

1919

Lucas

RUNNING INSTRUCTIONS
for the
—— LUCAS ——
DYNAMO LIGHTING SET
☒ FOR MOTOR CYCLES ☒



Barnstormers Co. Nz

Running Instructions for the

LUCAS
DYNAMO LIGHTING SET
FOR MOTOR-CYCLES (SOLO & SIDE CAR)



DESIGNED AND MANUFACTURED THROUGHOUT BY

THE LUCAS ELECTRICAL CO., LIMITED

(INCORPORATING THOMSON-BENNETT MAGNETOS LTD.)

BIRMINGHAM

TELEGRAMS: "MAGDYNO, BIRMINGHAM."

TELEPHONE: CENTRAL 1308 (PVTE. BCH. EX.)

CODE USED—A B C, 5TH EDITION

PROPRIETORS: **JOSEPH LUCAS LTD.**

WF10

Barnstormers Co. Nz



The Vickers-Vimy-Rolls Trans-Atlantic Machine—the first Aeroplane to cross the Atlantic in one stride—was equipped with LUCAS AERO DYNAMOS for lighting and heating.

The Lucas Dynamo Lighting Set

The COMPLETE SETS comprise :—

SOLO

DYNAMO No. E3
BATTERY (No. 68 for Solo Machines)
SWITCHBOX No. M5
HEAD LAMP No. M41
(with Double-Filament Bulb)
TAIL LAMP No. M10

SIDECAR

DYNAMO No. E3
BATTERY (No. 618 for Sidecar, or
No. 68 for Motor Cycle)
SWITCHBOX No. M5
HEAD LAMP No. M41
(with Double-Filament Bulb)
SIDE CAR LAMP No. R25
(for concealed Cable Fitting)
TAIL LAMP No. M10

*COMPLETE SET OF CABLES, WITH TERMINALS, ETC.,
JUNCTION BOX & DETACHABLE PLUG FOR SIDE CAR.*

The Dynamo is a 6 volt 4.5 amp machine.

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The Lucas Dynamo Lighting Set for Motor Cycles

RUNNING INSTRUCTIONS

THE DYNAMO

is a miniature machine, weighing barely 5 lb., and is a replica of the larger Lucas machines, which have given such excellent service on various internal combustion engines during the war.

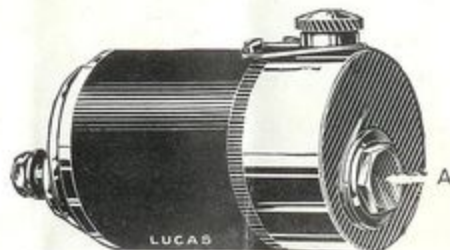


Fig. 1. The Dynamo

The output is 6 volts 4-5 amps., and is maintained constant at high speed by the well-tried inter-brush method.

Sparkless commutation at all speeds is a great feature of this machine, resulting in long life even under the severest conditions.

By unscrewing the hexagon nut A (Fig. 1) the dynamo end cover can be removed showing the commutator and brush gear.

The brushes should be free to slide in their holders, and care should be taken that the flexible cable from brushes should be well insulated from the body of the machine.

The commutator should always be kept clean and free from oil, or faulty commutation will result, with a consequent drop in the charging rate. Worn brushes may be easily replaced in a few minutes as follows:—The brush terminal should be released by unscrewing the nut C (Fig. 2). Then hold the spring lever B back out of the way so that the old brush may be withdrawn from the holder. Reverse these operations when putting the new brush into position.

It sometimes, though rarely, happens that the grooves between the commutator segments become clogged with brush dust, and tend to short circuit across to one another. This is easily rectified by carefully scraping out these grooves with a pin or other suitable instrument.

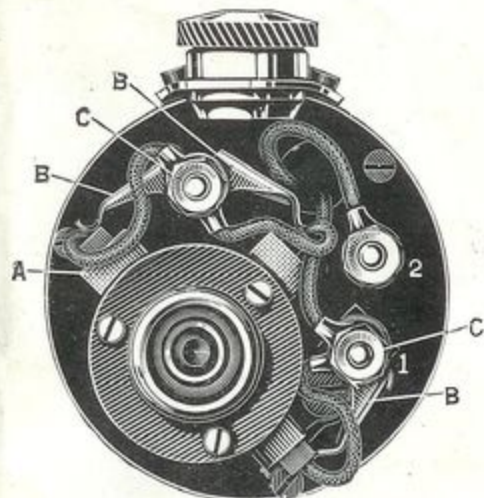


Fig. 2

Make sure that the terminals are all screwed down tightly—a loose terminal will give endless trouble!

The terminals for the two leading-out cables are numbered as are the terminal eyes affixed to the cables, thus avoiding the possibility of wrong connections when replacing after the cables have been removed.

The wiring is a departure from the usual method, the object being to obviate the large number of cables and terminals of the two wire system without having the defects of the earth return system. The cable is provided with a special copper sheathing which acts as the return conductor, and the latter is covered with a special insulating material finished to conform with the general finish of the motor-cycle. It is extremely durable and forms a simple wiring scheme easily understood by the motor-cyclist.

The negative dynamo brush A (Fig. 2) is earthed to the body of the machine, and at the cable entrance a tapered ferrule A (Fig. 3) is soldered on to the cable sheathing and screwed tightly into the socket by the cable locating screw B, thus carrying the current from the body of the machine to the cable sheathing.

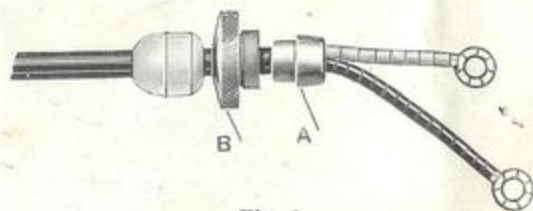


Fig. 3
Dynamo terminals showing tapered
ferrule and cable locating screw

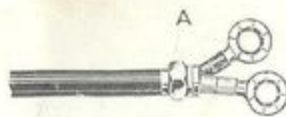


Fig. 4



Fig. 5

At the switchbox screwed ferrules A (Fig. 4) are soldered on to the cable sheathing and are screwed tightly on to the body of the switchbox in the cable locating slots A (Fig. 5), the negative dynamo and battery terminals of the switchbox being respectively earthed on to the body of the box.

RUNNING INSTRUCTIONS - continued

In order to obviate the possibility of corrosion at the battery terminals all corrosive metal has been eliminated, the rubber covered cable being cast into the terminals and the copper covered entirely with lead. The cables are then taken to a junction box (Fig. 6) and for sidecar machines the latter is combined with a readily detachable and robust plug, which offers no difficulty if it is required to remove the sidecar. By unscrewing the square nut the plug may be pulled out (see Fig. 7).

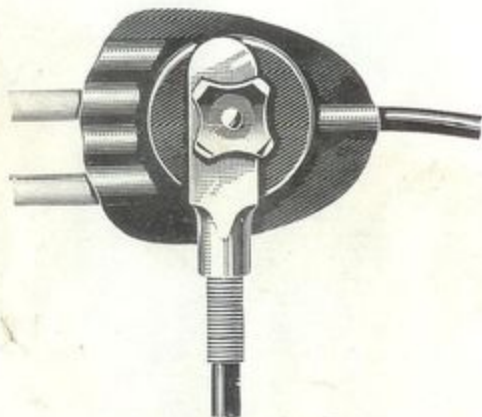
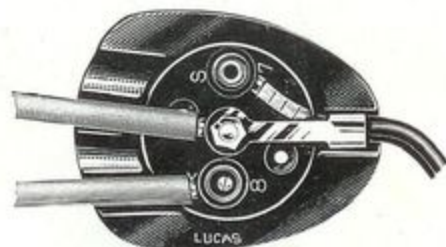


Fig. 6 Junction Box



Fig. 7



Junction Box with cover removed, showing terminals, etc.

On solo machines the cable is taken to the junction box (which is fixed to the battery box), a terminal eye being soldered on to the sheathing and fixed to the middle terminal of the junction box common to negative battery. To remove cover of junction box, unscrew small hexagon nut on central pin.

RUNNING INSTRUCTIONS—continued

On sidecar machines when the battery is carried on the motor cycle the sidecar lamp is connected by means of the detachable plug (Fig. 7), enabling the sidecar to be easily detached when required.

All connections should be kept tight, and if there is any irregularity in the behaviour of the lighting system this is the first and most important point to confirm.

SWITCHBOX

This is the junction of all cables and also contains the electro-magnetic switch or cut-out which automatically disconnects the battery from the dynamo immediately the latter stops running, connecting them again when the dynamo voltage has reached about 6.

The cut-out is placed within the switchbox and is accurately set at our works. It should not be tampered with or adjusted by an unskilled man. Should the cut-out fail to function the cause of failure is likely to be found elsewhere in the system.

The switchbox terminals are numbered, as are the terminal eyes affixed to the cable, thus avoiding difficulty in wiring correctly and enabling the terminals to be identified easily. The switchbox is best fitted flush in the side of the petrol tank by soldering the brass shell supplied in position and securing the switchbox in this shell by the fixing screws (Fig. 8).

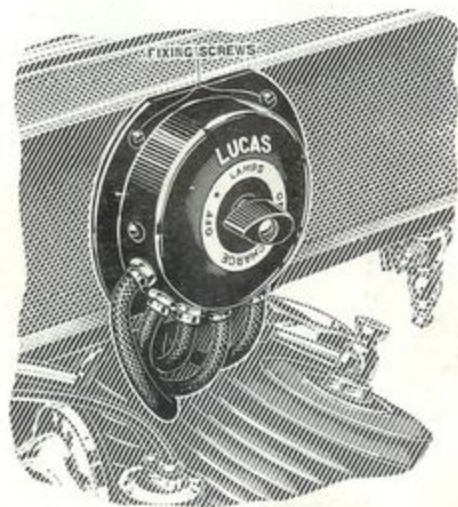


Fig. 8
Showing Switchbox fitted in the side of tank

The switch is then in a very convenient position for the owner and the fitment is neat and unobtrusive.

The switch is a new patent "load and fire" action and clicks into position smoothly. It is of the rotary type and designed to move in one direction **only**. There are four positions of the switch, viz. "Off," "Charge," "Off," and "Lamps."

In solo machines the full output of the machine is only attained when the switch is in the "lamps" position.

The "charge" position cuts down the charging rate of the dynamo to 2 amps. and prevents thereby overcharging of the battery.

For sidecar machines the full output is attained with the switch in either position.

The terminals are displayed by unscrewing the two cover screws A and sliding off the cover (see Fig. 9).

THE BATTERY

is the one unit of an Electric Lighting System which **must** have regular attention. It is the "reservoir" of the system, which is being frequently "tapped" by the lamps, and should, therefore, be constantly replenished from the dynamo by having the latter on "charge" during daytime running.

The capacity of the battery, or in other words the length of time it will keep the lamps going without the assistance of the dynamo, is governed by the size and also by the design; the maintenance of that capacity is

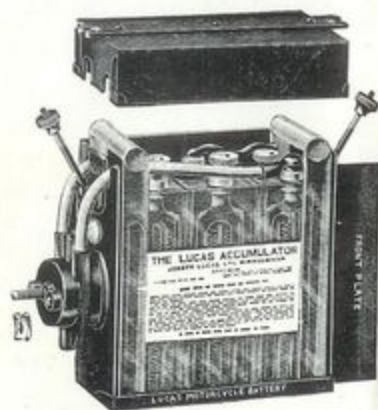


Fig. 9

Showing cover fixing screws, terminals and cable locating slots

RUNNING INSTRUCTIONS—continued

dependent firstly on the manufacture of the battery, and secondly on the care bestowed by the user. It is this latter point which we particularly wish to emphasise.



Motor Cycle Battery, showing junction box at side to which a plug for sidecar lamp can be attached if required



Sidecar Battery

A battery may be perfect in design and construction, but is always subject to diminution in capacity by neglect on the part of the user. During the normal action of the battery, water is given off from the acid solution in the form of gases, and this is why it is most important that the **battery should be inspected regularly**, as the acid level must be maintained about $\frac{1}{4}$ in. above plates by adding **distilled water** to make up for loss by evaporation. (Obtain distilled water from your chemist.) Should any acid become spilled, it must be replaced by

RUNNING INSTRUCTIONS—continued

solution of 1 part pure Brimstone Sulphuric Acid to 5 parts distilled water= 1.225 sp. gr. When mixing solution, always add acid to the water, not water to the acid. Allow solution to cool before filling up.

Never leave an accumulator standing when run down : it must be recharged immediately, otherwise battery may be permanently injured.

HEADLIGHT

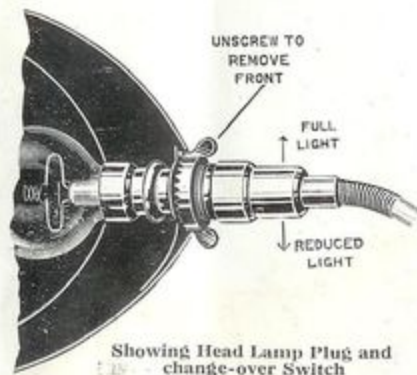
The headlight has side sockets to take a fork bracket, and is fitted with a parabolic reflector and our special double filament gas-filled bulb.

The front, with the reflector and bulb holder, is fixed to the body by means of the flynut at the back, and can be readily removed when a new bulb has to be fitted by unscrewing the nut A when the front and reflector complete can be withdrawn (see Fig. 10). The reflector B is attached to the front rim C by a bayonet fixing.



Fig. 10

The double filament bulb in the head lamp has advantages which will be fully appreciated by all motor cyclists. It is a standard size bulb containing two filaments, one providing the full driving light for the open road, the other supplying a reduced light for town use when the full light is not required. Either may be used at will by a rotative movement of the head lamp plug, which is adapted to form a switch. A quarter of a turn to the right gives the full light, and the opposite way the reduced light.



In addition to this, as all town running is necessarily slow, a brilliant head light tends to withdraw current from the battery in excess of the amount supplied from the dynamo, because the latter is not rotating fast enough to give its full output. In these circumstances the low c.p. bulb, consuming only $\frac{1}{4}$ amp., does not tend to run the battery down, and should **always** be used for town work.

FOCUSSING THE HEAD LAMP

In order to get the very best illumination on the road, it is absolutely essential that the filament should be focussed properly in the reflector, otherwise no matter how powerful the bulb, the light obtained will be unsatisfactory. Focussing is a very simple matter and should always be carried out on the road and not at short range in the garage. To focus a new bulb, notches are provided in the bulb holder (see Fig. 10a) for four alternative positions. Try the bulb in each position to obtain the best results. For instructions as to removing lamp front see page 12.

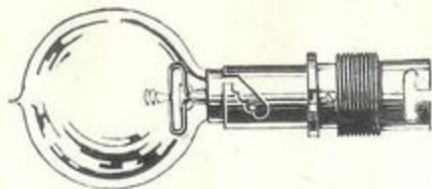


Fig. 10a



"Concealed Cable" pattern Lamp
fixed to sidecar body.

SIDECAR LAMP

This lamp is of the "concealed cable" pattern, the cable passing through the tubular bracket which carries the lamp. It should be fixed on the sidecar as shown. The front and lens are removed by releasing the coin-slotted screw at the back of lamp, bulb replacement being a simple matter (Fig. 11).

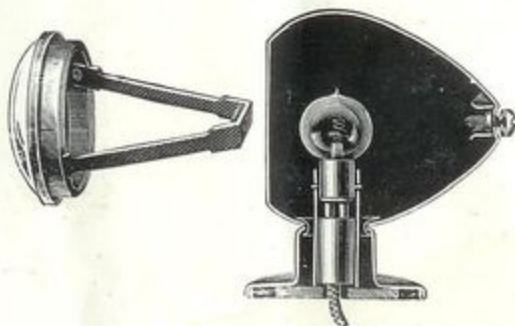


Fig. 11

TAIL LAMP

The front is secured by a bayonet fixing and can be easily detached if required to replace bulb.

MARK

LUCAS MOTOR CYCLE ELECTRIC LIGHTING SYSTEM (SIDECAR)

DRG. No. L577/B

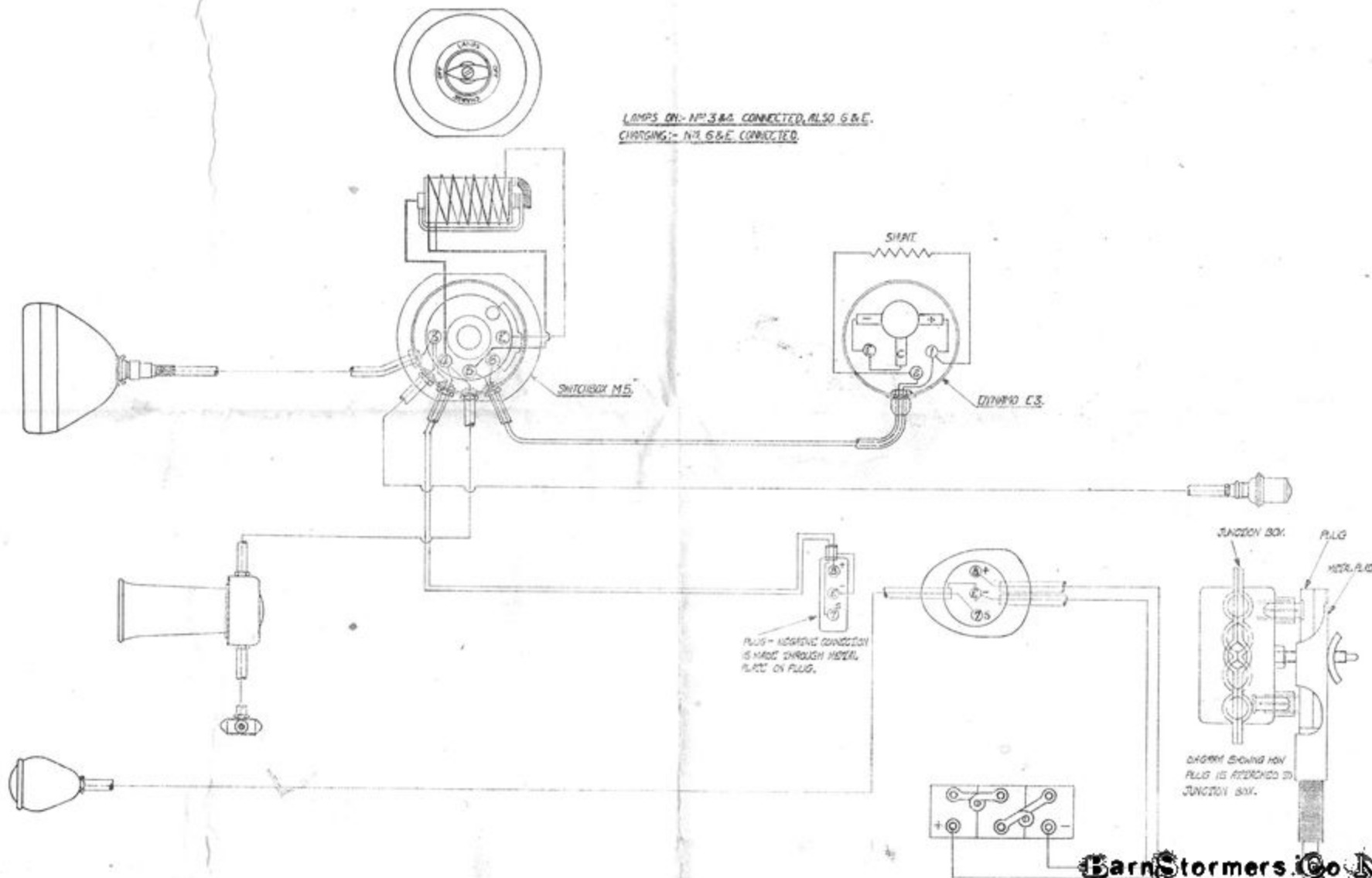
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 CHECKED BY..... SUPERSEDES.....
 PASSED BY..... DATE.....

DYNAMO E3
 SWITCHBOX M5

WIRING DIAGRAM

SHOWING INTERNAL CONNECTIONS OF SWITCHBOX. BATTERY ON SIDECAR

JOSEPH LUCAS LTD. B'HAM



MARK

DYNAMO E3
SWITCHBOX M5

LUCAS MOTOR CYCLE ELECTRIC LIGHTING SYSTEM (SIDECAR)

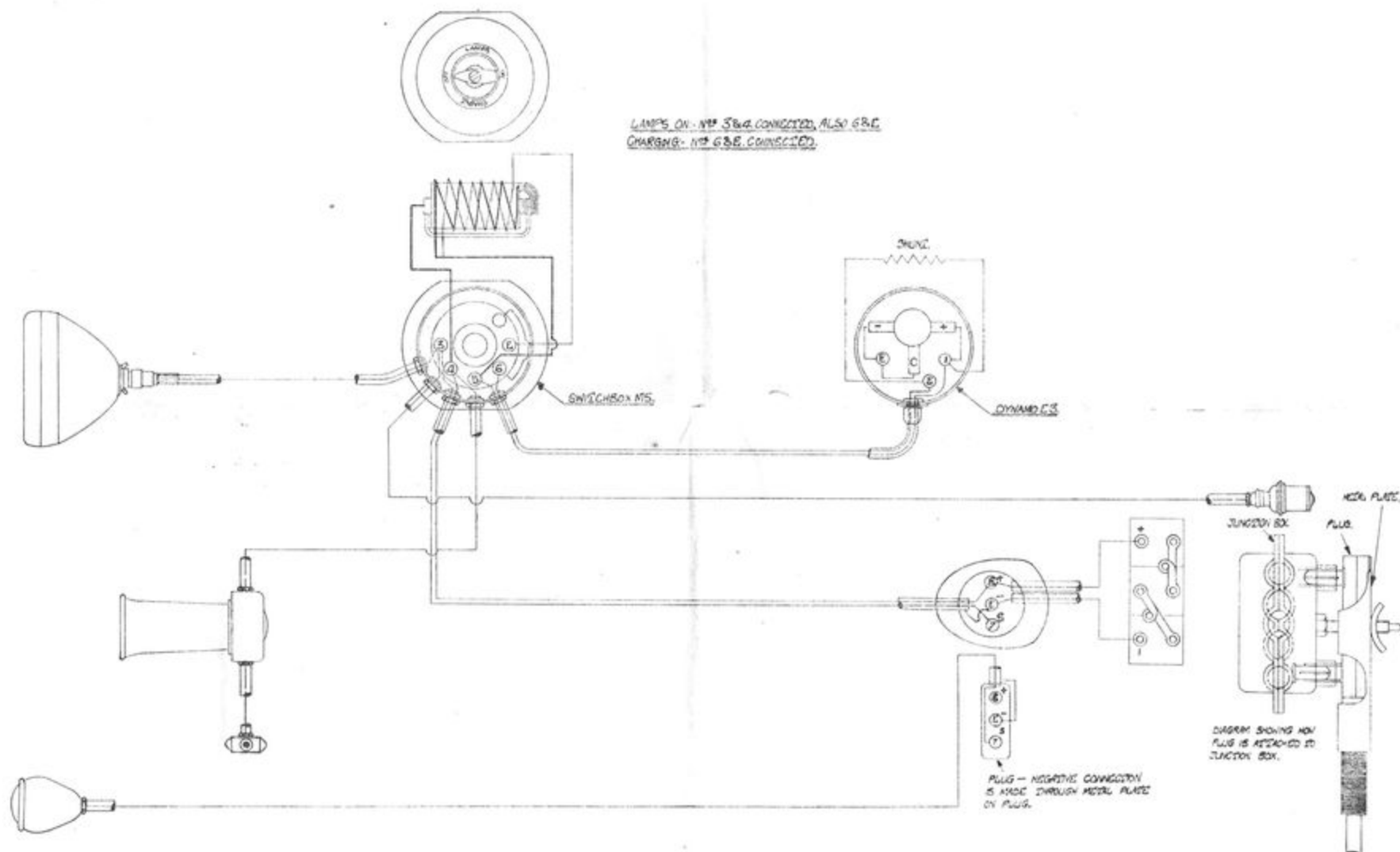
WIRING DIAGRAM

SHOWING INTERNAL CONNECTIONS OF SWITCHBOX. BATTERY ON CYCLE

DRG. No. L641/B

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Barnstormers Co. Nz

MARK

LUCAS MOTOR CYCLE ELECTRIC LIGHTING SYSTEM (SOLO)

DRG. No. L585/B

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CHECKED BY.....	SUPERSEDES....
PASSED BY.....	DATE.....

DYNAMO E3
SWITCHBOX M5

WIRING DIAGRAM

SHOWING INTERNAL CONNECTIONS OF SWITCHBOX

JOSEPH LUCAS LTD. B'HAM

