

TECHNICAL NOTES SERIES

JOWETT JAVELIN – PA, PB, PC, PD & PE



Ray Jowett's engine being installed using the purpose built engine and gearbox trolley.

PART VII – REMOVING THE JAVELIN ENGINE

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Revised – 2nd February, 2024.*

CONTENTS

Topic Discussed	Page No.
INTRODUCTORY COMMENT FOR TECHNICAL NOTES	3
INTRODUCTION	3
ITEM 1 – PREPARATION	3
ITEM 2. – REMOVAL OF BODY PARTS	4
ITEM 3. – REMOVING ANCILLARY EQUIPMENT	4
ITEM 4. – REMOVAL OF COOLANT PUMP, FAN, EXHAUST SYSTEM AND COOLANT HOSES	5
ITEM 5. – REMOVAL OF CYLINDER HEADS	5
ITEM 6. – STARTER MOTOR REMOVAL	6
ITEM 7. – DETACHMENT OF GEARBOX	6
ITEM 8. – REMOVAL OF ENGINE MOUNTINGS	7
ITEM 9. – REMOVAL OF ENGINE ASSEMBLY	7
APPENDIX I – COMPANION FLANGE HOLDER	8
APPENDIX II – ENGINE REMOVAL AND REPLACEMENT TROLLEY	9
APPENDIX III – CYLINDER HEAD REMOVAL TOOL	10
APPENDIX IV – OUTPUT FLANGE EXTRACTOR	10



WARNING!
ASBESTOS COULD BE PRESENT IN
GASKETS AND FIBRE WASHERS



INTRODUCTORY COMMENT FOR TECHNICAL NOTES

These introductory notes should be read prior to reading Part VII of the Technical Notes Series.

The Jowett Technical Notes Series have been an ongoing activity for several years. That means that some techniques and specifications may have been superseded in later notes on the same, or associated topics in the series. Also be aware that some topics and recommendations may be specific to certain Engine Serial Number ranges. It appears that, in Australia, the various State Main Agents did not carry out Service Bulletin information during Jowett active times. A set of known Service Bulletins is in Part III.

Some of the notes are restorations of what was written by members of the Jowett Car Club (UK), the Jowett Car Club (NZ) and by members of the JCCA.

Over the years of involvement with matters Jowett, and with the dawning of the personal computer age, a personal decision was made to help members of the Jowett Car Club of Australia Inc. with technical information. Included with the Technical Notes are 'restored' versions of the Javelin and Jupiter Maintenance Manuals and the associated Spare Parts Catalogues. Future generations will prefer to flick through images on their personal device screens, rather than leafing through pages in a tattered and oil stained book to access information.

The term 'restored' has been used because it soon became apparent that, as with our efforts in restoring Jowett vehicles, we desire excellent quality of workmanship in the reproduction of Jowett related documentation. Not for us the crude, and crooked, photocopies that have been issued over the years. These have, even though accurate at their time, become partly out of date.

Hence the decision to 'restore' the publications and documents that have come to hand.

It should be noted that the Javelin and Jupiter Spare Parts Catalogue is a combination of all the catalogues that were to hand (from 1948 to 1953).

The Maintenance Manuals were originally written on the assumption that they would be used by skilled motor mechanics who had attended service training courses conducted by Jowett Cars Limited and after works closure, were made available for owners who had reasonable mechanical knowledge of motor car maintenance and overhaul.

Included with the Technical Notes Series is a Lucas Overseas Correspondence Course, which can be of great assistance when trouble-shooting electrical problems related to your Jowett, or any other British vehicle of the same period.

Please be aware that this is an ongoing project

Mike Allfrey. – February, 2024

Introduction

Note: Items marked with an asterisk * signify parts which need not be removed and can be left on the engine until it is out of the car. Here it is assumed that a total reconditioning of the engine is to take place and these parts will have to be removed anyway. To anyone unfamiliar with removing the engine it is, in the opinion of the writer, advantageous to strip a good deal of the engine in situ to make it easier to handle. On the other hand some find the parts more accessible and easier to dismantle after the unit is out of the car.

Numbers in brackets are Item Numbers from 1952 *Spare Parts List*.

Item 1. – Preparation

- 1.0. The car should be parked on a level concrete floor, jacked up and mounted on four secure chassis stands so that access to the gearbox can be gained.
 - 1.1. Unscrew the oil filter drain setscrew (on the R.H.S. of the rear timing cover) about ¾-in. but do not remove it.
 - 1.2. Drain coolant and oil from engine and gearbox.
 - 1.3. Disconnect battery cables.
-

Item 2. – Removing Body Parts

- 2.0. Single-piece grille:
 - 2.1. Raise bonnet and fully back off the two upper knurled brass nuts.
 - 2.2. Unlatch lower catches and lift the grille assembly away.
 - 2.3. Two-piece grille:
 - 2.4. Raise bonnet and fully back off the two upper knurled brass nuts.
 - 2.5. Lift the upper grille portion away.
 - 2.6. With a large screwdriver, release the four quick-release fasteners, located at each corner between the slats, in the lower grille and lift it away.
 - 2.7. Remove ¼-in. BSF setscrews holding apron (1836) noting exact position of spacers and grille fasteners for two-piece grille.
 - 2.8. Taking care of rubber mouldings between apron and body, remove apron. (Rubber mouldings are attached to apron.)
 - 2.9. Remove front bumper and engine sump protection bar together. Two large setscrews hold the bumper springs to the forged iron brackets protruding through skirt of front wings. Four bolts, two each along side of sump secure sump protection bar. Remove these and withdraw assembly complete with bumper.
-

Item 3. – Removing Ancillary Equipment

- 3.0. Mark plug leads from distributor with suitable self adhesive tags. Do not cut notches in the insulation. Use the following notations:
'1' Near-side front; '2' Off-side front; '3' Near-side rear; '4' Off-side rear, 'Coil' to HT coil socket. Remove distributor cap and disconnect low-tension cable.
- 3.1. Remove the advance-retard vacuum pipe from RHS carburettor. The union nut at distributor end is ¾-in. AF SAE. Use two spanners, at the carburettor end, since using a single spanner will probably cause the union nipple to be detached from pipe.
- 3.2. Remove the distributor clamp bracket and note spacer under bracket. Lift the distributor clear of engine.
- 3.3. Disconnect flexible petrol pipe at upper end.
- 3.4. Disconnect petrol pump from delivery pipe to carburettors.
- 3.5. Carefully identify securing screws and remove them from the petrol pump flange and withdraw pump.
- 3.6. Withdraw the petrol pump operating rod (1506), place in plastic bag and keep safe.
- 3.7. Remove petrol delivery pipe (1495)* connecting carburettors by unscrewing banjos on carburettors. These banjo bolts have fine mesh filter gauzes and they are a different thread size from the very similar bolts in the petrol pump.
- 3.8. Unscrew and remove choke wires from carburettors.
- 3.9. Slacken nut holding end of accelerator cable to throttle rod (1585) connecting carburettors.
- 3.10. Pull the cable and its outer casing through its bracket on the R.H.S. tappet chest cover. Fasten clear of engine.
Note: In order to fasten out of harm various parts of the car the type of rubber cables used for holding luggage in place are very convenient. If parts are simply left loose they will become trapped and damaged when the engine is withdrawn and replaced.
- 3.11. Slacken hose clips securing air intake bellows to carburettors. Disconnect bellows.
- 3.12. Remove nuts (two for each carburettor) securing carburettors (1595 and 1596)* to cylinder heads. On R.H.S. carburettor loosen link wire between choke and throttle arm. Move fast idle link wire to highest position to make access to nut easier.
- 3.13. Lift off carburettors.* Immediately cover inlet ports with rags to stop foreign objects falling in.

- 3.14. Disconnect oil pressure gauge or, on some models, the cable to the oil pressure switch on the L.H.S. of the oil filter housing. Use two spanners at the pressure gauge union and fitting. Fasten clear.
 - 3.15. Uncouple electrical cables to dynamo. Fasten clear.
-

Item 4. – Removal Of Coolant Pump, Fan, Exhaust System And Coolant Hoses

- 4.0. Remove top hose (437) from water pump to radiator.
 - 4.1. Remove heater hose from water pump (374) body on L.H.S. Fasten clear.
 - 4.2. Loosen clips on hose (436) below pump attaching it to front timing cover.
 - 4.3. Identify setscrews fastening water pump bracket to dynamo and front timing cover. Remove.
 - 4.4. Remove fan belt (376).
 - 4.5. Remove slotted nuts holding fan shaft supports (402) to crankcase. Note double coil spring (Thackeray) washers which must be replaced.
 - 4.6. The water pump/fan assembly can now be removed. (This may require some juggling, but it is quite possible!)
 - 4.7. Remove front wheels (1720).
 - 4.8. Uncouple exhaust at rear of L.H.S. manifold (86). Nuts may be stainless steel or brass and if so should be noted.
 - 4.9. Remove both manifolds complete with front pipe.*
NOTE: If you do not remove the front pipe (1640) do not be tempted at any stage to use it as a handle to move the engine! The manifolds will almost certainly break.
 - 4.10. Slacken clips holding water hoses (438) at bottom of radiator to rear of crankcase. These clips may be accessible beneath wheel arches or else by a long screwdriver from inside the engine compartment.
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Item 5. – Removal Of Cylinder Heads*

Items 5.0. to 5.12. are optional at this stage.

- 5.0. Place an oil catch tray beneath the rocker covers. Working under the front wings remove the rocker covers (91) from each side of the engine.
- 5.1. Loosen-off the nut on the central cylinder head stud securing the oil feed banjo (229).
- 5.2. Remove retaining nuts and special collars on studs holding rocker shaft pedestals (239) to heads. Loosen both nuts a little at a time so as not to put a strain on the rocker shafts. As the nuts are loosened, continue unscrewing the No. 1 cylinder head nut. Identify collars.
- 5.3. Remove No. 1 stud nut, plain washer and fibre washers retaining the banjo (229) at the centre of the head, withdrawing the rocker shaft assembly after doing so.
- 5.4. Prepare some means of identifying (neither a hacksaw nor a file) push rods and their original position in the engine, e.g. a piece of stiff card with numbered holes.
- 5.5. Remove the push rods and store so that they can be returned to their same position on re-assembly.
- 5.6. Strictly following the sequence, in reverse order to that shown in the Maintenance Manual, remove cylinder head nuts and washers, releasing all a little at a time.
NOTE: Nut on stud No. 1 has already been removed (5.3.)
- 5.7. Remove any traces of lead wire around cylinder head studs.
- 5.8. With a sharp point tool, prise out No. 4 head stud water seal (321). (Rubber ring to be found in recess around No. 4 stud.)
- 5.9. Attempt to pull off head. If necessary tap around cylinder head with wooden mallet.
- 5.10. If cylinder head still does not move use the special tool, refer to Appendix III, to push the head against the No. 1 cylinder head stud. Once the head has moved outwards, insert slim levers

at each end, in a fashion that ensures that lever purchase is at the cylinder liner lip, not the crankcase cylinder head gasket surface. Levering on the gasket surface can ruin the crankcase set, and should be absolutely avoided.

- 5.12. If the gasket seal is broken the head can usually be removed by a gradual rocking movement. Otherwise a special puller illustrated in Appendix III, may be needed.
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Item 6. – Starter Motor Removal

- 6.1. Check that the battery leads are disconnected.
 - 6.2. From under the car, uncouple the heavy cable to the starter motor. Fix it clear.
 - 6.3. The starter is held to the clutch housing (495) at the top by a $\frac{3}{8}$ -in. bolt and nut and at the bottom by a stud and nut. Remove the nut and bolt, and the nut from the stud.
 - 6.4. Note the position of the starter terminal, in order that the starter motor can be returned to the same position.
 - 6.5. The starter can now be manipulated around the flywheel ring gear and removed.
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Item 7. – Detachment Of Gearbox

- 7.0. It is possible to remove the engine from the car, and leave the gearbox in-situ but this is not the recommended method, since there is a risk of damage to the gearbox input shaft.
- 7.1. Remove the clutch housing base cover (495).
- 7.2. Support the front propellor shaft (800) loosely.
- 7.3. With white paint, identify front face of Layrub coupling and identify the sleeve/yoke relationship.
- 7.4. Two bolts secure the front Layrub coupling (801) to the gearbox output flange (622) and two to the front prop shaft. The slotted nuts are secured by split pins.
- 7.5. Remove split pins and all four nuts and bolts. This will require the rotation of the shaft, entailing a rear wheel to be raised and the car out of gear.
NOTE: Above the front Layrub there is a domed metal plate in the floor board. Normally this is held by permanent rivets but these can be removed and replaced by self tapping screws. This allows access to the Layrub bolts in a way which may be found more convenient.
- 7.6. The Layrub sleeves are a tight spigot fit in the flanges and usually need to be prised out gently with a lever.
- 7.7. Remove the Layrub coupling. Do NOT let propeller shaft hang far out of its normal line.
- 7.8. Remove split pin from gearbox main (third motion) shaft and slotted nut (624)
- 7.9. To remove nut it will almost certainly require that car is placed in bottom gear. The starter ring gear can be held with a hardwood wedge. The ideal tool for removing this nut is shown in the sketch in Appendix I, which can be bolted on to the output companion flange.
- 7.10. It is unlikely that the output flange will be easily removed from the shaft, but it is worth a gentle tap with a hammer for luck! A suitable puller will be required. The proper tool is shown in Appendix IV. However, a tool can be made up by using a spare output companion flange. Two Layrub bolts can be used to fasten the spare companion flange to the one on the gearbox, face to face using a substantial washer or spacer pad to bear on the end of the main shaft.
- 7.11. The method of using a puller of this kind is to tighten the two bolts dead tight. By doing this the flange may be removed, but more probably it will require a sharp blow with a heavy hammer. Beware of the flange suddenly springing off with some force – keep well clear!
- 7.12. Remove the speedometer drive cable from R.H.S. rear of the gear box (616), The brass knurled nut may require a multi-grip hand wrench more often than not. Fix the cable clear.
- 7.13. Remove the split pin from the clutch operating rod clevis pin (520) and lift out the pin, disconnecting the clutch operating rod (518). Tie the rod up out of the way.
- 7.14. From inside the car remove the gearbox cover (2153) from the toe board, extracting the screws. (The screws are threaded into captive nuts).

- 7.15. Remove split pin from the gear change link socket (716) at gearbox end of rod. Now unscrew the socket adjustment screw (718) and lift off the rod.
 - 7.16. The selector change link (753) is best removed with the ball joint which is bolted onto its lever (638) on the gearbox. Alternatively, it can be removed by pushing back the tabs on the ends of the spring clip around the socket, but this action is likely to damage (break) the spring clip.
 - 7.17. Tie the gear change and selector change links out of the way.
 - 7.18. Through the same opening feel for the gear change stay which connects the gear change column to the centre top of the clutch housing. (This may not be present on cars prior to Chassis Number E1 PC 20135) Remove the nut and dished washer from the stud on the clutch housing and lift off the stay and rubber bush. It may help to slacken-off the bolt securing the column end of the stay assembly.
 - 7.19. Remove the electrical cables to the reversing light switch on the gearbox if it is fitted.
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Item 8. – Removal Of Engine Mountings

- 8.0. The cradle shown in the Maintenance Manual is ideal but not essential. From that figure it will be seen that the centre of gravity of the engine and gearbox is about three inches in front of the flywheel, with the cylinder heads in position.
 - 8.1. The correct method for removing the engine and gearbox assembly is to use some form of trolley on which the engine and gearbox unit can be wheeled out. A suitable trolley is illustrated on the front cover and in Appendix II. It is most important that such a trolley has a wide enough base to carry the engine safely. If a small lightweight trolley jack is used there is always a possibility that the engine could slide off the jack.
A very adaptable trolley can be fabricated from lightweight square steel tubing, with four castors and three scissor type car jacks. The three jacks should be the same and can be obtained from a wrecker's yard. See Appendix II.
NOTE: It will be assumed from here-on that a trolley is used.
 - 8.2. Place a piece of clean dry towelling cloth on the trolley where the sump will be supported, to help prevent slippage.
 - 8.3. From underneath the car withdraw the three set screws holding the rear mounting to the chassis cross member.
 - 8.4. Remove the bolts from the front engine mounting brackets (299 and 300), from the frame side member extensions (2185 and 2186), one set screw and one nut and bolt each side.
NOTE: Carefully adjust the three trolley mounted jacks so that the front and rear mounting bolts can be withdrawn without damaging their threads.
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Item 9. – Removing The Engine Assembly

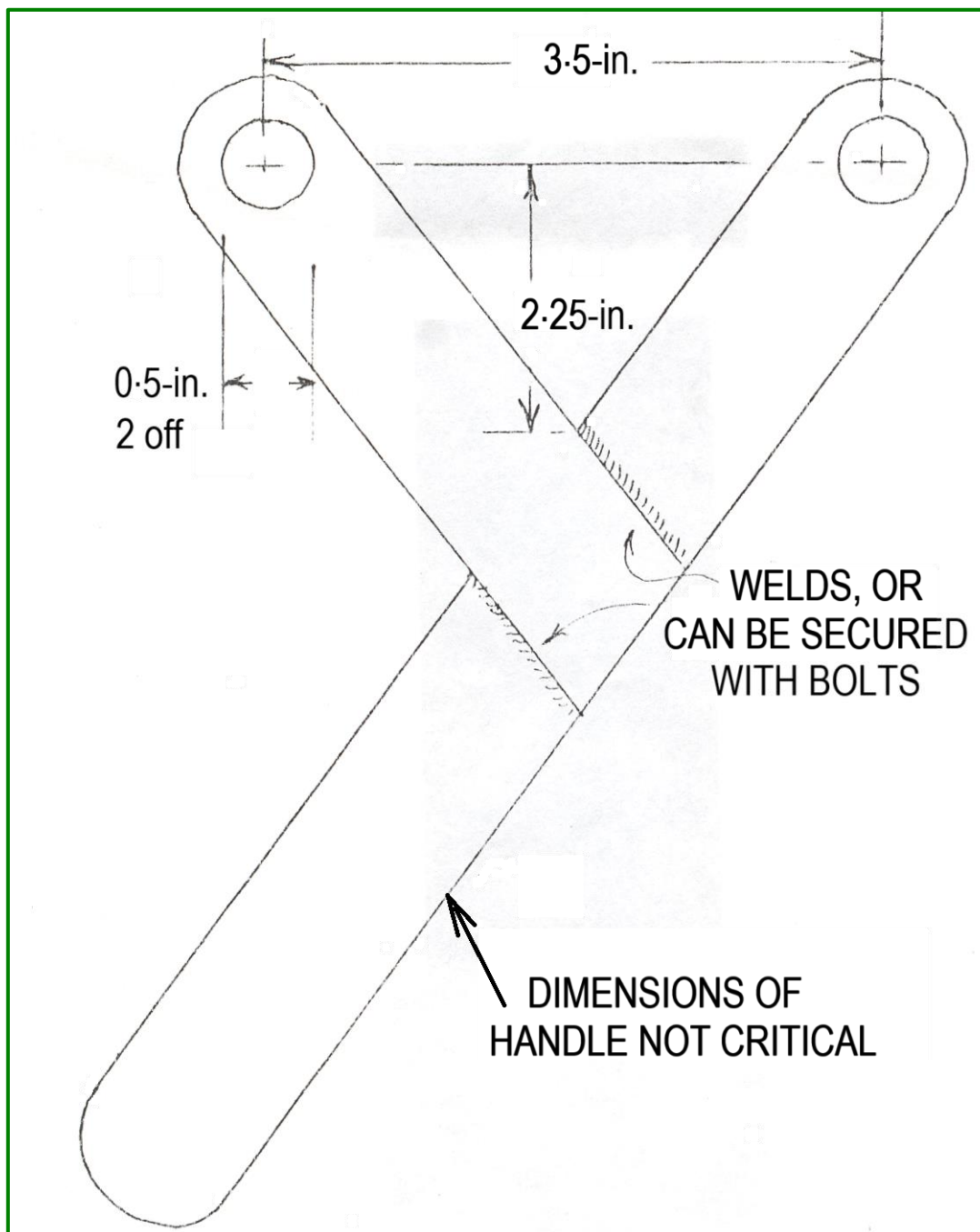
- 9.0. The engine and gearbox unit is now free, and can be gently edged forward.
- 9.1. Special care must be taken when moving the unit, particularly that it does not fall off the trolley. Fingers should be kept clear of places where a movement of the engine could trap them against the body of the car. It would be quite easy to lose a finger in this way, if the engine should slip. Remember that it is a very heavy and rather ungainly object.
- 9.2. Do not wear loose clothing, a scarf etc. Strong protective gloves are desirable and substantial boots worn.
- 9.3. Once removed from the car make sure the unit is securely supported.
- 9.4. Remove the gearbox from the engine by removing the two nuts from the top of the gearbox and the two from inside the bell housing below.
- 9.5. Once the gearbox is free remove it. Do *not* leave it hanging on the clutch (first motion) shaft when partly drawn back.
- 9.6. The engine is now ready to be dismantled.

Final Note

The engine can be removed with distributor, dynamo and starter motor attached.

APPENDIX I

Companion Flange Holder



Companion flange holding tool.

Description

Fabricated from flat mild steel bar stock, the handle needs to be sufficiently long to provide an easy hand grip that provides enough leverage to handle torque values of approximately 150 lb. ft.

Dimensions are as follows:

Distance between hole centres (after Welding)	3.50-in.
Distance from holes' centreline to intersect point on handle	2.25-in.
Hole diameter (nominal clearance)	0.53-in.
Material thickness	5 mm

APPENDIX II

Engine Removal And Replacement Trolley



Homemade engine/gearbox trolley.

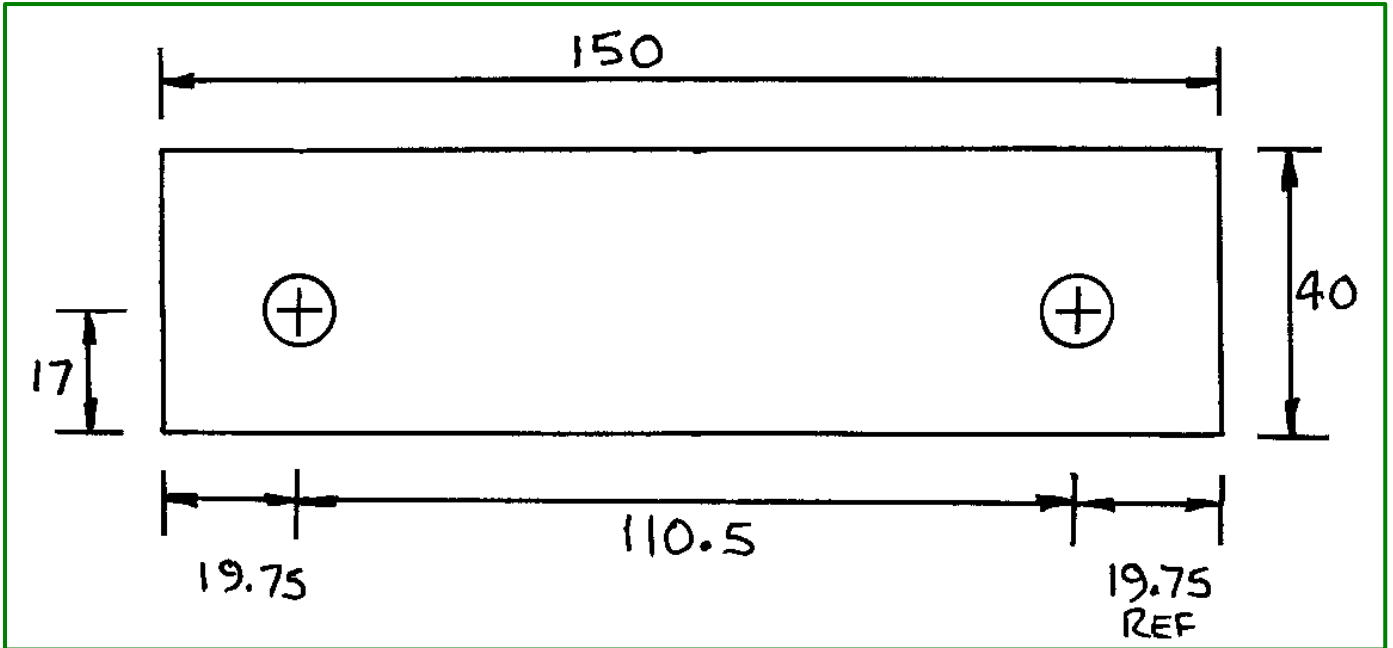
Description

This trolley, perhaps a little over-the-top, but most convenient all the same, was designed to operate on a level concrete floor. The framework is constructed from 1" square tube with 16 SWG wall thickness. Three identical scissor jacks have been employed to provide accurate adjustment for height and tilt – both sideways and fore and aft. The wooden platform sits on two ball sockets and can tilt two ways to sit flat under the engine oil sump. A yoke, formed from round steel bar welded to the gearbox support jack, holds the gearbox extension tube snugly forward of the rear mount bracket. The centre of gravity is forward of the rear set of castor wheels, just to the rear of the front pair of jacks.. The trolley also has storage facility for the jack screw handle.

This trolley provides complete control for lining up the engine and gearbox mounting brackets so that the hardware can be removed and replaced with ease.

Caution: This design of engine trolley has revealed that, should any of the wheels lodge on the floor, the engine can slide forwards off the wooden platform.

APPENDIX III



Material – mild steel bar, 40 x 150 x 10 mm.

Two holes 10 mm diameter.

All dimensions in millimetres. Drawing not to scale.

Sketch of cylinder head extraction tool – prepared by Ed Wolf.

With thanks.

Notes On Use Of Cylinder Head Removal Tool

This special tool was developed to ease a cylinder head away from the crankcase. After removing the rocker gear and all of the cylinder head securing nuts, slide the tool over the two rocker shaft securing studs. Place suitable spacers over the studs and tighten down two nuts. The tool should butt up against two of the cylinder head studs, Items 5 and 3 in the cylinder head tightening sequence. Care must be taken to tighten the two nuts evenly to open up a gap at the cylinder head gasket that is equal at both ends. Once the cylinder head has parted from the crankcase, levers can be inserted so that they purchase on the cylinder liners and be pulled to ease the cylinder head off further, until it is loose on the studs.

Note: Do not have the levers purchase for leverage on any of the aluminium cylinder head gasket surface of the crankcase set.

APPENDIX IV

Output Flange Extractor – J10805

For removal of gearbox output flange. Use with ½-in. high tensile bolts and nuts. Apply load with jack screw and strike with hammer to break taper lock-up.

Material:

Hot Rolled Mild Steel Bar, 16 mm Thick, 50 mm Wide, 130 mm Long. Steel supplier will cut bar to length.

Two holes 3.50-in. apart. Layrub coupling bolts can be used. Centre hole, drill and tap 16 mm thread for high tensile setscrew.

