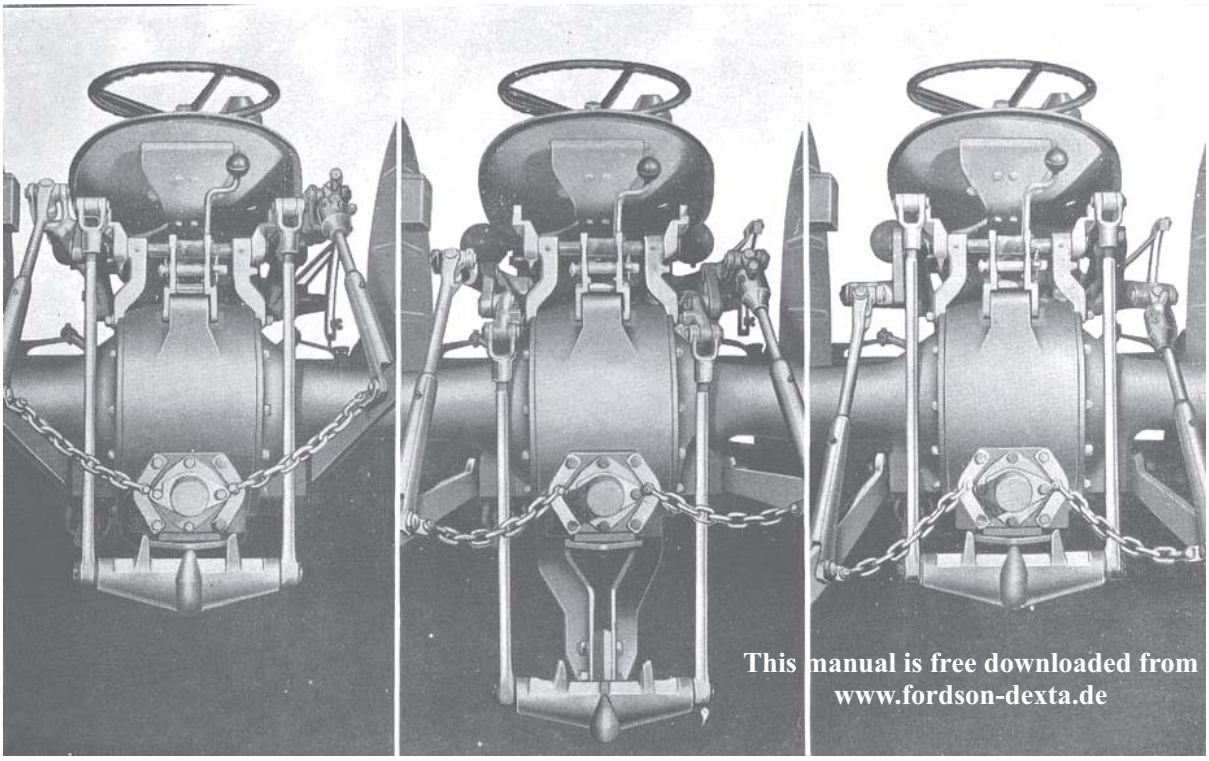
AUTOMATIC PICK-UP HITCH



HITCH RAISED— HYDRAULIC LIFT RAISED

HITCH LOWERED

HITCH RAISED— HYDRAULIC LIFT LOWERED

Fig. 1
The Pick-up Hitch

General Description

The hydraulically operated pick-up hitch installation, which is available as a production option or in service as an accessory, provides a means whereby trailers, etc. can be " hitched " to and " unhitched " from the tractor without it being necessary for the operator to dismount from his seat.

The foundation for the hitch upper linkage is provided by two support brackets secured to the left- and right-hand rear axle shaft housing flanges, six special securing studs replacing six standard ones in the rear transmission housing. Spanning the two support brackets is the hitch release handle pivot pin, the release handle being welded to the section of pin between the brackets, whilst two locking struts secured to the ends of the pin outside the support brackets provide a means of mechanically supporting the hitch in the raised position, obviating shock loading on the hydraulic system when the hitch is in use and locking the hitch in a suitable position when not required. The right-hand locking strut, operating between two lugs cast in the adjacent support bracket, controls the total release movement of the struts whilst the spring fitted between the left-hand strut and its adjacent support bracket ensures that once the hitch is raised sufficiently the locking struts automatically move into the locking position so that the hitch remains raised until the release procedure is carried out. The hitch lifting arms pivot at their

lower ends on pins secured to the support brackets and are connected by slotted links with further pins to special hydraulic lift arms which replace the standard lift arms normally supplied with the tractor. The slotted connection of the links to the hitch lifting arms allows independent operation of the hydraulic lift and associated linkage when the hitch is not required for use (see Fig. 2).

Two lifting rods provide the connection between the hitch linkage and the hook assembly, the upper ends of the rods having a yoke and pin attachment at the hitch lifting arms, the lower ends being retained on pins projecting from the arms of the hook body which is positioned under the rear of the rear transmission housing. The hook body is bolted in its channel location in the fabricated hook frame, the forward end of which is mounted on an anchor bracket, this in turn being located by a dowel and fixed by screws to the underside of the rear transmission housing.

When the hitch is in the raised position two lugs at the top of the arms of the hook body are positioned either side of a " bumper " plate which is fixed to the underside of the rear transmission housing rearward of the anchor bracket, thus preventing excessive lateral thrust on the hook assembly when the hitch is loaded. The bumper extends over the throat of the hook and ensures a stable connection between the trailed equipment and the tractor.

Operation

In order to preclude any possibility of damage the pick-up hitch must not be operated for any purpose with a belt pulley fitted to the tractor ; conversely, however, the belt pulley may be operated in the horizontal left- and right-hand positions (but not in the downward or upward positions) on tractors equipped with the pick-up hitch (see " BELT PULLEY " section—" Operation ").

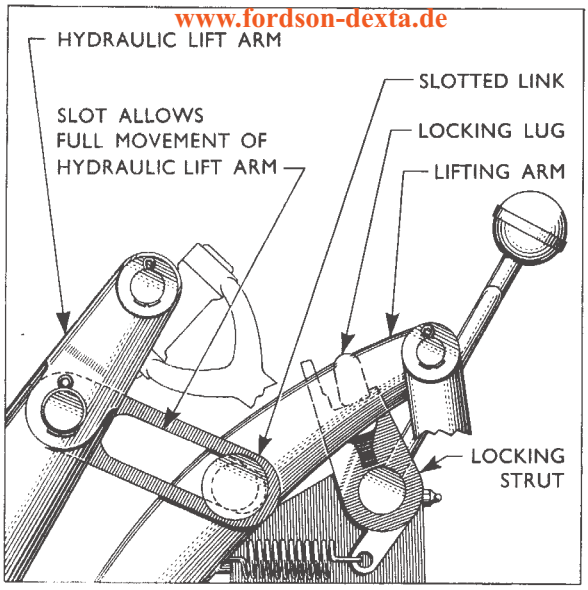


Fig. 2
Hitch Upper Linkage—Locking Struts Holding Hitch in Raised Position

The maximum load imposed on the hitch should not exceed 2,500 lbs. (1,134 kgs.) at the hook. It is recommended that the top link of the three-point linkage be removed before carrying out operations requiring the use of the pick-up hitch.

To facilitate accurate positioning of the hook, pick-up hitch operations should be performed with the hydraulic lift working under " Position Control " i.e. with the hydraulic lift control selector lever in the horizontal position.

To prevent damage to the hook the pick-up hitch when not directly in use must always be in the locked raised position i.e. with the lugs cast on the inside of the hitch lifting arms located on or above the slotted locking faces of the locking struts.

To lower the hook, the lifting arms must first be raised a sufficient amount for the lugs to clear the locking faces of the two struts. Start the engine, ensure the clutch is engaged (on tractors equipped with " Live " P.T.O. the transmission clutch may be disengaged if so desired) then move the hydraulic main control lever against the fixed stop at the top of the control lever quadrant. This will raise the hitch the required amount and enable the locking struts to be swung away from the hitch lifting arm lugs by pulling the release handle forward against the spring tension (see Fig. 3). Holding the release handle forward to its fullest extent move the hydraulic main control lever down the quadrant so that the hydraulic lift arms with lower links and the pick-up hitch lower under their own weight, the hitch lifting arms and hook assembly pivoting about their anchor points. The release handle need only be held forward until the hitch lifting arms have lowered to such an extent that the locking lugs are clear of the locking edges of the struts, after which the handle can be released and the locking struts will be repositioned under spring tension. Positioning the hook height for " hitching-up " when the lifting arm lugs are below the locking edges of the struts is controlled by movement of the hydraulic main control lever ; the lower the lever is moved down the quadrant the lower the position the hook will take up.

With the hitch hook suitably lowered, without being so low as to be damaged by ground contact, position the tractor to " hitch-up " the required equipment. When the hook is positioned under the eye of the trailer drawbar move the hydraulic main control lever slowly up the quadrant until the hook engages with the eye of the trailer then move the lever against the fixed stop at the top of the quadrant to fully raise the hydraulic lift arms and pick-up hitch. As the hitch lifting arms approach the fully raised position, the lugs on the lifting arms contact the locking struts, after which further progressive raising causes the locking struts to be swung forward against the spring tension. When the lifting arms have raised to the point where the lugs are above the edges of the struts the spring will pull the struts

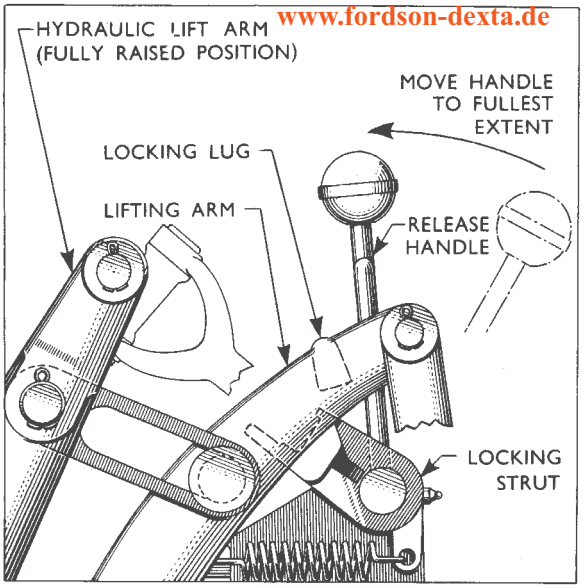


Fig. 3

Hitch Upper Linkage—Releasing Hitch from Locked Raised Position

rearward to the locking position (see Fig. 4). It is desirable that trailer loads on the hitch are supported mechanically rather than hydraulically and to achieve this end the control lever must now be moved down the quadrant sufficiently to ensure the hitch lifting arm lugs locate in the slots in the locking faces of the struts (see Fig. 2).

Operation of the hydraulic lift and associated linkage may be carried out in the normal manner when the pick-up hitch is in the locked raised position as the hydraulic lift arms operate independently of the hitch lifting arms when the latter are supported by the locking struts.

Modifying the Pick-up Hitch in Service for Special Applications

Under certain conditions where heavy loads are being carried by a front end loader it may be necessary to carry weights on the rear of the tractor in order to preserve stability. Such weight may either be carried by the linkage drawbar or by a plain bar which may be fitted between the lower links and which is supplied as an accessory. Normally the weight would be carried in the raised position and, if it is intended to carry out operations of this nature for extended periods, replacing the two standard slotted links of the hitch with two special links which are available as an accessory enables the weight on the lower links to be mechanically supported in the raised position by means of the hitch locking device.

The special links are fitted in the same way and are similar to the standard links but, having holes instead of slots, do not allow the hydraulic lift arms to move independently of the hitch lifting arms so that with the latter supported by the locking struts the hydraulic lift arms and therefore the weight on the lower links will also be supported. When the special links are fitted to the pick-up hitch its use and method of operation are unaltered but, as fully raising the hydraulic lift arms locks both the hitch and the hydraulic lift in the raised position, the procedure previously outlined for lowering the hitch from the locked raised position must now also be used when lowering the hydraulic lift with associated linkage from the fully raised position.

With the special links fitted the hydraulic lift linkage cannot be lowered without lowering the hitch hook also, therefore, to avoid damage the special links should be replaced by the standard slotted links before carrying out operations with mounted equipment such as ploughs, mowers, earthscoops, etc. and when it is required to use the linkage drawbar.

Routine Maintenance

In service, a good quality general purpose grease should be added at 50-hour intervals, by means of a grease gun, through the nipple at the rear of each support bracket, to lubricate the locking strut pivot pin and through the nipple provided at the large boss of each hitch lifting arm.

When the hydraulic lift arms are fully raised there must always be clearance between the lug cast in the centre of the hook body and the underside of the bumper and it is recommended that the clearance, which should be approximately $\frac{1}{16}$ in. (1.59 mm.) (see Fig. 4), be checked after extended periods of usage. If there is no clearance or if the clearance is excessive it should be corrected by adjusting the yokes on the hitch lifting rods an equal amount as required, bearing in mind that altering the position of the yokes on the rods half a turn will alter the clearance by approximately $\frac{1}{16}$ in. (1.59 mm.).

FITTING INSTRUCTIONS

Preparing the Tractor for Installation of the Pick-up Hitch

1. With the hydraulic lift arms fully raised, disconnect the lift rod knuckles at the hydraulic lift arms by removing the split pins and clevis pins, positioning each lower link, with lift rod, to one side when disconnected.

2. Remove the screw, locking tab and large flat washer retaining each hydraulic lift arm to the lift cross-shaft then withdraw the hydraulic lift arms.

3. At each rear axle housing flange unscrew the three nuts which must be removed in order to fit each of the two hitch support brackets (see Fig. 4) then unscrew the corresponding studs from the rear transmission housing.

4. Lightly file the face and diameter of each rear axle housing flange, removing any burrs and paint, etc. to ensure correct location of the hitch support brackets.

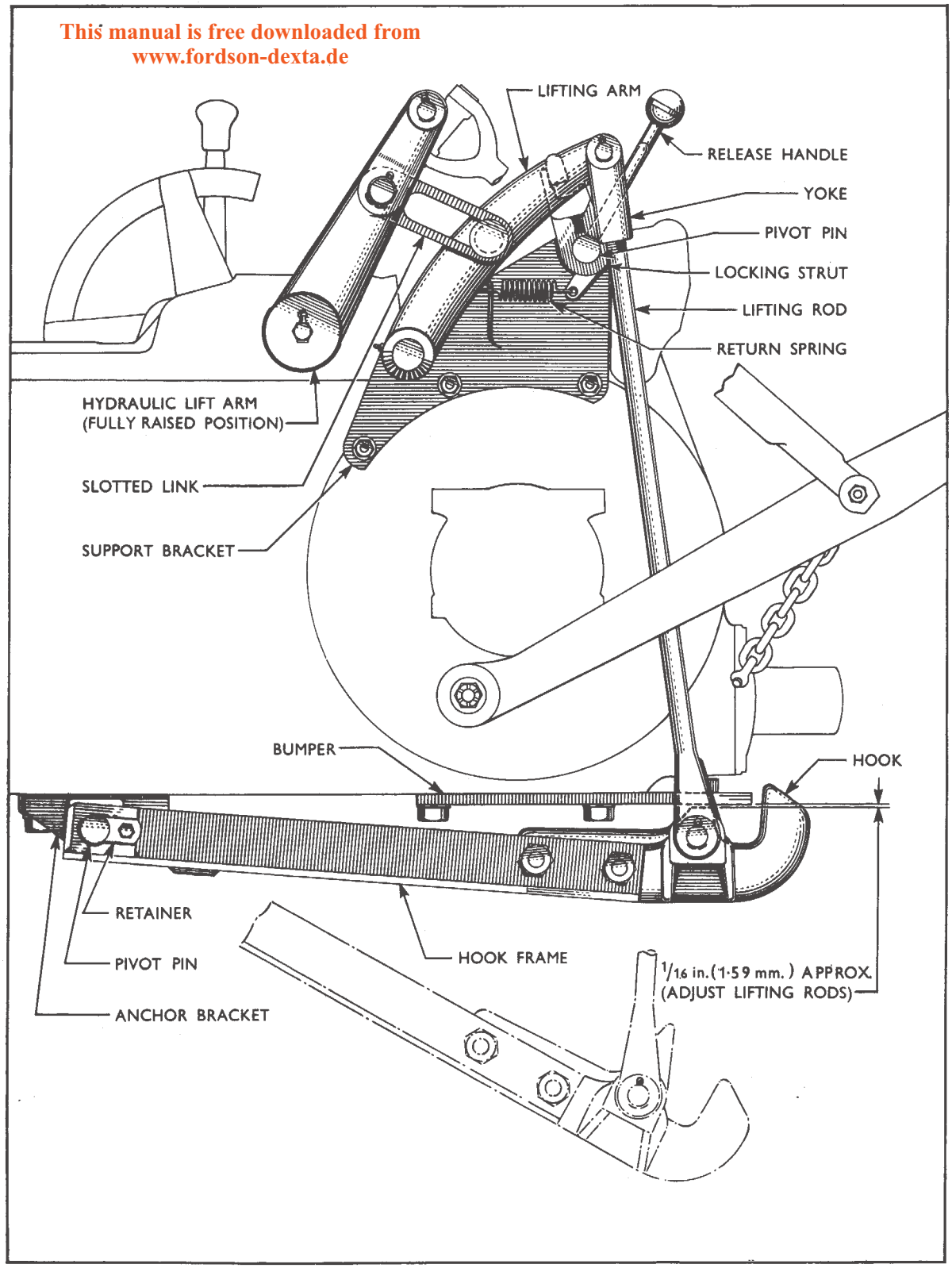


Fig. 4
Diagrammatic Illustration of the Automatic Pick-up Hitch Installation

5. Fit the six special long studs to replace the standard ones removed from the rear transmission housing, ensuring the coarse threaded end of each stud is screwed into the housing until fully tight.

Building the Minor Assemblies

Installing the pick-up hitch on the tractor will be facilitated by first building some of the hitch components into a number of minor assemblies at the bench and these operations are described separately under the appropriate headings.

At assembly, lubricate with a liberal application of a good quality general purpose grease all pivot points and surfaces subject to rotational or sliding action.

Assembly of Slotted Links to Special Hydraulic Lift Arms

1. Attach a slotted link at the boss cast on the inside of each of the two special hydraulic lift arms by inserting the appropriate pivot pin through the hole in the link and through the hole provided in the lift arm so that the pin head is adjacent to the link (see Fig. 5). Secure the pivot pins with split pins ensuring that the links pivot freely on the pins.

Assembly of Hitch Lifting Arms to Support Brackets

1. Screw a grease nipple into the threaded hole in the large boss of each of the two hitch lifting arms and into the threaded hole provided in each of the two support brackets.

2. Assemble the right- and left-hand hitch lifting arms to the corresponding support brackets by, in each case, positioning the large boss at the end of the arm against the machined face of the large boss of the support bracket with the locking lug of the arm adjacent to the bracket (see Fig. 5). Align the hole in the arm with the hole in the bracket, insert the appropriate pivot pin through the arm and into the bracket so that the securing pin hole in the pivot pin is in line with the securing pin hole in the support bracket. Retain the pivot pins by driving the 2 in. (50.8 mm.) long securing pins firmly into position, lightly grooved end of pin foremost. Check the hitch lifting arms for freedom of operation.

Assembly of Hook Body to Hook Frame

1. Lay the hook frame on the bench with the frame crossmember downwards and locate the hook body, hook upwards, in the narrow channelled end of the hook frame. Align the bolt holes in the hook body with those in the hook frame, fit the bolts, securing them with spring washers and nuts.

Installing the Pick-up Hitch on the Tractor

1. Install the left-hand support bracket on the three special studs fitted to the left-hand side of the rear transmission housing so that the hitch lifting arm is outside of the bracket with its free end towards the rear of the tractor. Locate the bracket on the rear

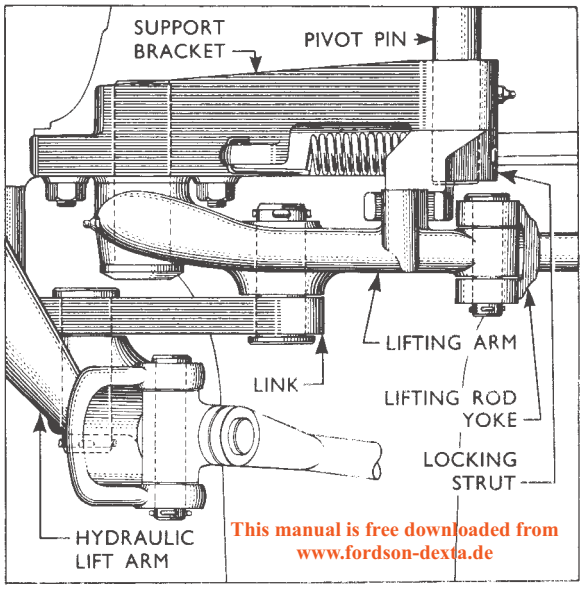


Fig. 5
Arrangement of Hitch Upper Linkage—Left-hand Side

axle housing flange and fit the nuts to the studs without fully tightening.

2. Insert the end of the locking strut pivot pin furthest from the release handle into the bore in the left-hand support bracket and slide the pin through the bore until the release handle is adjacent to the inside of the bracket.

3. Install the right-hand support bracket at the right-hand side of the rear transmission housing in the same manner as the left-hand bracket and slide the locking strut pivot pin into the bore of the right-hand bracket so that the pin is supported in both brackets. Fully tighten the nuts to secure both the left- and right-hand support brackets ensuring, at the same time, that the pivot pin remains free to rotate in the brackets.

4. Install the left-hand locking strut, identifiable by the hole in the small projecting tongue, on the end of the locking strut pivot pin so that it is located on the outside of the left-hand support bracket with its cranked end away from the bracket (see Fig. 5). Align the securing pin holes in the locking strut and pivot pin so that the strut is vertically above the pivot pin when the release handle is offset from the upright position approximately 45° towards the rear of the tractor. Retain the locking strut by driving the securing pin, lightly grooved end of pin foremost, firmly into position.

5. Hold the left-hand locking strut against the adjacent support bracket and install the right-hand locking strut on the end of the locking strut pivot pin which will now protrude outside the right-hand support bracket. The strut must be assembled with its cranked end away from the bracket and with its small projecting tongue positioned between the two

stop lugs cast on the side of the bracket. Align the securing pin holes in the right-hand locking strut and pivot pin with the strut in the same relative position as the left-hand locking strut and drive the securing pin firmly into position.

NOTE.—The locking strut pivot pin must still rotate freely in the support brackets after fitting the locking struts. Incorrect location of the support brackets, caused by burrs, paint, etc., could cause a " bind " at the locking strut pivot pin and this condition must be corrected before proceeding with the installation.

6. Screw the hand knob securely onto the end of the release handle.

7. Move the release handle rearwards to the fullest extent then fit the return spring between the tongue of the left-hand locking strut and the cast location provided on the left-hand support bracket, linking first the short hooked end of the spring through the hole in the tongue so that the open end of the hook is towards the support bracket. Check that freeing the release handle from the forward position causes the locking struts to be rapidly returned by the spring.

8. Raise the hitch lifting arms together, checking the action of the locking struts and locate the arms on the struts.

9. Fit the special hydraulic lift arms to the lift cross-shaft, picking up the master splines at the outer ends of the shaft, with the slotted links attached to the lift arms suitably positioned for connection to the hitch lifting arms. Fit the large retaining washer, **new** locking tab and the retaining screw to each end of the cross-shaft. Tighten the screws until the lift arms just drop under their own weight with no end play between the arms and the housing. Secure in this position by bending the locking tabs against the heads of the screws.

NOTE.—Over-tightening the screws will cause the lift arms to " bind " and adversely affect the operation of the lift.

10. Position each hitch lifting arm as required to enable the free ends of the slotted links to be connected to the hitch lifting arms by means of the pivot pins. Insert the pins through the slots in the links and the holes provided in the arms so that the pin heads are against the links (see Fig. 5). Secure the pivot pins with split pins.

11. Lift each hydraulic lift lower link, together with the lift rod and reconnect the knuckles of the lift rods to the special hydraulic lift arms by means of the clevis pins. **The clevis pins must be inserted so that the heads are on the inside of the lift arms (see Fig. 5).** Secure the clevis pins with new split pins.

12. Drive the dowel fully into the appropriate hole machined in the anchor bracket so that it protrudes from the locating face of the bracket. Position the anchor bracket against the underside of the rear transmission housing (see Fig. 4), locating the dowel in the hole provided at the front end of the housing. Align the screw holes in the bracket and housing then secure the bracket in position with the four $1\frac{5}{8}$ in. (41.3 mm.) long screws fitted with spring washers.

13. Secure the bumper, plain face downwards and angled end to the rear, to the underside of the rear transmission housing, rearward of the anchor bracket, using four screws and spring washers (see Fig. 4).

14. Position the hook assembly under the rear transmission housing, hook facing upwards, locate the end of the hook frame on the anchor bracket and retain by inserting the pivot pin through the hole in the frame and bracket so that the grooved end of the pin projects from the left-hand side of the hook frame. Fit the retainer to the pivot pin groove and secure to the hook frame with the screw and spring washer (see Fig. 4).

15. Jack or block-up the hitch hook so that there is approximately $\frac{1}{16}$ in. (1.59 mm.) clearance between the lug cast in the centre of the hook body and the underside of the bumper (see Fig. 4). Attach the hitch lifting rods to the pins located one either side of the hook body and secure each rod in position by means of a plain washer and split pin. **Ensure the hydraulic lift arms are fully raised with the pins connecting the hitch lifting arms to the slotted links contacting the lower ends of the slots (see Fig. 4).** Screw the yokes onto the hitch lifting rods so that they engage the hitch lifting arms with the holes in the yokes aligned, within the limits of the adjustment, with the holes in the hitch lifting arms—**do not alter the position of the hook.** Connect the yokes to the arms, if necessary now adjusting the position of the arms to enable the clevis pins to be installed, pin heads on the inside of the yokes (see Fig. 5). Secure the clevis pins with split pins.

16. Remove the jack or blocks supporting the hitch hook and check the operation of both the pick-up hitch and the hydraulic lift ensuring that the hitch lifting rods have been correctly adjusted so that there is clearance (approximately $\frac{1}{16}$ in. (1.59 mm.) between the lug in the centre of the hook body and the bumper when the hydraulic lift arms are fully raised.

BELT PULLEY

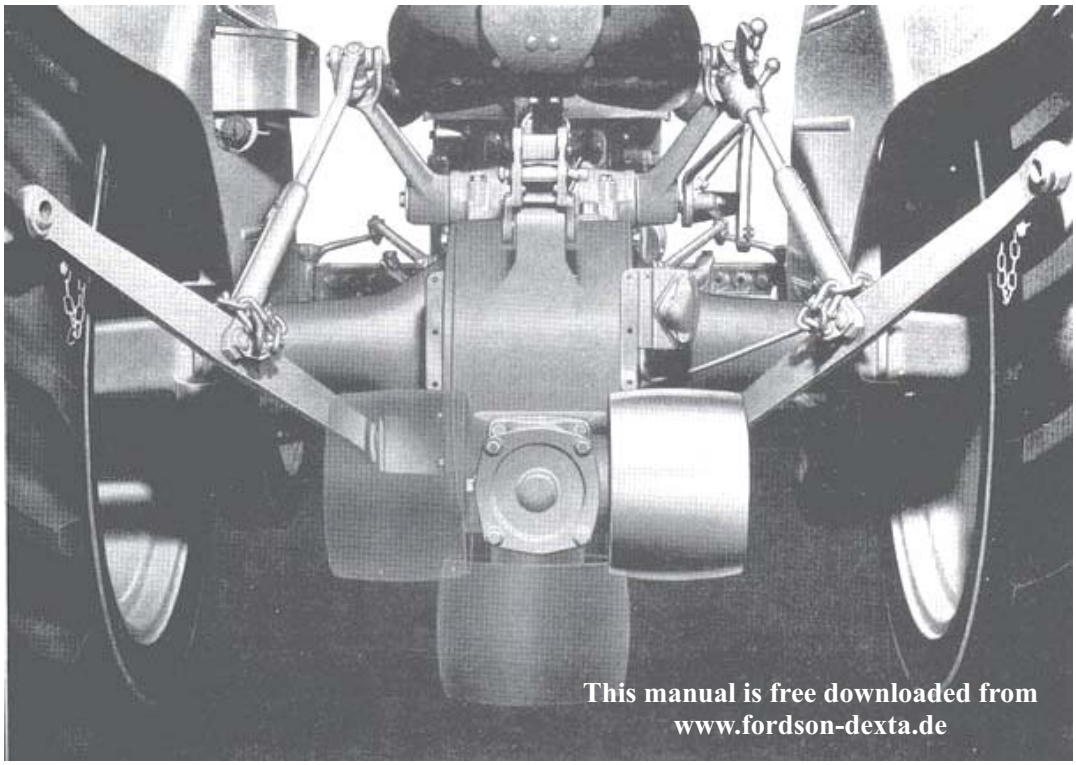


Fig. 6
The Belt Pulley Installed on the Tractor

General Description

The belt pulley assembly, supplied as a production fitted option or as an accessory, is designed for attachment to the rear of the tractor where it is driven by the P.T.O. shaft, the P.T.O. shifter lever providing the means of positively engaging or disengaging the drive to the pulley. The pulley driving gear assembly is self-contained in its own housing and uses its own supply of oil for lubrication purposes. An internally splined shaft, carried on taper roller bearings, connects with the external splines of the P.T.O. shaft and incorporates an integral spiral bevel driving gear. Meshing with this gear is a mating spiral bevel driven pinion which turns the drive through 90° and is internally splined to the pulley shaft. Taper roller bearings are also used to support the pulley shaft, the outer end of which is formed into a flange to connect by means of four set-screws with the 9 in. (229 mm.) diameter pulley. The gears in the assembly give a speed increase of 1.87 : 1 but taken overall the engine speed is **reduced** in the ratio of 1.55 : 1. An engine speed of 2,000 r.p.m. will therefore result in a pulley speed of 1,290 r.p.m. which with the 9 in. (229 mm.) pulley corresponds to a belt speed of 3,039 ft./min. (926 metres/min.).

Belt pulley operations can be carried out with the pulley assembly installed on the tractor in any one of three positions—horizontally left, horizontally right or downwards (see Fig. 6) except on tractors equipped with a pick-up hitch when only the two horizontal positions should be used. The horizontal left- and right-hand mounting positions give clockwise and anti-clockwise pulley rotation respectively, viewed from the left-hand side of the tractor. Under no circumstances must any attempt be made to

operate the belt pulley assembly in the upward position as this could result in oil starvation of certain parts within the pulley driving gear housing.

CAUTION :—With a belt pulley assembly fitted in either horizontal position care must be taken when raising the hydraulic lift that the lower links do not foul the pulley.

Where implements other than those which are belt driven are to be used it may, to obviate damage, be necessary to remove the pulley assembly completely. It **must** always be removed when a pick-up hitch is to be used.

To Install the Belt Pulley Assembly

1. Remove the P.T.O. shaft cap and/or guard but replace the securing screws to hold the P.T.O. shaft cover plate to the rear transmission housing.

2. Detach the lower link check chain brackets from the rear transmission housing and secure the brackets to their respective lower links (see Fig. 6). If the pulley assembly is to be used in a horizontal position swing the lower link which will be adjacent to the actual pulley outwards to its fullest extent and preferably secure it in this position.

3. Fit the pulley assembly in the required operating position, sliding the splined bore of the pulley drive gear shaft onto the P.T.O. shaft until the spigot machined on the pulley driving gear housing is fully located in the bore of the P.T.O. shaft cover plate.

4. Secure the pulley driving gear housing flange to the rear transmission housing using the four screws and tapped holes previously used to retain the check chain brackets.

Routine Maintenance

Whenever the belt pulley assembly is put into use check before operating and subsequently at daily intervals that the oil in the pulley driving gear housing is up to the level of the filler plug with the assembly in either one of the horizontal mounting positions. If the oil level is low add sufficient good quality oil of the same specification as that used in the transmission to bring the oil up to the required level in the housing.

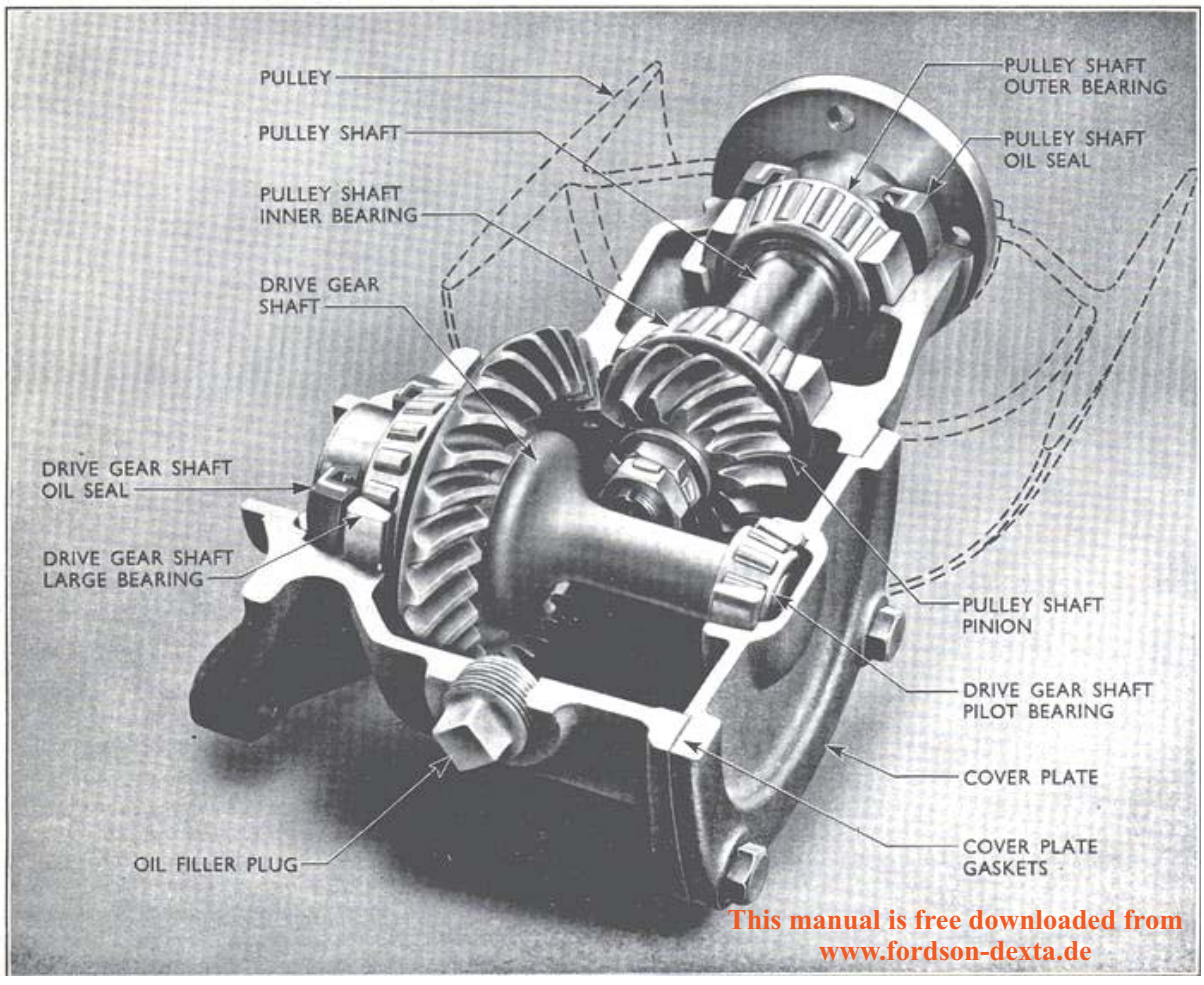


Fig. 7
Belt Pulley Assembly in Section

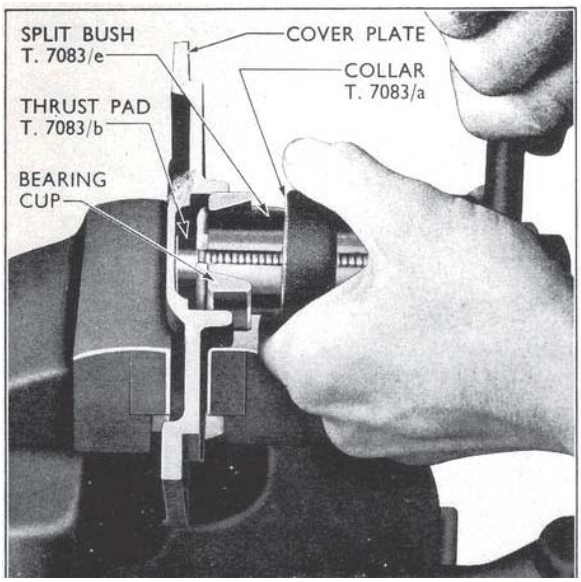


Fig. 8
Cover Plate and Bearing Cup Cut-away to show Tool T.7083 Removing Cup

REPAIR OPERATIONS

To Dismantle the Belt Pulley Assembly

1. Remove the four screws and spring washers securing the pulley then lift it from the spigot of the pulley shaft.

2. Unscrew the filler plug from the housing and drain off the oil.

3. When the housing is empty of oil remove the four screws securing the cover plate and lift it away from the housing. The cover plate is spigot-located in the housing (see Fig. 7) which, together with the use of sealing compound at the joint, may make it necessary to tap the plate out of position and in such circumstances, care must be taken not to damage the edges of the joint faces of the plate or housing. Remove any aluminium foil cover plate gaskets which come away with the cover plate or which may remain on the face of the housing.

4. To extract the drive gear shaft pilot bearing cup from the cover plate use Tool T.7083. Assemble the tool so that the centre screw is entered into the threaded bore at the plain end of the split bush T.7083/e, the sections of which must be in the correct sequence so that they are positioned by the thread of the centre screw with their rimmed edges in line. Enter the small thrust pad T.7083/b in the bore at the open end of the split bush, with the plain face away from the centre screw. Hold the sections of the split bush together to prevent the thrust pad from coming out of position, insert the end of the bush through the bearing cup in the cover plate and locate the rimmed edges of the sections of the bush behind the bearing cup. Pass the collar T.7083/a over the tool centre screw and locate it around the end of the split bush. Fit the handle to the centre screw then, holding the collar and split bush, turn down the centre screw to extract the bearing cup from the cover plate (see Fig. 8).

5. Straighten the tabs of the locking washer fitted between the two locknuts on the inner end of the pulley shaft (see Fig. 7). Remove the locknuts, locking washer and plain washer to enable the pulley shaft to be withdrawn from the housing, if necessary driving it out of position using a suitable brass or copper drift against the flanged end of the shaft. As the shaft moves out of the housing its splined diameter will pass out of the pulley shaft bevel pinion and through the pulley shaft inner bearing cone leaving them inside the housing, whilst the pulley shaft outer bearing cone will come away with the shaft and draw the pulley shaft oil seal out of the housing with the shaft. With the pulley shaft removed, extract the bevel pinion and inner bearing cone from the housing.

6. To remove the pulley shaft outer bearing cone or oil seal from the shaft first install the slave ring in Main Tool T.7000, which should be suitably held in a vice equipped with brass vice jaws. Insert the small end of the pulley shaft through the slave ring towards the tool centre screw so that the bearing cone is within the slave ring. Locate the split adaptors T.7000–23/a around the bearing cone and in the slave ring then turn the centre screw to press the shaft out of the bearing cone (see Fig. 9). With the bearing cone removed the oil seal is free to be withdrawn from the shaft.

7. Withdraw the drive gear shaft, complete with pilot and large bearing cones, through the housing cover plate aperture.

8. To remove the drive gear shaft pilot bearing cone from the shaft use Main Tool T.7000 with

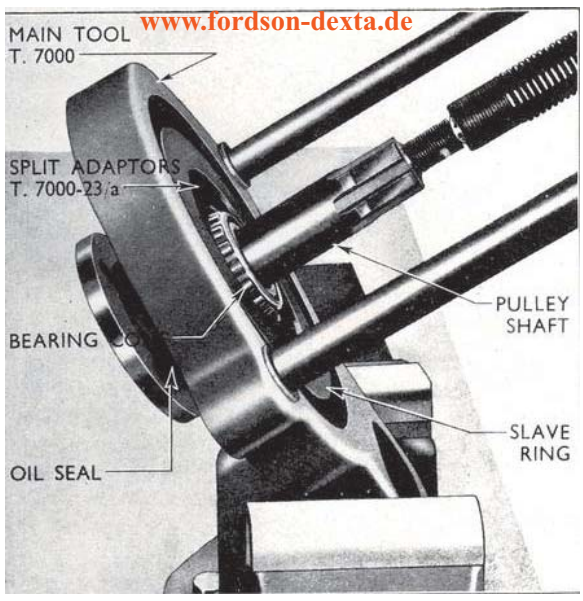


Fig. 9
Removing Pulley Shaft Outer Bearing Cone

slave ring installed. Position the end of the shaft carrying the pilot bearing cone in the bore of the slave ring with the bevel gear outside the tool. Fit the split adaptors T.7000–24/a around the pilot bearing cone and in the slave ring. Install the extension adaptor T.7000–24/g on the end of the tool centre screw and press the shaft out of the bearing cone (see Fig. 10).

9. Removal of the drive gear shaft large bearing cone is carried out again using the Main Tool T.7000 but for this operation the slave ring is not required. Position the shaft so that the large bearing cone is inside the bore of the tool with the hollow end of the shaft towards the tool centre screw, then locate the split adaptors T.7000–25/a around the bearing cone and in the tool. Fit the thrust pad T.7000–25/d to the hollow end of the shaft and operate the tool to press the shaft out of the bearing cone (see Fig. 11).

10. If it is required to remove the pulley shaft inner and outer bearing cups from their bores in the housing, drive them **squarely** out of position. A drift of soft metal rod approximately ½ in. (13 mm.) diameter and 15 in. (381 mm.) long can satisfactorily be used through the filler plug hole in the housing to drive the outer cup from its bore and the same punch can, if required, be used to remove the inner cup. Care must be taken when removing either bearing cup not to damage the shoulder of the bore against which the cup seats and, in addition, when removing the outer bearing cup not to damage the threaded filler plug hole.

11. The drive gear shaft large bearing cup is removed from its bore in the housing using the Main Tool PT.1024 with the aluminium adaptor ring T.1024–6/a attached to the tool body, after first locating the split adaptors T.1024–6/b in the bearing

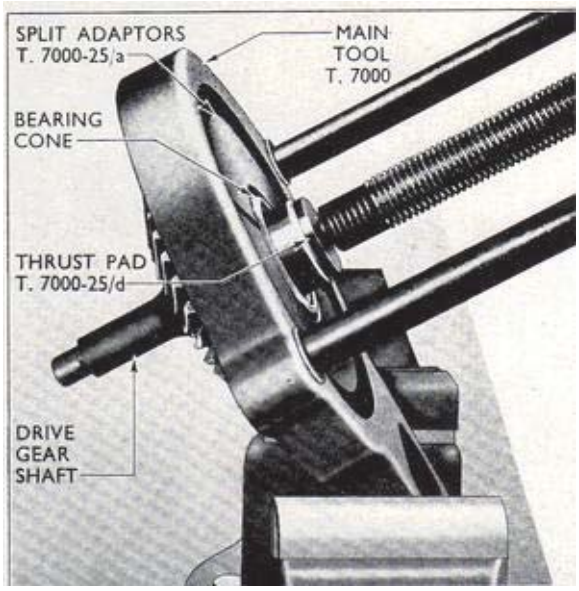


Fig. 11
Removing the Large Bearing Cone from the Drive Gear Shaft

cup. Position the tool, with the large wing-nut screwed up to the handle of the tool and with the knurled nut removed from the end of the tool centre spindle, so that the aluminium adaptor ring is located in the housing cover plate aperture with the centre spindle passing through the bore of the split adaptors in the bearing cup into the bore in the housing. Refit the knurled nut securely to the end of the tool centre spindle, draw the centre spindle out of the tool body to move the knurled nut into the bore of

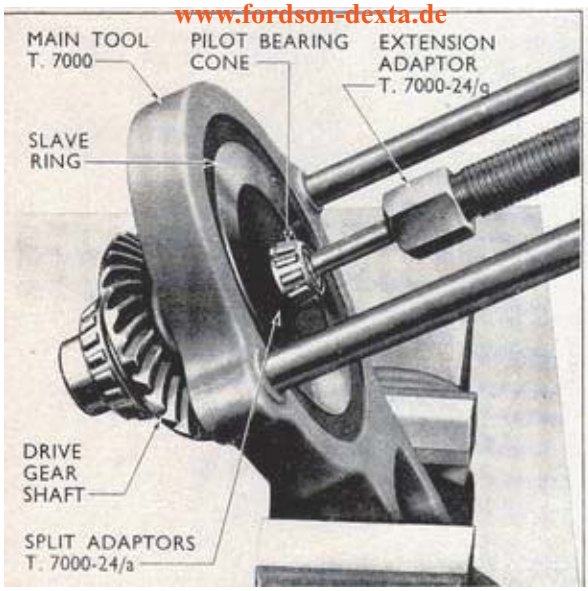


Fig. 10
Removing the Pilot Bearing Cone from the Drive Gear Shaft

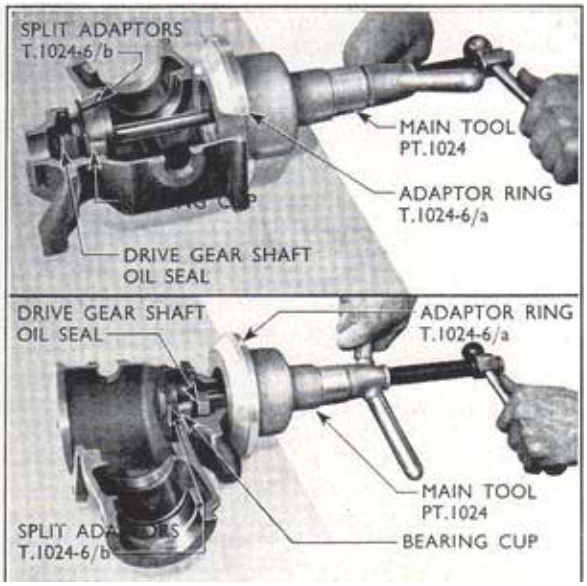


Fig. 12
Housing Cut-away to show Removal (Top) and Replacement (Bottom) of Large Bearing Cup

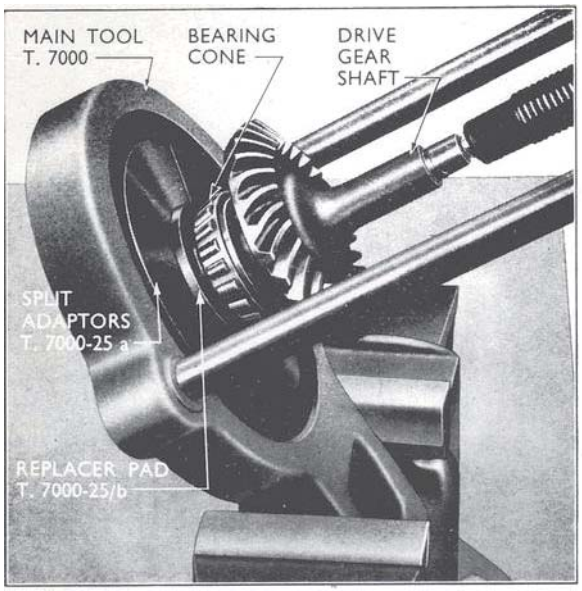


Fig. 13

Replacing the Large Bearing Cone on the Drive Gear Shaft

the split adaptors then screw down the large wing-nut to extract the bearing cup (see Fig. 12—Top).

12. After removing the drive gear shaft large bearing cup the drive gear shaft oil seal is exposed and can be removed from its bore in the housing.

To Rebuild the Belt Pulley Assembly

The spiral bevel gear which is incorporated in the drive gear shaft and the pulley shaft pinion (see Fig. 7) are manufactured as matched pairs and for this reason neither of these parts should be renewed individually i.e. if it is necessary to fit a new drive gear shaft a new pulley shaft pinion must also be fitted and vice-versa.

When replacing the taper roller bearing cups and cones ensure that the presence of dirt or burrs does not prevent them from being pressed fully onto their seats otherwise the meshing of the drive gear and pulley shaft pinion, controlled by manufacturing limits, may be adversely affected.

1. To fit a new drive gear shaft oil seal to the housing use Tool T.7087 with the 550 handle, inserting the tool through the housing cover plate aperture to drive the seal into the appropriate bore in the housing. Always ensure that when the oil seal is installed its sealing lip faces into the housing (see Fig. 7).

2. The drive gear shaft large bearing cup is drawn into the bore in the housing adjacent to the drive gear shaft oil seal by first positioning the Main Tool PT.1024 so that the aluminium adaptor ring T.1024-6/a, which must be fitted to the tool body, locates on the mounting spigot of the housing with the centre spindle of the tool passing into the housing. Insert the large bearing cup through the housing cover plate aperture and pass it over the tool centre spindle. Fit the split adaptors T.1024-6/b to the cup and around the tool centre spindle and move the cup with adaptors so that the latter locate on the knurled nut at the end of the centre spindle. Draw the centre spindle out of the tool body, which will position the bearing cup at the entrance to its bore in the housing and screw down the large wing-nut to pull the cup into position so that it seats against the shoulder of the bore (see Fig. 12—Bottom).

3. If the pulley shaft inner and outer bearing cups have been removed, new cups may be driven **squarely** into position in the housing , no special tools are required but it is recommended that soft metal drifts are used. In the case of the inner bearing cup the drift previously mentioned for removing the cups ($\frac{1}{2}$ in. (13 mm.) diameter and 15 in. (381 mm.) long approximately) may be used through the filler plug hole in the housing.

4. To assemble the large bearing cone to the drive gear shaft remove the slave ring from Main Tool T.7000, fit the split adaptors T.7000-25/a to the tool and position the replacer pad T.7000-25/b on the split adaptors, parallel spigot of the pad located in the counterbore of the adaptors. Position the large bearing cone on the replacer pad so that the small diameter end of the cone is adjacent to the pad, locate the large end of the drive gear shaft in the bearing cone then press the cone onto the shaft (see Fig. 13).

5. The pilot bearing cone is replaced on the drive gear shaft using Main Tool T.7000 with slave ring installed. Fit the split adaptors T.7000-24/a to the slave ring then position the replacer pad T.7000-24/d on the split adaptors so that the recessed end of the

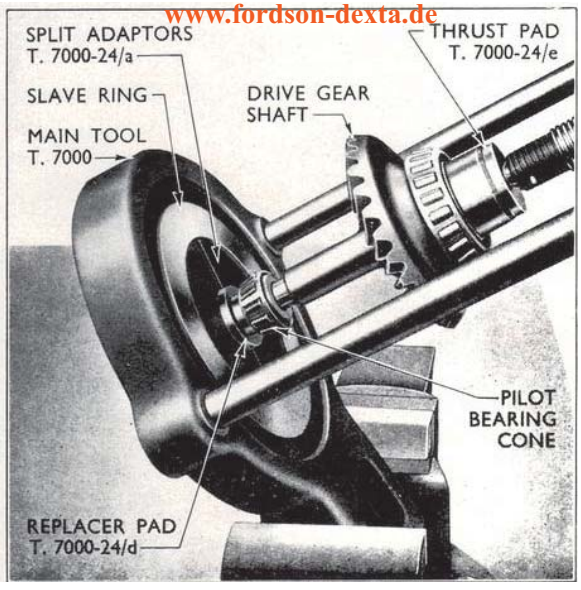


Fig. 14

Replacing the Pilot Bearing Cone on the Drive Gear Shaft

pad is towards the tool centre screw. Position the pilot bearing cone on the replacer pad with the small diameter end of the cone inner race located in the recessed end of the pad and install the drive gear shaft in the tool so that its small end is positioned at the entrance to the bore of the bearing cone. Fit the thrust pad T.7000–24/e to the hollow end of the shaft and turn the tool centre screw to press the bearing cone onto the shoulder of the shaft (see Fig. 14).

6. Install the drive gear shaft, complete with pilot and large bearing cones, in the housing.

7. Install the pulley shaft oil seal, plain face of the seal adjacent to the pulley securing flange of the shaft then fit the pulley shaft outer bearing cone using Main Tool T.7000 with slave ring and split adaptors T.7000–23/a. Position the replacer pad T.7000–23/b on the split adaptors, parallel spigot of the pad located in the counterbore of the adaptors and install the pulley shaft outer bearing cone on the replacer pad so that its small diameter end is adjacent to the pad. Fit the pulley shaft to the tool so that it is located in the bearing cone and turn the tool centre screw to press the cone fully into position on the shaft (see Fig. 15).

8. Locate the pulley shaft inner bearing cone in its cup in the housing then install the pulley shaft pinion so that it meshes with the drive gear shaft bevel gear and align the pinion with the bore of the bearing cone. Enter the pulley shaft, with oil seal and outer bearing cone assembled, into the housing so that the splined diameter of the shaft passes through the inner bearing cone to pick-up the splined bore of the pinion. Lightly tap the pulley shaft through the pinion sufficiently to allow the plain washer and one locknut to be securely fitted to the threaded end of the shaft.

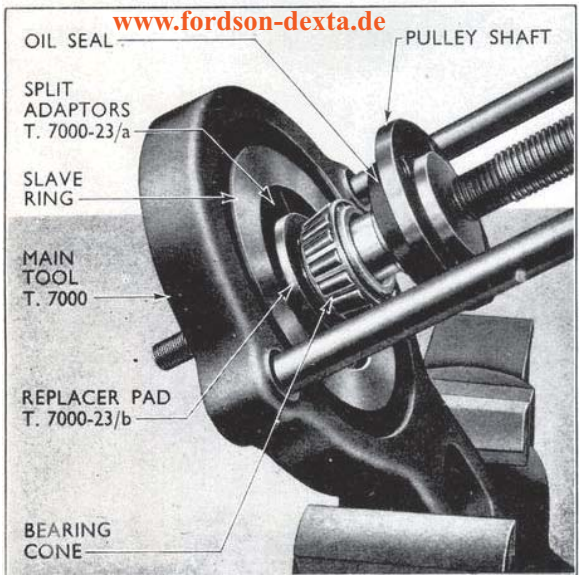


Fig. 15
Replacing Pulley Shaft Outer Bearing Cone

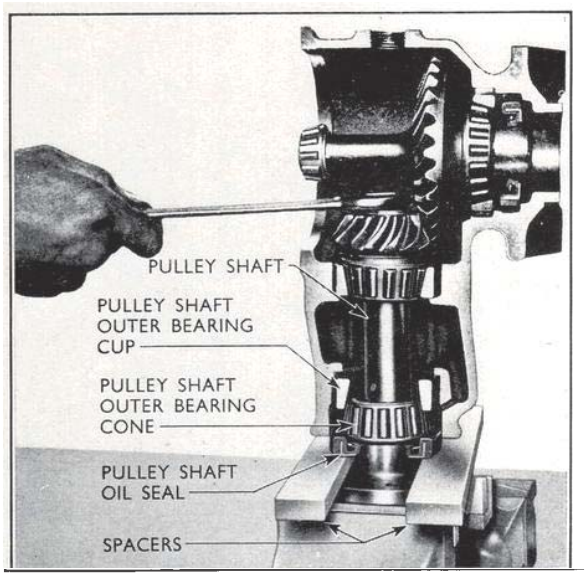


Fig. 16
Housing Cut-away to show Installation of Oil Seal when Replacing Pulley Shaft

9. Invert the assembly and grip the small spigot diameter at the flanged end of the pulley shaft in a vice fitted with brass vice jaws.

Move the oil seal up the pulley shaft to enter it into the bore of the housing and fit two suitable spacers (metal or wood strips approximately $\frac{3}{8}$ in. (10 mm.) thick and 6 in. (152 mm.) long) between the oil seal and the pulley shaft flange, one either side of the shaft. Tighten down the locknut at the inner end of the pulley shaft and draw the oil seal into position (see Fig. 16). As the pulley shaft moves into the housing loosely fit a new locking washer and the second locknut to the threaded end of the shaft, picking-up the keyway in the shaft with the internal key of the washer. The oil seal is correctly positioned when it is flush with the edge of the housing i.e. when the spacers contact the end of the housing. Remove the spacers and continue to draw the pulley shaft into the housing until by rocking the housing about the shaft a barely perceptible movement of the housing can be felt, indicating that the pulley shaft bearings are correctly adjusted, then tighten the locknuts together **ensuring that the one used to draw the shaft into position does not move, otherwise the bearing adjustment will be affected.**

NOTE.—When checking the bearing adjustment the pulley shaft oil seal tends to restrict the movement of the housing about the shaft and it is important that this is not misinterpreted as correct bearing adjustment otherwise excessive clearance may exist between the pulley shaft bearing cups and cones.

After tightening the locknuts together ensure that the bearing adjustment is still correct and secure the locknuts by bending a tab of the locking washer over flat against each locknut.

Fig. 17
Determining Total Thickness of Cover Plate Gaskets Required

10. Install the drive gear shaft pilot bearing cup in the housing cover plate, ensuring that it seats on the shoulder of the bore.

11. Before finally assembling the cover plate to the housing it is necessary to determine the total thickness of aluminium foil gaskets which must be fitted between the cover plate and the housing to ensure approximately .002 in. (.05 mm.) end-float on the drive gear shaft bearings. To determine the total thickness of cover plate gaskets required, first clean and remove all burrs from the joint face of the cover plate and the corresponding face of the housing. Ensure the drive gear shaft is fully located in the housing and fit the cover plate without any gaskets. Adjust the position of the cover plate, ensuring that it remains located on the drive gear shaft, so that an even clearance exists between the plate and the housing ; check the gap with feeler gauges (see Fig. 17). Select cover plate gaskets with a total thickness sufficiently larger than the gap to give an end-float of approximately .002 in. (.05 mm.) on the drive gear shaft bearings when the cover plate is secured to the housing.

NOTE.—The aluminium foil cover plate gaskets are supplied in three thicknesses each of which can vary within .003 in. (.08 mm.)—see " BELT PULLEY SPECIFICATIONS," therefore, to obtain a required total thickness of gaskets it will be necessary to physically measure the thickness of each gasket selected. Under no circumstances must the total thickness of the gaskets selected for fitment to the cover plate be such that no end-float will exist on the drive gear shaft bearings when the cover plate is finally fitted to the housing. Any of the cover plate gaskets removed at the time of dismantling may, if necessary, be re-used after cleaning thoroughly providing they are in no way damaged.

12. Having selected the gaskets required, remove the cover plate from the housing, apply a coating of good quality sealing compound to the joint face of the plate and housing, also to both faces of each gasket to be fitted. Install the gaskets and cover plate then fit the four securing screws. Using a suitable torque wrench gradually tighten the screws alternately to a torque of 35 to 40 lbs. ft. (4.8 to 5.5 kg.m.).

13. Fill the housing with sufficient good quality oil of the same specification as that used in the transmission, to bring the level to that of the filler plug hole when the assembly is in either of the horizontal positions it assumes when installed on the tractor—approximate capacity of housing 1 pint (.6 litres). Screw the filler plug firmly into position in the housing.

14. Install the pulley on the flange of the pulley shaft with the rim of the pulley closest to the offset pulley hub away from the housing (see Fig. 7). Secure with the four screws and spring washers, tightening the screws to a torque of 40 to 45 lbs. ft. (5.5 to 6.2 kg.m.).

BELT PULLEY SPECIFICATIONS

General

Type	Rear mounted—P.T.O. driven
Engine/pulley gear reduction	1.55 : 1

Speed at 2,000 Engine r.p.m.

Pulley	1,290 r.p.m.
Belt	3,039 ft./min. (926 metres/min.)

Pulley

Diameter	9 in. (229 mm.)
Width	6½ in. (165 mm.)

Pulley Shaft

Bearings	2—taper roller
End-float on bearings	.002 in. (.05 mm.) approximately

Drive Gear Shaft

Bearings	2—taper roller
End-float on bearings	.002 in. (.05 mm.) approximately
Internal spline	6 splines—major diameter 1⅜ in. (35 mm.)

Gearing

Type	Spiral bevel
Teeth in driving gear	28
Teeth in driven pinion	15
Ratio	1.87 : 1

Cover Plate

Gasket material	Aluminium foil
Gasket thicknesses	.012/.015 in. (.30/.38 mm.) .016/.019 in. (.41/.48 mm.) .020/.023 in. (.51/.58 mm.)

Lubrication

Type	Semi-immersion and splash
Lubricant grade	As transmission—see " SPECIFICATIONS AND REPAIR DATA—REAR AXLE "
Lubricant capacity	1 pint (.6 litres) approximately

Tightening Torque

Pulley securing screws	40 to 45 lbs. ft. (5.5 to 6.2 kg.m.)
Cover plate securing screws	35 to 40 lbs. ft. (4.8 to 5.5 kg.m.)