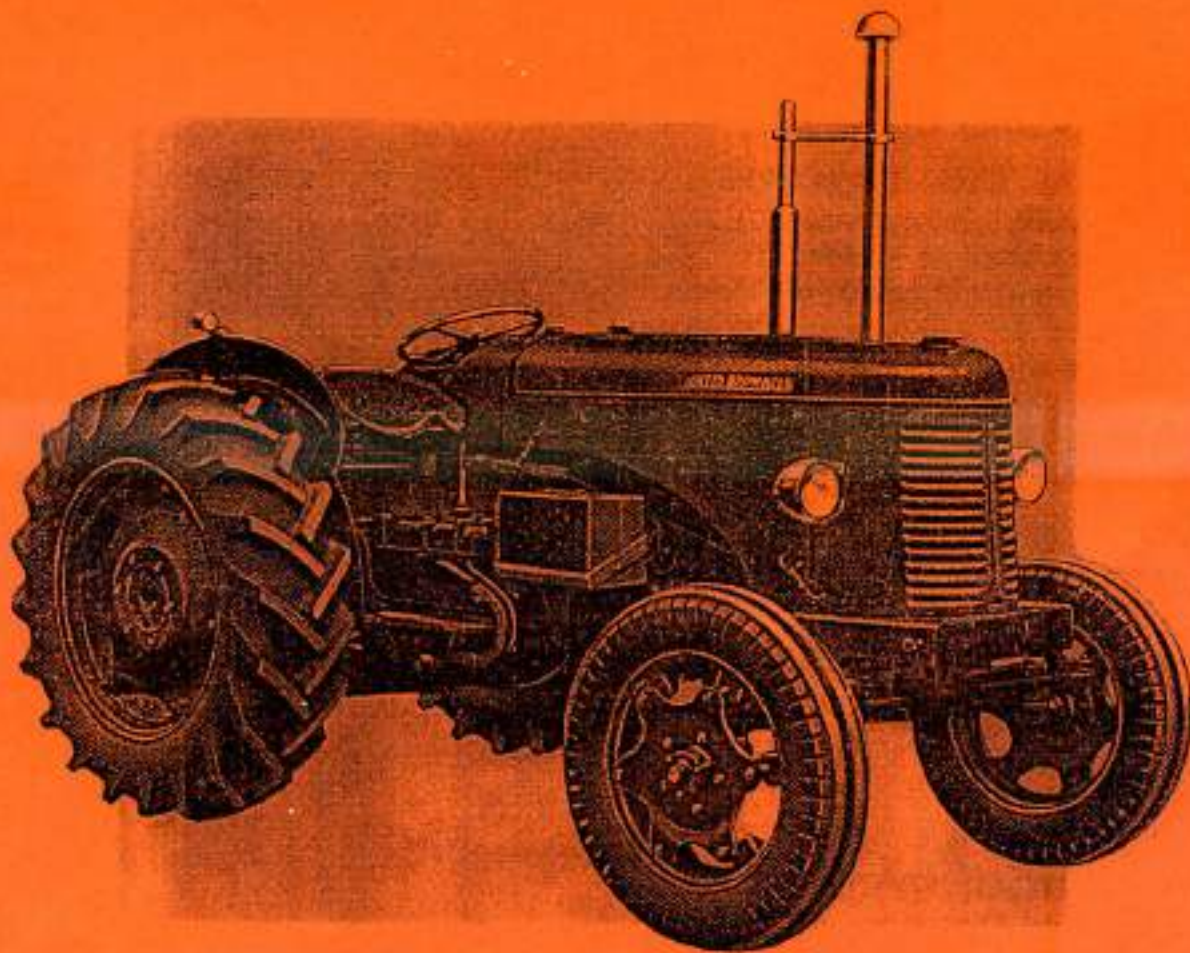


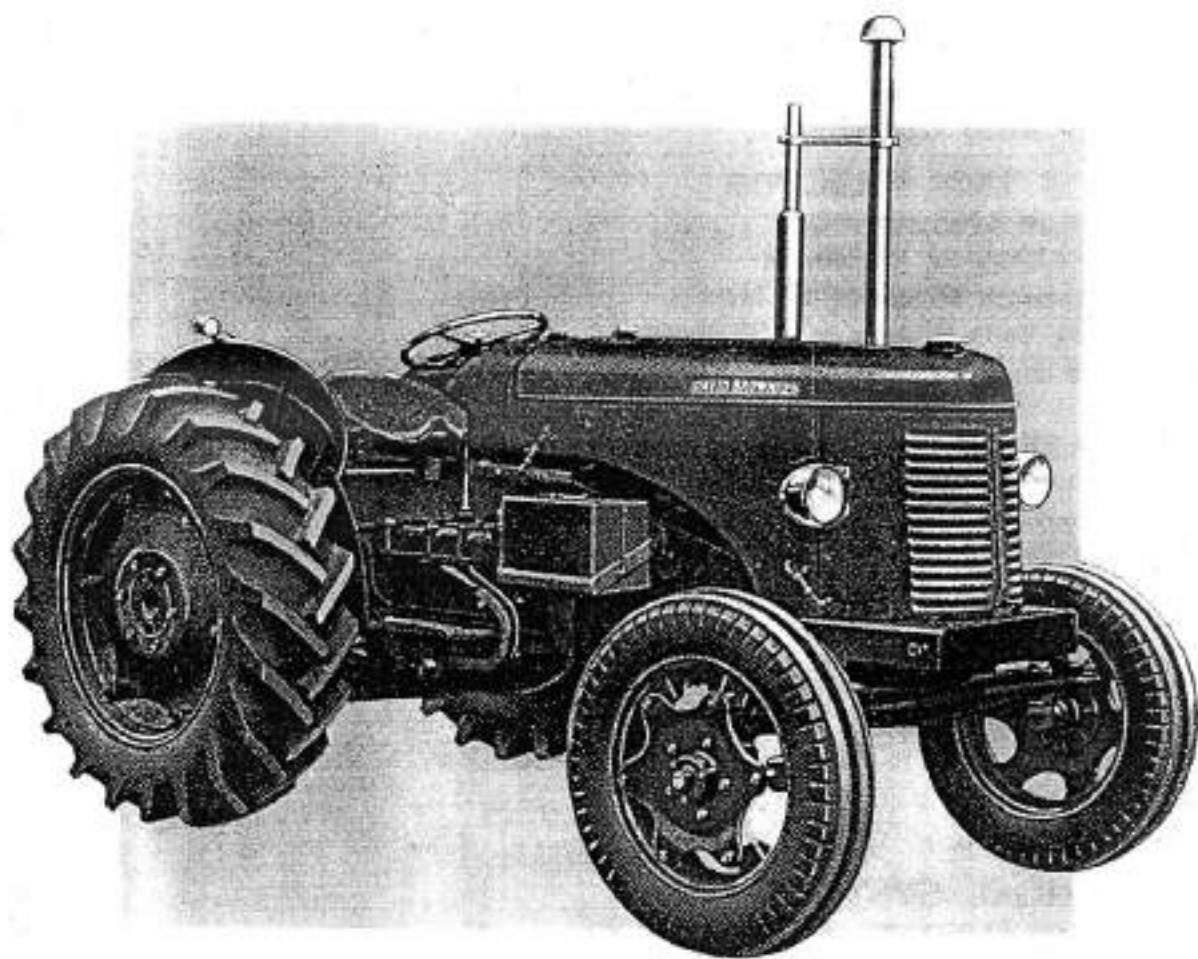
THE
DAVID BROWN
25D-30D



AGRICULTURAL TRACTOR

SERIES VAD/1C/25
and
SERIES VAD/1D 30

THE
DAVID BROWN
25D-30D



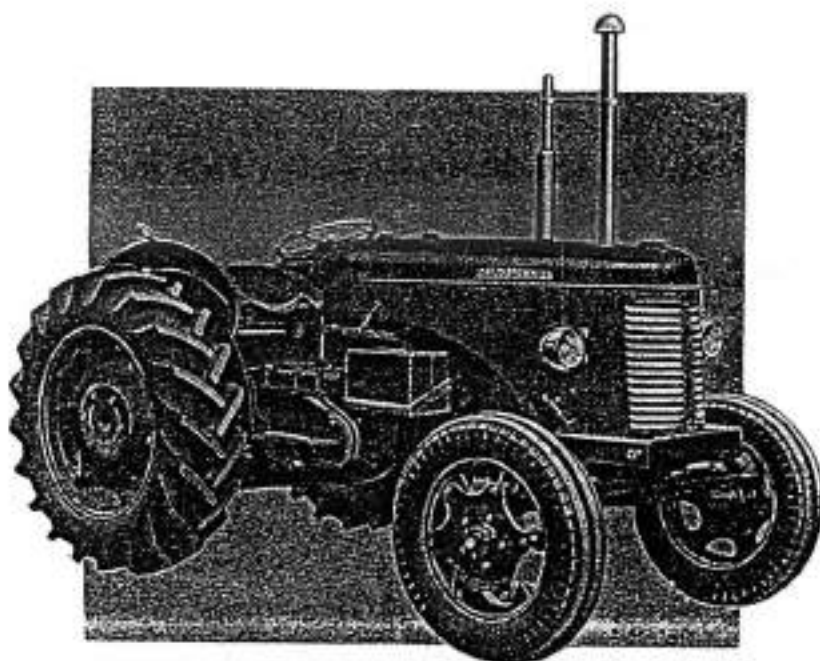
AGRICULTURAL TRACTOR

SERIES VAD/1C/25
and
SERIES VAD/1D/30

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DAVID BROWN
25D - 30D
INSTRUCTION BOOK



DAVID BROWN INDUSTRIES LIMITED

Tractor Division

MELTHAM

HUDDERSFIELD

Introduction

This Instruction Book has been prepared with the knowledge that the life of your Diesel Tractor will be extended in proportion to the attention paid to the regular maintenance and correct operation of the tractor.

Although you may not read this book in full at the outset you *should* certainly read the first two sections especially those dealing with "**Operating the Tractor**" and "**Care of the Tractor.**" Correct operation of the tractor reduces the time required for maintenance and obviates minor troubles which, when left unattended, might later become major repairs.

In addition to the normal routine maintenance we cannot overstress the importance of absolute cleanliness of the diesel fuel. Minute particles of dirt in the fuel system will cause damage to the fuel injection equipment and result in the unsatisfactory operation of the engine.

It is essential that all fuel containers and funnels are free from dirt and moisture and fitted with fine gauze strainers to prevent dirt entering the tractor tanks.

Servicing of the fuel injection equipment should always be carried out by specialists and your David Brown dealer or one of the manufacturer's appointed agents, should be consulted.

In the event of any major trouble arising you are advised to call on your David Brown Dealer and if spares are required use only genuine DAVID BROWN replacement parts.

The Service Department at Meltham will be pleased at all times to deal with operational, mechanical or technical queries from either Dealers or Diesel Tractor owners, and you are asked to quote in all such communications to the factory or to your dealer, the tractor and engine serial number.

Receiving the Tractor

IMPORTANT.—The installation of each tractor is carried out by your David Brown Dealer when delivering the tractor to your farm and he will arrange with you for the initial 50 hours free service.

IMMEDIATELY ON RECEIPT OF THE TRACTOR—*Having made yourself familiar with the controls, it is important to carry out the following procedure before starting the tractor.*

EXAMINATION—Examine the tractor to ascertain if any damage has occurred in transit, and check the equipment. Report any damage or shortages to your DAVID BROWN dealer immediately.

TRACTOR EQUIPMENT—All David Brown Diesel Tractors are supplied with six speed gear boxes, pan type seats, built in hydraulic power lift, extra two speed belt pulley and P.T.O. unit and adjustable drawbar.

LUBRICATION—Refer to the lubrication chart on page 27 (and to page 26), locate all the greasing points, make sure that all nipples are free from dirt and lubricate with the grease gun.

Check the oil levels in the engine, transmission, air cleaner, reductions, power take-off and pulley unit ; check all drain plugs for tightness.

COOLING SYSTEM—Close the cylinder block drain tap and the tap at the bottom of the left-hand side of the radiator, and fill the cooling system with clean, soft water. Capacity 3½ gallons.

FUEL SYSTEM—Fill the fuel tank with Diesolite (see page 26 for recommended fuels) to within one inch of the filler cap, using a fine gauze strainer.

It is always advisable to fill up the fuel tank immediately after the tractor has been used. This will prevent water condensing in the tank.

ELECTRICAL SYSTEM—Check the operation of the lights and the self starter motor ; test the latter with the clutch pedal depressed and the decompressor lever raised.

BRAKES, GOVERNOR CONTROL, CLUTCH—Inspect the linkages of these three controls for correct action.

TYRES—Examine the tyres, and if necessary, inflate to the correct pressures (see page 29). N.B.—Individual tyre factors may recommend slightly different maximum and working tyre pressures.

New Engine—Special Precautions

Extra care should be taken with the engine for the first 25 operational hours. Wear caused by inconsiderate handling during the "running in" period will impair the subsequent performance of the engine and shorten its working life.

After the first 25 operational hours, drain the engine oil while the engine is warm (drain plug A, Fig. 20) and renew the engine oil filter element with reference to page 36. Drain the filter by unscrewing the plug B, Fig. 21. Refill the engine to the correct level indicated on the dipstick, K, Fig. 10, using approximately 14 pints of the recommended lubricating oil, see page 26. Check the tightness of the cylinder head bolts, with reference to the tightening sequence given in Fig. 33. Check the tightness of all the remaining nuts and bolts which are readily accessible. Pay particular attention to the manifold nuts.

After the first 50 operational hours, drain and flush the reductions and transmission units. Refill with the recommended grades of new lubricant. See page 26. Remove and clean the gauze and magnetic filter (power lift) as instructed on page 31.

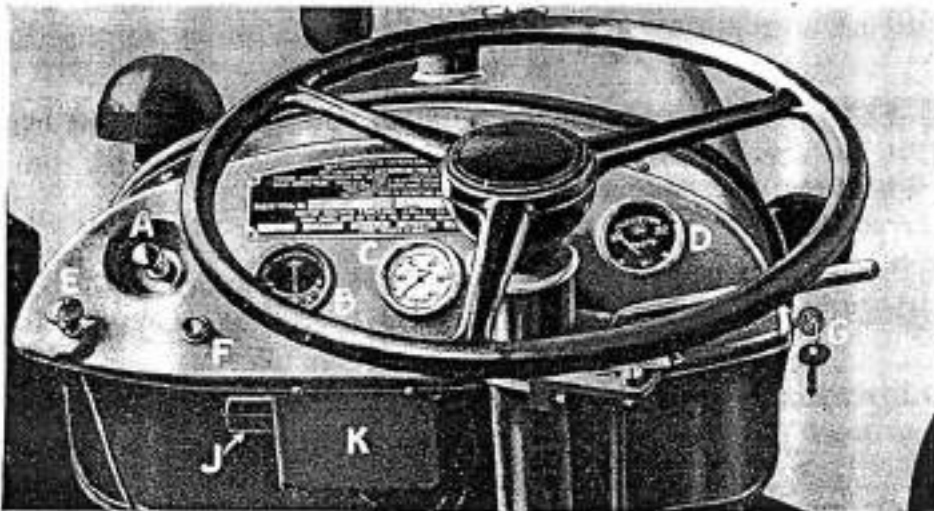


FIG. 1

INSTRUMENT PANEL

- | | |
|-----------------------------------|--------------------------|
| A. Push/Pull type Lighting Switch | F. Starter Push-button |
| B. Ammeter | G. Master Switch |
| C. Oil Pressure Gauge | H. Hand Throttle Control |
| D. Temperature Gauge | J. Fuse Box |
| E. Fuel Cut-off Control | K. Regulator R.B.107 |

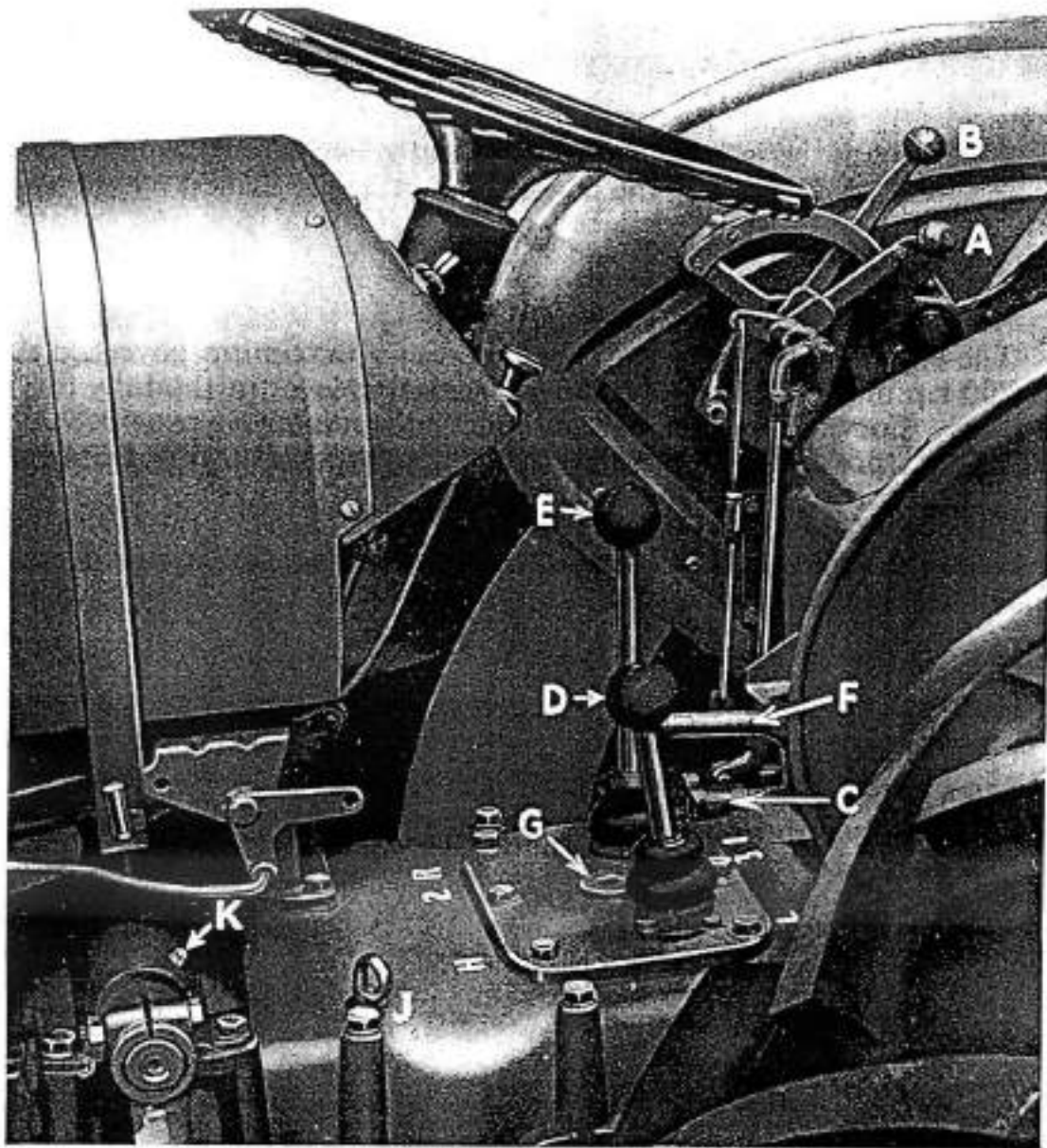


Fig. 2

GEAR LEVERS AND CONTROLS

- | | |
|---------------------------------|---------------------------------|
| A. Traction Control Lever | E. Main Gear Lever |
| B. Hydraulic Lift Control Lever | F. Pull Up Hand Brake |
| C. Traction Control Valve | G. Transmission Oil Filler Plug |
| D. High/Low Range Gear Lever | J. Transmission Oil Dipstick |
| K. Steering Box Lubricators | |

Driver's Controls and Instruments

Engine Controls

FUEL CUT-OFF CONTROL (E, Fig. 1)

Pull outwards to stop the engine ; ensure that this is fully " IN " before restarting.

EXCESS FUEL DEVICE (A, Fig. 3)

The button is pressed IN to provide additional fuel for easy starting when the engine is cold. The device automatically resets itself when the engine starts.

ENGINE CONTROLS

DECOMPRESSOR LEVER (B, Fig. 3)

When the lever is raised to the vertical position, the compression is released in all cylinders and the engine may be easily turned by hand when cold. The lever must be replaced in the horizontal position before the engine is started.

GOVERNOR CONTROL LEVER (H, Fig. 1)

The engine is designed to be operated at a maximum governed speed of 1,800 r.p.m. which is obtained by placing the lever in the fully forward position. For convenience, an intermediate pointer is provided at the 1,600 r.p.m. position—most suitable for many agricultural operations.

ELECTRIC STARTER BUTTON (F, Fig. 1)

When pressed, this operates the starter motor. Release the button immediately the engine fires.

OIL PRESSURE GAUGE (C, Fig. 1)

Normal oil pressure with the engine hot at 1,600 r.p.m. should be 30 to 40 lb./sq. in. The engine should not be operated without oil pressure.

TEMPERATURE GAUGE (D, Fig. 1)

This shows the operating temperature of the engine and should normally register 180° to 200° F. The radiator blind should be adjusted to maintain this range of temperature.

RADIATOR BLIND CONTROL (G, Fig. 5)

The control has four positions. The blind is closed when the control is

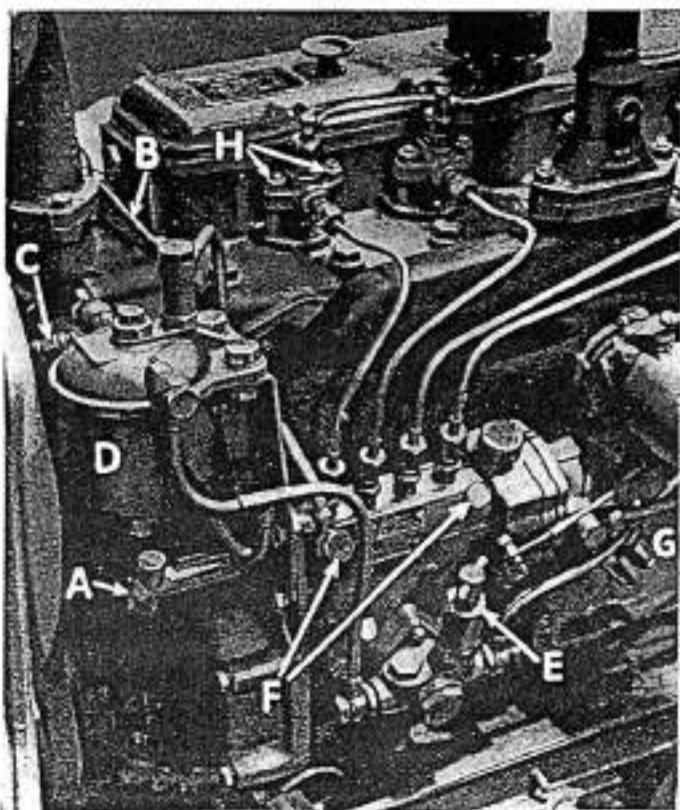


Fig. 3
ENGINE CONTROLS

- A. Excess Fuel Button
- B. Decompressor Lever
- C. Water Pump Lubricator
- D. Front Fuel Filter
- E. Priming Pump (Fuel)
- F. Pump Gallery Vent Plugs
- G. Cylinder Block Drain Tap
- H. Injector Holding Down Nuts

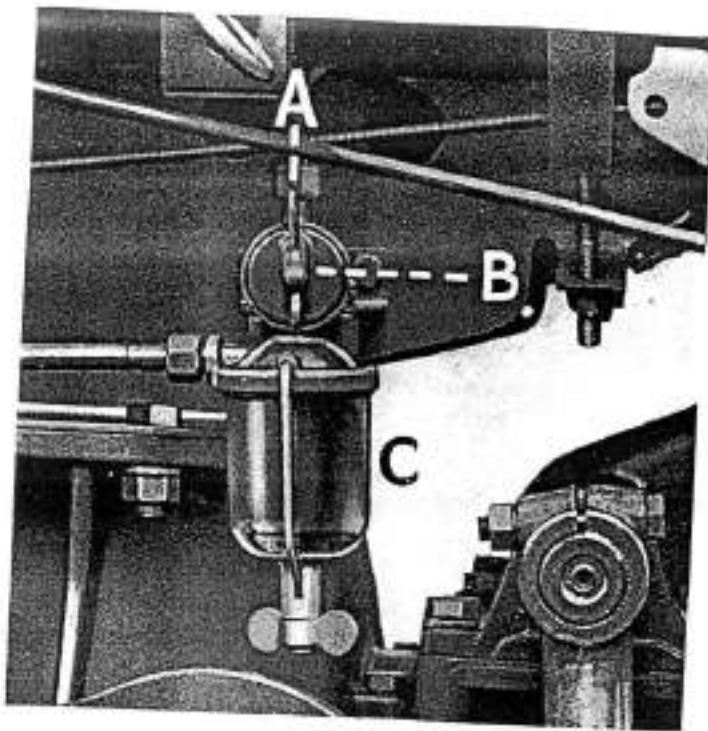


Fig. 4
FUEL TAP

- A. Open Position
- B. Closed Position
- C. Sediment Bowl

in the rear position, and is fully open when the control is in the forward position.

Always reduce the engine speed before adjusting the blind.

AMMETER (B, Fig. 1)

This indicates the rate of charge or discharge of the battery. The reading will vary according to the output of the dynamo and the number of lamps switched on, and also the condition of the batteries.

FUEL TAP (Fig. 4)

The fuel tap incorporates a sediment bowl and fuel strainer. It has two positions: when vertical, the main supply is ON; and when horizontal the tank is turned off.

NOTE.—Always ensure that the fuel tap is turned on and that a supply of fuel is available in the tank before starting the engine.

Tractor Controls

LIGHTING SWITCH (A, Fig. 1)

This has three positions and controls the side, rear and front headlamps. When pushed fully IN the switch is OFF.

CHANGE OVER SWITCH (D, Fig. 6)

Located on the off-side mudguard. The switch has two positions only and controls the tail lamp and rear flood lamp.

NOTE.—On later series tractors this switch is incorporated in the floodlamp.

CLUTCH PEDAL (B, Fig. 11)

The clutch pedal is mounted on the nearside for left foot operation, when depressed the clutch is disengaged and the drives to gearbox, P.T.O. and power lift are disrupted. A separate **Hand Clutch Release Lever** is mounted on the nearside mudguard (A, Fig. 12).

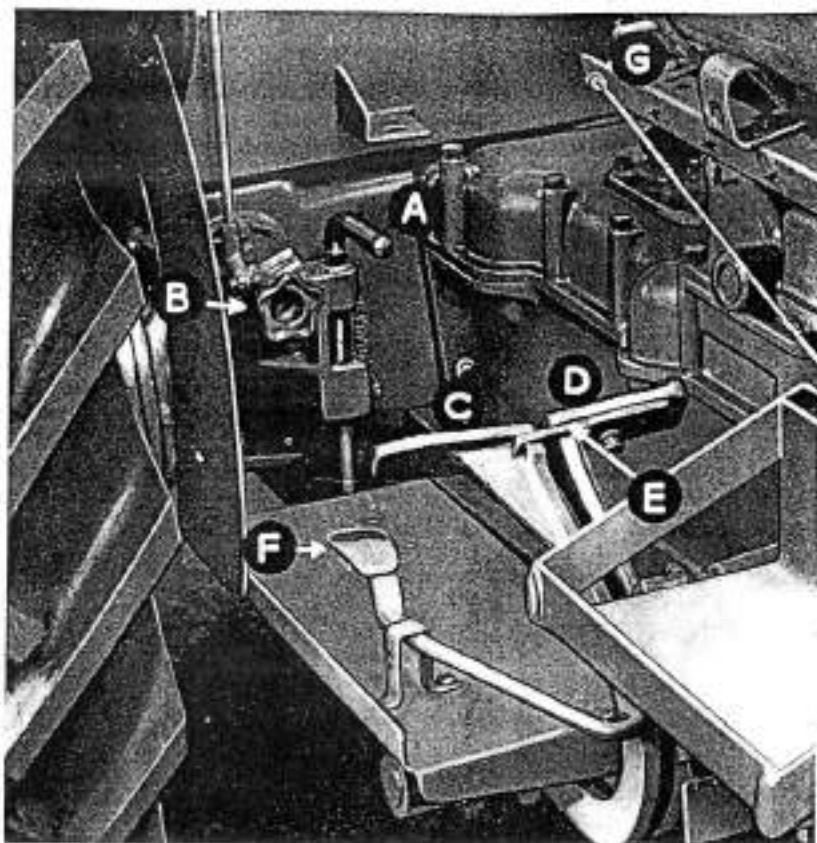


FIG. 5
STEERING BRAKE PEDALS

- | | |
|---------------------------|-----------------------------------|
| A. Pull Up Handbrake | D. Left Hand Brake Pedal |
| B. Traction Control Valve | E. Locking Bar, (Engaged) |
| C. Right Hand Brake Pedal | F. Foot Accelerator Pedal (Extra) |
| G. Radiator Blind Control | |

GEAR LEVERS (E and F, Fig. 2)

(Tractor with standard gearbox : six forward and two reverse speeds.)

Gear positions are as shown cast on gearbox cover. The main gearbox lever has 3 forward and 1 reverse gear positions, namely : 2 — R
3 — L

AUXILIARY GEAR LEVER

The "H" (High) and "L" (Low) positions of the left-hand lever are indicated. The auxiliary gear lever has a neutral position.

BRAKE PEDALS (C and D, Fig. 5)

Independently acting brake pedals are mounted side by side on the offside and may be used individually as steering brakes for making short turns at headlands. When applied each pedal operates the corresponding rear wheel brake. The pedals may be locked together with a locking bar (E, Fig. 5) and used as road brakes.

HAND BRAKE (A, Fig. 5)

To apply the hand brake, turn the lever outwards then pull upward until the brake is secure. To release turn handle in towards axle and lower.

POWER TAKE-OFF and BELT PULLEY (TWO-SPEED) (A, Fig. 13)

The engaging lever has three positions, indicated on the instruction plate attached to the cover of the unit. With the control lever forward, the pulley and P.T.O. shaft run at low-speed ; centre is neutral, and rear position is for high speed.

The two-speed P.T.O. unit, U.5.F. may be converted to a combined P.T.O. and Pulley unit, U.5.F.

POWER LIFT CONTROL (A, Fig. 6)

A three position control lever is fitted with the Mark II hydraulic system. Referring to Fig. 6 :—

1. Move the control lever to position (a) to raise the lift. The control lever automatically returns to (b) when released.
2. To hold the lift in the raised position place the control lever in the notch (b).
3. To lower the lift, move the control away from the notch (b) and place in position (c). The rate of lowering is controlled directly by this movement of the lever.

Two sliding bolts are provided (Fig. 12); the L.H. bolt locks the lift in the raised position, whilst the R.H. bolt limits its fall and should only be used with implements taking their depth control from the tractor.

Caution : This bolt must not be engaged with the hole in the lift arm.

NOTE : It is not advisable to use the L.H. Lift Lock Bolt when operating the Mark II Hydraulic system in the raised position.

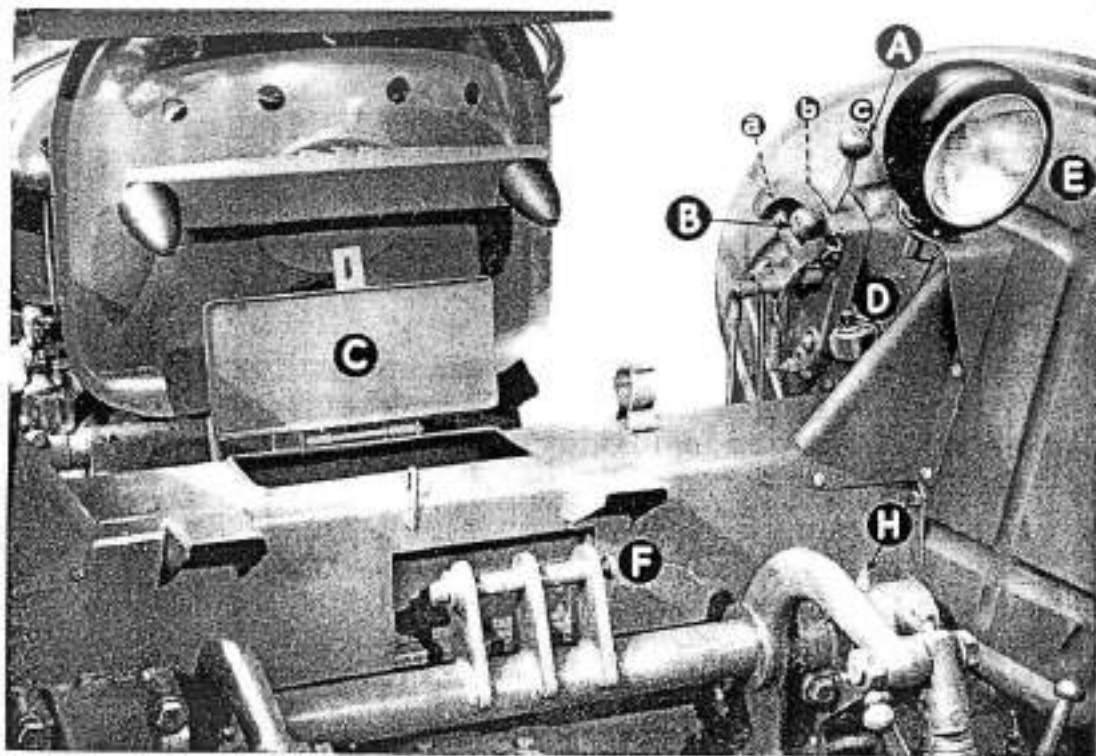


FIG. 6

POWER LIFT CONTROL.

- | | |
|-----------------------------|----------------------------------|
| A. Power Lift Control Lever | D. Plough Lamp Switch |
| (a) Lift Position | E. Plough Lamp |
| (b) Hold Position | F. Top Link Hitch Point (altern- |
| (c) Drop Position | ative position (to right) is for |
| B. Traction Control Lever | narrow width ploughs) |
| C. Tool Box | H. Lubricator to Ram Shaft |

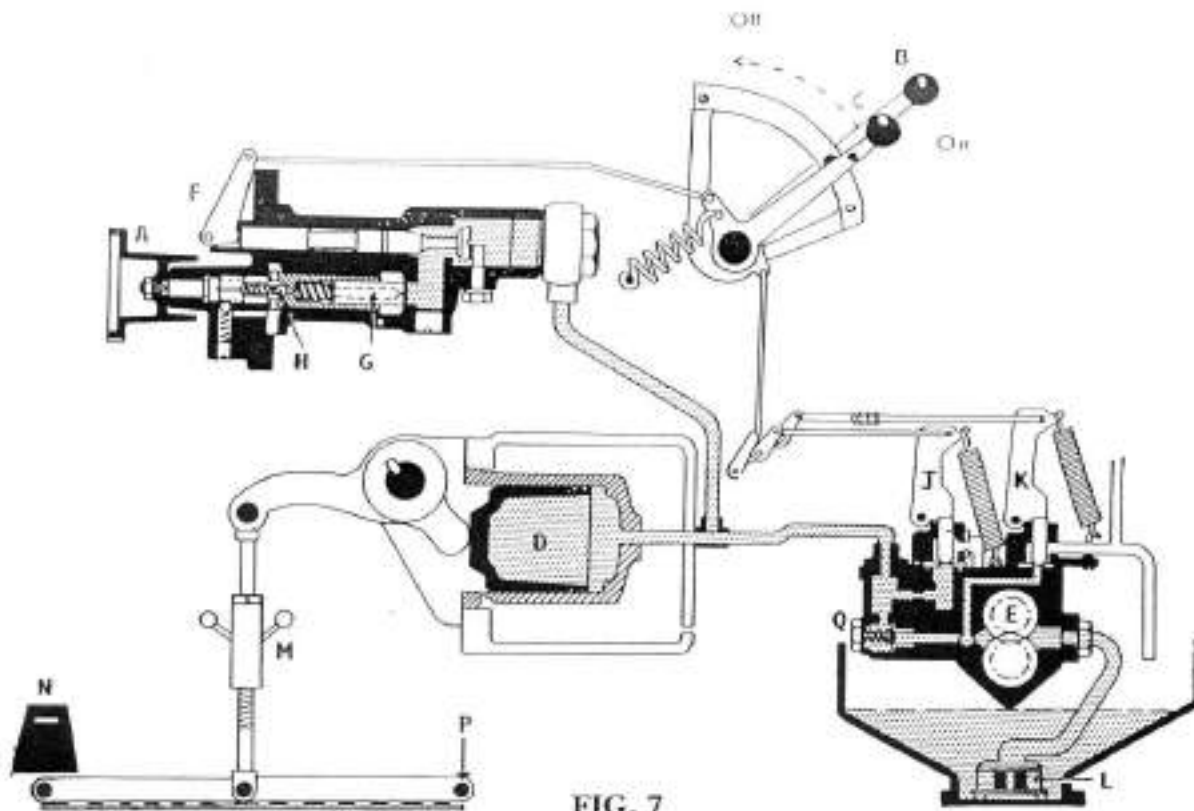


FIG. 7

DIAGRAM OF HYDRAULIC LIFT WITH TRACTION CONTROL

- | | |
|-------------------------------------|-----------------------------|
| A. Handwheel Traction Control Lever | H. Pressure Control Valve |
| B. Hydraulic Lift Control Lever | J. Main Control Valve Lever |
| C. Traction Control Lever | K. Lift Control Valve Lever |
| D. Ram Piston | L. Magnetic Filter |
| E. Hydraulic Pump | M. Lift Lever |
| F. Poppet Valve Lever | P. Hitch Points |
| G. Flow Control Valve | N. Implement Weight |
| | Q. Non-return Valve |

Operation of the Traction Control Unit

DAVID BROWN 25D and 30D tractors are fitted with the new *Hydraulic Traction Control Unit*. This enables the tractive effort of the tractor to be increased and wheel grip to be maintained in the most difficult and adverse ploughing conditions.

The controls consist of:—

Hand Lever B, Fig. 6, fitted at the hydraulic lift control.

Hand Wheel B, Fig. 5, fitted at the front right side axle case.

TO ENGAGE THE TRACTION CONTROL

1. Move the lever B, Fig. 6, forwards to the notch. This action also places the hydraulic lift control lever in the forward position.
2. To adjust the amount of traction control, turn the hand wheel B, Fig. 5, in a clockwise direction, as indicated by the arrow, to increase the traction or in an anti-clockwise direction to reduce the traction. The hand wheel adjusting screw has a maximum of four complete turns and each turn requires six "clicks" of the graduated adjustment.

IMPORTANT

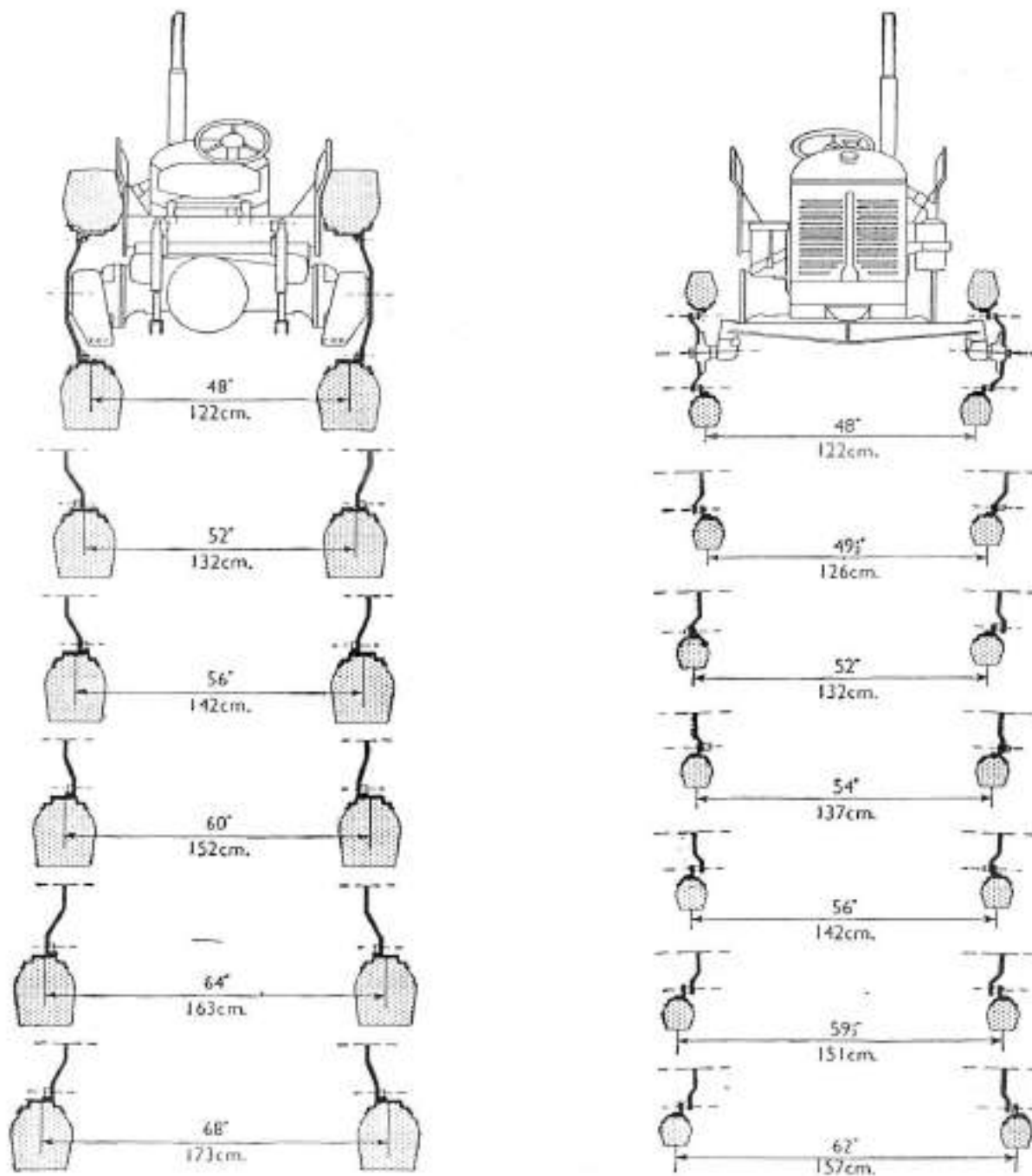
Do not employ more traction control than is necessary for the particular ground conditions or accurate ploughing will be difficult to obtain. Once the traction control has been set for the particular ploughing conditions no further adjustment is necessary, all the land can then be worked to an even depth and width of cut.

TO RELEASE THE TRACTION CONTROL

A slight sideways movement of the traction control lever will release the lever from the notch. The lever returns to the OFF position by the action of the return spring. When it is desired to lift the implement simultaneously, the lift lever is held in the forward position whilst the traction control is released.

Fig. 8

WHEEL SETTING CHART



WHEEL SETTINGS FOR PLOUGHING

DAVID BROWN 25D. Front wheels 48 in. (122 cm.) Rear wheels 48 in. (122 cm.)

DAVID BROWN 30D. Front wheels 49½ in. (126 cm.) Rear wheels 52 in. (132 cm.)

Operating the Tractor

Starting and Stopping the Engine

IMPORTANT.—Ensure that the electrical system is switched ON at the master switch (G Fig. 1)

TO START THE ENGINE WHEN COLD (NORMAL)

1. Ensure there is ample fuel in the tank.
2. Place the gear lever of the tractor in neutral.
3. Turn the fuel tap forwards.
4. During extremely cold weather conditions place the decompressor lever in the vertical position and turn the engine several times with the starting handle. Always return the decompressor lever to the horizontal position before pressing the starter button.
5. Check that the fuel cut-off control E, Fig. 1, is in.
6. Place hand throttle control $\frac{1}{4}$ in. above idling stop.
7. Press the excess fuel button A, Fig. 3, in, and note that it stays in that position. Depress the clutch pedal until the engine has started.
8. Press the starter button F, Fig. 1, and release it immediately the engine fires.

NOTE—If the engine does not start within 10 seconds, release the starter button for 20 seconds before depressing it again. This will prevent damage to the batteries, caused by a high rate of discharge.

9. When the engine is running, adjust the radiator blind to maintain the correct working temperature.

TO START THE ENGINE WHEN COLD (SUB-ZERO)

In exceptionally cold weather conditions the engine is readily started by using the ether starting carburettor if fitted at the air intake manifold. The container is charged by removing the base and inserting one ether capsule. The base is replaced and the engine is prepared for starting.

It is also important when operating the engine in near arctic conditions to ensure that the correct grade of lubricating oil is used and the engine crankshaft freed by turning several times with the starting handle.

1. Place the gear lever in neutral, pull the fuel cut-off control lever (E, Fig. 1) out, and raise the decompressor lever (E, Fig. 3).
2. Turn the engine several times with the starting handle until the engine is quite free.
3. Push the fuel cut-off control in *fully* and lower the decompressor lever.
4. If exceptionally cold weather, insert one "ether" capsule.
5. Press the excess fuel plunger and note that it stays in position.
6. Press the starter button whilst the clutch pedal is depressed. If the engine does not start immediately wait for a short period before again pressing the starter button and hold in the excess fuel plunger until the engine runs smoothly. Should the engine again fail to start repeat the procedure of starting from cold.

NOTE.—Further failure to start in sub-zero conditions may be due to the presence of ice in the tractor fuel system. If ice is present it is advisable to replenish the entire fuel system at the first opportunity.

TO START THE ENGINE WHEN WARM

1. Ensure there is ample fuel in the tanks.
2. Open the fuel tap.
3. Place the tractor gear lever in neutral.
4. Place hand throttle control $\frac{1}{4}$ in. above idling stop.
5. Press the starter button F, Fig. 1, and release the button immediately the engine fires.
6. Adjust the radiator blind to maintain the correct working temperature.

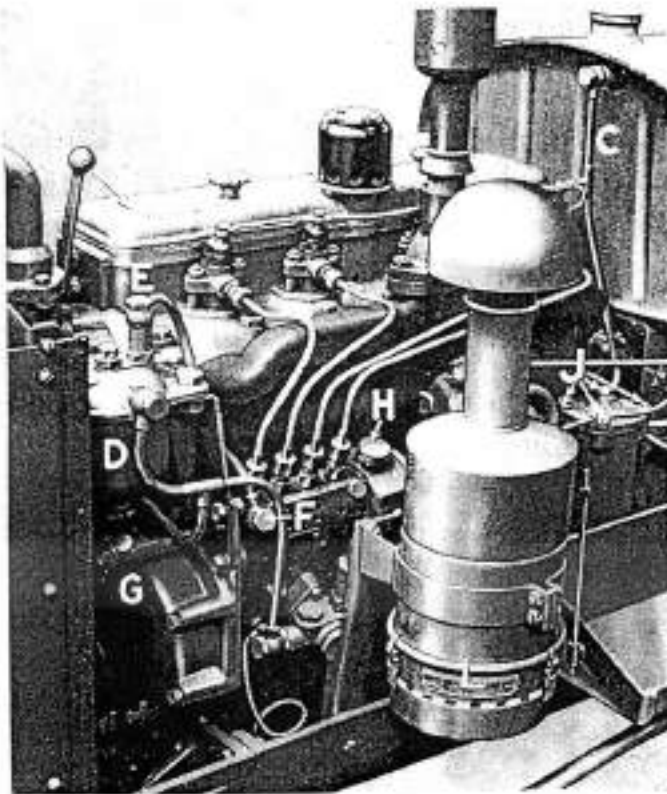


Fig. 9

ENGINE AND AIR CLEANER

- A. Decompressor Lever (raised)
- B. Engine Breather
- C. Excess Fuel Leak Off Pipe
- D. Front Fuel Filter
- E. Filter Relief Valve
- G. Excess Fuel Button (Starting)
- H. Governor Breather (remove to lubricate)
- F. Injection Pump Vent Plug
- J. Oil Filter Cover Nuts
- L. Air Cleaner Oil Level

TO STOP THE ENGINE

1. Reduce the engine speed to idling.
2. Pull out the fuel cut-off control E, Fig. 1, and hold it out until the engine stops. After the engine has stopped, push the fuel cut-off control in fully.

IMPORTANT.—Do not stop the engine by turning off the fuel, or by raising the decompressor lever.

Operating Instructions

Always keep the engine speed constant when operating the tractor. When the engine is not under load allow it to run at a fast idling speed, i.e., about 700/800 r.p.m.

Each time the engine is started, check the engine oil pressure.

The engine speed is controlled by a pneumatic governor and it is therefore most important to maintain the correct oil level in the air cleaner.

To ensure accurate governor control renew the air cleaner oil as stated. Always clean the container when renewing the oil and use only new engine oil.

Always check that the fuel tank is full before commencing work. Shortage of fuel will cause air locks in the fuel system, and engine failure.

Important Engine Operating Precautions

In no circumstances run the engine without the air pre-cleaner fitted or with the air cleaner base removed.

OPERATING THE TRACTOR

When starting the engine with the starter motor ensure that the decompressor lever is in the horizontal position, as shown in Fig. 3. Never attempt to stop the engine by means of the decompressor lever.

Do not turn the fuel tap off while the engine is running and do not stop the engine by this means. Failure to observe these precautions will result in air-locks in the fuel system, and will prevent the engine being restarted.

Ensure that the fuel cut-off control is in fully before starting the engine.

PRECAUTIONS IN FROSTY WEATHER

It is essential to keep the engine as warm as possible. Aids in this connection are :—

A dry garage free from draughts. To cover the entire bonnet and radiator with a blanket at night or when standing during the day. Draining the cooling system. Always maintain the batteries in a fully charged condition.

ANTI-FREEZE SOLUTIONS

The use of anti-freeze solutions will obviate the necessity for draining, but *it is most important to use a thoroughly reliable brand and to follow the makers' instructions with the greatest care.* The use of an unsatisfactory solution, or failure to use a good solution carefully, can easily result in a choked radiator block for which there may be no cure except a new

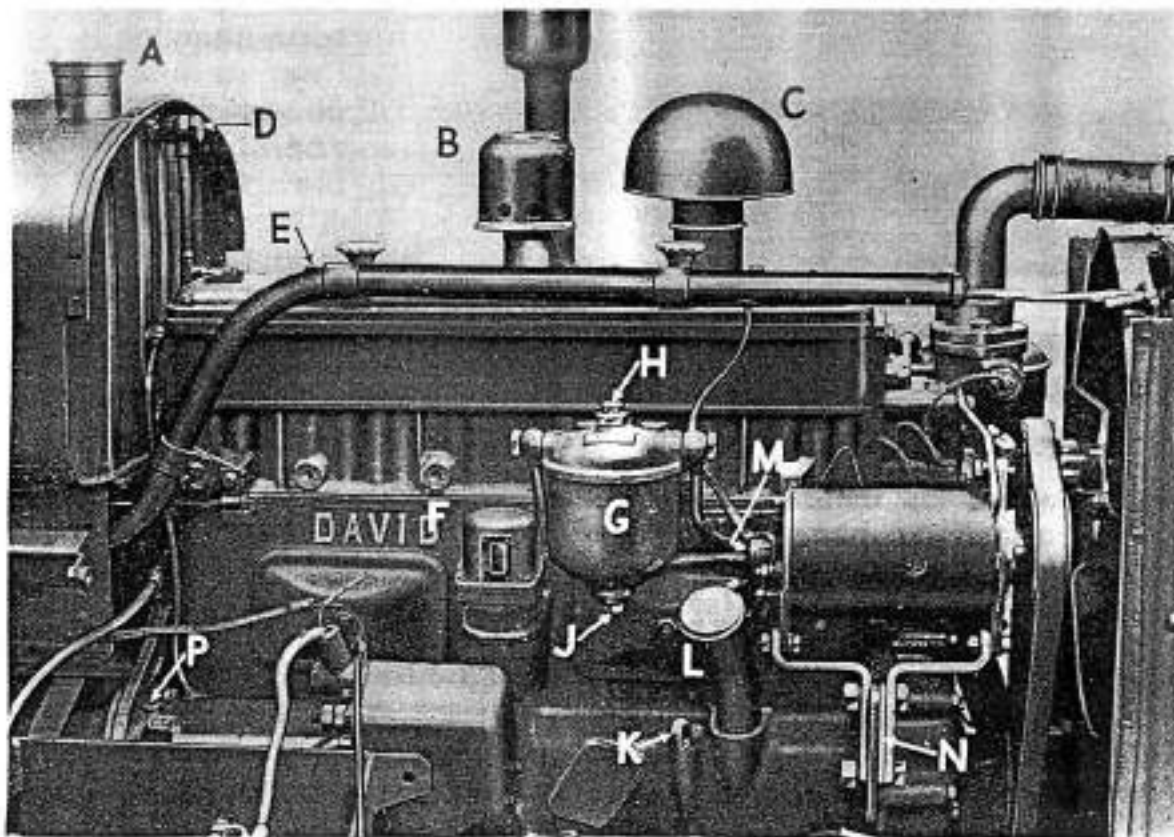


FIG. 10
ENGINE OFFSIDE

- | | |
|-------------------------|------------------------------|
| A. Fuel Tank Filler Cap | H. Filter Body Nut and Vent |
| B. Engine Breather | J. Filter Drain Plug |
| C. Pre-cleaner | K. Engine Dipstick |
| D. Fuel Return Union | L. Engine Oil Filler |
| E. Conduit | M. Dynamo Lubricator |
| F. Hour Counter | N. Fan Belt Adjustment Shims |
| G. Fuel Filter | P. Starter Lubricator |

block. When using anti-freeze, affix a warning label to the radiator cap to guard against draining and loss of anti-freeze solution.

Driving the Tractor

The David Brown tractor is easy to drive, but like everything else it can be done well or badly. Bad driving increases wear-and-tear and repair bills and does not save any working time.

Maxims of good driving are :—

- Avoid sudden acceleration or braking.
- Avoid violent changes in engine speeds.
- Apply the least possible force to the controls.
- Use the controls at just the right moment.

STARTING FROM REST

Assuming the engine to be running, the gear lever will be in neutral and the clutch and brakes engaged. Do not choose too high a gear in which to start—the engine will probably take it, but wear on the clutch is increased.

When engaging the gear, depress the clutch pedal and hold it down long enough to ensure that the gearbox primary shaft has come to rest before moving the gear lever. It may happen once in ten times that the engaging teeth are "end on" and will not mesh; in this case momentarily release the clutch pedal and again depress before moving the gear into mesh.

Before allowing the clutch pedal to return, release the foot brake by lightly depressing the pedal and releasing the hand brake. If starting up-hill, release the foot brakes and the clutch pedal together so that the engine commences to take up the drive while the brakes are being released.

CLUTCH PEDAL OPERATION

When starting from rest, do not run the engine faster than is necessary.

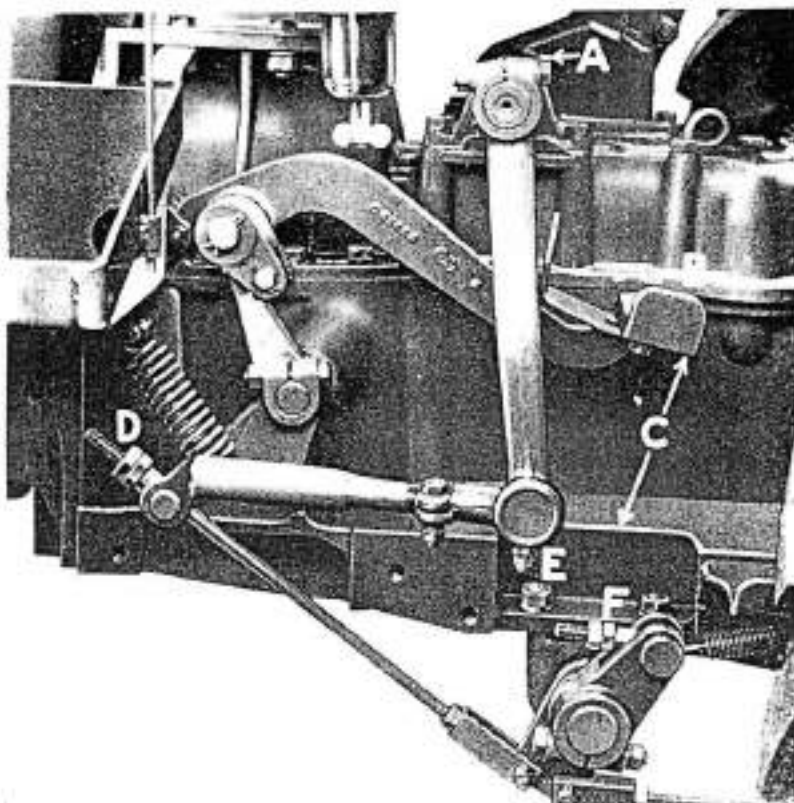


Fig. 11

CLUTCH PEDAL

- A. Steering Box Lubricator
- B. Clutch Pedal
- C. Clutch Pedal Working Movement
- D. Clutch Lever Adjusting Nut
- E. Drop Arm Lubricator
- F. Left-Hand Brake Adjusting Nuts
- G. Clutch Pedal Bolt

OPERATING THE TRACTOR

Except when the clutch is actually being used, keep the foot off the pedal.

Do not run the engine with the clutch pedal depressed longer than is absolutely necessary. Do not, for example, run downhill with the clutch disengaged.

GEAR SELECTION

Experience is the best guide to the choice of gears for any particular requirement, but if the engine is labouring select a lower gear. The engine is labouring if its speed is appreciably pulled down by the load.

The gearbox is of the sliding-gear type, *and gear changing while the tractor is in motion must be undertaken only by an experienced driver.* If a lower or higher gear is required, the tractor should be brought to a standstill before it is selected. Gear changing while the tractor is under load *must not be undertaken.*

The gear positions for the 6-speed gearbox : H — 2 — R
 L — 3 — 1

First determine whether a high or low speed is required and, with the clutch pedal depressed, place the left-hand lever in the "H" (high) or "L" (low) position. Then, with the clutch pedal still depressed, select the required gear by moving the right-hand lever.

NOTE.—The lever for selecting High and Low gears has a neutral position.

Gear changing by the inexperienced while the tractor is in motion may result in serious and costly damage to the gearbox pinions. This may also occur if force is necessary to engage the gears, due to incorrect clutch adjustment. (See clutch adjustment, page 43.)

USE OF ENGINE CONTROLS

The life of the engine can be safeguarded by considerate handling. Therefore :—

Allow the engine to idle at 700/800 r.p.m. when under no load.

Do not race the engine.

Reduce the engine speed when engaging the clutch and before disengaging the clutch to slow down the tractor.

Do not operate the engine at low speeds in high gears. Use a lower gear and higher engine speed.

STEERING

Do not pull the steering wheel round when the tractor is stationary. This causes high stresses for which the steering mechanism is not designed. When turning the tractor round in a confined space, or negotiating an awkward corner, it is always possible to move the tractor gently forwards or backwards and to pull the steering wheel round progressively as the tractor moves.

STOPPING THE TRACTOR

At the moment before coming to rest and while the foot brake is still in action, depress the clutch pedal, move the gear lever into neutral and apply the hand brake.

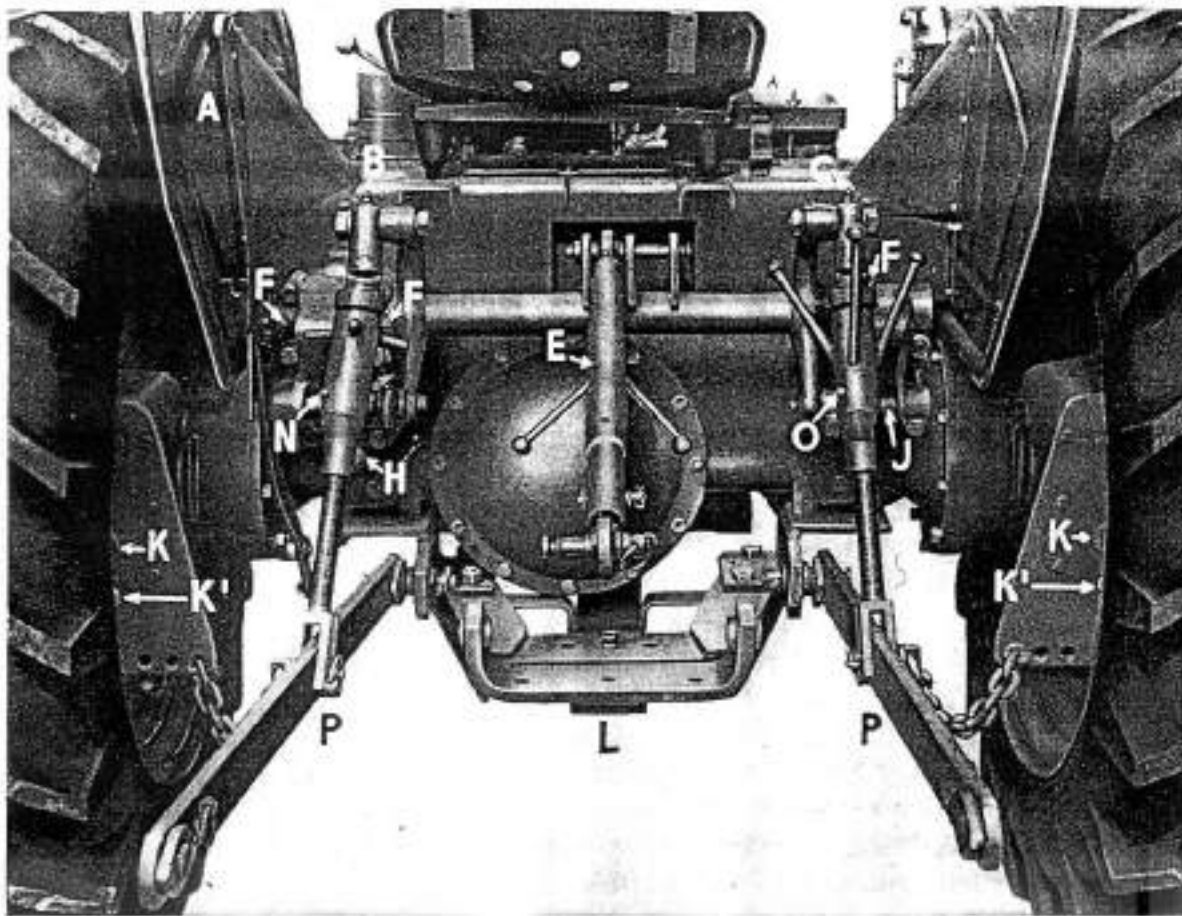


FIG. 12
HYDRAULIC LIFT LINKAGE AND HITCH POINTS

- | | | | |
|-------|-------------------------------|-----|-------------------------|
| A. | Hand Clutch Lever | Kj. | Reduction Drain Plugs |
| B, C. | Upper Lift Rod Lubricators | L. | Fixed Drawplate |
| E. | Yop Link Lubricator | M. | Tool Box |
| F. | Ram Shaft Lubricators (3) | N. | L/H Lift Rod Lubricator |
| H. | L/H Lift Lock Bolt | O. | R/H Lift Rod Lubricator |
| J. | R/H Lift Lock Bolt | P. | Lower Links |
| K. | Reduction Filler/Level Plugs. | | |

IMPORTANT.—For tractors fitted with centrally positioned hydraulic linkage lubricators the N/S, O/S levelling levers and top link must be set to the minimum length before lubricating.

The clutch pedal may then be released. As an additional precaution put the gear lever into bottom gear, particularly if it is necessary to stop on a slope. Return the lever to the neutral position before restarting the engine.

Stop on level ground to refill with oil, fuel or water, so that the levels may be read correctly.

WHEEL EQUIPMENT

The wheel equipment for use with the David Brown Diesel tractors covers all that is required in steels and pneumatics, and a wide range of adjustment is available.

TRACK ADJUSTMENT

Adjustments to wheel widths are necessary for most field work, particularly ploughing and row crop cultivations. These are obtained by

OPERATING THE TRACTOR

utilising the dished centre plate and the offset lugs on the wheel rims as required ; all that is necessary is a jack and two spanners. The centre plate is cut away between the fixing bolts to enable the lugs in the wheels to be passed behind the centre plate. The full range of wheel settings for all purposes is shown on the chart, page 13.

Special attention is drawn to the changing over of pneumatic tyres to ensure correct direction of rotation. When it is necessary to reverse the wheels to obtain a particular track setting they should be transferred to opposite sides of the tractor. Correct rotation should be checked by referring to the arrow moulded into the side wall of the tyre.

IMPLEMENT LINKAGE

Instructions for Category I and II three point attachment are given on page 44.

BALLAST

Wheel slip is expensive, not only because of wear but also because it wastes fuel. To reduce wheel slip to a minimum the operator should first select the type of wheel best suited to the conditions and then consider the use of ballast in the form of wheel weights and, in the case of pneumatic equipment, water-filling of the tyres. If water ballasting is required it is advisable to consult an Authorised David Brown Dealer, who will have the necessary equipment for this job.

The following recommended quantities of water and calcium chloride, per tyre, should be adhered to in order to protect the tyre down to 0° F.

Tyre size, 10×28	..	18 gallons water, 26 pounds calcium chloride dissolved in 3 gallons water.
Tyre size, 11.25×28	..	30 gallons of water, 45 pounds calcium chloride dissolved in 6½ gallons of water.

The amount of calcium chloride given is for the flaked type ; if crystalline calcium chloride has to be used the weight per tyre should be doubled.

ROAD WORK

When the tractor is used for road work, ensure that the tyres are inflated to the correct pressures.

Road work .. Front 28 lb. sq. inch ; Rear 18 lb. sq. inch.

DRAWBARS

The standard **adjustable drawbar U50C** may be fitted to either the 25D or 30D later series tractors that are fitted with the standard alternative hitch brackets as illustrated in Fig. 13. The alternative hitch brackets are provided with two locations, the upper locations are used with 9-00 or 10-00 tyres and the lower locations with the larger tyres to ensure a constant level at the draught point.

When fitting the U50C, the lower links are removed and the top link or overload release is reconnected with the upper drawbar link pin through the lug on the sliding member, Fig. 16. Nine lateral positions of adjustment in 2 in. steps (22 in.) are provided for the fish plate and the height can be adjusted by the screw adjustment at the lift levers, 11 in. to 18½ in., alternatively the drawbar can be raised and lowered by the power lift.

The U50C drawbar can be attached with the permanent drawplate in position.

To fit the swivel type drawbar U177 it is necessary to remove the permanent drawplate but this is countered by the drawbar U177 being quickly detachable from its mounting bracket which may then take the place of the permanent drawplate. Provision is made at the right side front of the tractor main frame for stowing the detached drawbar.

The U177 drawbar assembly is mounted as seen in Fig. 17, and is permanently bolted to the special hitch brackets thus providing a strong anchorage for all types of heavy drawbar work.

The height of the swivel drawbar is adjustable in three positions. The draw arm may be locked in one of seven positions provided for lateral adjustment or may be free to swivel $6\frac{3}{4}$ in. either side of centre line. The draw arm is detachable by removing the locking pin D, Fig. 17 and by pushing in the drawbar until the arm is free of the swivel hinge pin. If the draw arm is canted slightly it may now be withdrawn leaving the drawbar frame in position on the tractor.

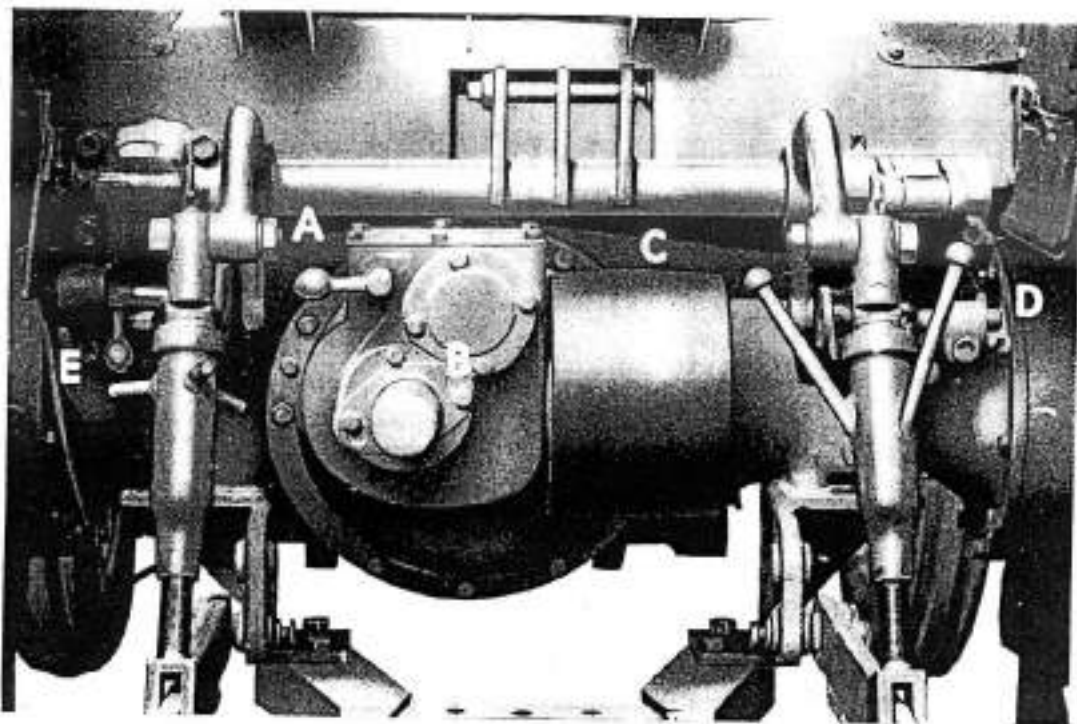


FIG. 13

TWO SPEED PULLEY AND P.T.O. UNIT

- | | |
|---|--|
| A. Power Take Off Control Lever | C. Belt Pulley |
| B. P.T.O. Shaft Cover | D. Right Side Lift Lock Bolt (depth control) |
| E. Left Side Lift Lock Bolt (lift raised) | |

HAND CLUTCH LEVER

The hand clutch lever is provided so that with the driver dismounted the tractor may be manoeuvred when leading, backing up to an implement or trailer, or when belt tension is being adjusted. To do this, declutch by the hand lever and engage forward or reverse gear; the hand clutch can be re-engaged when standing beside the tractor. Use only bottom

OPERATING THE TRACTOR

or reverse gear and minimum throttle opening. Do not run the engine with the clutch disengaged longer than is necessary, but put the gear lever into neutral if it is desired to keep the engine running.

P.T.O. AND BELT PULLEY UNITS

The P.T.O. shaft speeds listed on pages 57 and 60 also apply to the alternative P.T.O. and pulley unit.

When operating the P.T.O. only, the belt pulley may be removed from the driving flange and the flange protected by fitting the special cover supplied with each tractor.

When operating the pulley only, the cover supplied for the P.T.O. shaft extension should be fitted.

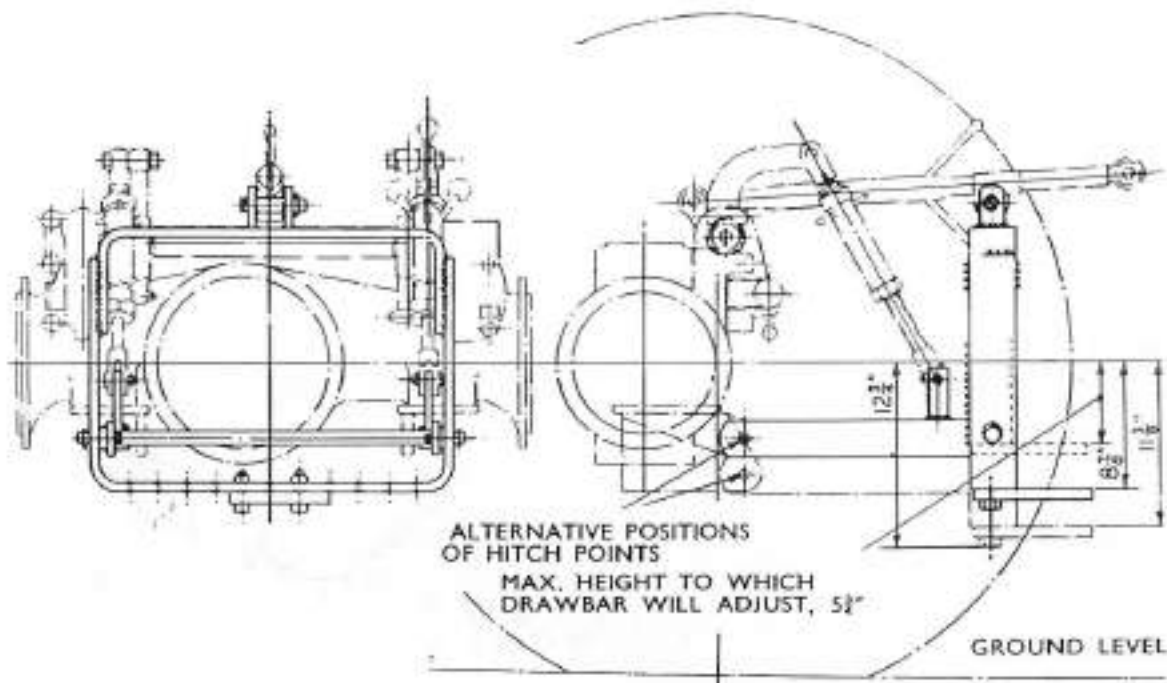


Fig. 14 ADJUSTABLE DRAWBAR U50C
Height adjustable 10 1/2 in. to 17 1/4 in.

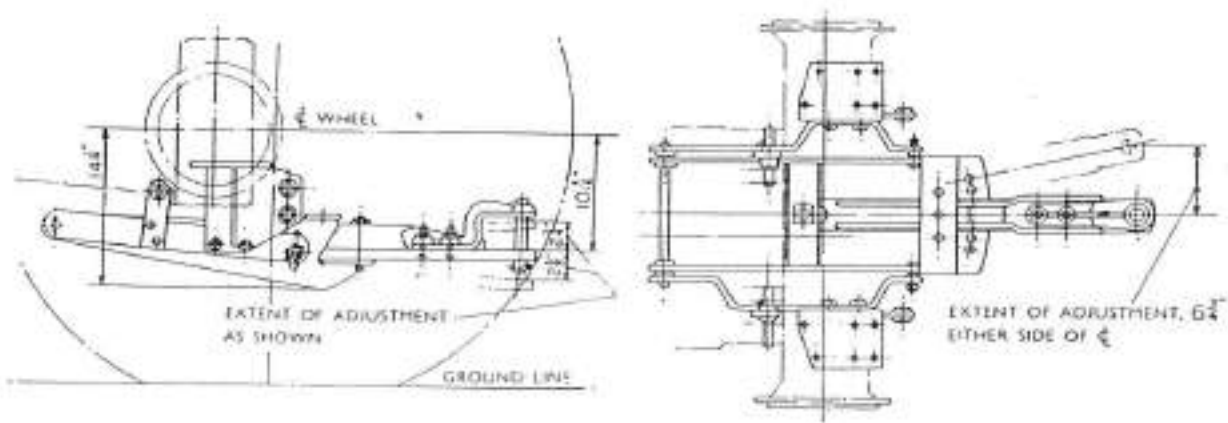


Fig. 15
SWIVEL TYPE DRAWBAR U177
Swivel movement 6 1/2 in. each side of centre.

Alternative Drawbars

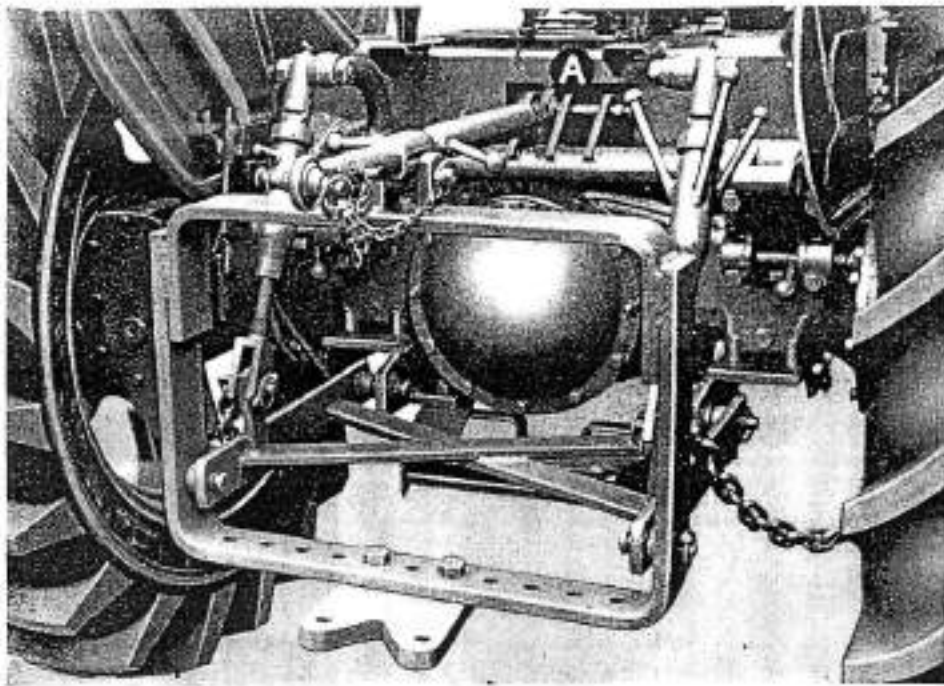


Fig. 16. The U50C ADJUSTABLE DRAWBAR
A. Centre attachment for top link

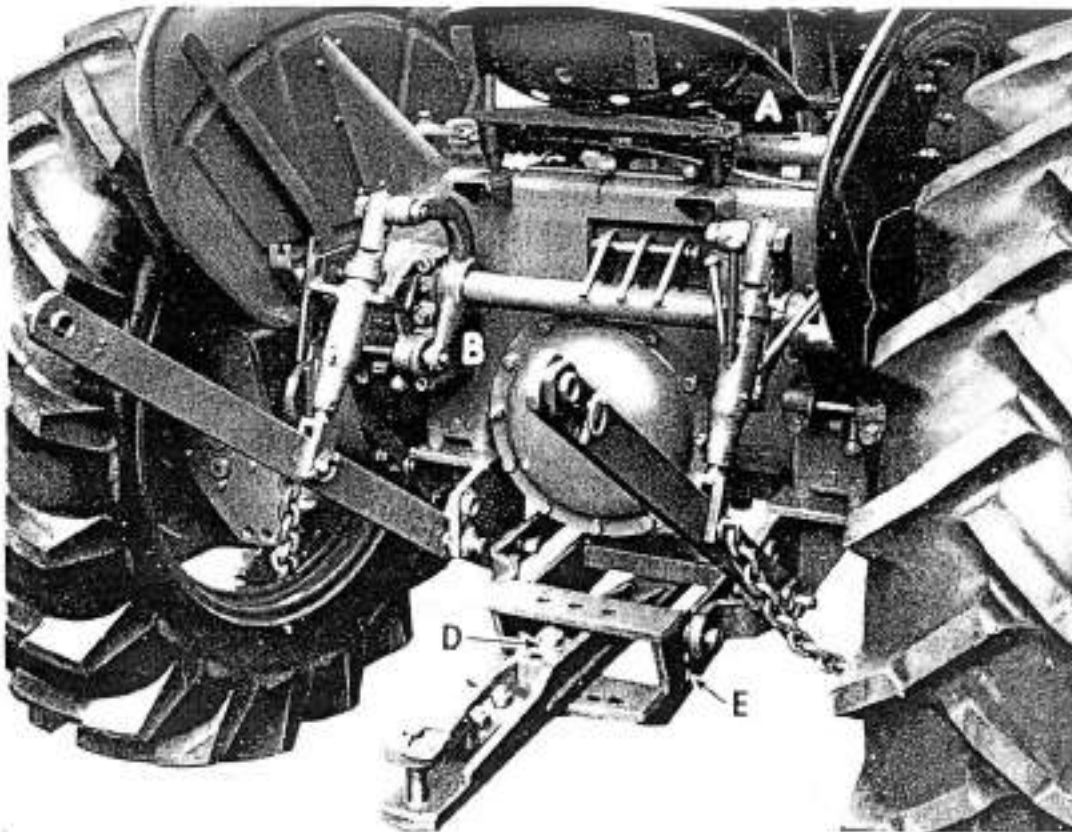


Fig. 17. U177 UNIVERSAL DRAWBAR.

Three positions of height adjustment. Seven swivel positions.

- | | |
|--------------------------------|---|
| A. Top link stowage. | D. Pivot bolt. (Release to remove drawbar.) |
| B. N-S lift lock bolt engaged. | E. Height adjustment. |

Hydraulic Power Lift System (Mark II)

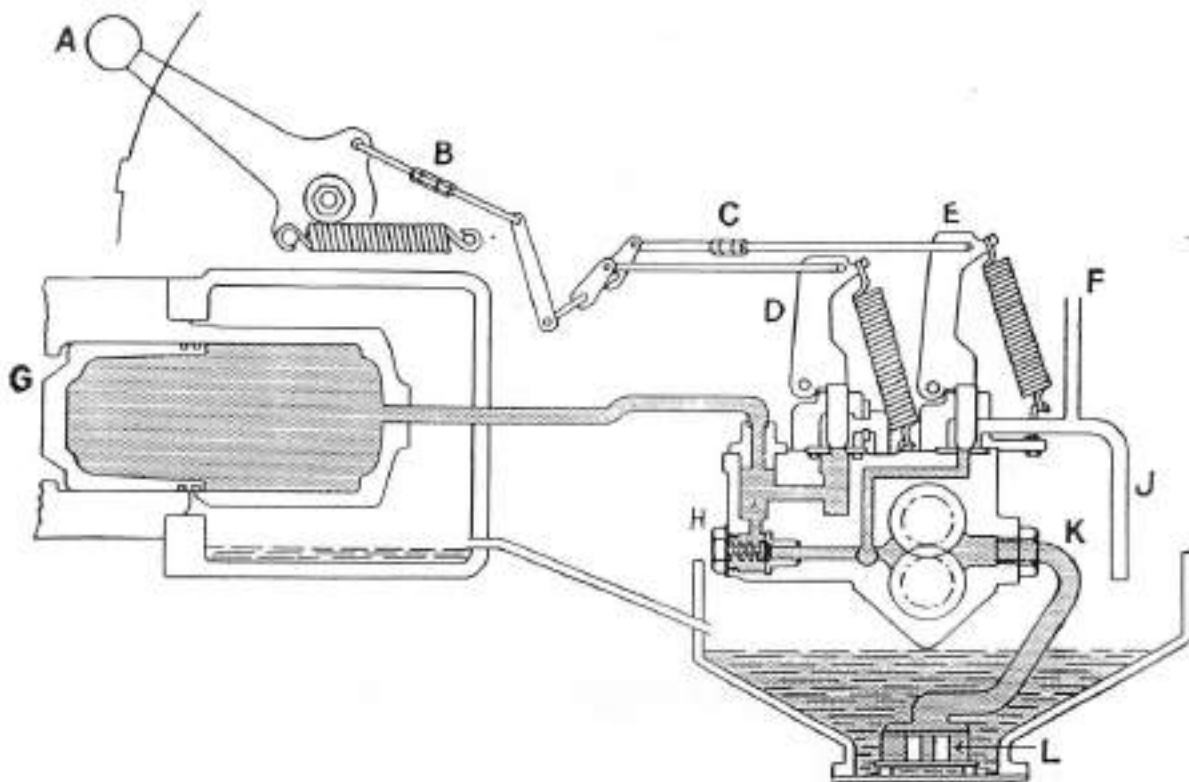


FIG. 18

DIAGRAM OF THE POWER LIFT IN THE LIFT POSITION

- | | |
|------------------------------|-------------------------|
| A. Control Lever | F. Oil Pipe to Bearings |
| B. Control Lever Adjustment | G. Ram Piston |
| C. By-Pass Control Adjuster | H. Non-return Valve |
| D. Main Control Valve | J. Outlet Pipe |
| E. By-Pass Control Valve | K. Intake Pipe |
| L. Magnetic and Gauze Filter | |

The hydraulic power lift system fitted to all series diesel tractors is similar in design to the earlier system and includes the Mark II series power lift pump with the "no load" by-pass valve and a new type automatic control lever.

The power lift pump is constantly driven at engine speed when the clutch is engaged, but when the control lever is in the lower or hold position the pump is working under "no load" conditions and the oil drawn in by the pump is used for the lubrication of the gearbox upper bearings and power take off unit.

When the control lever is placed in the "lift" position the main and by-pass relief valves are closed and oil passes through the non-return valve to raise the lift. The pressure of the by-pass valve 1,100 lbs. per sq. in., controls the system during the lift.

When the control lever is placed in the "hold" position the by-pass valve is open and the system is controlled by the pressure of the main control valve at 1,400 lbs. per sq. in. In this position the non-return valve is closed and the oil drawn in by the pump is exhausted via the by-pass valve.

To lower the lift, the control lever is placed in the lowest position and the main relief valve is opened. A restriction in the oil return pipe limits the rate of fall and prevents damage to the lift mechanism or implements.

The difference in pressure of 300 lb. per sq. in. between the main and by-pass relief valve pressures enables heavy implements to be transported over long distances. If, however, the system is loaded to its capacity and the load is transported over uneven surfaces the lift may drop slightly due to the shock loading imposed on the system. In this instance the tractor's road speed should be reduced and the load elevated by further application of the control lever.

OPERATING PRECAUTIONS

It is essential to ensure that the correct oil level is maintained and that the correct grade of oil is used.

Always drain and renew the transmission oil at the recommended period (1,000 operational hours) and service the magnetic and gauze filter every 250 operational hours (monthly) see page 31.

Do not mix the oils used. If a different grade of oil is required due to climatic changes, always completely drain and flush the system and refill with the correct grade of oil.

Lubricate the ramshaft bearings and external lift linkage at the recommended periods.

LIFT LOCK BOLTS

Before operating the power lift make sure that the lift lock bolts are disengaged from the lift arms.

It is not advisable to use the lift lock bolt when transporting heavy loads over long distances or uneven surfaces.

LEVELLING LEVERS

To ensure an equal lift and to maintain the balance of the lift linkage, adjust the levelling levers so that the lower links are the same height before attaching the implement.

OVERLOADING

The hydraulic power lift is designed to handle loads up to 10½ cwts. (11½ cwts. for 30D tractor) with a lift height at the extremity of the lower links of 18½ in. When the lift angle is increased or when the lifting implement extends considerably beyond the lower links the mean height of the lift is increased.

If the lift speed is appreciably reduced due to excessive loading, do not continue operating the lift but reduce the load.

Recommended Fuels and Lubricants

UNITED KINGDOM LUBRICANTS

Unit	Lubricant	Capacity
Engine	Shell Rotella Oil 20/20W or Shell Tractor Oil Universal	14 pints
Air Cleaner	New engine Oil	2½ pints
Transmission Gearbox including P.T.O./Pulley unit.	Shell Tractor Oil 50	4 gallons
Final Drive Reductions	Shell Tractor Gear Oil 140	2 Pints
Grease Gun Application General use:— Water Pump:—	Shell Retinax A or CD Shell Retinax A	

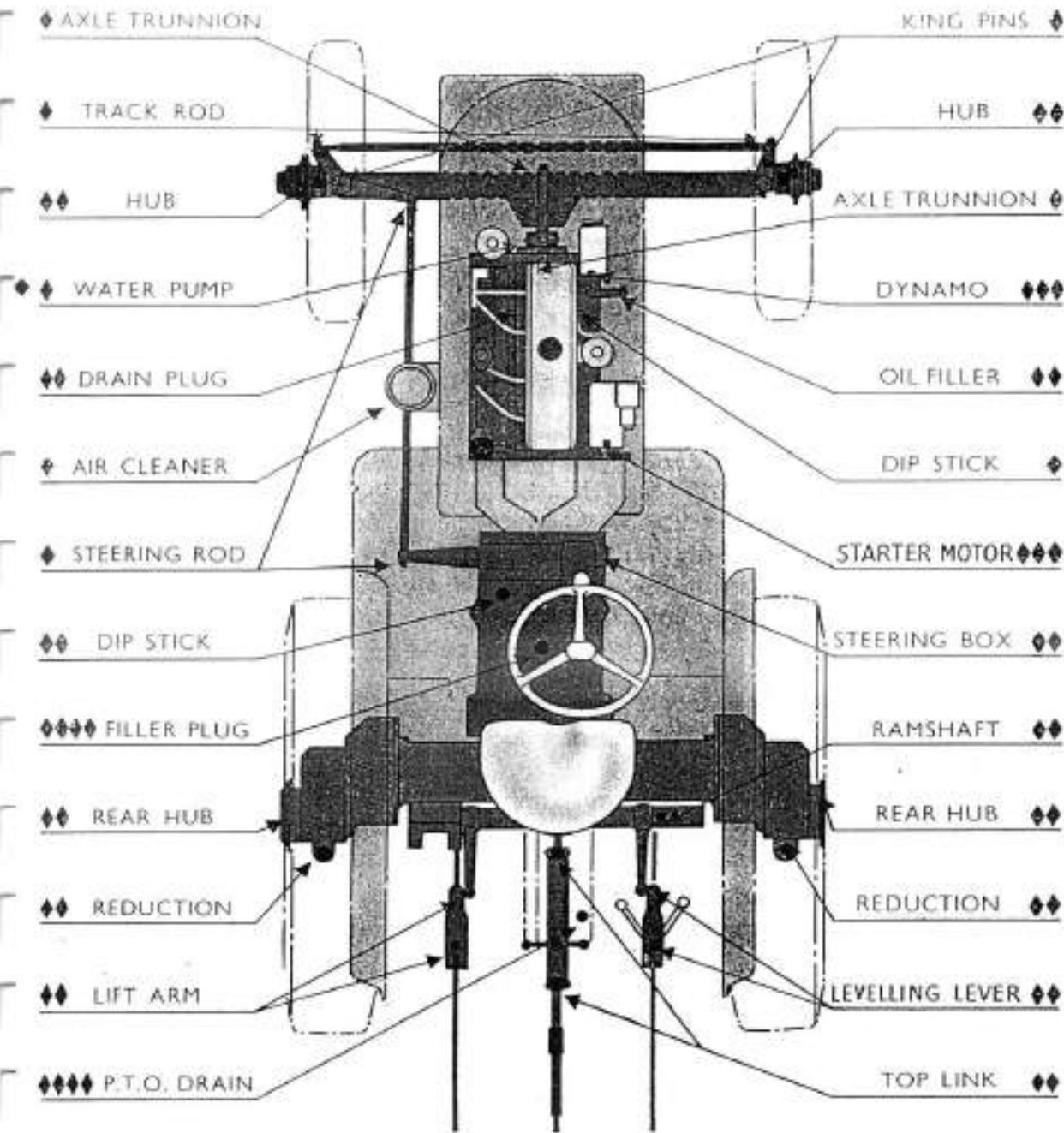
OVERSEAS LUBRICANTS

Engine (See Note p. 27)		
Temps. over 90°F (32°C)	Shell Rotella Oil 30	8 litres
90°F to 20°F (32°C to -7°C)	Shell Rotella Oil 20/20W	(17 U.S. pints)
Below 20°F (-7°C)	Shell Rotella Oil 1 OW	
Air Cleaner	New engine oil	1.4 litres (3 U.S. pints)
Transmission Gearbox Temps. above 90°F (32°C)	Shell Dentax 140	18 litres
90°F to 20°F (32°C to -7°C)	Shell Dentax 90	(4.8 U.S. Gallons)
Below 20°F (-7°C)	Shell Dentax 80 or Shell Rotella Oil 30	
Final Drive Reductions	Shell Dentax 140	1.1 litres each (2.4 U.S. pints)
Grease Gun Application General use:— Water Pump:—	Shell Retinax A or CD Shell Retinax A	

FUELS

United Kingdom	Shell Diesolite
U.S.A. and Canada	Shell Diesoline
Australia, New Zealand, India	Shell Diesoline
South America	Shell Diesoline
Venezuela	Shell Light Diesel Fuel
North Africa	Shell Gas Oil
Canary Islands, Spanish Morocco, Tangier	Gas Oil Shell
Tripolitania	Shell Diesoline
France	Shell Fuel Oil Domestique
Germany, Austria	Diesel Shell
Italy	Shell Diesel Oil Agricolo
Belgium, Denmark, Gibraltar, Holland, Malta, Norway, Portugal	Shell Diesoline
Finland, Greece	Shell Gas Oil
Turkey	Shell Motorin

Lubrication Diagram



♦ Daily or 10 Operational Hours

♦♦♦ Monthly or 240 Operational Hours

♦♦ Weekly or 60 Operational Hours

♦♦♦♦ Seasonal or 1,000 Operational Hours

Three lubricators are provided at the ramshaft and the steering box cross shaft.

NOTE—In certain countries, or parts of countries, it may be found impossible to obtain the high grade of fuel recommended for use with the David Brown diesel engine. Where an inferior fuel having a sulphur content of over 1% is used (such as Fuel Oil Domestique in France), it is recommended that a more highly detergent oil be used in the sump. Rotella T oil which corresponds to Mil-L-2104A Supplement 1 should be used, the correct grades being Shell Rotella T Oil 30, Shell Rotella T Oil 20/20W, and Shell Rotella T Oil 10W according to temperature.

Care of the Tractor

ROUTINE MAINTENANCE

It is essential that the following routine be carried out at the end of each indicated period of operation. It is planned in accordance with the usual working periods of the tractor, and with the knowledge that each point must have attention or be checked at regular intervals. The daily maintenance should be carried out at the end of each working day. The tractor is thus left ready for immediate use.

Important

When charging with oil or grease, be sure that no dirt goes in with it. Always clean filler caps before removing them and also the surrounding surface of the housing. Clean drain plugs before replacing. Wipe grease nipples clean before applying the grease gun. Wipe also the nozzle of the gun. Keep oil containers clean and wipe the tops and necks before pouring the oil; it is advisable to pour the oil through a funnel with a gauze strainer, and to do it under cover.

Detergent Oils

The oil recommended for the engine is inhibited to prevent, as far as possible, the formation of "sludge" in the engine sump and oil filters. After renewing the oil it may be noticed that it discolours rapidly. This does not affect the lubricating qualities and is only due to the absorbent nature of the oil.

Once each day or every 10 hours of operation

(1 Star on lubrication diagram)

WATER .. Check the level in the radiator and top up if necessary.

OIL .. Check the oil level in the engine and top up if necessary with the correct oil. (See Page 26.)

GREASE

Apply a shot of grease to the king pins (2 points), front axle trunnions (2 points), and steering joints (4 points), see Fig. 19.

In extremely wet operating conditions it is advisable to apply a shot of grease to the reduction hub bearings each day.

FUEL

Top up the fuel tank to within 1½ in. of the filler cap, preferably each evening.

AIR CLEANER

Empty and refill with new engine oil to the correct level. (See Fig. 9.)

AT MID-DAY—AIR CLEANER

If working in very dusty conditions, refill the air cleaner.

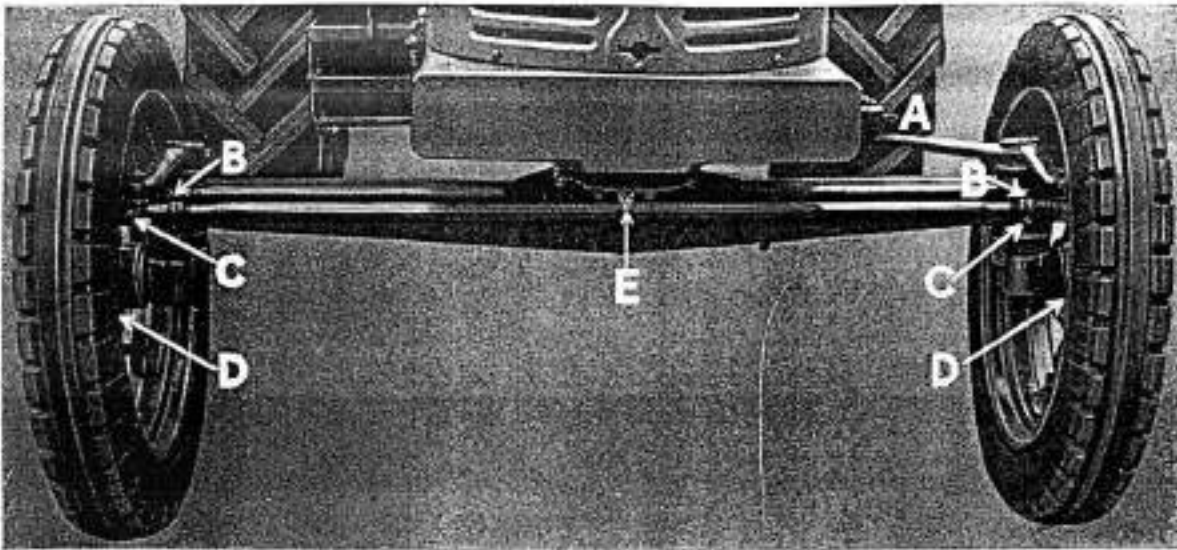


FIG. 19

STEERING AND FRONT HUB GREASE POINTS

- | | |
|-----------------------------|------------------------------|
| A. Steering Rod Lubricators | D. King Pin Lubricator |
| B. Track Rod Lubricator | E. Axle Trunnion Lubricators |
| C. Front Hub Lubricator | |

Once each week or every 60 hours of operation

(2 Stars on lubrication diagram.)

GEARBOX AND FINAL REDUCTION HOUSINGS

Check the oil level and top up if necessary with the correct oil. (See Fig. 2, Fig. 12, page 26.)

FRONT HUBS

Apply a shot of grease to each hub. C, Fig. 19.

REAR HUBS

Apply a shot of grease to each hub. A, Fig. 23.

Apply a shot of grease to the reduction unit hub bearings, see Fig. 32.

Move the tractor until one of the holes in the wheel hub is opposite to lubricator, i.e., when holes are horizontally displaced.

POWER LIFT LINKAGE

Referring to Fig. 12, lubricate (with the grease gun) all the indicated points. Wipe off excess grease to prevent dirt adhering to the moving parts.

TYRES

Check the pressures, which should be :—

Land work . . Front 28 lb. sq. inch ; Rear 12 lb. sq. inch.

Road work . . Front 28 lb. sq. inch ; Rear 18 lb. sq. inch.

NOTE.—Inflation pressures must be checked more frequently with water filled tyres.

CARE OF THE TRACTOR

CLEANING

Clean the tractor, engine and controls thoroughly. Apply a spot of oil to the control lever pivots and joints. Wipe off all excess lubricant.

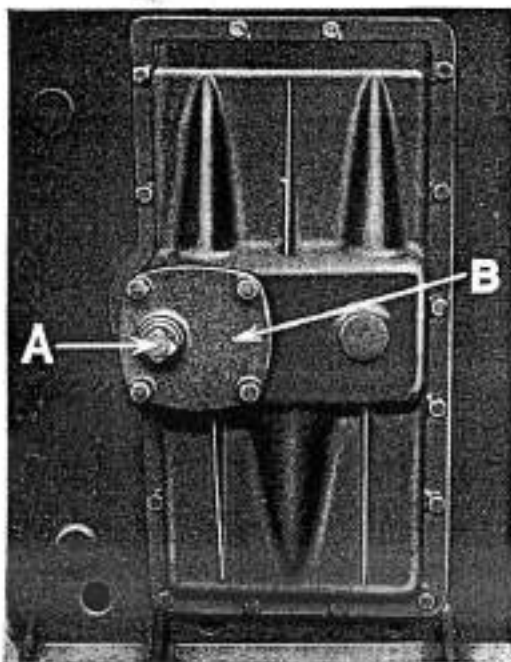


FIG. 20
ENGINE SUMP

A. Drain Plug
B. Cover Plate

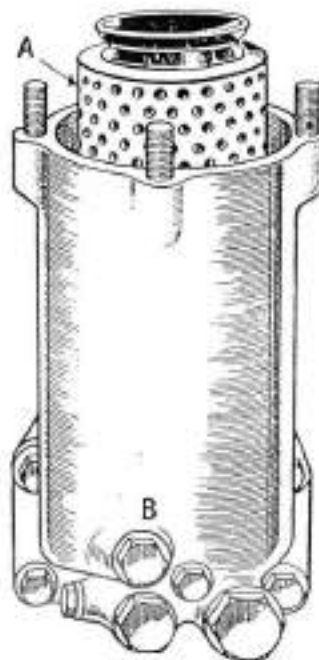


FIG. 21
OIL FILTER

A. Element
B. Drain Plug

Every two weeks or every 120 operational hours

ENGINE

While the engine is warm, drain the oil from the drain plug A, Fig. 20, and refill with approximately 14 pints of the recommended lubricant.

SEDIMENT BOWL

Examine and clean when necessary the sediment bowl as instructed on page 39.

Monthly or every 250 operational hours

ENGINE OIL PUMP GAUZE FILTER

Remove and clean the oil pump gauze filter. Access is obtained by removing the plate B, Fig. 20, and the single set screw securing the filter at the pump.

STARTER

Lubricate the starter motor with one or two drops of engine oil in the oil cup. If fitted with dust cap, remove to oil.

DYNAMO

Later series Dynamos have felt pad lubrication, the pad is lubricated through the oiling hole provided. Apply one or two drops of engine oil.

VALVES

Check the valve clearances in accordance with the instructions on page 41. Inlet and exhaust valve clearances should be 0.015 in. when the engine is hot.

BATTERIES

Check the condition of charge and top up to just above plate level with clean distilled water.

POWER LIFT FILTERS

Drain the oil from the transmission (see Fig. 22) *into a clean container*, remove the power lift sump plate, which releases the gauze and magnetic filter from the power lift suction pipe. The magnetic filter secured to the gauze centre with three countersunk headed set screws, should be removed to enable the magnet to be thoroughly cleaned.

After cleaning the gauze with paraffin, allow it to drain. Before replacing the plate make sure that the gasket is intact, renew if necessary.

The original oil may be used for refilling the transmission at this period.

Every six weeks or 360 operational hours**ENGINE AND OIL FILTER**

Drain the engine oil filter and renew the oil filter element in accordance with the instructions on page 36.

Inspect the engine and tighten all accessible nuts and bolts.

DYNAMO AND FAN BELT

Check the tension of the fan and dynamo drive belt and adjust if required, referring to Fig. 31, and the instructions on page 40.

Two months or every 500 operational hours

Remove the four injectors in accordance with the instructions on page 39. These must be handled carefully and *serviced only by a David Brown Dealer or one of the Manufacturers' Appointed Agents*.

SERVICING OF INJECTORS

It is most important that the injector nozzles are serviced at this period in order to maintain high engine performance without undue deterioration of the nozzles.

It should be noted that the complete servicing of the injectors at this period only involves cleaning the nozzle, spray orifices, needle valves and resetting the injector atmospheric pressure.

Reconditioning of the injectors and nozzles should only be required after 1,500 to 2,000 hours' use, unless the 500 hours' servicing period has been exceeded.

Care must be taken when removing the injectors for servicing to prevent damage to the pipe lines and unions, or damage to the cylinder head inserts. On removal the inserts should be plugged to prevent the ingress of dirt into the combustion chambers.

CARE OF THE TRACTOR

ENGINE BREATHER

Remove and clean the engine breather (page 40).

WATER PUMP

Apply a shot of H.M.P. grease (C, Fig. 3).

Seasonal Maintenance or every 1,000 operational hours

FUEL FILTERS

Drain the engine fuel filters and renew the filter elements referring to page 33, and then prime the fuel system.

GEARBOX, FINAL REDUCTION HOUSINGS, P.T.O. AND PULLEY UNIT

Referring to Figs. 22 and 12 drain while warm, *flush out* and refill with the correct oil. (See page 26.)

BRAKES AND CLUTCH

Check for adjustment referred to on page 43.

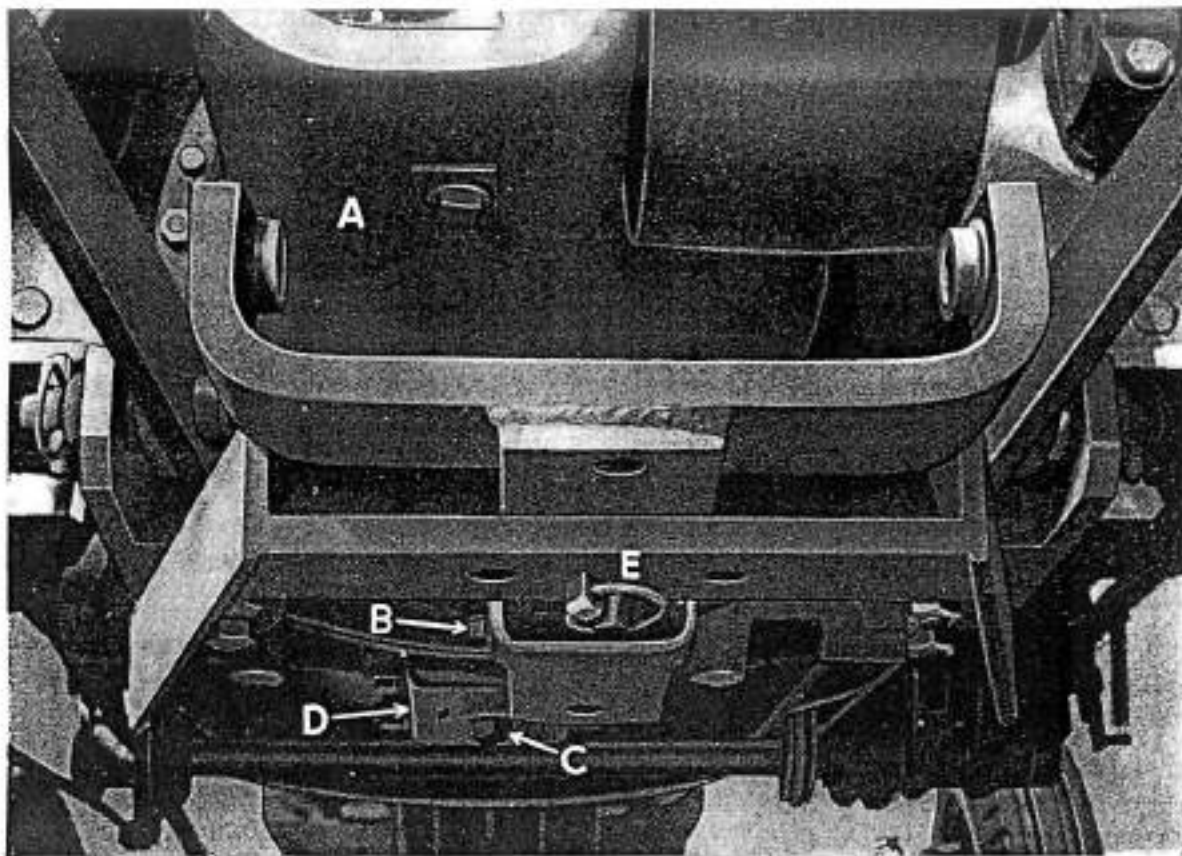


FIG. 22

TRANSMISSION DRAIN POINTS

- | | |
|--------------------------------------|---|
| A. P.T.O. and Pulley Unit Drain Plug | D. Power Lift Magnetic Filter Cover Plate |
| B. Transmission Drain Plug | |
| C. Gearbox Power Lift Drain Plug | |

FRONT AXLE AND STEERING

Jack up the front of the tractor and examine the steering king pins and front wheel bearings (adjustment of the front hub bearings is referred to on page 44).

Examine the front axle swivel and trunnion bracket bushes and the steering rods.

SEDIMENT BOWL

Remove and clean the gauze strainer in the fuel tap sediment bowl. Clean with petrol or air blast. Do not use cloths.

ELECTRICAL EQUIPMENT

Have the entire electrical system including the batteries checked over by your dealer or authorised agent.

INSPECTION

Carefully examine the engine for fuel leakage and examine the tractor for oil leakage. Check the brakes, governor, blind and cut-off controls. Pay special attention to the tyres.

SPARES

Examine the Tractor and order spares which you anticipate may be required. Carry out the Minor Service adjustments that are required. See pages 36-44.

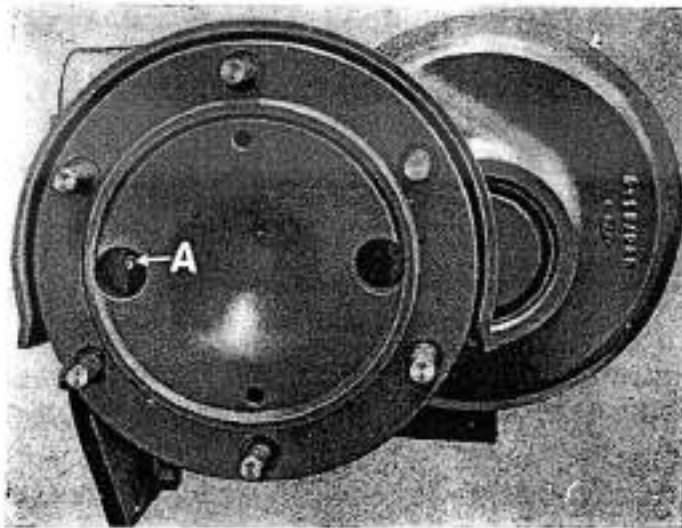


FIG. 23.

FINAL DRIVE HUB LUBRICATOR

- A. Lubricators are accessible when holes in rear wheel hub are horizontal

Filling, Greasing and Draining Points**ENGINE**

The filler and dipstick are shown at L and K, Fig. 10, the drain plug for the sump A, Fig. 20 and water pump greaser C, Fig. 3.

AIR CLEANER

The base may be removed by releasing the clamps (Fig. 9).

GEARBOX

The filler and dipstick are shown at G and J, Fig. 2, and the drain plug C, Fig. 22.

CARE OF THE TRACTOR

FINAL REDUCTION UNITS

Filler and level plugs and the drain plug are shown at K and K¹, Fig. 12.

POWER LIFT

Sump plate and drain plug C and D, Fig. 22.

P.T.O. (and Pulley Unit when fitted)

Drain plug shown at A, Fig. 22. The oil level is automatically maintained from the transmissions.

FRONT AXLE AND STEERING

The king pins, front axle trunnions and steering joints are lubricated by grease at the points in Fig. 19. Three steering box lubricators K, Fig. 2.

FRONT WHEEL HUBS

Lubricant is applied at the grease nipples (one to each hub) shown at C, Fig. 19, until grease is seen at the inner end of the hub.

REAR WHEEL HUBS

Lubricators are provided at A, Fig. 23.

ELECTRICAL EQUIPMENT

The dynamo lubrication point M, Fig. 10.

POWER LIFT RAMSHAFT AND LINKAGE

Lubrication points are indicated in Fig. 12. The spherical bearings on the top and lower links *should not* be lubricated.

FUEL STORAGE

Whilst it is not intended in this book to provide complete details covering the storage of Diesel Fuel Oil, the following details may assist those contemplating the purchase and installation of storage equipment.

Ample storage to cover expected requirements should always be provided but the tank should not be of a size which would make draining and refilling periods infrequent.

The tank should be situated above ground and under cover. The refuelling tanker should be able to approach within forty feet of the filling pipe. It is advisable to locate the tank high enough to enable the tractor tanks to be conveniently filled by gravity through a short length of flexible hose.

The tank should be elevated above ground level on brick or concrete cradles. These should allow the tank to slope downwards from the inlet to the outlet valves approximately $\frac{1}{4}$ in. to $\frac{1}{2}$ in. per foot of the tank length. This will allow two or three inches of residual space in the bottom of the tank and the residue must be periodically drawn off by means of a sediment drain cock.

Fig. 24 shows a typical storage tank layout. The tank illustrated is protected from extreme changes in temperature by surrounding walls. The accumulation of water in the fuel, due to condensation, is thereby greatly reduced.

Cylindrical or square type storage tanks may be used. The tanks must be clean internally and galvanised metal should not be used for any part of the installation in contact with the fuel. The tank should have a standard size manhole with the cover in an accessible position, well bolted down with a close-woven graphited asbestos packing to ensure a gas-tight joint.

The tank filling pipe should be as short as possible, free from bends and terminating in a convenient position for coupling to the delivery hose. The end of the pipe should be covered with a cap when not in use. A goose-necked vent pipe, protected by a coarse gauze screen, should be fitted on the top of the tank. The vent pipe should have the same internal diameter as that of the filling pipe.

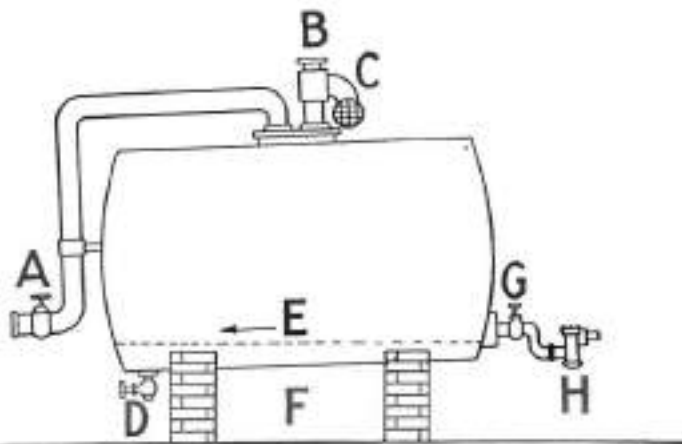


FIG. 24

FUEL STORAGE

- A. Fill Pipe Valve
- B. Dipstick Cover
- C. Vent Pipe
- D. Drain Valve
- E. Fall
- F. Cradle
- G. Draw Off Valve
- H. Filter

To provide a settling space for water and residue the outlet draw off pipe should not be less than 3 in. above the bottom of the tank. An enclosed filter should be fitted to the outlet of the tank. The filter should have approximately 120 meshes per linear inch and it should be detachable for cleaning at regular intervals.

A brass dipstick should be provided as a level indicator and the dipping hole, fitted with a suitable protective covering, should be situated in a central position on the top of the tank.

A large diameter drain cock should be provided on the underside of the tank at its lowest point. Ample space should be allowed to facilitate the use of this valve, and before each new delivery of fuel oil is received the valve should be opened to draw off sediment.

Service Adjustments

Engine

TO REMOVE THE ENGINE OIL FILTER ELEMENT

Drain the lubricating oil from the filter drain plug F, Fig. 26. Mark the filter cover and the body to ensure refitting the cover in exactly the same position. Remove the four cover holding-down nuts and remove the cover. Lift out the filter element. Clean interior of the filter body.

Fit the new element and assemble the filter in the reverse order to dismantling. Renew the cover gasket if necessary. Refit the drain plug tightly and with the decompressor lever raised and the fuel cut-off control out, turn the engine several times with the starting handle.

When the engine has been started, inspect the filter cover for oil leakage and check the engine oil level.

FIG. 26
OIL FILTER

- A. Cover
- B. Element
- C. Body
- D. Joint Gasket
- E. Low P.R.V.
- F. Drain Plug



TO CLEAN THE ENGINE OIL PUMP STRAINER

The strainer surrounding the oil pump is readily accessible after removing the plate B, Fig. 20, fitted to the sump. Drain the oil from the engine and remove the plate. Remove the setscrew from the centre of the oil strainer base and remove the strainer from the pump.

Clean the strainer by washing in paraffin and replace. Refit the plate, tighten the sump drain plug and refill the engine with the recommended grade of oil.

Fuel System

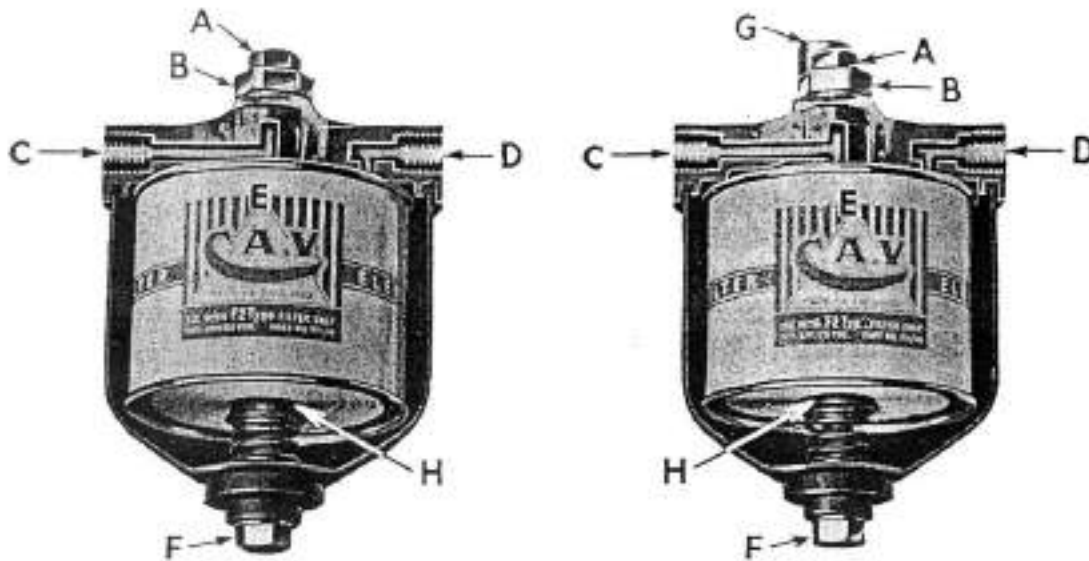


FIG. 27

MICRONIC TYPE FUEL FILTERS

- | | |
|-----------------|----------------|
| A. Vent Plug | D. Inlet Union |
| B. Body Nut | E. Element |
| C. Outlet Union | F. Drain Plug |
| G. Relief Valve | |

TO RENEW THE FUEL FILTER ELEMENTS

Two fuel filters are provided and both filter elements must be renewed at the same time after 1,500 operational hours usage.

1. Clean the outside of each filter with a cloth then close the fuel supply tap.
2. Slacken the drain plug on the underside of each filter body and also the vent plug on the filter cover.
3. Unscrew hexagonal nut below vent plug to remove each filter body. Discard used element and clean interior of each filter body.
4. Fit new element with exposed portion downwards, refit filter body. After installing new fuel filter elements (C.A.V. 7111/46, D.B.T. Part No. 62594) the fuel system is air vented as follows :—

NOTE.—*The sediment bowl filter located below the fuel tap should be removed and cleaned each time the filter elements are renewed.*

TO PRIME THE FUEL SYSTEM

The presence of air in the fuel system will prevent the engine operating satisfactorily and will often result in complete stoppage and failure to restart the engine. The main causes of air entering the fuel system are either turning the fuel tap off whilst the engine is running or failure to maintain a sufficient quantity of fuel in the tanks.

SERVICE ADJUSTMENTS

TO AIR VENT THE FUEL SYSTEM (Referring to Fig. 28)

1. Ensure that a plentiful supply of fuel is available in the fuel tank and turn the fuel tap on.
2. Open the vent plugs N and K and operate the fuel priming pump F.
3. When air free fuel issues from the filter vent plugs, tighten the vent plugs.
4. Open the vent plugs G, on the fuel pump gallery and operate the priming pump until air free fuel issues from the vent plugs then tighten the vent plugs. Screw the plunger of the priming pump firmly to the barrel after use.
5. Lift the decompressor lever and, whilst holding out the fuel cut-off control motor the engine. Lower the decompressor lever, return the fuel cut-off control and start the engine.
Should engine fail to start air vent the fuel system again.

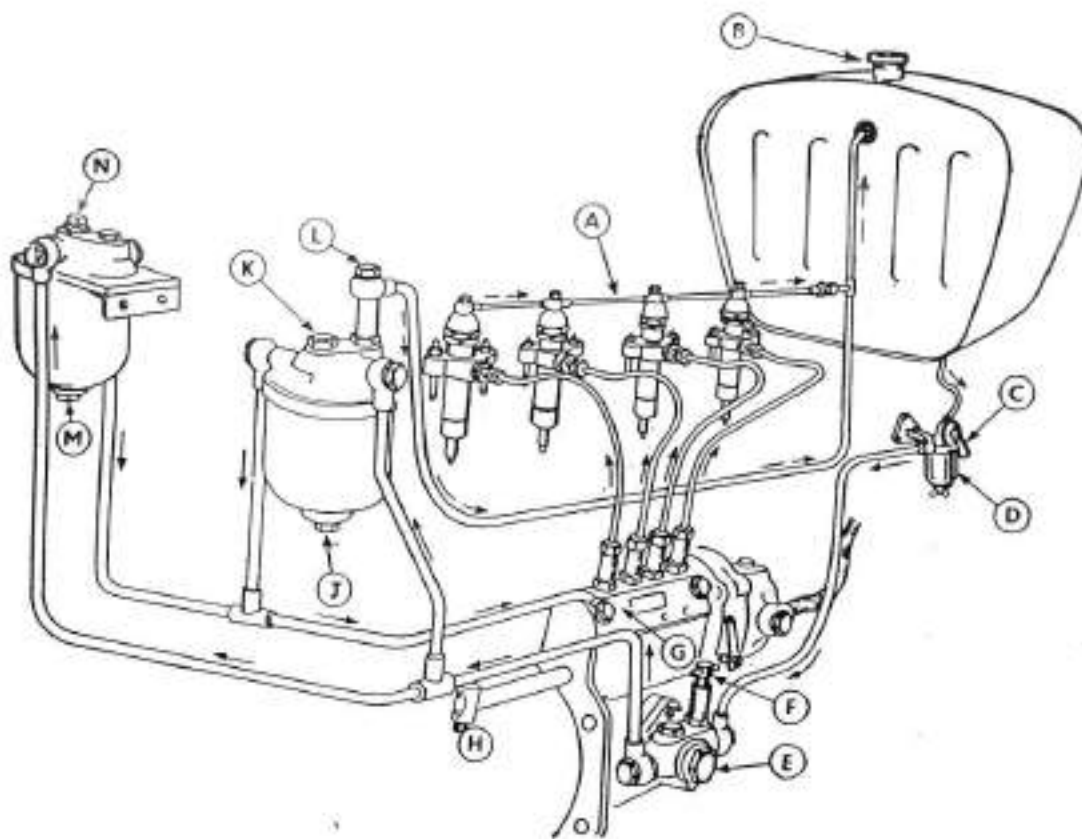


FIG. 28
FUEL SYSTEM

- | | |
|---------------------|-------------------------|
| A. Leak-off Pipes | G. Fuel Pump Vent Plugs |
| B. Fuel Tank Filler | H. Excess Fuel Button |
| C. Fuel Tap | L. Relief Valve |
| D. Sediment Bowl | M-J Filter Drain Plugs |
| E. Fuel Feed Pump | N-K Filter Vent Plugs |
| F. Priming Pump | |

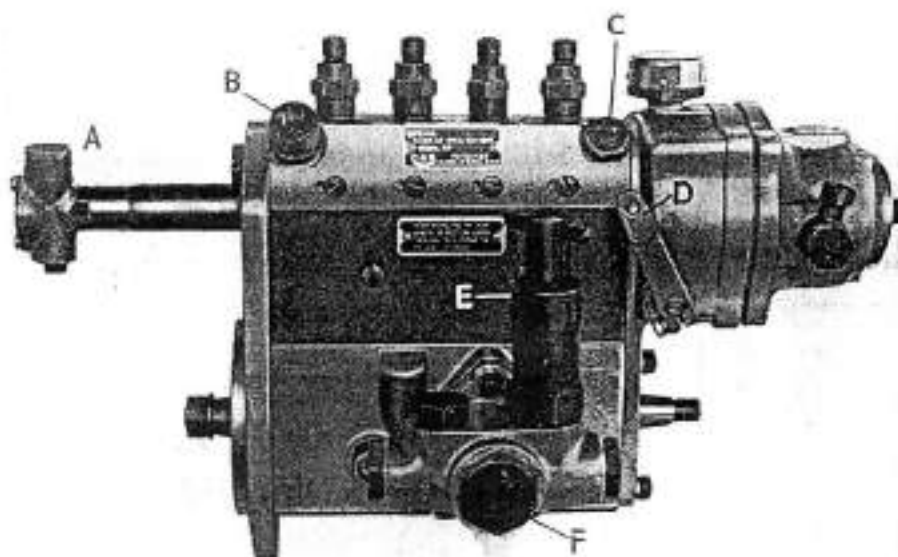


FIG. 29

FUEL INJECTOR PUMP

- | | |
|-----------------------|--------------------------|
| A. Excess Fuel Button | D. Cut-Off Control Lever |
| B. Fuel Inlet Union | E. Priming Pump |
| C. Gallery Vent Plug | F. Feed Pump Cover |

FUEL TAP, SEDIMENT BOWL AND STRAINER

It is advisable to remove and clean the sediment bowl and filter before bleeding the fuel system. Wash the bowl and filter in petrol and replace them wet. In no circumstances clean the filter or the bowl with a cloth. Always renew the gasket if the old one is damaged.

If, after priming the system, the engine fails to start, check that all the union connections are tight and that there are no fuel leaks. Prime the system again.

TO REMOVE THE INJECTORS

1. Remove the fuel leak-off pipes A, Fig. 30, by disconnecting the dome unions and the vertical pipe union. After removing the fuel leak-off pipes replace the banjo bolts and copper washers on each injector cap.
2. Disconnect the high pressure fuel lines from the injector unions K, Fig. 30, and slacken the unions at the injector pump.
3. Carefully slacken and remove the injector holding down nuts and withdraw the injectors.

PRECAUTION

Handle the injectors carefully when removing them from their seatings to prevent damage to the nozzle tips or the sealing surfaces. After removal the injector inserts should be plugged with suitable clean material to prevent any dirt entering the cylinders.

TO REFIT THE INJECTORS

1. Remove the plugs from the cylinder head injector ports and clean the inserts thoroughly.
2. Place the injectors in the inserts and tighten the holding-down nuts lightly. Tighten each holding-down nut half a turn alternately until the injectors are located firmly. Take care not to overtighten.
3. Reconnect the high pressure line unions at the injectors taking care not to damage the threads or overtighten the unions.

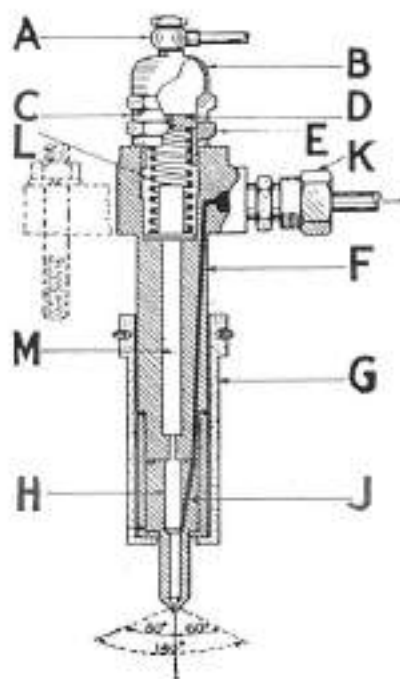


FIG. 30

SECTIONAL INJECTOR

- A. Leak Off Union
- B. Dome Nut
- C. Sealing Washer
- D. Pressure Adjusting Screw
- E. Locknut
- F. Nozzle Holder
- G. Injector Sleeve
- H. Needle Valve
- J. Nozzle
- K. Pressure Union
- L. Pressure Spring
- M. Plunger Valve

4. Reconnect the fuel leak-off pipes to the injectors and reconnect the vertical pipe union.
5. Check the tightness of the high pressure line unions at the fuel pump.
6. After replacing all the injectors, start up the engine and inspect the fuel pipe lines for leakage.

TO CLEAN THE ENGINE BREATHER

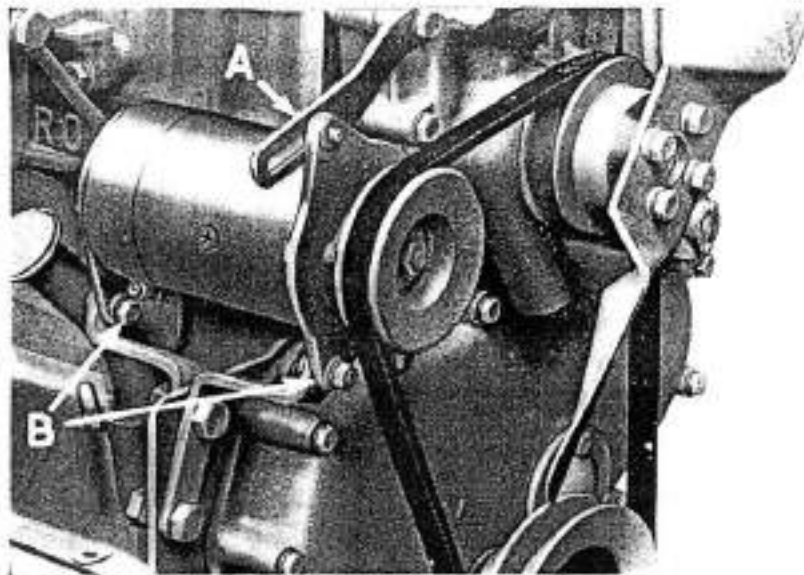
A combined crankcase and valve gear breather is mounted on the rocker box cover. It is a push fit on to an extension sleeve and is easily detached for inspection and cleaning. It should be removed periodically, cleaned in petrol, and allowed to dry. Before replacing the breather a few drops of engine oil should be applied to the gauze. If the breather is unserviceable it should be renewed.

TO ADJUST THE FAN AND DYNAMO DRIVE BELT

The fan, dynamo and water pump drive belt should never be run taut. The correct adjustment allows one inch of deflection on the drive side of the fan pulley. The correct tension is obtained by slackening the clamping bolts A and B, Fig. 31, and pivoting the dynamo in its mounting bracket. Retighten the clamping bolts after adjustment has been made.

Fig. 31
FAN AND
DYNAMO BELT
ADJUSTMENT

A. Adjusting Bar
B. Clamping Bolts



TO ADJUST THE VALVE CLEARANCES

The inlet and exhaust valve clearances are the same—0.015 in. HOT. Remove the rocker box cover by releasing the two knurled nuts. The valve clearance is measured between the face of the rocker arm and the end of the valve stem.

Adjustment is made by slackening the lock nut A, Fig. 32 and turning the adjusting screw B. When the correct clearance is obtained, retighten the lock nut whilst the adjusting screw is held firmly.

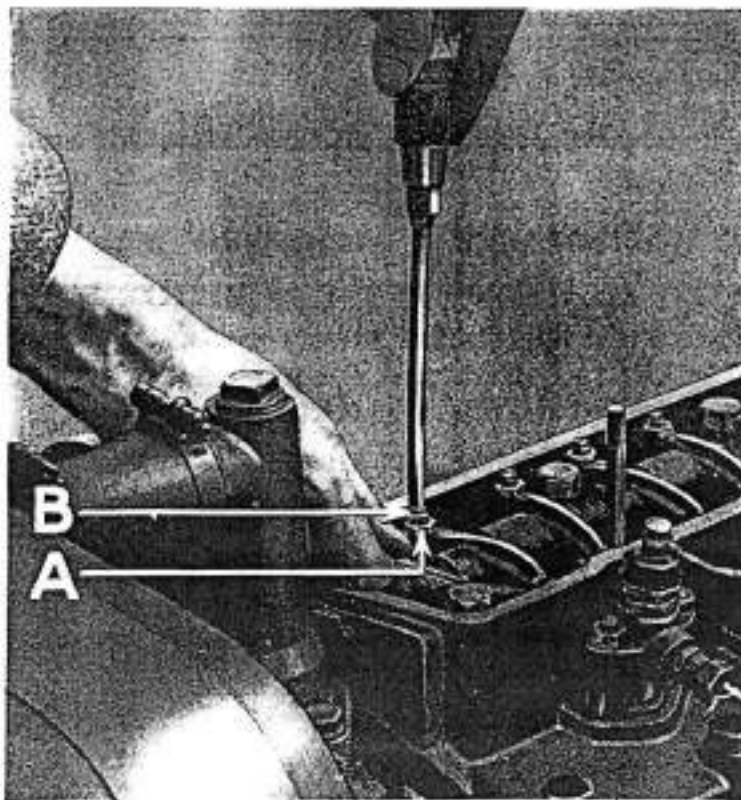


FIG. 32
VALVE CLEARANCE ADJUSTMENT
A. Lock Nut B. Adjusting Screw

SERVICE ADJUSTMENTS

With the engine warm and the decompressor lever in the horizontal position, adjust the clearances in the following sequence :—

Adjust No. 1 valve with	No. 8 valve fully open.	
” No. 6	” ” No. 3	” ” ”
” No. 4	” ” No. 5	” ” ”
” No. 2	” ” No. 7	” ” ”
” No. 8	” ” No. 1	” ” ”
” No. 3	” ” No. 6	” ” ”
” No. 5	” ” No. 4	” ” ”
” No. 7	” ” No. 2	” ” ”

PRECAUTION

It is essential that this sequence of adjustment is strictly observed and that the correct clearances are made. Failure to observe these points may result in damage to the valves and the pistons or loss of compression owing to improper seating of the valves.

After re-setting all the clearances correctly the engine should be restarted, and, when the normal working temperature is reached, stopped, and all the clearances finally checked.

When the valve adjustments are made, it is advisable to check the tightness of the manifold nuts.

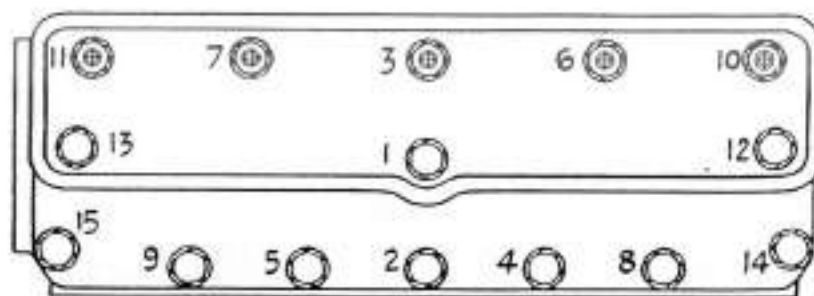


FIG. 33

CYLINDER HEAD TIGHTENING SEQUENCE

SEQUENCE OF TIGHTENING THE CYLINDER HEAD

After the first 25 operational hours the cylinder head bolts and special nuts should be carefully tightened in the sequence shown in Fig. 33. If a torque wrench is used it should be set to 90 lb. ft.

NOTE.—After tightening the cylinder head bolts the valve clearances should be rechecked.

TO FLUSH OUT THE COOLING SYSTEM

To remove sludge and other deposits from the cooling system, start up the engine with the cooling system full and run the engine until normal working temperature is reached. Run for a further five minutes, then stop the engine and drain the cooling system.

Prepare $3\frac{1}{2}$ gallons of clean HOT water and add $1\frac{1}{2}$ pounds of caustic soda. Turn off the drain taps and refill the cooling system with this solution. Start up the engine and run at normal working temperature for 15 minutes. Stop the engine and drain the cooling system.

If the draining is sluggish, inspect the hose to ensure that there is no further obstruction. If the hose is damaged it should be renewed.

Disconnect the hose from the radiator header tank and the water pump stand pipe. Remove the pipe, taking care not to damage the thermometer bulb and lift out the thermostat valve. With a suitable hose, entered into the thermostat housing and connected to a supply of clean water, flush out any sediment remaining in the cylinder block.

After flushing in this way, enter the hose in the radiator header tank and flush out the radiator block.

Replace the thermostat valve and refit the stand pipe, ensuring that a watertight joint is made; renew the gasket if damaged. Reconnect the hose from the radiator header tank to the stand pipe; check the tightness of the lower hose joints, turn off the drain taps and refill the system with $3\frac{1}{2}$ gallons of clean, soft water.

Start the engine and run at normal working temperature. Examine all the cooling system connections, joints and hoses for water leaks.

NOTE.—Care should be taken when flushing the cooling system to avoid splashing the caustic soda solution on to the hands or the tractor paint work.

GOVERNOR DETAILS

All pneumatic governors are entirely automatic in operation and can be considered as non-adjustable governors. The maximum engine speed 2,050 r.p.m. under light load is determined by the venturi diameter and the sealed stop position of the opened butterfly valve. The maximum engine r.p.m. under load is not controlled by the position of the throttle valve but by the maximum fuel delivery stop at the front of the fuel pump. The intermediate speed position is adjusted when the engine intermediate speed of 1,600 r.p.m. has been determined by a tachometer, and is set by adjusting the length of the throttle control rod. The idling speed is controlled by a sealed stop on the throttle valve at 700 r.p.m.

Service Adjustments Transmission

CLUTCH

Refer to Fig. 11. Depress the clutch pedal B by hand to ascertain the free movement, which should be about 1 in. (2.5 cm.). If this is not so, check that the clutch is not being held down by the hand clutch lever: there should be about $\frac{1}{16}$ in. (1.5 mm.) clearance at Point D.

To reset clutch proceed as follows:—

- Slack back the adjustment nut D, to give $\frac{1}{4}$ in. (6 mm.) or so clearance.
- Adjust bolt G, to give 1 in. (2.5 cm.) free movement at the clutch pedal.
- Reset the adjustment D to give $\frac{1}{16}$ in. (1.5 mm.) clearance.

SERVICE ADJUSTMENTS

FRONT HUBS

Adjustment to the front hub bearings is carried out by removing the hub caps and the split pins from the castellated nuts. The nuts should be tightened and then slackened back sufficient to allow a 0.010 in. feeler blade to be introduced between the nut and washer.

BRAKES

The brake gear is not compensated and each side requires individual adjustment. This is checked by driving the tractor on a flat road and applying the foot brakes, when it will immediately be noticed whether the tractor has a tendency to slew to one side or fails to stop in a reasonable distance. The brake on the side to which it slews will be acting harder than that on the other side and therefore adjustment is required either by slackening off the more active brake or tightening up the opposite brake.

Adjust as follows :—

Jack up both rear wheels and depress the foot pedals and apply the parking brake, leaving approximately one-and-a-half inches free pedal travel. Release the locknuts at the brake end of the rearmost rods and regulate the adjusting nuts until the resistance to each wheel is equal. Check by turning each wheel by hand. Tighten the locknuts, release the hand brake and spin the wheels to check for freedom.

When the brake linings have seen considerable service and require relining, consult a David Brown dealer.

HAND PARKING BRAKE

NOTE.—When adjustment is made at the brake rods the action of the pull up type parking brake should be checked. If the action is not satisfactory adjustment should be made at the push rods under the O/S footplate.

IMPLEMENT LINKAGE. Category I and II

Provision is made at the lower draught links for the direct attachment of implements fitted with either Category I or Category II B.S.I. implement hitch points. The new type lower links have spherical attachment balls with large and small diameter holes. The new type tractor hitch pins have also two corresponding diameters. *For Category I converging linkage attachment* the hitch pins are fitted with the large diameter step to the outer sides of the hitch brackets and the large balls of the lower links are mounted adjacent the tractor. *For Category II linkage attachment* the hitch pins are fitted with the small diameter step next to the outer sides of the hitch brackets. The lower links are reversed end for end and then interchanged, left side to right side, so that the small balls are mounted adjacent the tractor.

NOTE.—To permit the reversal of the lower links alternative holes are provided for the lift lever fork and check chain attachment.

Electrical System

Maintenance

LEADS AND TERMINALS

All leads should be secured firmly to avoid chafing of the insulation. Battery leads should be clean and tight, and lightly smeared with petroleum jelly to protect them from corrosion.

BATTERIES

Always maintain the correct level of acid solution by topping up each cell to just above plate level with pure distilled water. Never allow the level to fall below the top of the plates. Keep the batteries clean and dry, and the plug vents open. It is advisable to have the batteries checked by a David Brown Dealer every two months.

DYNAMO

Inspect the brushes every six months in addition to the routine lubrication maintenance. Ensure that the brushes slide freely in their guides, that the spring tension is sufficient and that the leads have a clearance and are not charred or burnt. New brushes should be bedded in by a David Brown Dealer or a Lucas/C.A.V. Repair Agent.

AMMETER

This normally does not require any attention but if faulty, it should be renewed.

COMBINED REGULATOR AND CUT-OUT

This unit is located under instrument panel and should require no attention. If a fault is suspected, the entire electrical system should be checked immediately by a David Brown Dealer or a Lucas/C.A.V. Repair Agent.

FUSE BOX

The fuse box is located under instrument panel. The fuse wire is a single strand of tinned copper wire. Value 25 amps.

CAUTION

Never renew the fuse until the *cause* of the failure has been determined and rectified. It is advisable to have this carried out by a David Brown Dealer or a Lucas/C.A.V. Repair Agent.

STARTER MOTOR

This is a 12-volt axial type incorporating a solenoid relay switch. Maintenance consists of periodical lubrication only. *Do not attempt to renew or adjust the brushes or the relay mechanism.* Failure of the starter motor to operate may be due to the discharged condition of the batteries, slackness of the battery terminal connections, or faulty relay mechanism. If the starter motor does not function **DO NOT CONTINUE OPERATING THE SWITCH**, or damage to the starter motor, relay mechanism or the batteries may result.

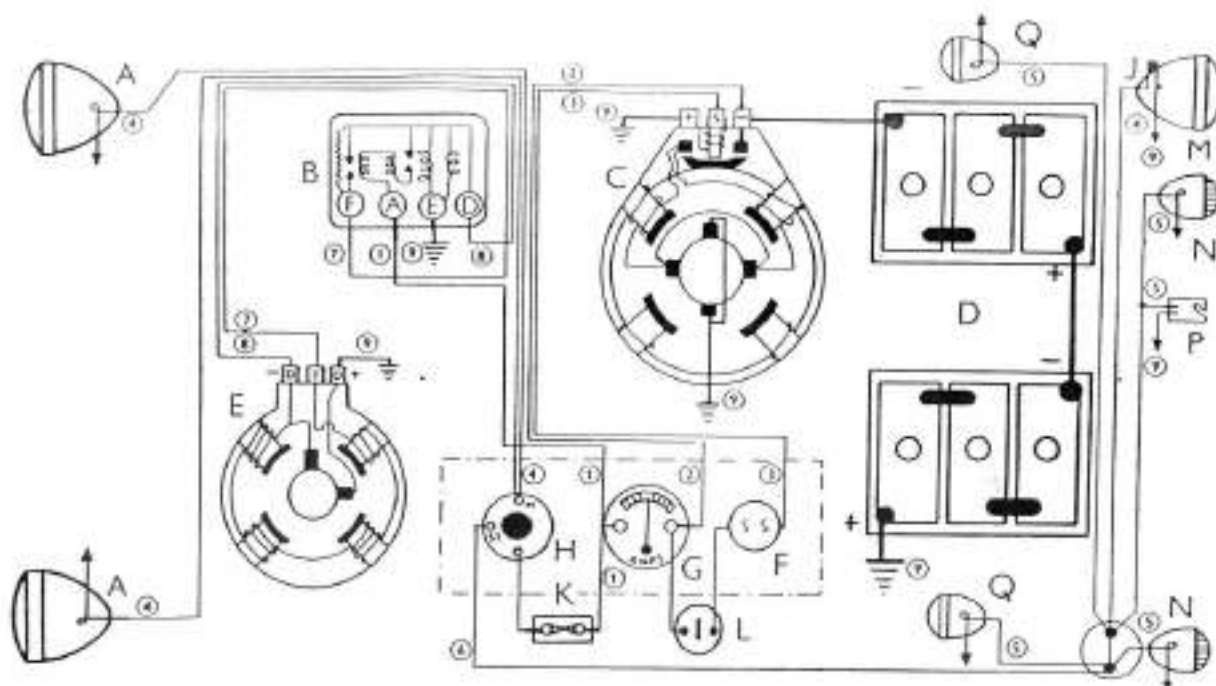


FIG. 34

ELECTRICAL WIRING DIAGRAM

A. Head Lamps	F. Starter Switch	L. Master Switch
B. Regulator	G. Ammeter	M. Flood Lamp
C. Starter Motor	H. Light Switch	N. Rear Lamps
D. Batteries	J. Flood Lamp Switch	P. Trailer Extension
E. Dynamo	K. Fuse	Q. Side Lamps

WIRING IDENTIFICATION

1—Red 2—Yellow 3—Purple 4—Blue 5—Green 6—Green and White
 7—Blue and White 8—Red and White 9—Black (all earth leads)

Engine Trouble Tracing and Electrical Service Adjustments

The electrical and injection equipment fitted to the David Brown Diesel engine is of proprietary manufacture and whilst immediate difficulties may often be overcome by the tractor operator, specialised knowledge is generally necessary to effect a permanent and satisfactory repair. The engine and trouble tracing details are intended to provide sufficient detail to enable a tractor operator to overcome a difficulty, only when expert assistance is not available.

Details of the electrical and injection equipment are provided in the specification to facilitate servicing and repairing by a David Brown Dealer or an agent of the proprietary equipment.

Engine Trouble Tracing

ENGINE FAILS TO START

Probable causes :—Lack of fuel or air lock in the fuel system ; mechanical fault in the fuel system ; faulty injectors or fuel pump ; loss of compression due to faulty valves or valve gear ; loss of compression due to faulty piston rings or piston and cylinder wear.

To locate the fault :—

Check the amount of fuel in the tanks, ensure that the fuel tap is turned ON and prime the fuel system. If the engine again fails to start, slacken the high pressure pipe line unions on each injector in turn and, with the decompressor lever raised and *the fuel cut-off* in, turn the engine with the starting handle and note if the fuel is present at the unions.

No fuel present at the injector unions may be due to a faulty fuel filter relief valve or to excessive water or dirt in the fuel filter. Drain the fuel filters, renew the fuel filter elements, and prime the fuel system.

To check the fuel filter relief valve, slacken the outlet union at the front fuel filter, allow the fuel to drain out and note if further fuel issues when the fuel pump priming lever is operated. After checking, the union should be reconnected and the fuel system primed at bleed points G, Fig. 28, on the fuel pump gallery.

If fuel is present at the injector unions failure of the engine to start may be due to faulty atomisation of the fuel and a set of serviced injectors should be fitted.

Mechanical faults in the fuel system may be due to failure of the excess fuel starting device to stay in, or to stiffness of the governor diaphragm control. Check the governor vacuum pipe and connections for air leaks and lubricate the governor. Check that the fuel cut-off control is "in" fully before starting the engine.

Failure to start may be due to loss of compression caused by the valves not seating properly. Ensure that when the decompressor lever is lowered, all the valves function properly and that the decompressor lever does not prevent them from seating properly.

To test the engine for compression, pull out the fuel cut-off control and hold it in this position. Note the difference in speeds when the engine is turned by the starter motor with the decompressor lever in the raised position and in the lowered position. Little or no variation in the speeds indicates weak compression.

To test the compression by hand, hold out the fuel cut-off control and slowly turn the engine with the decompressor lever lowered. If, on nearing the top of each compression stroke, the resistance offered by the starting handle does not increase appreciably, the compression is weak. There should be one compression stroke for each half turn of the handle.

Weak compression may also be caused by faulty piston rings, or worn cylinders and pistons, and the advice of a David Brown Dealer should be obtained.

Further failure to start may be due to mechanical faults in the engine or fuel pump, and the complete fuel pump and injection equipment should be serviced.

ENGINE RUNS UNEVENLY

Probable causes :—One or more injectors faulty ; fuel containing water or dirt ; fuel or air leakage, faulty governor or fuel pump ; valves, valve gear or clearances faulty ; mechanical defect in the engine.

Ensure that the fuel is clean. If it is suspected that water may be in the system, drain it from the fuel filters, refill with clean fuel and prime the system. If the fuel is clean, remove the injectors for servicing.

After refitting the serviced injectors, check each injector and fuel pump union to ensure that no fuel is leaking. Inspect the remaining pipes and unions for fuel leaks. If the engine still runs unevenly, reset the valve clearances and test the engine for equal compression on all cylinders. Should the compression in one or more cylinders appear weak, have the valves and piston rings examined by a David Brown Dealer. If the compression appears equal, lubricate the governor and the controls, and test the governor vacuum pipe and unions for air leaks.

Further uneven running may be caused by the fuel pump being out of phase, by worn bearings, or by mechanical defects in the engine.

ENGINE RACES

Check the air inlet manifold for leaks, by applying a small amount of oil on the joints and with the fuel cut-off pulled out and the decompressor lever lowered turn the engine by hand and note if the oil disappears. Check the throttle valve pivots and the governor vacuum pipe for air leaks, and have the operation of the governor checked.

ENGINE LACKS POWER

Probable causes :—Air cleaner element choked, or dirty condition of the oil ; insufficient or inferior engine lubricating oil ; excessive carbon deposit in the cylinder head ; faulty injectors or fuel pump timing ; loss of compression.

To locate the fault :—Inspect the condition of the oil in the air cleaner base, and renew the oil if necessary.

Inspect the air filter element and clean the element if it appears dirty. Do not, however, operate the engine with the air cleaner base removed.

Check the engine lubricating oil level. If necessary, drain the sump and refill it with the recommended grade of oil.

Lack of power may be due to excessive carbon deposit in the cylinder head associated with faulty injectors. This condition may be diagnosed by the black appearance of the exhaust gases, and the engine should be decarbonised and the fuel injectors serviced.

General loss of power may be due to loss of compression caused by wear of the pistons, piston rings and cylinders or worn valves and seats. The components concerned should be renewed or serviced by a David Brown Dealer.

Should the general condition of the engine be good and no loss of compression be apparent, loss of power may be due to a faulty fuel injection pump or faulty injection timing. The pump should be serviced as a complete unit, and the engine timing should be checked.

ENGINE OVERHEATS

Probable causes :—Shortage of water in the cooling system ; fan belt requires adjusting ; blockage in the cooling system ; excessive carbon deposit in the combustion chambers ; insufficient, or the wrong grade of lubricating oil.

Check the water level in the radiator. Ensure that the radiator blind is working correctly and is fully open. Check the fan belt tension and adjust it if necessary. If a blockage is suspected in the cooling system, the latter should be flushed and refilled with clean, soft water. Afterwards check the cooling system carefully for leakage.

Check the engine oil level and the quality of the oil. Top up or refill with the correct grade of recommended lubricating oil, as required. While the engine is running, check the engine oil pressure. If the pressure is inadequate; have the lubrication system checked by a David Brown Dealer.

Excessive carbon deposit in the cylinder head, denoted by the black condition of the exhaust gases, will also cause the engine to overheat and the engine should be decarbonised, and the fuel injection equipment serviced.

ENGINE " KNOCK " WITH OVERHEATING

Probable causes :—Faulty injectors.

This trouble is usually associated with faulty fuel injection equipment and excessive carbon deposit in the combustion chambers. The injectors should be serviced, the engine decarbonised and, if the knock persists, the fuel pump should be serviced.

ENGINE " KNOCK " WHEN COLD

Probable causes :—Worn main, big end, or gudgeon pin bearings ; worn pistons, broken or seized piston rings ; incorrect valve adjustment.

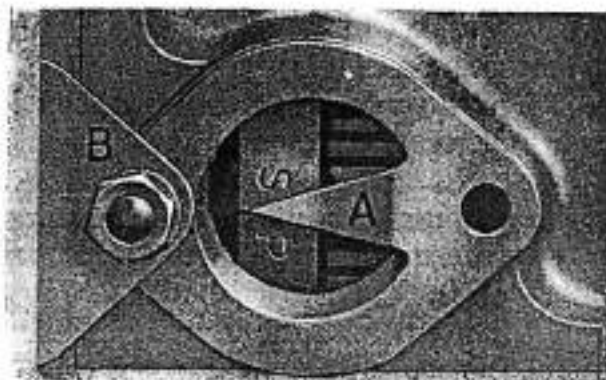
If the knock is apparent immediately the engine is started do not operate the engine until it has been rectified. In all cases the engine should be examined by a David Brown Dealer and the fault rectified, otherwise serious damage may result.

FIG. 35

SPILL TIMING MARK

A. Pointer B. Cover Plate

NOTE.—The S.P. timing mark coincides with the pointer at the instant of fuel (spill) cut off of No. 1 element of the fuel injection pump when the engine is at 25° B.T.C. No. 1 cylinder firing.



Electrical Trouble Tracing

STARTER MOTOR FAILS TO TURN THE ENGINE

Probable causes :—Discharged condition of the batteries ; loose battery terminal connections ; faulty relay mechanism ; internal fault in the starter motor.

Ensure the batteries are fully charged and top up with distilled water. Check the tightness of the battery terminal connections and the earth connection. Note if the relay mechanism “clicks” when the starter button is depressed. The “click” indicates that the relay mechanism is in order. If the mechanism “chatters” the solenoid switch and the starter motor should be serviced.

BATTERIES DISCHARGED

Probable causes :—Excessive use of the starter motor ; failure of the dynamo to charge ; short circuit in the tractor wiring system.

Do not operate the starter motor if the batteries are discharged ; the batteries should be removed and recharged. Should a short circuit be suspected in the wiring system, isolate each separate circuit until the fault is located.

NOTE.—Check that the *positive* terminal of one battery is connected to earth, and that the *negative* terminal of this battery is connected to the *positive* terminal of the second battery.

DYNAMO FAILS TO CHARGE

Probable causes :—Drive belt tension incorrect ; battery terminals loose ; internal fault in the dynamo or charging system.

Check the tension of the dynamo drive belt and adjust if required.

Check the tightness of the dynamo and the battery terminal connections.

FUSE

This is located by the side of the control box. Should any fault occur in the electrical lighting system, immediately check to see if the fuse is burnt out.

WIRING HARNESS

Causes of general wiring failures may be divided into two main sections :—

1. Failure of electrical equipment to operate due to a broken cable.
2. A short circuit, resulting in a high discharge rate shown on the ammeter.

Trouble in these categories may take place between the battery and the switches or in a particular circuit, in which case the fault will only reveal itself when that particular circuit is switched on.

In the event of either type of trouble :—

1. Determine the section affected.
2. Examine the wiring connections.
3. Check each wire for damage.

Mark II Power Lift Hydraulic System

FAULT DIAGNOSIS AND CORRECTIONS

Minor troubles which may arise and which may be remedied by the operator are printed in bold type.

The major troubles which may develop and which can only be remedied by a David Brown Dealer are noted with an asterisk*

Fault	Remedy
FAILURE TO LIFT Load in excess of stipulated lift. *Will not lift stipulated load.	Reduce the load, especially if the material is loose or wet. Incorrect setting of main control valve. Controls require re-adjustment.
Will not lift any load or lift rate is intermittent.	Dirt lodging on control valve seats. Increase engine speed and operate control lever to flush off dirt. Control valve seats chipped or damaged. Insufficient or incorrect grade of oil. Worn ram cylinder or piston. Piston rings seized or broken, cylinder scored. Piston seized in ram cylinder. Leakage at pressure pipe unions. Intake filter choked or pipe fractured. Pump rotors and housings worn.
Lift linkage locked.	Ensure lift lock bolts are not engaging or fouling the lift arms.
RATE OF LIFT SLOW	Engine speed low. Increase engine speed. Insufficient oil ; oil aerated. Top up to level. Incorrect grade of oil. Drain transmission and refill with recommended grade of oil. Internal oil leakage at pressure pipe unions. Intake filter dirty or blocked. Intake pipe fractured or union leaking. Pump or hydraulic cylinder worn. Piston rings broken or seized. Linkage and ramshaft require lubricating.
LIFT DROPS IN HOLDING POSITION. *Main control valve faulty	Main control valve adjustment incorrect. Dirt on main control valve seat, move control valve from holding to lift position with the engine at a fast speed to flush the dirt away. Check by moving control lever quickly to the lower position. Main control valve seat chipped or damaged.

*Non-return valve faulty.

*LIFT WILL NOT LOWER

Lift locked in raised position.

*LIFT LOWERS ABRUPTLY

*LIFT LOWERS SLOWLY

Non-return valve or non-return valve seat chipped or damaged. Non-return valve spring broken. Main control valve adjustment incorrect. By-pass control valve adjustment incorrect. Ram piston seized. Lift linkage seized.

Lift lock bolt engaged.

Ramshaft bearings seized.

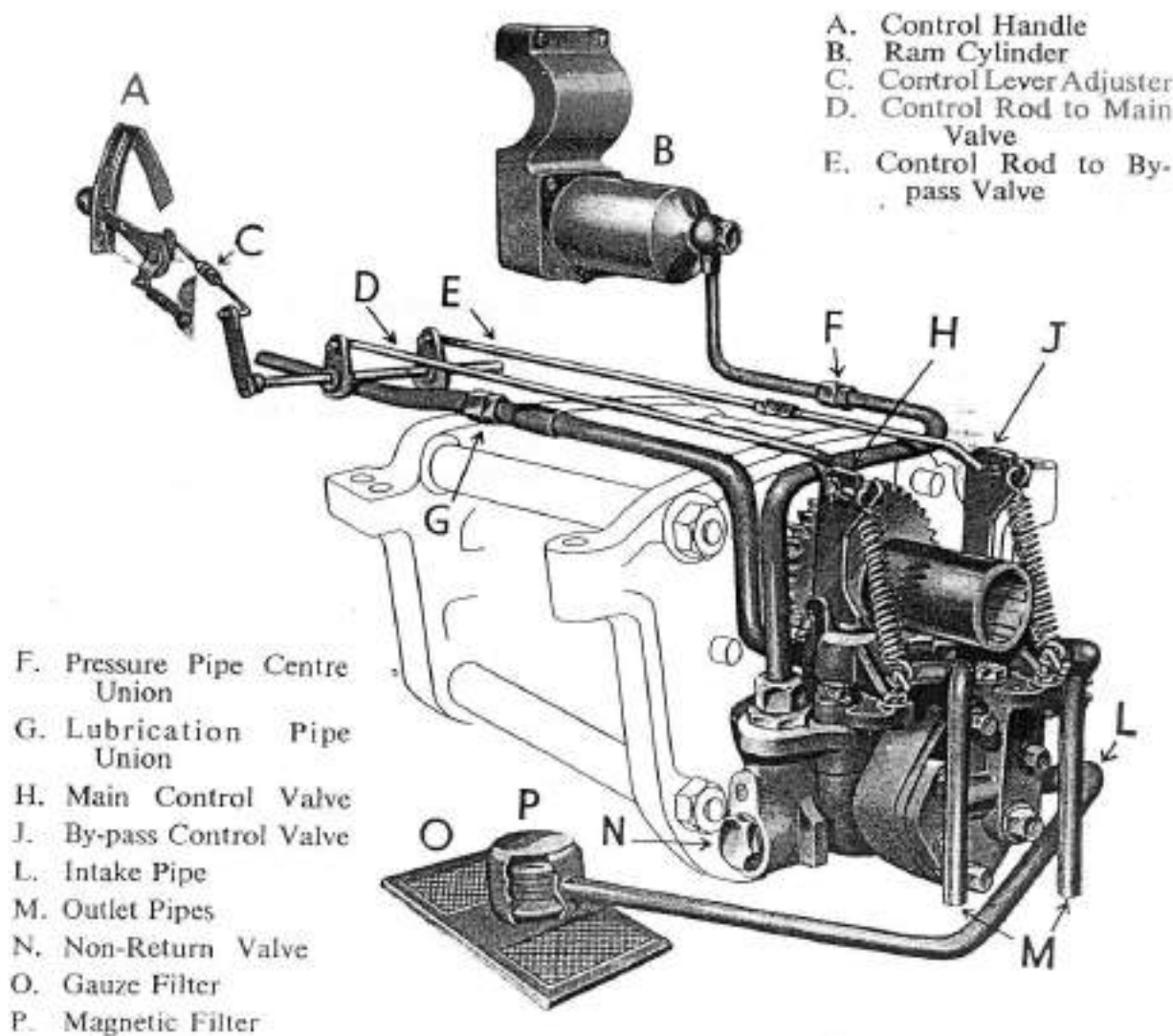
Main control valve adjustment incorrect.

Non-return valve and by-pass valve faulty. By-pass valve requires adjustment. Main control valve linkage requires adjustment.

Incorrect grade of lubricant used
Drain and refill with correct grade of oil.
Piston tight in ram cylinder

FIG. 36

ARRANGEMENT OF THE POWER LIFT



Abridged Specification

David Brown 25D

ENGINE

The David Brown 25D is powered by the AD4/25 series engine unit. Four cylinders, water cooled, direct injection, cold starting. O.H.V. Bore $3\frac{1}{2}$ in. (88.9 mm.). Stroke 4 in. (101.6 mm.). Capacity 154 cu. in. (2,523 c.c.). Governed working speed 1,600 r.p.m. Maximum Governed speed 1,800 r.p.m. Firing order, 1, 2, 4, 3.

BRAKE H.P.

28.2 B.H.P. at 1,600 r.p.m.

31.3 B.H.P. at 1,800 r.p.m.

Pneumatic governor controls engine at all speeds.

Compression Ratio. 15.9 : 1.

STARTING EQUIPMENT

Full decompression is provided enabling the engine to be "freed" quickly with the starting handle.

An excess fuel plunger at the front of the fuel pump supplies extra fuel and is automatically reset.

A 12-volt axial starter motor is fitted.

NOTE.—Provision is also made for the inclusion of an ether starting device for sub-zero starting conditions.

The cylinder block is a single piece casting fitted with four detachable wet sleeve liners of close grained iron. To ensure a gas tight joint the cylinder sleeves are proud of the block face. The camshaft bearings and the main oil galleries are integral with the cylinder block. The combined cylinder head and rocker box is of high duty cast iron and supports the valve gear and decompressor lever mechanism. The fully balanced, Tocco hardened forged steel crankshaft is mounted in three replaceable bearings. The upper halves are steel backed white metal and the lower halves are steel backed copper-lead shells. The big end bearings are replaceable steel backed copper-lead shells and the small end bearings are phosphor bronze. Silicon alloy pistons are fitted with three pressure rings above the gudgeon pin and an oil control ring in the piston skirt. A toroidal type combustion chamber is formed in each piston crown.

C.A.V. FUEL INJECTION EQUIPMENT

Fuel Pump : Type B.P.E. 4A65S. 420/S—6437 E.L.

Atomizer (Injectors) : Type B.K.B.L. 97S/650.

(Set to 175 Atmospheres.)

Atomizer (Nozzle) : Type B.D.L.L. 140S. 6119.

Fuel Lift Pump : Type B.F.P./K22N68

Fuel Filter (Micronic Element) : C.A.V. F2/8, F2/9.

Element : C.A.V. 7111/44, D.B.T. Part Number 62594.

Pneumatic Governor : C.A.V. Type BEP/AMZ 80A127.

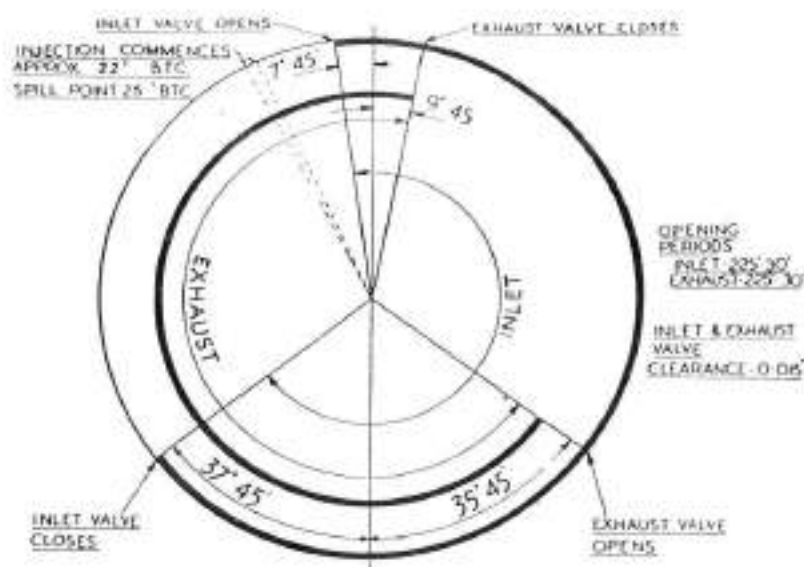


FIG. 37 TIMING DIAGRAM

AIR CLEANER

Burgess Oil Bath. Type O.B.A.—070/18. Capacity oil 2½ pints.

INJECTION TIMING

Spill point marked on flywheel.

VALVE GEAR

Overhead valves, push rod operated.

Valve clearance HOT : Inlet and Exhaust, 0.015 in.

VALVE TIMING

Inlet opens 7° 45' B.T.C. Closes 37° 45' A.B.C.

Exhaust opens 35° 45' B.B.C. Closes 9° 45' A.T.C.

FUEL SYSTEM

Fuel : Gas Oil, PUMP FEED.

Tank Capacity 11½ gallons

COOLING SYSTEM

Radiator, fan and water pump. Directed flow with thermostat and radiator blind control. Temperature gauge on dash panel.

Capacity 3½ gallons.

LUBRICATION SYSTEM

Full flow pressure lubrication to all main, big end and camshaft bearings. Restricted feed to timing gears intermittent restricted feed to O.H. valve gear controlled by engine speed. The system is supplied from a submerged gear type oil pump, controlled by adjustable main pressure relief valve set to operate at 50 lb./sq. in. maximum. A dial type oil pressure gauge is fitted at the dash panel. A replaceable element type oil filter incorporates a low pressure by-pass valve to ensure constant pressure at the element and to prevent overloading.

Engine sump capacity 14 pints, indicated by dipstick level gauge.

ELECTRICAL STARTING AND LIGHTING SYSTEMS

A twelve-volt earth return system is supplied from two (120 amp. hour) heavy duty six-volt batteries wired in series. The belt driven dynamo supplies the charging system through automatic voltage control regulator,

and cut-out. The fuse box is at the side of this unit. The axial type starter motor incorporates a solenoid relay switch and is operated by push button. The universal lighting system includes two head lamps and two side lamps. A rear floodlamp with built in switch and two tail lamps. Agricultural lighting comprises one head and a rear floodlamp. An ammeter is mounted on the dash panel.

ELECTRICAL COMPONENTS

BATTERIES (2)	.. ..	6 volts Lucas M.T.17E or Exide 3K. HV.17L.
DYNAMO	.. ..	12 volts Lucas C.39P.
STARTER MOTOR	.. ..	12 volts C.A.V. CA4512—4.
REGULATOR/CUT OUT	.. ..	12 volts Lucas R.B.107.
AMMETER	.. ..	12 volts C.A.V. B.M.4.
SWITCH	.. ..	12 volts Lucas P.P.G./1.
HEAD LAMPS	.. ..	12 volts C.A.V.1145.
SIDE LAMPS	.. ..	12 volts Lucas 52282.
REFLECTORS	.. ..	Lucas R.E.R.2.
FLOODLAMP	.. ..	12 volts Lucas 1405P.
REAR LAMP	.. ..	12 volts Lucas 529.
REPLACEMENT BULBS	.. ..	Head—Lucas No. 1. Pilot Lucas 207. Tail—Lucas 207.

CLUTCH

Borg and Beck single dry plate, Type 10 A6G.
Carbon type thrust pad.

GEARBOX AND DIFFERENTIAL

Assembled as a unit and connected to clutch shaft by splined sleeve. Shafts supported on ball bearings.

Standard equipment: 6 speeds forward, 2 reverse; comprising 3 forward and 1 reverse speeds with supplementary High and Low gears operating on all speeds. All gears sliding type.

ROAD SPEEDS (6-speed Gearbox) 10×28 Pneumatic Tyres.

	Engine	1,600 r.p.m.	1,800 r.p.m.
1st (1 low)	1.46 m.p.h.	1.64 m.p.h.
2nd (2 low)	2.70 "	3.04 "
3rd (1 high)	3.59 "	4.04 "
4th (3 low)	5.36 "	6.02 "
5th (2 high)	6.66 "	7.49 "
6th (3 High)	13.20 "	14.80 "
Reverse Low	2.35 "	2.64 "
Reverse High	5.78 "	6.51 "

ROAD SPEEDS (11×28 Pneumatic Tyres.)

	Engine	1,600 r.p.m.	1,800 r.p.m.
1st Range 1.L. Ratio 140.9	1.53 m.p.h.	1.73 m.p.h.
2nd " 2.L. " 75.9	2.84 "	3.20 "
3rd " 1.H. " 57.2	3.77 "	4.25 "
4th " 3.L. " 38.3	5.64 "	6.34 "
5th " 2.H. " 30.8	7.00 "	7.83 "
6th " 3.H. " 15.5	13.9 "	15.6 "
H. Reverse " 35.5	6.08 "	6.84 "
L. Reverse " 87.5	2.46 "	2.78 "

REAR AXLE AND FINAL DRIVE

Offset rear axle casing surrounds the differential and supports at its outer ends, spur gear reduction units, ratio 3.7 : 1, the drive shafts to these units being spline-coupled to the differential bevel wheels. Hubs, integral with final drive shafts. Oil capacity of reduction units 2 pints each. Totally enclosed internal expanding brakes are fitted to each drive shaft of the reduction units, both independently operated by foot pedals. Pull up type parking brake applies both brakes when interlocked.

FRAME (Two piece main-frame)

Designed to comprise engine and transmission casings and to carry radiator and provide front axle fixing. Top face is ground to take engine, clutch cover, gearbox and gearbox cover, while rear end is machined to take rear axle casing.

FRONT AXLE AND STEERING

Square construction, offset pivot fixing. King pins integral with stub axles, inserted from below pivot eyes. Bronze bushes at centre pivots and king pins. Front hubs supported on Timken taper roller bearings. Steering arms fitted to upper portions of king pins by serrations and clamp bolts. Track and side steering rods tubular and fitted with self-adjusting ball joints. Steering unit of screw and nut type with column floating on double self-aligning bearing under steering wheel. Drop arm serrated to rocker shaft carried in bronze bushes. Steering wheel, 16 in. diameter.

PNEUMATIC EQUIPMENT

Pneumatics : Front 4.50 x 19 ; Rear 10 x 28

Oversize 11 x 28 rear, 6.00 x 19 front.

Tyre pressures—Front—all conditions	..	..	..	28 lb. sq. in.
Rear—field work	..	..	..	12 lb. sq. in.
Rear—road work	..	..	..	18 lb. sq. in.

Rear wheel track adjustable from 48 in. to 68 in.

Front ,, ,, ,, ,, 48 in. to 62 in.

STEEL WHEEL EQUIPMENT (OPTIONAL)

Front 5 in. wide, 26 in. diameter with fin.

Rear 10 in. wide, 42 in. diameter, fitted with 20.5 in. spuds.

Row crop rear wheel 2 in. wide, 44 in. diameter fitted with 2 position spuds. Ridge riding front wheels. Front and rear wheel weights.

DRAWBARS

U177 Swivel type universal drawbar, three positions for height adjustment. Detachable.

U50C Square frame type adjustable drawbar attached to three point linkage. Movable drawplate provides lateral adjustment.

POWER LIFT

Incorporated in transmission unit. Hydraulically operated by gear type pump and provided with overload release valve. Magnetic and gauze filters at pump inlet. Maximum effort at end of links ; 1,300 lb. Controlled by lever from driver's seat.

POWER LIFT LINKAGE

Incorporates levelling levers and adjustable top link. Lift arms can be locked in high or low positions. Overload clutch release top link optional.

POWER TAKE-OFF AND PULLEY (2-SPEED) U5D

Bolted to rear axle and driven direct from gearbox input shaft. Three position hand lever control giving low speed, neutral and high speed. P.T.O. Shaft $1\frac{3}{8}$ in. diameter, 6 spline (SAE 6B). Pulley $8\frac{1}{2}$ in. diameter, $5\frac{3}{4}$ in. wide. Oil level automatically maintained as with P.T.O. unit.

P.T.O. SHAFT SPEEDS and BELT PULLEY SPEEDS (U5F)

	P.T.O. SHAFT		PULLEY	BELT SPEED
<i>Engine, 1,600 r.p.m.</i>	R.P.M.		R.P.M.	FT. PER MIN.
Low speed	545	1,120	2,490	
High speed	885	1,820	4,040	
<i>Engine, 1,800 r.p.m.</i>				
Low speed	612	1,260	2,880	
High speed	995	2,050	4,550	

TRACTOR DIMENSIONS

Overall length	113 in.
Wheelbase	74 $\frac{1}{8}$ in.
Width	58 $\frac{3}{4}$ in. (minimum)
Height	54 in.
Turning radius (right hand) ..	11 ft. 2 in. (unaided)
Turning radius (left hand) ..	12 ft. 0 in. (")
Ground clearance	15 $\frac{1}{2}$ in.
Total Weight	30 cwts.
Optional Equipment—	
Auxiliary tool kit	U.49
Overload release attachment ..	U.37 C.
Rear wheel weights	U.31 C.
Front wheel weights	U.32 C.
Downswept exhaust	U.92 D.
Foot throttle control	U.150

Abridged Specification

David Brown 30D

The construction of the CAD4/3 engine unit is identical to the AD4/25 engine unit fitted to the DAVID BROWN 25D ; the fitting of the CAD4/3 increased capacity engine unit to the DAVID BROWN 30D enables larger super traction tyres to be fitted and increased drawbar effort to be obtained. The construction of the DAVID BROWN 30D agricultural tractor is similar to the DAVID BROWN 25D agricultural tractor and alternative types of drawbar are supplied.

- A. Adjustable (two-piece drawbar).
- B. Universal drawbar.

NOTE.—To compensate the larger tyres fitted to the DAVID BROWN 30D series tractors lower hitch points should be used.

ENGINE

The David Brown 30D is powered by the CAD4/3 series engine unit. Four cylinders, water cooled, direct injection, cold starting, O.H.V. Bore $3\frac{5}{8}$ ins. (92.1 m.m.). Stroke 4 ins. (101.6 m.m.). Capacity 165 cu. ins. (2,705 c.c.). Governed working speed 1,600 r.p.m. Maximum Governed speed 1,800 r.p.m. Firing order, 1, 2, 4, 3.

BRAKE H.P.

31 B.H.P. at 1,600 r.p.m.

34 B.H.P. at 1,800 r.p.m.

Pneumatic governor controls engine at all speeds.

Compression Ratio. 15.9:1.

STARTING EQUIPMENT

Full decompression is provided enabling the engine to be "freed" quickly with the starting handle.

An excess fuel plunger at the front of the fuel pump supplies extra fuel and is automatically reset.

A 12-volt axial starter motor is fitted.

NOTE.—Provision is also made for the inclusion of an ether starting device for sub-zero starting conditions.

GEARBOX AND DIFFERENTIAL

Standard equipment : 6 speeds forward, 2 reverse ; comprising 3 forward and 1 reverse speeds with supplementary High and Low gears operating on all speeds. All gears sliding type.

Final Drive. Spur gear reduction ratio—4.11:1.

ROAD SPEEDS (6-SPEED)

11-28 Pneumatic Tyres.

		Engine	1,600 r.p.m.	1,800 r.p.m.
1st Range	1.L.	.. ..	1.38 m.p.h.	1.56 m.p.h.
2nd	2.L.	.. ..	2.56 "	2.88 "
3rd	1.H.	.. ..	3.39 "	3.83 "
4th	3.L.	.. ..	5.08 "	5.71 "
5th	2.H.	.. ..	6.30 "	7.05 "
6th	3.H.	.. ..	12.5 "	14.0 "
H. Reverse		.. ..	5.47 "	6.16 "
L. Reverse		.. ..	2.21 "	2.50 "

ROAD SPEEDS (6-SPEED) Reductions 4:1 : 1.

11.25 x 28 Pneumatic Tyres.

		Engine	1,600 r.p.m.	1,800 r.p.m.
1st Range	1.L.	.. ..	1.42 m.p.h.	1.59 m.p.h.
2nd	2.L.	.. ..	2.64 "	2.97 "
3rd	1.H.	.. ..	3.50 "	3.94 "
4th	3.L.	.. ..	5.24 "	5.89 "
5th	2.H.	.. ..	6.50 "	7.32 "
6th	3.H.	.. ..	12.9 "	14.5 "
H. Reverse		.. ..	5.64 "	6.35 "
L. Reverse		.. ..	2.29 "	2.58 "

PNEUMATIC EQUIPMENT

Pneumatics : Front 6.00 x 19 ; Rear 11.00 x 28.

Oversize 11.25 x 28 or 13.00 x 28.

Tyre pressures—Front—all conditions	.. ..	28 lb. sq. in.
Rear—field work	.. ..	12 lb. sq. in.
Rear—road work	.. ..	18 lb. sq. in.

Rear wheel track adjustable from 52 in. to 67½ in.

Front " " " " 49¼ in. to 62½ in.

STEEL WHEEL EQUIPMENT (OPTIONAL)

Front 5 in. wide, 26 in. diameter with fin.

Rear 10 in. wide, 42 in. diameter, fitted with 20.5 in. spuds.

Row crop rear wheel 2 in. wide, 44 in. diameter fitted with 2-position spuds. Ridge riding front wheels. Front and rear wheel weights.

DRAWPLATE

Of fabricated construction, 3 lateral positions, fixed height 15¼ in.

ADJUSTABLE DRAWBAR U50C

Detachable drawbar, height adjustable from 10¼ to 17¾ in.

UNIVERSAL DRAWBAR UI77

Detachable from mounting bracket, swivels to seven positions, height adjustable in three positions.

POWER LIFT

Incorporated in transmission unit. Hydraulically operated by gear type pump and provided with overload release valve. Magnetic and gauze filters at pump inlet. Maximum effort at lift arms ; 1,300 lb. Controlled by lever from driver's seat.

POWER LIFT LINKAGE

Incorporates levelling lever and adjustable top link. Lift arms can be locked in high or low position. Overload clutch release top link optional.

TWO SPEED P.T.O. UNIT U5E OR TWO SPEED COMBINED P.T.O. AND BELT PULLEY UNIT U5D

Bolted to rear axle and driven direct from engine. Three-position hand lever control giving low speed, neutral and high speed. P.T.O. Shaft $1\frac{3}{8}$ in. diameter, 6 spline (SAE 6B). Pulley $8\frac{1}{2}$ in. diameter, $5\frac{3}{4}$ in. wide. Oil level automatically maintained as with P.T.O. unit.

BELT PULLEY SPEEDS (U5D)

		Pulley Speed	Belt Speed
<i>Engine 1,600 r.p.m.</i>			
Low speed	.. ..	1,120 r.p.m.	2,490 ft. per min.
High Speed	.. ..	1,820 "	4,040 ft. "
<i>Engine 1,800 r.p.m.</i>			
Low speed	.. ..	1,275 "	2,880 ft. "
High speed	.. ..	2,050 "	4,550 ft. "

P.T.O. SHAFT SPEEDS

		<i>Engine 1,600 r.p.m.</i>	<i>Engine 1,800 r.p.m.</i>
Low speed	.. ..	545 r.p.m.	612 r.p.m.
High speed	.. ..	885 "	995 "

TRACTOR DIMENSIONS

Overall length..	.. ..	115 $\frac{3}{8}$ in.
Wheelbase ..	.. ..	74 $\frac{5}{8}$ in.
Width ..	.. ..	63 $\frac{3}{4}$ in. (minimum)
Height ..	.. ..	55 $\frac{1}{4}$ in.
Turning radius (right hand)..		11 ft. 2 in. (unaided)
Turning radius (left hand) ..		12 ft. 0 in. (unaided)
Ground clearance ..	.. ..	16 in.
Total Weight ..	.. ..	34 $\frac{1}{2}$ cwts.
Optional Equipment—		
Auxiliary tool kit ..	.. ..	U.49
Overload release attachment		U.37 G.
Rear wheel weights	U.31 C.
Front wheel weights	U.32 C.

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**DISTRIBUTOR TYPE
INJECTION PUMP**

**STARTING, VENTING, AND
FILTER CHANGE
INSTRUCTIONS**

DAVID BROWN INDUSTRIES LIMITED

STARTING FROM COLD

The starting procedure is similar to that given previously, but the following points should be observed.

- (1) No excess fuel device is required. Starting is made easy by retarding the injection and this is done automatically within the pump each time the engine stops.
- (2) Open the throttle wide. (As soon as the engine fires it should be closed to give an engine speed of about 1,000 R.P.M., for warming up).
- (3) Ensure that the fuel cut-off lever has been returned to the "run" position, i.e., fully forward.
- (4) In cold weather with temperatures below 37°F. (3°C.) it is essential before the first start to turn the engine with the starter for 10 seconds with the decompressor lifted.

VENTING THE FUEL SYSTEM

(This supersedes the system shown in the Instruction Book)

It is essential that any air trapped in the system be cleared. If difficulty in starting is experienced, or if any of the fuel system has been disturbed, vent the system in the following way repeating two or three times if necessary to ensure good starting.

- (1) Fill the tank with a minimum of 2 gallons (9 litres) of fuel. It may be necessary to bleed at least $\frac{1}{2}$ gallon (2.3 litres) through the system to ensure air free fuel, especially after a filter change.
- (2) Ensure that the fuel tap is on and check the glass bowl and all fuel joints for leaks.
- (3) Refer to figure 1. Clean the outside of the filters and remove plug D. Operate the lift pump priming lever until No. 2 filter is full of fuel, then replace and tighten plug D.
- (4) Slacken plug A and prime until all air is expelled from the dirty side of No. 1 filter, then tighten plug A. Slacken plug B, taking care not to loosen nut K, then prime until the clean side of the filter is free from air; tighten plug B.
- (5) Slacken plug D again and prime until all air is expelled from the dirty side of No. 2 filter, then tighten plug D. Slacken banjo bolt C, taking care not to disturb nut L, then prime until the clean side of the filter is free from air; tighten bolt C.
- (6) Slacken plug E on the injection pump, prime until all air is expelled, then tighten E. Repeat this operation with plug F.
- (7) Slacken connection G and prime until free from air, then retighten.
- (8) Slacken Nos. 1 and 2 high pressure pipes at the nozzle end H and J, then with the fuel cut-off lever in the "run" position and the throttle fully open, operate the starter *with the engine decompressed*, until fuel is ejected. Tighten the pipe connections and, with the decompressor lever disengaged, press the starter button, ensuring that the isolator switch is on. The engine should now start. Run for a few minutes and check all joints for leaks. Dry off all fuel from joints and observe whilst the engine is running.

