

"ALCO"  
PORTABLE STEAM  
GENERATING SET  
MHC GAUSDAL

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ARTHUR LYON & Co. Engineers Ltd

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**"ALCO"**  
**PORTABLE STEAM**  
**GENERATING SET**

"FIREFLY" MODEL  
MHC GAUSDAL

**Description**  
and  
**Working Instructions**

Price 5/-

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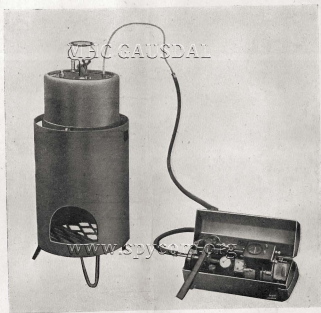
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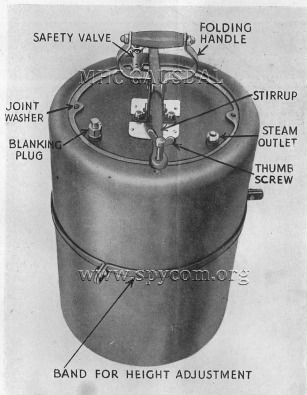
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- Page 4. Para. (2) (d). The oil can is supplied empty.  
Mobiloil A oil should be used.
- Page 13. Para. (c). (see Figure 3, page 8), should read  
(see Figure 3, page 14).

**"ALCO"**  
**PORTABLE STEAM GENERATING SET**  
**"Firefly" Model**

This equipment, weighing 90 lbs., gives an output of 20/40 watts for 6 volt battery charging, and occupies a total space 14" diameter x 18" high. It is designed to be carried in a standard parachute container.

MHC GAUSDAL  
**DETAILS OF EQUIPMENT**

- (1) **STEAM GENERATING SET**, consisting of twin-cylinder engine, direct-coupled to standard wireless service generator, nominally rated at 6/8 volts 4 amps., type CMKL. Set mounted in protective hinged box, fittings include centre zero 10-0-10 ammeter, pressure gauge, and 9' length rubber exhaust pipe.

Dimensions : 15" x 7½" x 5½".

Weight (this item only) : 30 lbs.

- (2) **POT BOILER**, with large aperture oval-flanged lid, making a joint on the inside of the boiler top. This joint is held in position by a bridge piece, with single captive thumb-screw. To fill or empty the boiler, the bridge piece is removed and with a half-turn the lid can be withdrawn from the inside of the boiler.

For transport purposes, the boiler is packed internally with the whole of the equipment, as follows :

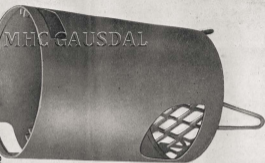
- (a) Box containing steam generating set (as described in paragraph (1), above).
- (b) Duplicate 4' length of copper steam tubing, with union attachment for boiler fitting.
- (c) Duplicate 6' length of rubber steam hose.
- (d) Can of lubricating oil.
- (e) Spares and tools, as follows :

Spares : 4 spare boiler joints.  
2 spare dynamo brushes.  
1 set nuts and screws.  
1 set paper and fibre washers.

Tools : 1 screwdriver.

1 pair of pliers.  
1 small oil can.

LUGS TO RECEIVE PROJECTIONS  
ON BOILER HEIGHT  
ADJUSTING BAND



HEIGHT  
ADJUSTING  
BAND

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## POT BOILER—continued

The boiler itself, nesting within the furnace cylinder, is withdrawn from the latter and suspended in its working position on a tripod-fitting mounted on the inside of the furnace. The height at which the boiler is suspended to give clearance for fire space above the fire-bars is determined by a clipped adjustable band on the outside of the boiler.

The boiler is designed for a working pressure of 45 lbs. per sq. in. (at which the safety valve is permanently set). It is tested to 100 lbs. per sq. in.

Water consumption: Approximately 1 gallon per hour. (So that if filled initially with  $2\frac{1}{2}$  gallons of water, the boiler will operate for  $2\frac{1}{2}$  hours, when driving a single set.

Boiler is tinned inside and out against corrosion.

The boiler flanged lid is fitted with two steam-delivery outlets, to which are attached the union nuts of the 4' length copper steam pipe.

Note: This enables two engine sets to be run, simultaneously, from the one boiler, if so desired.

A safety-valve, pre-set to blow off at 45 lbs. per sq. in. pressure, is also fitted.

For packing, the non-conducting handle of the lid folds back, and the lid is inverted, with a clip-band to retain same in position on the boiler shell, all projections of fittings being inside the boiler.

Weight of boiler, complete with lid and fittings and all spares: 35 lbs.

**FURNACE.** This consists of an outside cylinder, with tripod feet to fold outwards, thus allowing of ground clearance under the fire-bars.

A firing aperture is arranged in the lower part of the furnace, i.e. just above the fire-bars, for the admission of brushwood or other bulky fuel. (The tripod feet of the furnace fold back behind the aperture, when packed.)

As there is an annular space between the boiler and the furnace, wood stick fuel can also be fed in from the top.

Two hand-holes are provided at the upper end for carrying purposes.

Weight of furnace and 2 spare fire-bars: 25 lbs.

## WORKING INSTRUCTIONS

1. Fill the Boiler to  $\frac{3}{4}$  full with clean water if available. If very muddy, allow to settle in bucket before filling. Fix lid by means of stirrup (as detailed separately) and light fire. Connect up hose. In order to do this it will be necessary to :

2. Open crankcase breather.

While steam is being raised remove oil sump cap and if necessary add oil until level pin is covered (the level pin will be found at the base of the oil filler tube standing up from the base of the sump. (See Figure 1.) ~~Replace cap. Put a drop of oil on each end of overhead valve rod.~~

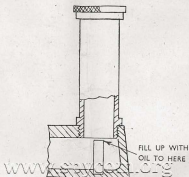


Fig. 1.

3. See that steam valve is closed (turned to right—clockwise) and cylinder cocks open (turned to left—anti-clockwise). Drain cock on steam inlet Manifold open.

4. When water ceases to flow from cock and steam emerges, close the cock.

5. When steam pressure reaches red line on gauge—30 lbs.—open steam valve by turning  $\frac{1}{4}$  turn, left hand—or anti-clockwise—and turn flywheel by hand clockwise, when engine should start after a few turns. ~~Close cylinder drain cocks when steam only emerges.~~ Now connect up battery and adjust steam valve until ammeter registers 4 amps.



## WORKING INSTRUCTIONS—continued

6. Add wood to the fire to keep steam pressure between 25 and 30. Do not fire so heavily that safety valve blows off.
7. The boiler holds water for a run of three hours. After this period, let fire down, stop engine, disconnect battery, turn on drain cock until steam ceases to emerge. If required the boiler lid may be removed and the boiler refilled for another run.
8. After engine is stopped (for any length of time) clean it down and oil metal parts to prevent rust.
9. Unscrew sump drain plug 4 turns and if clean oil emerges, close it again at once. If water emerges, leave plug open until water ceases and oil flows; then close it.
10. Generally there are no adjustments to make to the engine, as there are no glands, but screws may be tested to see that they are tight.
11. If it is decided to examine interior of engine remove unit from box, take out the four screws holding the engine down to base, when it may be removed bodily.
12. If main bearings are removed timing will be lost and must be reset. There are two punch marks on one mitre wheel and one on the other. Set so that they agree.
13. Use new joints if any are damaged.
14. It is unlikely that piston and rings will need replacement unless very much running has occurred. Check ring gaps which should not exceed  $\frac{1}{2}$ .
15. The piston valve is stainless and will not rust. If, however, this engine is to be left long, say overnight, tilt the engine forward, insert a teaspoonful of oil into the exhaust pipe, and turn engine backwards a few turns (with steam valve open) until oil appears from steam inlet. This ensures that valve and pistons are well oiled.
16. To remove valve take out pin coupling banjo to end of valve. Now turn engine until banjo is at maximum stroke, push valve in until banjo can be lifted off crankpin. Valve may now be removed.

**GENERATOR:** The Generator is designed to give an output of 4 amperes for charging a 6-volt battery, and as the Set is not fitted with a Cut-out, the battery should not be connected to the Generator until the Set is actually running, when it will be possible to observe

## WORKING INSTRUCTIONS—continued

on the Ammeter whether the Set is charging or not. If the Ammeter shows a discharge reading, the steam valve should be opened until the required charge rate is reached.

The Engine is capable of driving the Generator at a speed at which the Generator's output will be far in excess of its normal rating, and care should be taken to see that the normal rate of 4 amperes is not exceeded.

METHOD OF WIRING FOR BATTERY CHARGING. The connections are as follows:

Generator positive (plus) terminal to battery positive terminal.

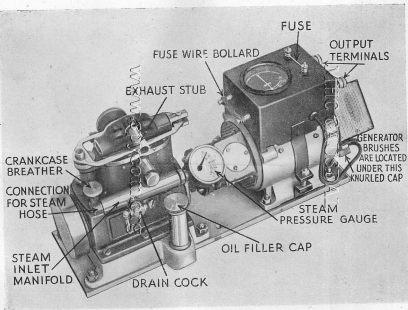
Generator negative (minus) terminal to battery negative terminal.

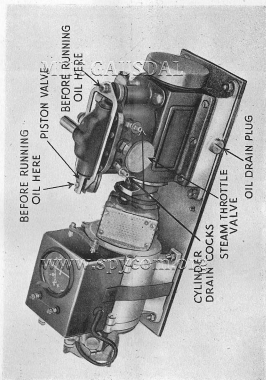
GENERATOR MAINTENANCE. The Generator should require little or no maintenance of any sort, other than occasional cleaning of the commutator. This will be found under the gauze cover at the end of the Generator opposite to that of the Engine. If the Commutator is dirty, clean it by holding a clean soft cloth against it whilst the Engine is rotating slowly. It may also be found necessary, after prolonged running, to change the Brushes. These are located under the knurled caps on the Generator and plate Commutator end. New Brushes will require re-bedding, and to do this correctly, insert a strip of glass paper with back on to Commutator and ~~abrasive surface against end~~ of Brushes. Move Commutator backwards and forwards until Brushes are bedded on to the radius of the Commutator. An occasional polishing of the Commutator with a rag, slightly smeared with vaseline, will maintain a good surface.

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## NOTES

(a) The method of fixing the lid of the boiler is as follows: The handle should be pulled up into the vertical position and the lid threaded through the top of the boiler being turned through a quarter of a turn after insertion into the boiler. The stirrup may now be pushed through the space between the arms of the handle and the end of the thumb-screw placed in the recess on the top of





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