

LACY-HULBERT WINCH, TRAILER TYPE

1. **General.**—The Lacy-Hulbert trailer-type winch consists of an industrial-type petrol engine suitably geared to two horizontal capstans, the whole being mounted on a four-wheeled pneumatic-tyred chassis capable of being trailed behind a motor vehicle. Fig. 1 shows the winch on tow behind a motor vehicle, and Figs. 2 and 3 give views of the winch with canopies raised, showing the mechanism and controls. A line-drawing showing engine details is given in Fig. 4.

2. The engine

(a) is a twin-cylinder four-stroke water-cooled

4. *The epicyclic gear* is embodied in an annular metal casing provided with brake shoes, which may be adjusted to bear on the periphery of the casing and to arrest its rotation, so communicating the drive to the spur gearing and capstans. The arrangement thus constitutes a clutch by means of which the capstans may, at will, be connected to or disconnected from the engine. By a suitable setting of the clutch, the gear may be adjusted to slip at any prearranged load, thus providing a precaution against overload of the winch or damage to the cable. In addition, the speed of the capstans may

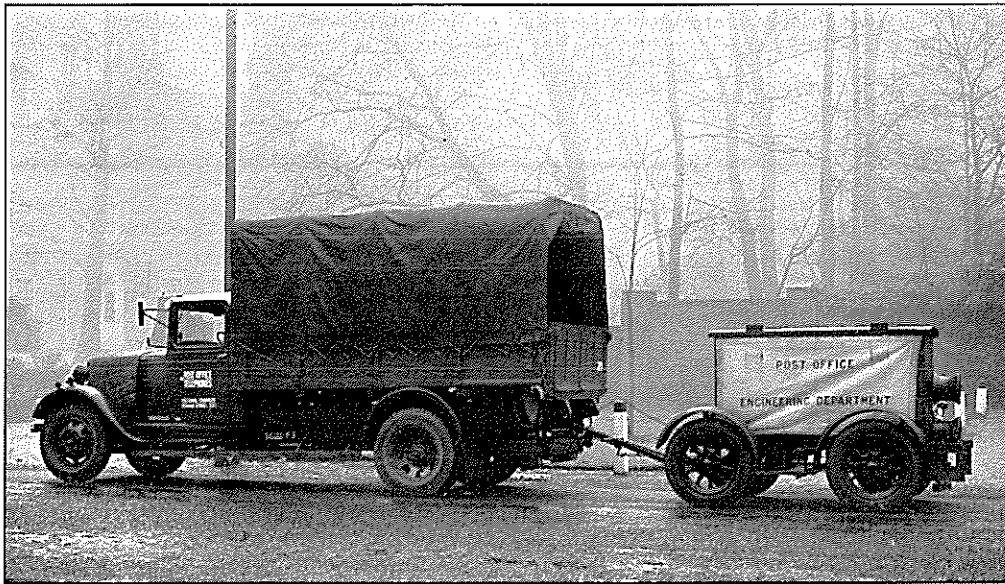


FIG. 1.—LACY-HULBERT WINCH—TRAILER TYPE (ON TOW)

petrol engine with side valves and develops $7\frac{1}{2}$ B.H.P. at 900 r.p.m., which is the normal speed of operation

(b) ignition is by magneto

(c) cooling by radiator and fan

(d) a centrifugal governor is fitted, which operates on the throttle and controls the quantity of mixture admitted to the cylinders.

3. **The drive** is communicated through a flexible coupling, an epicyclic reduction gear and double reduction spur-gearing as shown in Fig. 2.

be reduced independently of the engine speed when, for example, a cable is required to be positioned in a manhole for jointing. The lower capstan is driven from the final spur-wheel, and the upper capstan from the intermediate spur-wheel.

5. **Hauling capacity and rope speeds.**—The upper capstan provides a continuous pull of $\frac{1}{2}$ ton at a rope speed of 93 ft./min., and a maximum pull of approximately $\frac{3}{4}$ ton. The lower capstan provides a continuous pull of 2 tons at 25 ft./min. and exerts a maximum pull of approximately $2\frac{1}{2}$ tons.

6. Assembly.—The complete assembly is mounted on a four-wheeled trailer-type chassis fitted with an over-run brake mechanism and parking brake operating brake shoes on the rear wheels. Suspension is by leaf springs and artillery-type wheels, with pneumatic tyres. Screw jacks are provided to relieve the springs and wheels of stress when the winch is in use. A steel canopy with canvas side-sheets serves as protection, and all tools are housed in a tool box secured by padlock.

7. Lighting.—The winch carries a tail lamp, connected by a flexible cable terminating in a bayonet connector. The bayonet connector is inserted in a lamp-holder fitting, mounted under the rear of the towing vehicle.

8. Weight.—The weight of the complete winch with full equipment is approximately 30 cwt.

9. Fuel consumption and cost of operation.—The table below gives the petrol consumption and cost of operation of the winch.

Petrol consumption (a)	Standing costs (b)	Running costs (c)
7 pts. per hour	£34 per annum	1/5 per hour

The petrol tank has a capacity of 4 gallons and will, therefore, when filled, provide for about 4½ hours running. The standing costs in column (b) include depreciation, interest on capital, and standing maintenance. The running costs in column (c)

include fuel and running maintenance but exclude labour. The costs in column (b) and (c) are exclusive of indirect charges.

10. Equipment.—The following tools and accessories are supplied with the winch:—

- 1 5/8 in. × 3/4 in. double-ended spanner
- 1 3/8 in. × 5/8 in. " "
- 1 1/8 in. × 1/2 in. " "
- 1 1/16 in. × 3/8 in. " "
- 1 3/16 in. × 1/4 in. " "
- 1 Spanner for magneto contact-breaker
- 1 Box spanner with tommy-bar, for sparking plug
- 1 1/4 in. Box spanner with tommy-bar
- 4 Lifting hooks for engine
- 1 Oil can
- 1 Screwdriver
- 1 Tommy-bar for jacks
- 1 Tecalemit grease gun
- 1 Petrol funnel (with filter)
- 1 Water funnel (without filter)
- 1 Starting handle
- 1 Tyre pump
- 1 Tyre lever
- 4 Padlocks and 8 keys
- 2 Tool Box keys
- 1 Jack with lever and handle
- 1 Wheel brace
- 3 Spare rear lamp glasses
- 1 Puncture repair outfit

OPERATING INSTRUCTIONS

11. Engine fuel.—Petrol No. 3 and "Oil, Cylinder Lorry" only should be used and obtained as directed by the Sec. Engr.

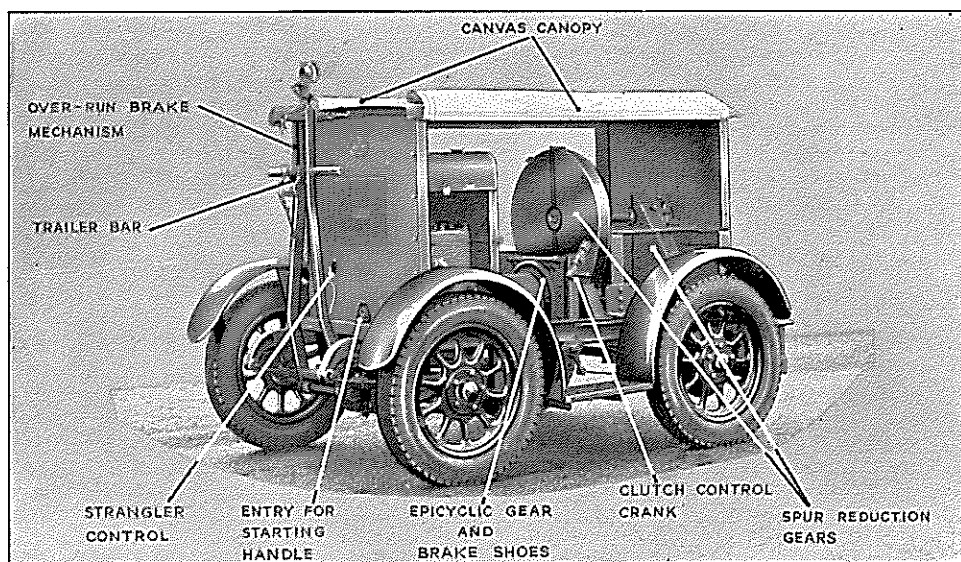


FIG. 2.—LACY-HULBERT WINCH—TRAILER TYPE (FRONT VIEW)

12. *Before starting the engine* (See Fig. 4.)

(a) Verify that the oil level in the sump is up to the notch on the dipstick. If necessary, pour in additional oil through the oil filler.

(b) Verify that the level of the water in the radiator is within about $\frac{1}{2}$ in. of the filler opening. If more water is required, fill up whenever possible with soft water, using the funnel without the filter.

(c) Ensure that sufficient petrol is in the tank

(d) Turn on the petrol tap under the fuel tank.

(f) Set the governor throttle-control handle (Fig. 3) to the START position, i.e. when the red mark on the hand wheel points to "Start."

(g) Release the brake on the epicyclic-gear box by operating the clutch control crank (Fig. 2), i.e.

14. *To stop the engine*, turn off the petrol tap and, when the engine has stopped, switch off the magneto. The magneto switch should not be used for stopping the engine except in the case of an emergency, as subsequent starting will be found difficult.

15. *Difficulties in starting*.—If the engine fails to start when the above instructions have been carried out, the following should be tried in the order stated:—

(a) Examine the cables from the magneto to the sparking plug for defects in the insulation.

(b) Remove the sparking plugs. Check the gap width, by the gauge on the plug spanner ($\frac{1}{2}$ mm.). Test for a spark, by cranking the engine sharply while holding the outside of the plug in contact with some bare part of the engine casing. If a

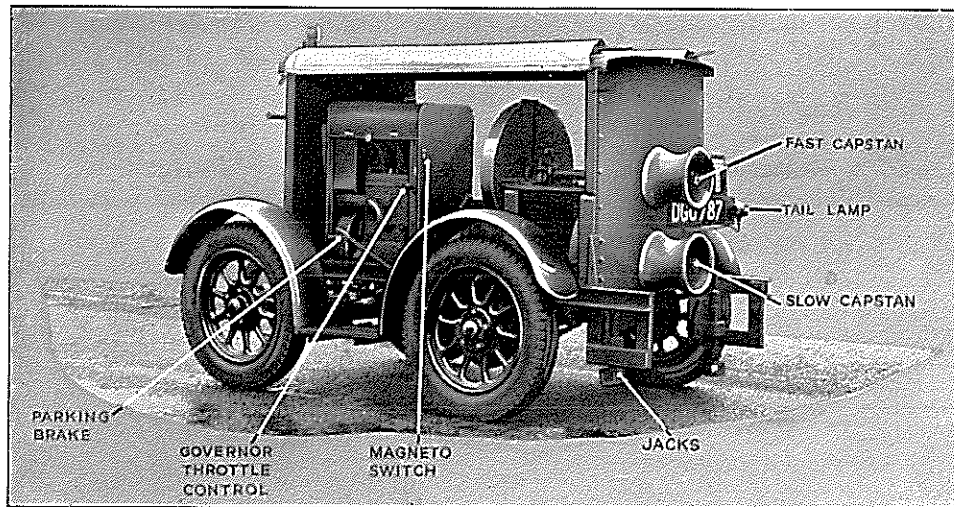


FIG. 3.—LACY-HULBERT WINCH—TRAILER TYPE (REAR VIEW)

by rotating the clutch control in a counter-clockwise direction to release the brake-shoes from the epicyclic-gear case.

13. *To start the engine*.

(a) Close the air-choke strangler, engage the starting handle, and turn the engine over a few times slowly

(b) Turn on the magneto switch

(c) Pull the starting handle up sharply against the engine compression, when the engine should start. If it does not, proceed as indicated in para. 15

(d) Open the air-choke fully as soon as possible after the engine has started, only closing it momentarily if the engine falters during starting. The air-choke *must always be open* when the engine is running normally.

spark is not produced, repeat the test with a plug known to be in order. If still a spark is not produced, the fault probably lies in the magneto. The gap between the contact-breaker points should be checked by the gauge on the magneto spanner, and adjusted if necessary. Ensure that the lock-nut on the long contact screw is tight after adjustment.

(c) Verify that the petrol flow is free, by momentarily unscrewing the petrol pipe at its union.

(d) Leaks at the induction-pipe joints or at the cylinder-head gaskets will cause a weak mixture and difficult starting. Tighten all nuts on the cylinder head and on the induction-pipe joints.

(e) The carburetter jets may be blocked. Dismantle the carburetter and clean the jets.

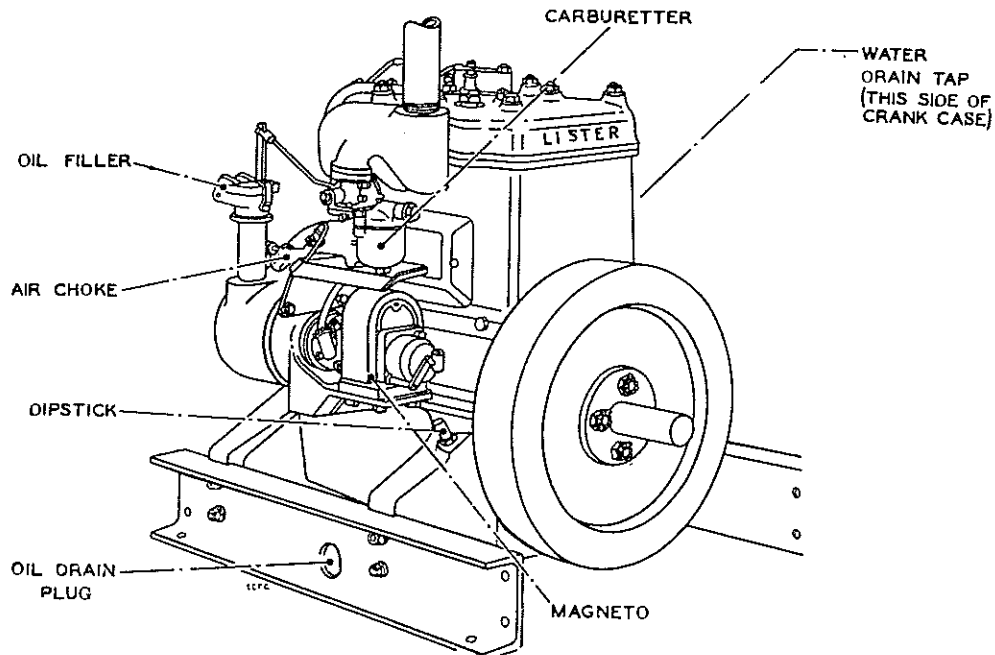


FIG. 4.—ENGINE DETAILS

16. **Winch gear.**—It is essential that one man who is known to be fully conversant with the working of the winch be instructed to guard the winch continuously during operation. In addition, the POSITION AND FUNCTION OF THE MAGNETO SWITCH (see Fig. 3) MUST BE CLEARLY POINTED OUT TO EVERY MEMBER OF THE GANG, so that any one of them may be able to stop the winch in an emergency by switching off the ignition. Care should be taken, at all times, to ensure that no part of the man's clothing comes into contact with the revolving capstans, as serious injury may result.

17. *Before the winch is brought into action,*

(a) the parking brake must be on

(b) the jacks must be lowered so that the chassis springs are relieved of stress

(c) if it is necessary to operate the winch over a surface such as flagstones or loose gravel which may be damaged by the thrust of the jacks, boards should be placed under the feet of the jacks so as to distribute the weight over a larger area.

18. **The epicyclic gear and brake shoes** serve as a clutch. When the brake shoes are released from the epicyclic-gear casing, the engine is disconnected from the capstans; when the brake-shoes are adjusted to bear on the casing, the engine power is transmitted to the capstans.

19. When hauling a cable, the clutch should be applied until the required pull on the cable is obtained and then adjusted to give slip just beyond this tension.

By this means the cable will be protected from undue strain arising from any obstruction encountered in the pipe-line.

20. The clutch should never be tightened more than is necessary to give the required pull, AND SHOULD NOT IN ANY CIRCUMSTANCES BE SCREWED FULLY TIGHT. During operation, the clutch should always be locked in any setting, by tightening the lock-nuts on the clutch shaft.

21. **Vehicles to be used for towing.**—Only vehicles of 30 cwt. capacity or over, and provided with the towing hitch, may be used for towing the winch. Further, in hilly districts, it may be necessary to restrict the load carried by the vehicle. It is impracticable to fix load limits for the various gradients which may be encountered, and the decision as to the proper maximum load that may be carried on the vehicle when towing the winch should be based on local knowledge of the route and the condition of the towing vehicle.

22. *When on tow:—*

(a) the jacks must be screwed right up by means of the tommy-bar provided, and not by hand

(b) the conditions of use of trailers given in Vehicles, F 1011 should be carefully observed.

23. *When parked,* ensure that the parking brake is on, the petrol turned off, the ignition switched off, and the draw-bar up. All tools, including the starting handle, should be locked in the tool box. The engine housing must be locked, and the canopy side sheets dropped and locked.

MAINTENANCE

24. General.—The following paragraphs detail the periodic attention (including minor repairs and lubrication) to be given by the workman in charge of the winch, or by the workman nominated for this duty in accordance with A 1020.

25. Daily (when the winch is in use).

[NOTE.—When the winch is out of service these operations should be performed weekly.]

(a) Check the engine oil-level (see par. 12 (a))

(b) Check the water level in the radiator (see par. 12 (b))

(c) Ensure that sparking-plug leads are securely connected to the magneto and sparking plugs

(d) Inspect the chassis brakes for security, adjustment and connexions. Adjust, if necessary, and tighten all locking nuts

(e) Inspect the tail lamp and wiring

(f) Give one turn to the two greasers for the reduction-gear cases

(g) Give one turn each to the four greasers on the main winding-shaft and lay shaft bearings

(h) Check the tyre pressures, which should be maintained at:—

32 lb. per sq. in. for rear tyres

24 lb. per sq. in. for front tyres.

Distribution :—96, 97, 127, 128

26. Weekly.—*Lubrication.*—It is of the utmost importance that the lubrication be carried out thoroughly and regularly.

(a) The following points should be greased by the Tecalemit grease-gun provided:—

	<i>No. of nipples</i>
(i) Brake-arm bracket—near side and off side	2
(ii) Brake arm	1
(iii) Stub axle—near side and off side ...	4
(iv) Track rod	2
(v) Steering lever	1
(vi) Trailing bar	3
(vii) Road springs (3 nipples per spring) ...	12

(b) The stauffers stated below must be packed with graphite grease when empty:—

(i) on the top of each reduction-gear case

(ii) on each of the four main winding-shafts.

27. Monthly.

(a) Thoroughly clean all sparking-plugs, and adjust the gaps, using the gauge provided.

(b) Clean the carburettor jet, the float chamber, and the tubular filter embodied in the supply pipe.

(c) Examine and tighten all nuts and bolts.

(d) Remove the plug on the epicyclic-gear case and add, by means of the oil can, one eighth of a pint of gear oil.

(e) Lubricate the magneto cam and the contact-breaker pivot with a trace of thin oil.

28. Three-monthly.

(a) Drain the engine sump of oil (when hot), and replenish with new oil up to the notch on the dipstick.

(b) Coat the four road-springs with the old engine-oil.

(c) Smear a little old engine-oil on the jack threads.

(d) Remove and clean the filter incorporated in the feed pipe to the carburetter.

29. Six-monthly.—Remove the road wheels in turn and grease the four wheel hubs.

30. Annually.—Remove the sump and swirl it out with paraffin, taking care to clean the oil strainer. Before replacing the sump, ensure that all traces of paraffin and grit are removed.

31. Water in petrol tank.—Care should always be taken to prevent water entering the petrol tank. If the presence of water is suspected, it is advisable to remove the tank and drain off, lest rusting should occur.

References :—A 1020
(Cn1) Vehicles, F 1011

32. Frosty weather.—Before the winch is left for the night in frosty weather, the water should be drained from the radiator and cylinder jackets, unless the winch is stored on heated premises.

★**33. Dynamometers.**—A limited number of trailer motor winches have been supplied with direct reading dynamometers. Two dials are provided, for the high- and low-speed hollards respectively, and are calibrated for 1½, 2, 3 and 4 in. ropes. The dynamometer dials are operated by means of oil-filled pipes fed from a bellows that is mounted between the epicyclic reduction-gear housing and the framework in such a way that the bellows is compressed as the load on the winch is applied. If it becomes necessary to remove the dynamometers during maintenance work on the winch, the dynamometer system should be removed as a complete harness and *the separation of the components should not be attempted.* The complete harness should be returned to the manufacturers for repair if the dynamometers become defective.

★**34.** Dynamometers are provided on trailer motor winches with Serial Nos. TMW 58 to TMW 92 inclusive (Trailer Nos. T 9502 to 9536).

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