. THE FIGURES ON THE BIG END ARE THEN ON THAT SIDE OF THE ROD, WHICH IS TOWARDS THE FLYWHEEL END OF THE ENGINE.
IMPORTANT.
 AFTER FINISH BORING THE BEARING TO THE REQUIRED DIAMETER, THE RADIUS AT EACH SIDE OF THE BEARING MUST BE RESTORED TO ITS ORIGINAL SIZE (.0161").

THE GEAR RING IS TO BE SHRUNK ON THE FLYWHEEL.
 THE PROCEDURE IS AS FOLLOWS :-
 EXPAND THE GEAR RING BY PLAYING THE FLAME OF A
 BLOW LAMP AROUND SAME UNTIL THE INTERNAL DIA. IS
 INCREASED BY ABOUT $\frac{1}{16}$. VERY LITTLE HEAT IS REQUIRED
 TO CAUSE THIS EXPANSION, THEREFORE CARE MUST BE TAKEN
 NOT TO OVERHEAT THE RING DURING THIS OPERATION.
 AFTER EXPANDING, PLACE THE GEAR RING IN POSITION ON
 THE FLYWHEEL AND ALLOW IT TO COOL SLOWLY IN THE AIR.
IMPORTANT :
 THE GEAR RING MUST NOT BE HEATED IN A FIRE.



GARDNER & SONS LTD. PATRICROFT M ¹ MANCHESTER.		TYPE: L. K. ENGINE & H.L.W. ENGINE		SUPERSEDER		DWG. N ^o	
INSTRUCTIONS FOR FITTING GEAR RING ON FLYWHEEL.		MATERIAL		SUPERSEDER BY		2958 F	
SCALE: HALF SIZE.		FINISHING		D.D.		DRAWN BY J.A.J.	
				INDEXED BY E.M.		CHECKED BY	
				DATE 26.1.47.		DESIGNED BY	

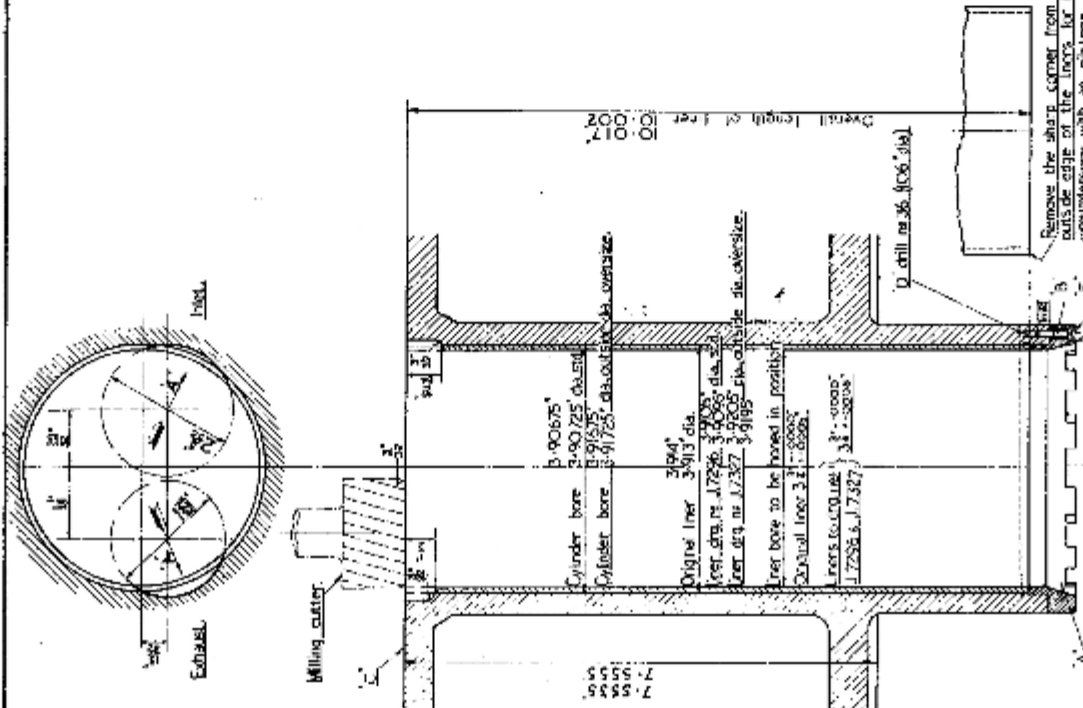


NOTE:-

In order to avoid leakage of the liner when milling, valve recesses like small radial cuts in direction of arrows A, B, with small vertical grooves of the cutter Endeavour to reproduce accurately the designed dimensions.

INSTRUCTIONS. See note (H) below Nos. 0445. Remove the locking screws B and the nuts A.

- ① Heat up the cylinder block in boiling water before attempting to press out the liners. The heating up of the cylinder block to be repeated for each liner.
- ② After the nuts have been pressed out replace the nuts A & locking screws B. If found necessary, new holes D can be drilled in the cylinder blocks. The edge of the holes E to be burr'd over so as to lock the screws B.
- ③ If the gasket face C of the cylinder block does not require re-surfacing, it is important to determine that the liners are not of such a length that they will project above the gasket face after being pressed in.
- ④ Remove the sharp corners on the liners as indicated in view below.
- ⑤ Heat up the cylinder block and gag liner in boiling water for one minute. Remove the cylinder block & the liner from the water and immerse both the cylinder bore and external surface of the liner liberally with lard oil. Press in the liner. The approximate pressure required is a maximum of 4 tons and a minimum of 2 1/2 tons.
- ⑥ It is important that the above instructions be executed quickly. Instruction (G) including the heating up of the cylinder block, is to be repeated for each cylinder bore.
- ⑦ **NOTE:-** The liners in dia. no. J.7296 & J.7227 are to be pressed in without heating. A pressure approx. 3 1/2 tons maximum and 2 tons minimum.
- ⑧ Mill away the valve recesses in each liner as indicated in view above.
- ⑨ Hone the bore of each liner to finished size (3 1/4" 0.0003 dia. for original liners) (3 1/4" 0.0003 dia. for liners to org. no. J.7296 & J.7227) if found necessary re-surface the gasket face of the cylinder block by surface grinding. See instruction no. (4).
- ⑩ A new cylinder head gasket should be fitted after re-boring the liners.
- ⑪ Now, 0446, when fitting or removing liners to org. no. J.7296 or J.7227 identified by label attached to each liner, it is unnecessary to heat the cylinder block or liner. In default which liner has been fitted to the cylinder block, heat to remove. Liners to org. no. J.7296 & J.7227 are not impregnated & can thus be identified.



TYPE :- 4 LK. ENGINE. (ALUM. CYLINDER BLOCK)
 DESCRIPTION :- INSTRUCTIONS FOR THE RENEWAL OF CYLINDER LINERS.
 SCALE :-

DWG. No
 1764 H

APPROVED	DATE
REVISION	BY
DATE	BY

DESIGN	DATE
BY	BY

LDGARDNER & SON, LTD.
 MANCHESTER.
 MANCHESTER

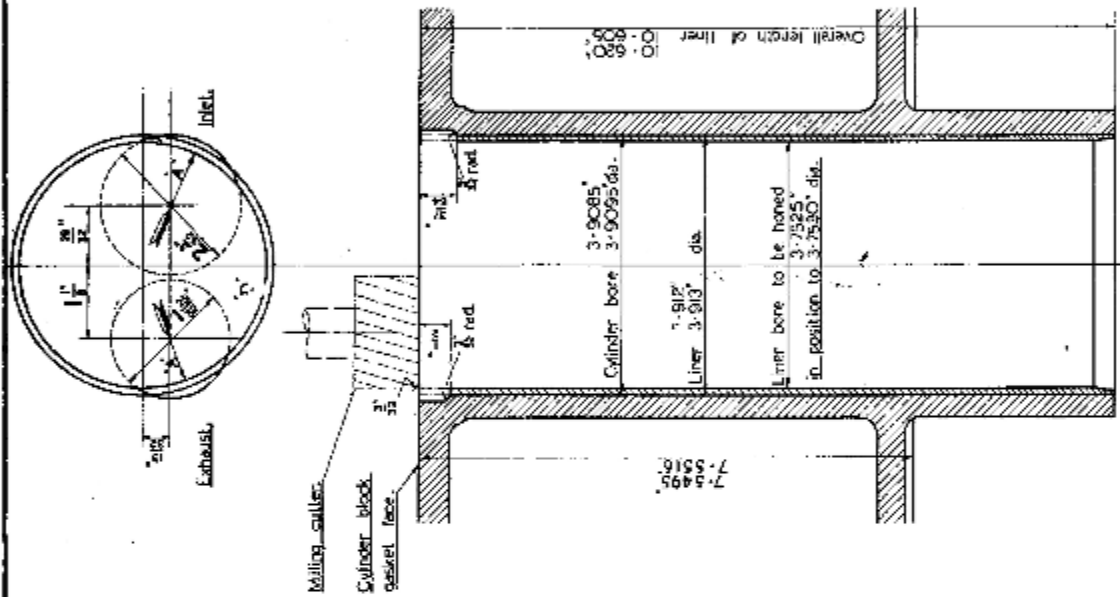
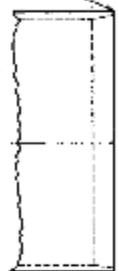
RD. 117

NOTE -
In order to avoid breakage of the liner when milling valve recesses, take small radial cuts in direction of arrow A-A' with small vertical feeds of the cutter. Endeavour to reproduce accurately the designed dimensions.

INSTRUCTIONS

- ① Press out the existing liners.
- ② Remove the sharp corners on the liners as indicated in view below.
- ③ Smooth tallow liberally over the surface of each cylinder bore and the external surface of each liner. It is important that tallow is used and not lubrication oil. Press in the liners until the upper edges are level with the gasket face of the cylinder block. The approximate pressure required is a maximum of five tons and a minimum of two tons.
- ④ Mill away the valve recesses in each liner as indicated to dimensions shown in view C.
- ⑤ Hone the bore of each liner to finished size = $3\frac{1}{16} \pm 0.0005$ " dia.
- ⑥ If found necessary re-surface the gasket face of the cylinder block by surface grinding.
- ⑦ A new cylinder head gasket should be fitted after renewing the liners.

NOTE -
Remove the sharp corner from the lower side of edge of liners for the whole circumference with an oil stone.

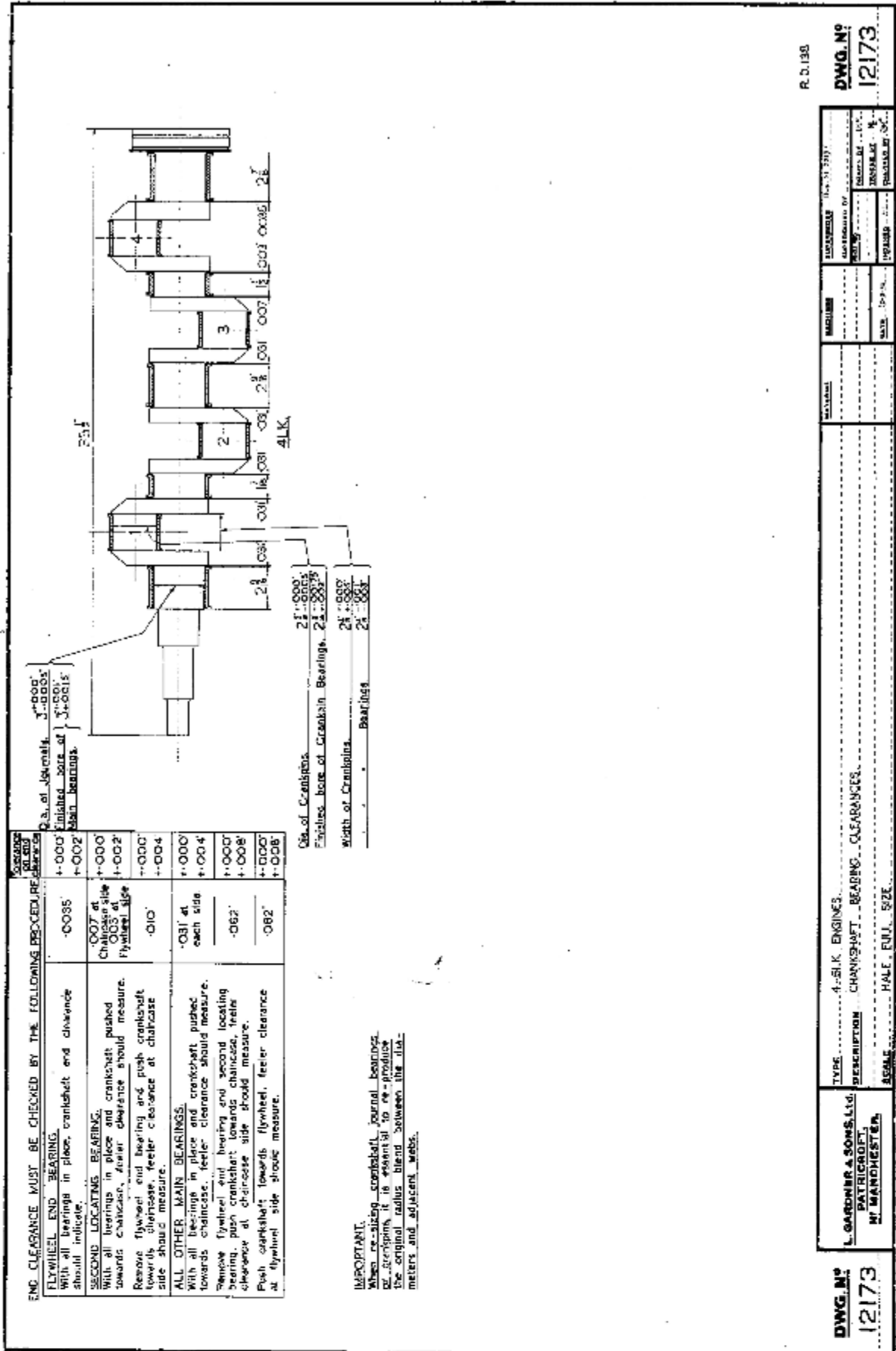


RD. 1021
DWG. NO
3676 H

APPROVED	T.H.P.
DRAWN	CHECKED
DATE	BY
REVISED	BY
NO. 81.46	DATE

TYPE - 4 LK ENGINES. (C.I. CYLINDER BLOCK)
DESCRIPTION - INSTRUCTIONS FOR THE RENEWAL OF CYL. LINERS.
SCALE -

GARDNER & SON (LONDON) LTD.
MANCHESTER
NEWCASTLE



END CLEARANCE MUST BE CHECKED BY THE FOLLOWING PROCEDURE		CRANKPIN DIAMETER	BEARING CLEARANCE
FLYWHEEL END BEARING. With all bearings in place, crankshaft end clearance should indicate.		+000	+002
SECOND LOCATING BEARINGS. With all bearings in place and crankshaft pushed towards chassis, feeler clearance should measure.		+000	+002
Remove flywheel end bearing and push crankshaft towards chassis. Measure feeler clearance at chassis side shaft measure.		+000	+004
ALL OTHER MAIN BEARINGS. With all bearings in place and crankshaft pushed towards chassis, feeler clearance should measure.		+000	+004
Remove flywheel end bearing and second locating bearing, push crankshaft towards chassis, feeler clearance at chassis side should measure.		+000	+008
Push crankshaft towards flywheel, feeler clearance at flywheel side should measure.		+000	+008

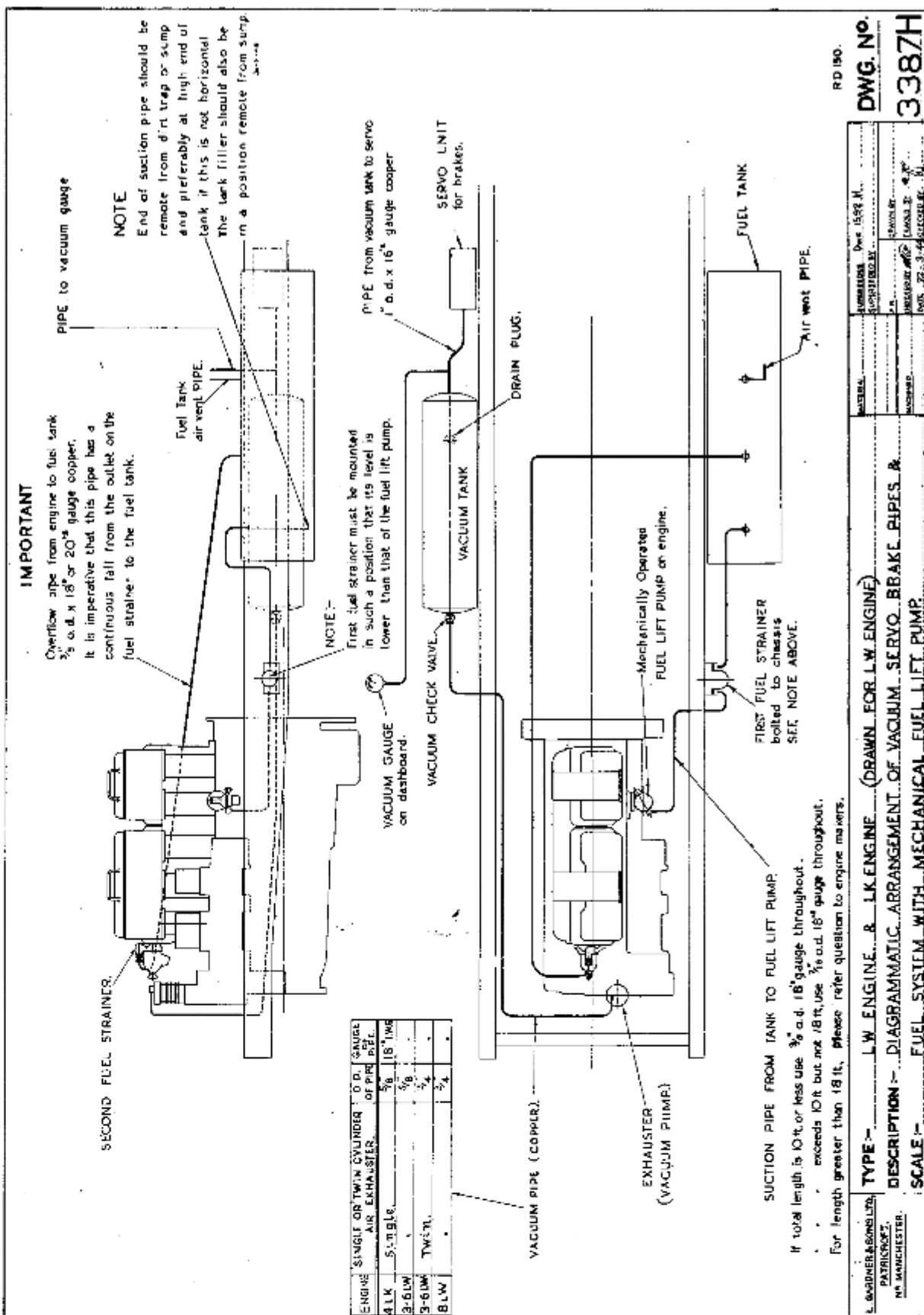
IMPORTANT.
When re-sizing conrod ball journal bearings or bearings it is essential to re-produce the original radius blend between the fillets and adjacent webs.

Dia. of Crankpins $2\frac{1}{8}$ Dia. Crankpins
Finished bore of Crankpin Bearings $2\frac{1}{16}$ Dia. Crankpins
Width of Crankpins $2\frac{1}{8}$ Dia. Crankpins
Bearings $2\frac{1}{16}$ Dia. Crankpins

R. 5.130

DWG. No. 12173

L. GARDNER & SONS, LTD. PATRICROFT, W. BARMINGHAM	TYPE	4-CYL. ENGINES.
	DESCRIPTION	CRANKSHAFT BEARINGS CLEARANCES.
DWG. No. 12173	SCALE	HALE 1/4" = 1" SIZE
APPROVED BY	DATE	PREPARED BY
CHECKED BY	DATE	DESIGNED BY
DRAWN BY	DATE	MANUFACTURED BY



RD 150.
DWG. No. 3387H

TYPE - L.W. ENGINE & L.K. ENGINE (DRAWN FOR L.W. ENGINE)

DESCRIPTION - DIAGRAMMATIC ARRANGEMENT OF VACUUM SERVO BRAKE PIPES & FUEL SYSTEM WITH MECHANICAL FUEL LIFT PUMP.

SCALE -

L. GARDNER & SONS LTD.
PATRICKSCT.
NY MANCHESTER.

MATERIAL -
SUBMITTER -
DATE -
DESIGNED BY -
CHECKED BY -
APPROVED BY -

LW & 4LK ENGINE TESTING EQUIPMENT.

PARTS WHICH CAN BE SUPPLIED BY L. GARDNER & SONS, LTD.
FOR USE WITH HESNAN & FROUDE HYDRAULIC DYNAMOMETER
TYPE DPX4 FOR 2 - 6LW & 4LK ENGINES,
" DPX5 " 8LW ENGINES

For Testing LW Engine

- 1 Flywheel to Dwg. No. 1060H
- 1 Adaptor to Dwg. No. 3225F
- 6 Nuts J8176
- 1 Adaptor to Dwg. No. 3226F (2-6LW & 4LK)
- 1 Adaptor to Dwg. No. 3227F (8LW only)
- 6 Bolts J8177
- 1 "Layrub" No. 60 X 1 $\frac{1}{4}$ " 6/6 series Propeller Shaft.
Manufactured by The Laycock Eng.Co.Ltd.,
Victoria Works, Millhouses, Sheffield. 8.
(Outline Dwg. to L.Gardner & Sons Ltd.
Dwg. No. 3218F).

Additional items for testing 4LK Engine

- 1 Flywheel to Dwg. No. J7
- 1 Adaptor to Dwg. No. 3228F
- 6 Studs J15
- 6 Nuts E2797

All as per assembly drawing No. 12672.

A copper fuel feed flask complete with glass sight tube to Drawing No. 8972 can also be supplied.

We recommend a "Hasler" or similar hand tachometer.

"L" TYPE ENGINESINSTRUCTIONS FOR THE CORRECT TIGHTENING OF MAIN BEARING CAP NUTS

As the procedure for the tightening of the above nuts has a slight but highly important effect on the bearing bore size and shape, it is essential that these nuts are re-tightened in exactly the same order and to the same degree of tightness every time the bearings and caps are assembled. FOR THIS PURPOSE IT IS NECESSARY TO ESTABLISH A STANDARD PROCEDURE, WHICH MUST BE OBSERVED BY EVERY OPERATOR AT EACH STAGE OF THE JOB.

This standard procedure must be as follows:-

- 1st STAGE. Run each pair of nuts down until they just slightly nip the bearing cap (or steel bridges in the case of the LW & HLW)
- 2nd STAGE. Tighten number side nut to about half the final tightness.
- 3rd STAGE. Tighten opposite side as above.
- 4th STAGE. Tighten number side to final tightness.
- 5th STAGE. Finally tighten opposite side.

NOTE: the ELW engine incorporates a four-bolt centre main bearing and the correct procedure for this particular bearing is as follows:-

- 1st STAGE. Run each pair of nuts down until they just nip the steel bearing bridges.
- 2nd STAGE. Tighten nut No. 9 followed by nut No. 11, to about half final tightness.
- 3rd STAGE. Tighten nut No. 10, followed by nut No. 12, as above.
- 4th STAGE. Tighten nut No. 9, followed by nut No. 11 to final tightness.
- 5th STAGE. Tighten nut No. 10, followed by nut No. 12 as above.

General use of this method will ensure that the size and shape of the bearing bore as produced by line boring, or hand scraping, will be maintained, which is of course vital.

The correct tightness for these nuts on the various engines is as given by the following loads on a spanner of 3ft. effective length :-

L2 - 41 to 43 lb.	LK - 41 to 43 lb.
L3 - 55 to 58 lb.	LW & HLW - 55 to 58 lb.



"L" TYPE ENGINES

INSTRUCTIONS FOR THE CORRECT TIGHTENING OF
CONNECTING ROD BIG END NUTS

As the procedure for the tightening of the above nuts has a slight but highly important effect on the bearing bore size and shape, it is essential that these nuts are re-tightened in exactly the same order and to the same degree of tightness every time the bearings and caps are assembled. FOR THIS PURPOSE IT IS NECESSARY TO ESTABLISH A STANDARD PROCEDURE, WHICH MUST BE OBSERVED BY EVERY OPERATOR AT EACH STAGE OF THE JOB.

This standard procedure must be as follows:-

LW, HLW & LK

- 1st STAGE. Run each pair of nuts down until they just slightly nip the bearing cap.
- 2nd STAGE. Tighten odd number side nut to about half the final tightness.
- 3rd STAGE. Tighten opposite side as above.
- 4th STAGE. Tighten odd number side to final tightness.
- 5th STAGE. Finally tighten opposite side.

L3

NOTE: the L3 engine incorporates a four-bolt connecting rod and the correct procedure for this particular bearing is as follows:-

- 1st STAGE. Run each pair of nuts down until they just slightly nip the bearing cap.
- 2nd STAGE. Tighten nut No.1, followed by nut No.3, to about half final tightness.
- 3rd STAGE. Tighten nut No.2, followed by nut No.4, as above.
- 4th STAGE. Tighten nut No.1, followed by nut No.3, to final tightness.
- 5th STAGE. Tighten nut No.2, followed by nut No.4, as above.

General use of this method will ensure that the size and shape of the bearing bore as produced by line boring, will be maintained, which is of course vital.

The correct tightening torque for these nuts on the various engines is as given by the following table :-

L3	-	980 lb. in.
LK	-	980 lb. in.
LW & HLW	-	1250 lb. in.

L. GARDNER & SONS, LTD.	PATRICROFT.	<u>TYPE</u>	<u>DESCRIPTION</u>	<u>CORRECT TIGHTENING TORQUE FOR VARIOUS NUTS</u>	<u>SCALE</u>	<u>MATERIAL</u>	<u>HEAT TREATMENT</u>	<u>MACHINED</u>	<u>DATE 26-10-48</u>	<u>SUPERSEDES</u>	<u>SUPERSEDED BY</u>	<u>DRAWN BY A.L.D.</u>	<u>TRACED BY H.B.</u>	<u>CHECKED BY A.C.</u>	<u>INDEXED BY E.M.</u>	<u>PART No.</u>	SA 2968.
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NOTE:- ALL TORQUE INDICATING SPANNERS SHOULD BE CHECKED REGULARLY BY MEANS OF A SPRING BALANCE, USED TO APPLY A KNOWN LOAD ON THE HANDLE OF THE SPANNER AT A KNOWN DISTANCE FROM THE NUT CENTRE.

NUT	THREAD SIZE	CORRECT TIGHTENING TORQUE IN LB. INCHES.
MAIN BEARING CAP.	$\frac{3}{8}$ B.S.F.	1500.
CONNECTING ROD BIG END.	$\frac{9}{16}$ B.S.F.	980.
CYLINDER FOOT.	$\frac{5}{8}$ B.S.F.	815.
CYLINDER HEAD.	$\frac{1}{2}$ B.S.F.	750.
EXHAUST MANIFOLD CLAMP	$\frac{3}{8}$ WHIT.	200.
SPRAYER CLAMP.	$\frac{9}{16}$ WHIT.	80.
C.V.I. INJECTION PUMPS- DELIVERY VALVE HOLDERS.	20 x $1\frac{1}{2}$ $\frac{3}{4}$ M.	800
SPRAYER PIPE UNION (PUMP END)	18 x $1\frac{1}{2}$ $\frac{3}{4}$ M.	450
" " " (SPRAYER END)	$\frac{1}{2}$ B.S.P.	450
SPRAYER DELIVERY STOCK.	$\frac{3}{8}$ B.S.R.	750
SPRAYER LEAK STOCK.	$\frac{9}{16}$ B.S.R.	750.
SPRAYER NOZZLE CAR	$\frac{3}{4}$ -14 THDS.	380
VALVE TAPPET GUIDE CLAMP	$\frac{5}{16}$ WHIT.	150
" " ADJUSTER.	$\frac{9}{16}$ B.S.F.	200
FUEL PUMP TAPPET SCREW LOCKNUT.	$\frac{3}{8}$ -24 THDS.	300
VALVE CAMSHAFT (FWD. END)	$\frac{9}{16}$ B.S.F.	900
VALVE CAM (POINTED SETSCREW).	$\frac{7}{16}$ -20 THDS.	600
VALVE CAMSHAFT CHAINWHEEL.	$\frac{3}{8}$ B.S.F.	400
GOVERNOR BODY (POINTED SETSCREW).	$\frac{3}{8}$ -24 THDS.	550
FUEL PUMP DRIVEN GEAR.	$\frac{5}{16}$ B.S.F.	400
FUEL PUMP DRIVING SHAFT COUPLING.	$\frac{5}{16}$ B.S.F.	200
COUPLING BOLTS (FLYWHEEL TO CRANKSHAFT)	$\frac{1}{2}$ B.S.F.	850
CRANKSHAFT BALANCE WEIGHT.	$\frac{3}{16}$ B.S.F.	800
FUEL STRAINER COVER.	$\frac{3}{8}$ WHIT.	180
LUB. OIL STRAINER COVER.	$\frac{1}{2}$ I.S.R.	610
STARTER MOTOR STRAP	$\frac{3}{8}$ WHIT.	180
LUB. OIL STRAINER DRAIN PLUG.	$\frac{1}{2}$ B.S.R.	170
" " SUMP	$\frac{3}{4}$ B.S.R.	450
FUEL PUMP CAMSHAFT.	$\frac{9}{16}$ B.S.F.	1150
DYNAMO STRAP.	$\frac{3}{8}$ WHIT.	150
CENT. WATER PUMP DRIVING SHAFT	$\frac{7}{16}$ B.S.F.	500



L. GARDNER & SONS, LTD.
PATRICROFT.

TYPE: L TYPE
ENGINES.

DESCRIPTION: PISTON STANDARD BORE GROOVES. OVERSIZE IN WIDTH.

SCALE:

MATERIAL:

MACHINED:

DATE: 23-1-56

WORK NO.: 11W 3040

SUPERSIDES:

SUPERSEDED BY:

RE-DRAWN BY: T.H.P.

TRACED BY: A.G.

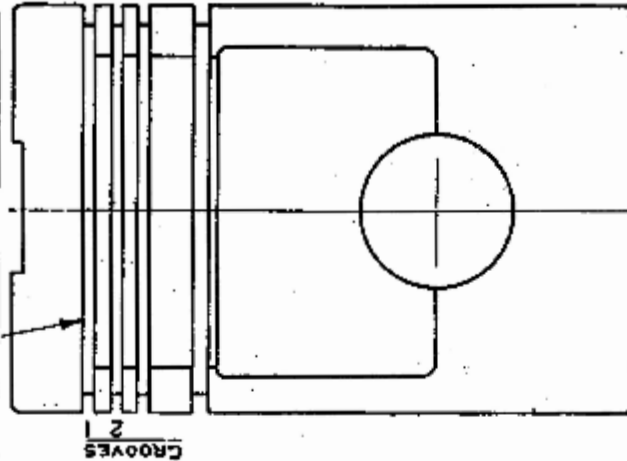
CHECKED BY: H.P.

INDEXED BY: K.D.F.

PART NO: S.A. 2913

USED WHEN RE-CONDITIONING PISTONS WITH WORN GROOVES.

WHEN OPENING OUT NO. 1 GROOVE THE UPPER FACE MUST ONLY JUST BE CLEANED UP. THE REMAINING METAL TO BE REMOVED FROM THE LOWER FACE.



NOTE: IT IS IMPROBABLE THAT THE OTHER GROOVES WILL REQUIRE OVERSIZING DURING LIFE OF PISTON.

HLW
1-6L2 & 2-BLW ENGINES (STANDARD CYL. BORE.)

Groove	FIRST OVERSIZE. WIDTH.			SECOND OVERSIZE. WIDTH.		
	WIDTH OF GROOVE	WIDTH OF RING	RING CHROMIUM PLATED ENG. S.P.N.	WIDTH OF GROOVE	WIDTH OF RING	RING CHROMIUM PLATED ENG. S.P.N.
1	.1119" GAUGE NO. 16285	.1094" -1089"	L2 3/17 2-6L2 HLW 3/118	.1275" -1270" GAUGE NO. 16287	.1250" -1245"	L2 3/18 2-6L2 HLW 3/120
2	.1144" -1134" GAUGE NO. 16286	*	*	.1300" -1290" GAUGE NO. 16288	"	"

L.K. ENGINES (STANDARD CYL. BORE.)

Groove	FIRST OVERSIZE. WIDTH.			SECOND OVERSIZE. WIDTH.		
	WIDTH OF GROOVE	WIDTH OF RING	RING CHROMIUM PLATED ENG. S.P.N.	WIDTH OF GROOVE	WIDTH OF RING	RING CHROMIUM PLATED ENG. S.P.N.
1	.0995" -0990" GAUGE NO. 16289	.0970" -0965"	LK 3/142	.1145" -1140" GAUGE NO. 16291	.1120" -1115"	LK 3/143
2	.1010" -1000" GAUGE NO. 16290	*	*	.1160" -1150" GAUGE NO. 16292	"	"

L3 ENGINES (STANDARD CYL. BORE.)

Groove	FIRST OVERSIZE. WIDTH.			SECOND OVERSIZE. WIDTH.		
	WIDTH OF GROOVE	WIDTH OF RING	RING CHROMIUM PLATED ENG. S.P.N.	WIDTH OF GROOVE	WIDTH OF RING	RING CHROMIUM PLATED ENG. S.P.N.
1	.1477" -1472" GAUGE NO. 16293	.1450" -1445"	L3 6/80	.1589" -1584" GAUGE NO. 16296	.1562" -1557"	L3 8/81
2	.1510" -1500" GAUGE NO. 16294	*	*	.1622" -1612" GAUGE NO. 16296	"	"

A.I. 130-4 (Mar. 1956)
 (Supersedes A.I. 130, A.I. 130-1, A.I. 130-2, A.I. 130-3)

P.D. 2044

PISTON RINGS

LW, HLW, L2, LK & L3 SERIES ENGINES.

Please note, sets of spare piston rings now include two pressure rings only. The rings are Chromium Plated on the periphery, and are for use in grooves Nos 1 & 2 of each piston.

See table for location of rings and respective part numbers.

SPARE PART No.

LOCATION, Groove No.	2 - 6LW 3 Groove Piston	8LW & HLW 3 Groove Piston	L2 3 Groove Piston	LK 3 Groove Piston	L3 3 Groove Piston
No. 1	3/115 (C.P.)	3/115 (C.P.)	9/36 (C.P.)	3/136 (C.P.)	8/78 (C.P.)
No. 2	"	"	"	"	"
No. 3	3/126 (Scraper)	3/2013 (Scraper)	9/40 (Scraper)	3/32 (Scraper)	8/86 (Scraper)

C.P. = Peripherally Chromium Plated.

A.I. 171.

LK, LW, HLW, L2 & L3 ENGINES.**PISTONS-OFFSET PIN HOLE TYPE.****INSTRUCTIONS FOR THE ASSEMBLING OF PISTONS IN ENGINE.**

Pistons bearing the word **GARDNER** on the side panels, (see Fig. 1), indicates that the piston pin is offset from the axis of the piston. Since the effect of this construction is greatly to reduce the noise generated at inner dead centre when the piston transfers from one cylinder wall to the other, it is desirable but not essential that all cylinders of an engine be equipped with either this design of piston or the previous one.

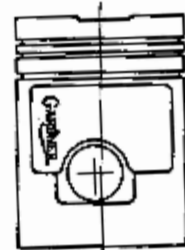


Fig. 1

Pistons for L3 & L2 engines in addition to having the word **GARDNER** on the side panels are also marked on the top with an arrow indicating engine rotation, (see Fig. 2), & must be assembled in the engine with this arrow pointing in the direction of rotation (see Fig. 3)

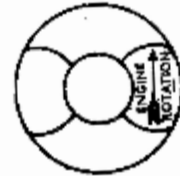


Fig. 2

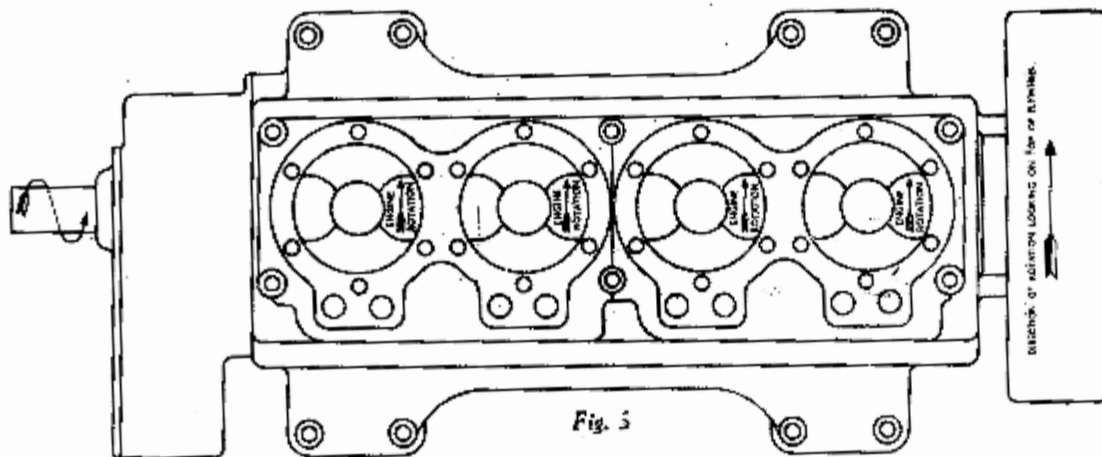


Fig. 5

The piston pin endwise location pads have for all pistons been modified to suit the offset piston pin. Previous type pin pads may however be used in LK, LW, HLW & L2 pistons, but for the L3 piston it is necessary to use the modified pads.

NOTE:- The LW & HLW piston can not now be used in the 2-6L2 engine. Pistons for 2-6L2 engines are marked on the top with an arrow for the purpose of assembly.

LK ENGINE

UNDERSIZE MAIN & CRANKPIN BEARING SHELLS

The following is a list of the standard undersize bearing shells together with the range of undersize covered by each class.

MAIN BEARING

Class F1 Suitable for line boring to original STANDARD size

"	F2	"	"	"	"	"	"	"	for Journals of .005" to .030" <u>UNDERSIZE</u>
"	F3	"	"	"	"	"	"	"	.035" to .090" "

CRANKPIN BEARING

Class F1 Suitable for boring to original STANDARD & .005" UNDERSIZE

"	F2	"	"	"	"	"	"	"	for crankpins of .010" to .030" "
"	F3	"	"	"	"	"	"	"	.035" to .055" "
"	F4	"	"	"	"	"	"	"	.060" to .095" "

Both main and crankpin bearings can of course be supplied already bored to suit a specified size of crankshaft within the above ranges when required.

RE-METALLING OF EXISTING BEARING SHELLS IS NOT RECOMMENDED



MANUFACTURER PATRICROFT
TYPE 4LK ENGINE
DESCRIPTION TAPPET CLEARANCE
SCALE
MATERIAL
MACHINED
DATE 23-6-49
REVISIONS
APPROVED BY
MADE AT A.L.O.
DESIGNED BY
CHECKED BY
DATE
PART NO S.A. 3026

4LK ENGINE. TAPPET CLEARANCE.

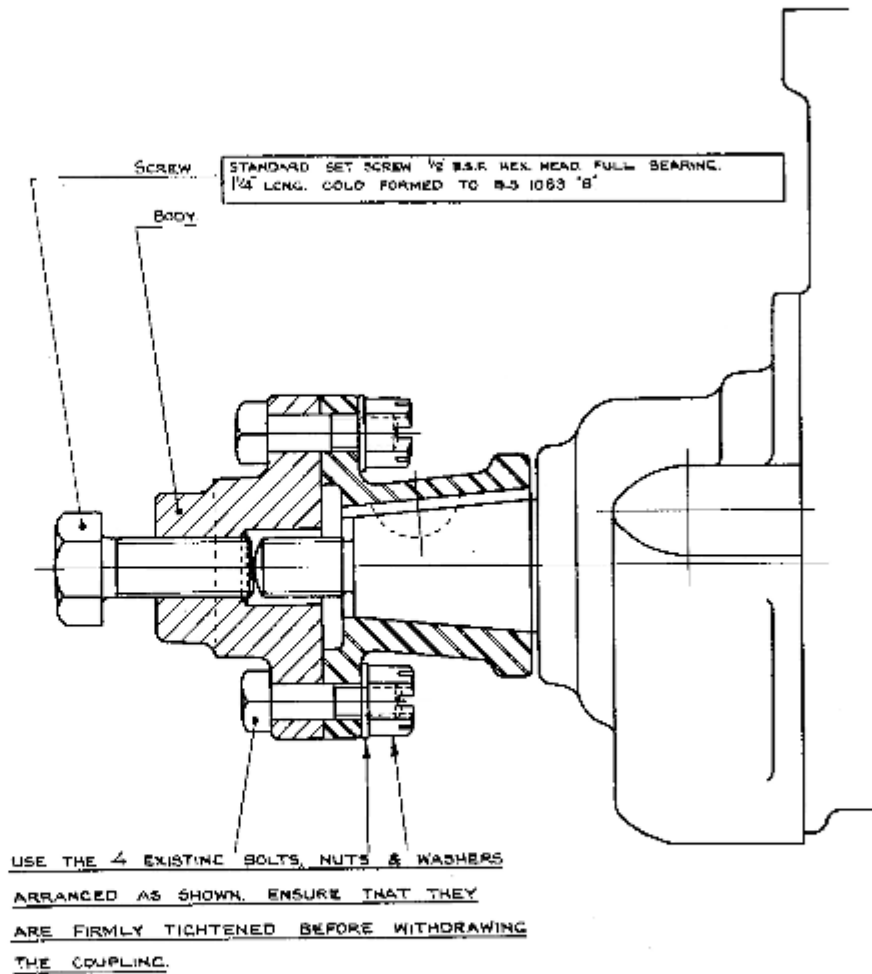
IT IS ESSENTIAL THAT FOR THE SATISFACTORY OPERATION OF THE ENGINE, THE CORRECT TAPPET CLEARANCE SHALL BE PROVIDED.

THE CORRECT CLEARANCE FOR THE FOLLOWING COMBINATIONS OF CYLINDER BLOCK AND CYLINDER HEAD MATERIAL IS AS FOLLOWS, WHEN MEASURED WITH ENGINE COLD.

COMBINATION.	TAPPET CLEARANCE.	
	INLET.	EXHAUST.
ALUMINIUM HEAD & ALUMINIUM CYLINDER BLOCK.	.002"	.002"
CAST IRON HEAD & CAST IRON CYLINDER BLOCK.	.008"	.012"
CAST IRON CYLINDER BLOCK & ALUMINIUM HEAD.	.003"	.006"
ALUMINIUM CYLINDER BLOCK & CAST IRON HEAD	.003"	.006"

IT IS DESIRABLE TO ENSURE THAT THE APPROPRIATE CLEARANCE IS STAMPED ON THE VALVE COVERS.

IF THE EXISTING STAMPING IS INCORRECT FOR THE COMBINATION IN USE, ERASE & RE-STAMP ACCORDING TO THE ABOVE TABLE.



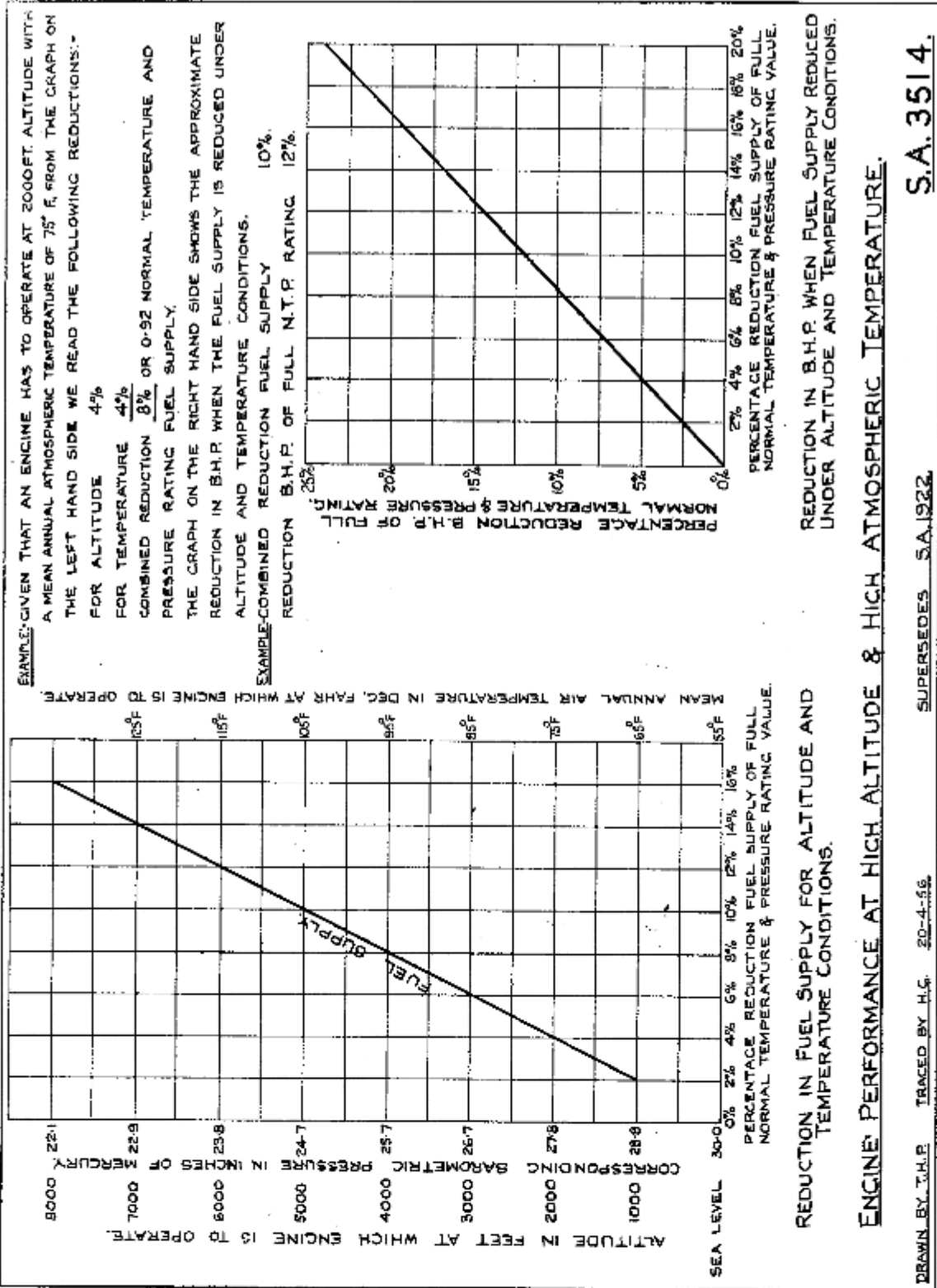
LK ENGINE

FUEL PUMP CAMSHAFT COUPLING WITHDRAWAL TOOL

Illustration No. S.A.3392

PURPOSE. For removing the coupling from the Fuel Pump Camshaft.

METHOD. Remove the nut from the shaft, fit tool as shown above and draw coupling off shaft by means of the jacking screw.



S.A. 3514.

SUPERSEDES S.A. 1932.

DRAWN BY T.H.E. TRACED BY H.G. 20-4-56.

ENGINE PERFORMANCE AT HIGH ALTITUDE AND HIGH ATMOSPHERIC TEMPERATURE

As is well known, the density of air is lower at both high altitude and high temperature and since a given amount of fuel requires a given amount of air for its combustion, it is necessary that the injected fuel supply to an engine operating under conditions of lower air density be restricted to a value satisfactory for combustion and operation with a smokeless exhaust.

Engine Catalogue powers are known as the 100% rating, and are those developed with a satisfactory fuel/air ratio under conditions of normal temperature and pressure. These conditions, namely, a barometric pressure of 30" HG., and an atmospheric temperature of 55°F. normally obtain at the manufacturer's works at Patricroft, Lancashire.

Conditions of reduced air density encountered both as a result of high altitude and high atmospheric temperature, each separately have an effect on engine performance such that for every 1000ft. altitude and each 10°F. increase over sea level and 55°F. mean annual temperature respectively, it is appropriate to reduce the fuel supply 2%.

When it is intended that an engine shall operate permanently at 1000ft. altitude or 65°F. mean annual ambient temperature, or in excess of either of these figures, it is necessary that the length of the fuel pump output control trigger be increased in order to reduce the injected fuel supply appropriately according to altitude and temperature shown on the graph.

When site operating conditions are known, new engines are appropriately set during test at the makers works, and the setting clearly stamped on the fuel pump rating plate. When, however, it is necessary to adjust spare or reconditioned fuel pumps the work can be accomplished only by use of the Gardner fuel pump calibrating machine and by observing precisely the provisions of Instruction Book 45.3. On page 9 of Book 45.3 will be found the average delivery from each plunger in cubic centimetres and the values quoted are to be reduced according to the graph.

GARDNER

SERVICE

UNITED KINGDOM

(OCTOBER, 1956)

NORRIS, HENTY & GARDNERS, LTD.

(Proprietors : L. GARDNER & SONS, LTD.)

HEAD OFFICE AND WORKS

BARTON HALL ENGINE WORKS, PATRICROFT, MANCHESTER

Telegrams : "Theorem, Patricroft, Eccles." Telephones : ECCLES 2201 (8 lines).

LONDON OFFICE AND EXPORT DEPARTMENT

ABFORD HOUSE, WILTON ROAD, S.W.1.

Telegrams : "Nornodeste, Sowest, London." Telephones : YATe Gallery 3315 & 3316.

SCOTTISH BRANCH

124, ST. VINCENT STREET, GLASGOW, C.2.

Telegrams : "Glasgard Glasgow." Telephone : Central 0887/8.

REPRESENTATION IN NORTHERN IRELAND AND EIRE

GARDNER ENGINES IRELAND LIMITED, 13, SYDENHAM ROAD, BELFAST.

Telegrams : "Gardnor 59522 Belfast." Telephone : Belfast 59522.

The following are officially appointed Service Agents or Recommended Repairers who carry Stocks of Spare Parts. At these Depots are Practical Engineers from whom users of Gardner Engines can rely upon obtaining assistance and advice regarding their Engines.

OFFICIAL SERVICE AGENTS AND DISTRICT STOCKISTS

County	Name and Address	Telephone Numbers		Telegraphic Address
		Day	Night	
ABERDEENSHIRE ...	J. M. Forbes, 114-116 Hutchison Street, Aberdeen ...	Aberdeen 29295 ...	Aberdeen 5973 ...	Aberdeen 29295
	J. S. Pirie, Harbour Road, Fraserburgh. (Marine only) ...	Fraserburgh 14 ...	—	Pirie, Engineer, Fraserburgh
AYRSHIRE ...	Armstrong & Marr, The Garage, Maidens. (Marine only) ...	Turnberry 210 ...	—	Marr, Turnberry, 210
BEDFORDSHIRE ...	Wase Park Engineering Co. Ltd., 405 Dunstable Rd., Luton	Luton 2372/3/4 ...	Luton 2372/3/4 ...	Luton 2372
DERBYSHIRE ...	North Derbyshire Engineering Co. Ltd., Unity Garage, Darley Dale, near Matlock, Derbyshire ...	Darley Dale 3381/2/3 ...	Darley Dale 3381/2/3 ...	Darley Dale 3381/2/3
DEVONSHIRE ...	Autopart Engineering Co. Ltd., Haven Road, Exeter ...	Exeter 73429 ...	—	Exeter 73429

GARDNER

OFFICIAL SERVICE AGENTS AND DISTRICT STOCKISTS—Continued

County	Name and Address	Telephone Numbers		Telegraphic Address
		Day	Night	
EDINBURGH ...	J. Bowen & Sons, Ltd., 45 to 59 Pitt Street, Edinburgh, 3	Edinburgh Can. 4204/7	Edinburgh Can. 4204	Bowang Edinburgh
GLOUCESTERSHIRE	Wates (Factors) Ltd., High Street, Lydney ...	Lydney 392/3/4/5 ...	Lydney 392/3/4/5 ...	Watts Lydney
HAMPSHIRE ...	Fodens Ltd., Southern Depot, Cowplain, Portsmouth.	Waterlooville 2108...	Waterlooville 2108...	Fodens Cowplain Hants
LANCASHIRE ...	Atkinson Vehicles, Ltd., Winery Lane, Walton-le-Dale, Preston ...	Preston 84284/5/6/7	Preston 84284/5/6/7	Wagons Preston
	C.V.R. (Engineers) Ltd., 37 Virgil Street, Liverpool ...	North 1808/9 ...	Great Crosby 4408	North 1808/9
LANARKSHIRE ...	Norris, Henty, & Gardners, Ltd., 124, St. Vincent Street, Glasgow, C.2, and Ratrasco Buildings (McAlpine Street Entrance), Broomielaw, Glasgow, C.2 ...	Glasgow Cent. 0887/8	Glasgow, Giffnock 3754 (by arrangement)	Glasgard Glasgow
LEICESTERSHIRE ...	Parrs (Leicester) Ltd., Abbey Lane, Leicester ...	Leicester 61511/2/3...	Leicester 61511/2/3...	Garage Leicester
LONDON ...	Norris, Henty, & Gardners, Ltd., Abford House, Wilton Road, London, S.W.1, and 76 Gc. Suffolk St., Southwark, London, S.E.1 ...	Tate Gallery 3315&3316 Waterloo 7203	— Croydon 8086 (by arrangement)	Nornodosee Sowsat London Nornodeste Central London Fleetwood Lissimouth 3015
MORAYSHIRE ...	Henry Fleetwood & Sons, Baker Lane, Lossiemouth (Marine only)	Lossiemouth 3015 ...	—	Fleetwood Lossiemouth 3015
NORTHUMBERLAND	W. L. Paynter Ltd., 51/53 Melbourne St., Newcastle-on- Tyne, 1 ...	Newcastle 29594/5	—	Paynter Newcastle 29594/5
STAFFORDSHIRE ...	Beech's Garage (Hanley) Ltd., Hope St., Hanley, Staffs. ...	Stoke-on-Trent 25249 and 25240 ...	Stoke-on-Trent 25249 and 25240 ...	Stoke-on-Trent 25249
SURREY ...	W. Harlock Junior Ltd., 5-7 Kingston Hill, Kingston-upon Thames ...	Kingston 4526/7/8 ...	Kingston 4526/7/8 ...	Kingston 4526/7/8
WARWICKSHIRE ...	The Birmingham Garages Ltd., Navigation Street, Bir- mingham 5 ...	Midland 1023/4/5/6	Midland 1023/4/5/6	Garage Birmingham
	Scammell Lorries Ltd., Wharfedale Road, Tyseley, Birmingham, 11 ...	Acocks Green 0923...	Acocks Green 0923...	Acocks Green 0923
YORKSHIRE ...	Pelican Engineering Co. (Sales) Ltd., Wakefield Road & Wood Lane, Rothwell Haigh, near Leeds ...	Rothwell 2491/3 ...	Leeds 74693	Pelican 2181 Rothwell Leeds

RECOMMENDED REPAIRERS

County	Name and Address	Telephone Numbers		Telegraphic Address
		Day	Night	
CAERNARVONSHIRE	J. & A. Higginbottom, Ltd., The Quay, Conway ...	Conway 3108 ...	Conway 3108 ...	Conway 3108
CAMBRIDGESHIRE	King & Harper Ltd., Hills Road, Cambridge ...	Cambridge 3201 ...	—	Motors Cambridge
CORNWALL ...	A. & J. E. Polincar, Island Works, St. Ives. (Marine only) ...	St. Ives 131 ...	—	Polincar Engineers St. Ives Cornwall
DEVONSHIRE ...	S. H. Partridge & Co. Ltd., Brixham... ..	Brixham 2251/2 ...	—	Partridge Engineers Brixham
DORSETSHIRE ...	Wilkins & Wilkins Ltd., Quay Side, Hansworthy, Poole. (Marine only) ...	Poole 174 ...	—	Poole 174
DUMFRIESHIRE ...	A. C. Panman Ltd., Queensberry Motor Works, Dumfries	Dumfries 57 ...	—	Automobile Dumfries
ESSEX ...	Brookside Engineers Ltd., Springfield Drive, Fairfax Drive, Westcliff-on-Sea ...	Saushand 44660 & 44590 ...	—	Brookside Engineering Westcliff
	F. G. Smith (Motors) Ltd., High Road, Goodmayes, Ilford	Seven Kings 6060 ...	—	Seven Kings 6060
GLAMORGANSHIRE	Fairwood Garages Ltd., Upper Killay, Swansea ...	Swansea 88830	—	Swansea 88830
GLOUCESTERSHIRE	Bristol Motor Co. Ltd., Ashton Gate, Bristol 3 ...	Bristol 68013 ...	—	Motorerve
HAMPSHIRE ...	Southampton Boat & Launch Co. Ltd., Yessapan Road, Bitterne Manor, Southampton. (Marine only) ...	Southampton 51030 ...	—	Launch Co. Bitterne Park Southampton
INVERNESS-SHIRE	MacRae & Dick Ltd., Academy Street, Inverness	Inverness 1000 ...	—	Dick Inverness
KENT ...	Arnolds (Branbridges) Ltd., Paddock Wood, near Tonbridge	East Peckham (Kent) 274/5/6	—	Arnold East Peckham (Kent) 274/5/6
	Robert Brett & Sons Ltd., Wincheap, Canterbury ...	Canterbury 3211 ...	—	Brett Canterbury 3211
	M. Drysdale & Co., Bath Street, Gravesend. (Marine only)	Gravesend 208 ...	—	Drysdale Engineers Gravesend
LONDON ...	W. J. Boyes & Son Ltd., Blenheim Grove, Peckham, London, S.E.15 ...	New Cross 3111/2/3	—	Breakdowns Peck London
	Mack & Walford Ltd., 205 Regents Park Road, Finchley London, N.3 ...	Finchley 1166 ...	—	Finchley 1166
	Normand Ltd., Cumberland Avenue, Park Royal, London, N.W.10 ...	Elgar 7757 ...	—	Appoint Harlos London
NORFOLK ...	A. Pank & Son, Ltd., Castle Hill Works, Norwich ...	Norwich 20294/5 ...	—	Pank Norwich 20294/5
NORTHAMPTON- SHIRE ...	Peterborough Engineering Co., 165 Cromwell Road, Peterborough ...	Peterborough 5503...	—	Peterborough 5503
STAFFORDSHIRE	Streechly Garage Ltd., Chester Rd., Streechly, nr. Birmingham	Streechly 7250 ...	Streechly 78333 ...	Streechly 7250
SUSSEX ...	Bailey & Noyce, Marine Engineers, Ischenor. (Marine only)	Birdham 228 ...	—	Birdham 228
WORCESTERSHIRE...	H. A. Saunders Ltd., Ausrin House, Castle Street, Worcester ...	Worcester 2368 ...	—	Worcester 2368
YORKSHIRE ...	Redwell's Motors Ltd., Woodside Garage, Wombwell,	Wombwell 2307 and 2308	—	Wombwell 2307 & 2308

GARDNER SERVICE

O V E R S E A S

(FEBRUARY, 1957)

NORRIS, HENTY & GARDNERS, LTD.

(Proprietors : L. GARDNER & SONS, LTD.)

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BARTON HALL ENGINE WORKS, PATRICROFT, MANCHESTER

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LONDON OFFICE AND EXPORT DEPARTMENT

ABFORD HOUSE, WILTON ROAD, S.W.1.

Telegrams : "Nornodesta, Sowest, London." Telephones : TATe Gallery 3315 & 3316

SCOTTISH BRANCH

124, ST. VINCENT STREET, GLASGOW, C.2.

Telegrams : "Glasgard Glasgow." Telephone : Central 0887/8

REPRESENTATION IN NORTHERN IRELAND AND EIRE

GARDNER ENGINES IRELAND LIMITED, 13, SYDENHAM ROAD, BELFAST

Telegrams : "Gardner 59522 Belfast." Telephone : Belfast 59522

FACTORY REPRESENTATIVES OVERSEAS

AUSTRALIA	...	...	...	...	Mr. H. S. Driver, G.P.O. Box No. 71, 19 Bridge Street, Sydney, N.S.W. Phone : BU.3186.
CHINA	...	...	...	...	Mr. J. S. Howell, c/o Dodwell & Co. Ltd., P.O. Box 36, Hong Kong. Phone : 28021.
SOUTH AFRICA	...	...	...	...	Mr. J. H. Plane, P.O. Box 5793, 597-615 Lower Main Reef Road, Denver, Johannesburg. Phone : 25-6347.

OVERSEAS REPRESENTATION

AUSTRALIA : Western Australia	...	...	Diesel Motors Pty., Ltd., Cnr. Albany Highway & Walpole Avenue, East Victoria Park, Perth. Phone : MW531.
New South Wales	...	...	Ferrier & Dickinson Pty., Ltd., P.O. Box 21, Artarmon, Sydney, N.S.W. Phone : J.F.1215.
Victoria	...	...	Moore Road Machinery (Vic.) Pty. Ltd., 296-300 City Road, South Melbourne, S.C.S. Phone : MX.2131.
South Australia	...	...	Rasch Motors Pty. Ltd., 317-319 King William Street, Adelaide. Phone : LA 5371 & LA 5372.
Queensland	...	...	Underhill, Day & Co. Pty. Ltd., 52-54 Alfred Street, (Cnr. Julia St.) Fortitude Valley, Box 1164P, G.P.O. Brisbane. Phone L.3047 & L.3048.
Tasmania	...	...	A. G. Webster & Woolgrowers Ltd., 60 Liverpool Street, Hobart. Phone : 4031. (Also at Launceston).
ARGENTINA...	...	...	Banham Bros. & Co., Calle Peru 362, Buenos Aires. Phone : 33 Avenida 1325.
BELGIUM	...	...	Automobiles Miesse, S.A. 28-44 Rue des Goujons, Brussels. Phone : 22.25.00 (10 lines)
BRITISH WEST AFRICA : Nigeria	...	...	J. and A. Zarpas, Ltd., P.O. Box 557, Lagos. Phone: 264.
CANADA : British Columbia	...	...	Gardner Diesel Engines Ltd., 1729 West Georgia Street, Vancouver, S.B.C. Phone : Marine 5845.
Eastern Canada, Newfoundland and Maritime Provinces	...	...	Gardner Engines (Eastern Canada) Ltd., 6033 Hamilton Street, Montreal, 20, Que. Phone : Pontiac 6-7783.
CANARY ISLANDS	...	...	Transportes Canarios, S.A. Perojo, 14-16 Las Palmas de Gran Canaria. Phone : 5208.
CHINA	...	...	Dodwell & Co. Ltd., P.O. Box 36, Hong Kong. Phone : 28021.
DENMARK	...	...	Dansk Gardner Diesel, Uplandsgade, 72, Copenhagen. Phone : Sundby 6868.
EGYPT	...	...	Port Said Engineering Works (S.A.E.) P.O. Box 17, Port Said. Phone : 2322. (Marine and Stationary)
FUJI ISLANDS	...	...	W. R. Carpenter & Co. (Fiji) Ltd., Suva, Fiji.
FRANCE, FRENCH COLONIES & GREECE	...	...	P. Lacombe, 6 bis Rue Denis-Papin, Asnieres, (Seine). Phone : GRESillans 02-55.
INDIA	...	...	W. H. Brady & Co. Ltd., Brady House, 12-14 Veer Nariman Road, Post Box No. 26, Bombay, 1. Phone: 25030. Branches at Ahmedabad, Calcutta, Coimbatore, Kanpur and Madras.
IRAQ	...	...	W. J. Coker & Co. Ltd., P.O. Box 93, Al Raschid Street, Bagdad. Phone : 83021.
KENYA	...	...	Montague Dwen & Jessop, Ltd., P.O. Box 276, East African Highway, Nairobi. Phone : 2082.
FEDERATION OF MALAYA & SINGAPORE	...	...	W. Hammer & Co. Ltd., G.P.O. Box 782, B, Fullerton Road, Singapore. Phone: 2959. (Marine, Stationary, and Rail Traction). Malayan Motors Ltd., 14-20 Orchard Road, Singapore. Phone: 5321/3 (Automotive)
MALTA & GOZO	...	...	Canadian Bros., Mannarino Road, B'Kara, Malta.
MAURITIUS	...	...	H. P. Gujadhur Bros. & Co. Ltd., Port Louis.
NETHERLANDS	...	...	Handelscompagnie, N.V., P.O. Box 5050, Rotterdam. Phone: 79500 (10L).
NEW ZEALAND	...	...	John Chambers & Son Ltd., P.O. Box 934, Fort Street, Auckland. Branches at Christchurch, Dunedin, Invercargill, and Wellington.
NYASALAND	...	...	Brown & Clapperton Ltd., P.O. Box 52, Blantyre. Phone : 352/3.
PAKISTAN	...	...	Brady & Co. of Pakistan, Ltd., Shernaz House, West Wharf Road, Karachi, 2.
PERSIAN GULF : Bahrain & East Coasts of Kuwait, Saudi-Arabia, Qatar, also Trucial Oman & Oman Coast	...	...	Ahmad Fakhroo & Bros., Bahrain. Phone : 531.
PORTUGAL	...	...	Conde Barao, Lda., Avenida 24 de Julho 62-64, Lisbon. Phone : 671011/8.
PORTUGUESE EAST AFRICA	...	...	Beira Engineering Co. Ltd., Beira. (Marine). J. H. Plane & Co. Ltd., c/o Agencia Geral Lda. P.O. Box 677, Lourenco Marques. (Automotive)
RHODESIA	...	...	J. H. Plane (Central Africa) Ltd., P.O. Box 2054, Mafeking Road, Bulawayo, Phone: 61655. (Also at Salisbury).
SOUTH AFRICA: Transvaal, Cape & Orange Free State	...	...	J. H. Plane & Co. Ltd., P.O. Box 5793, 597-615 Lower Main Reef Road, Denver, Johannesburg. Phone : 25-6347.
Natal	...	...	J. H. Plane (Natal) Ltd., P.O. Box 1178, 80 Prince Alfred Street, Durban. Phone : 62741.
THAILAND	...	...	Barrow, Brown & Co. (1948) Ltd., Barrow Brown Building, Asadang Road, Bangkok.