

Oct. 18, 1949.

G. L. LANG

2,485,241

RADIO-SHIELDED UNIT

Filed April 7, 1945

2 Sheets-Sheet 1

FIG. 1

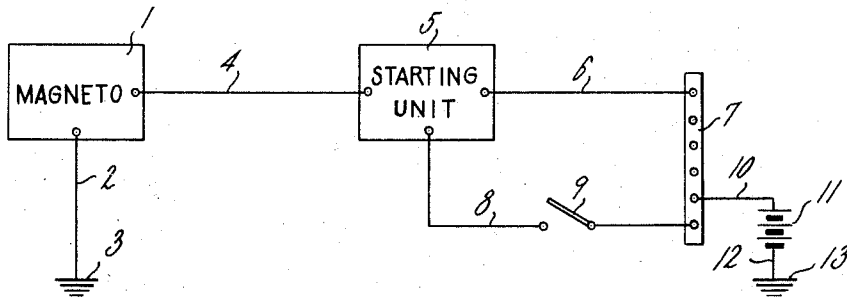
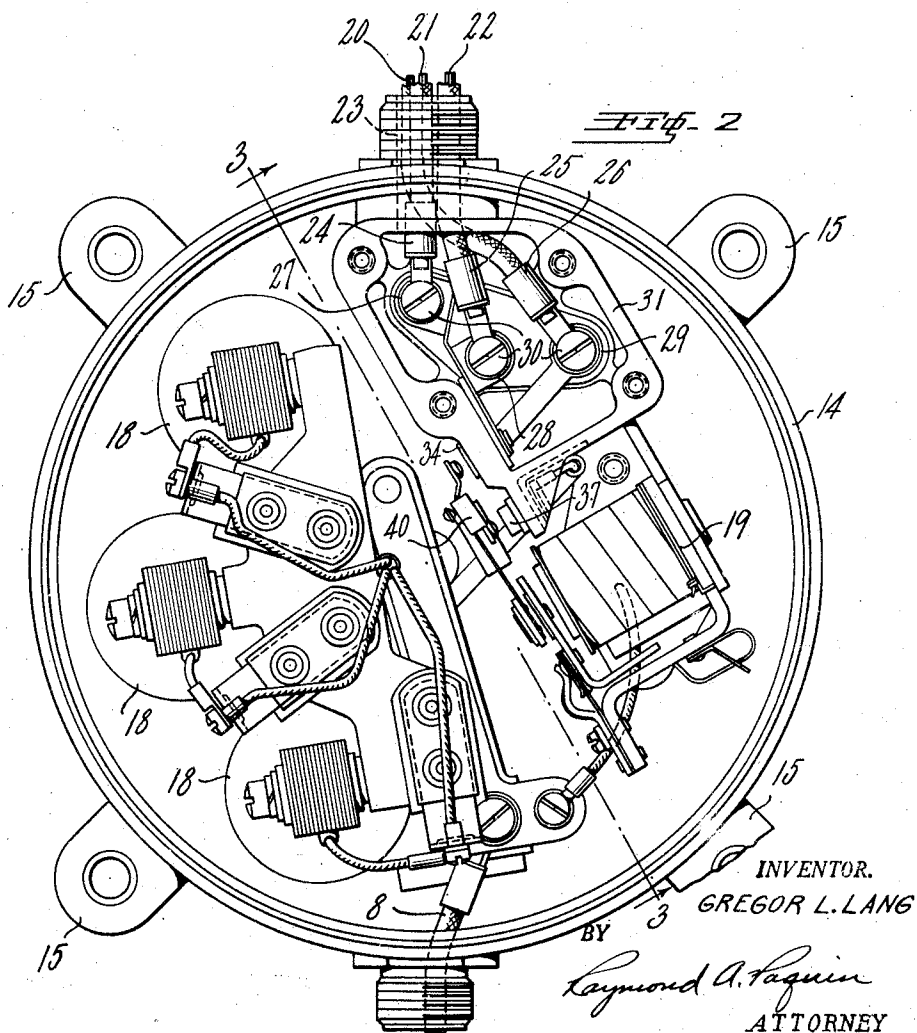


FIG. 2



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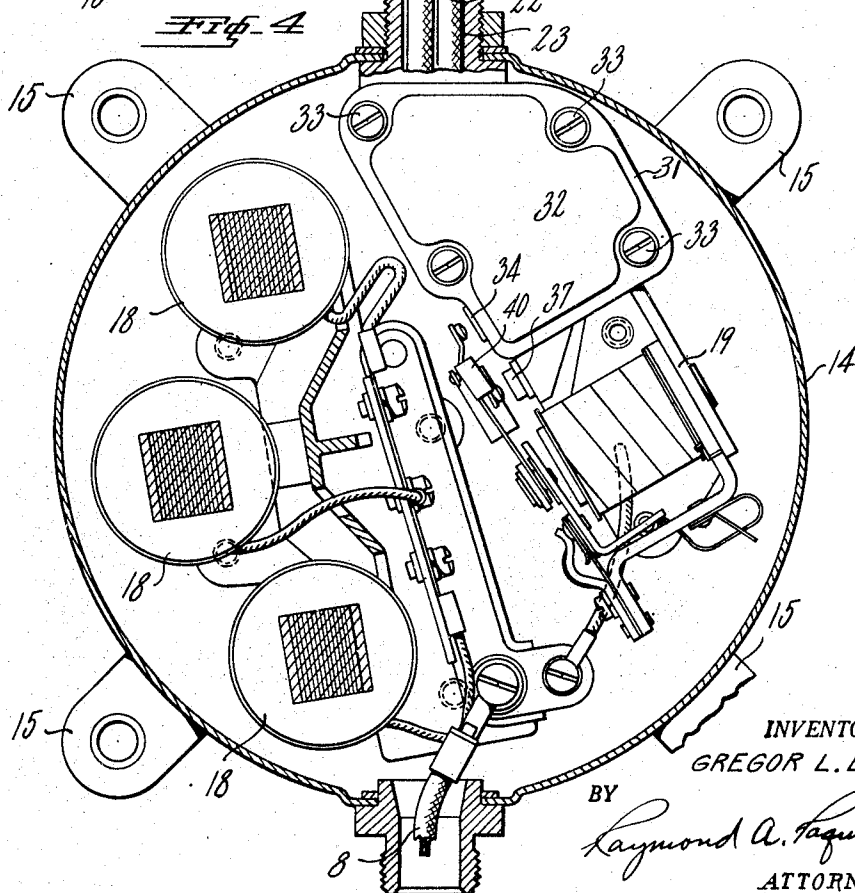
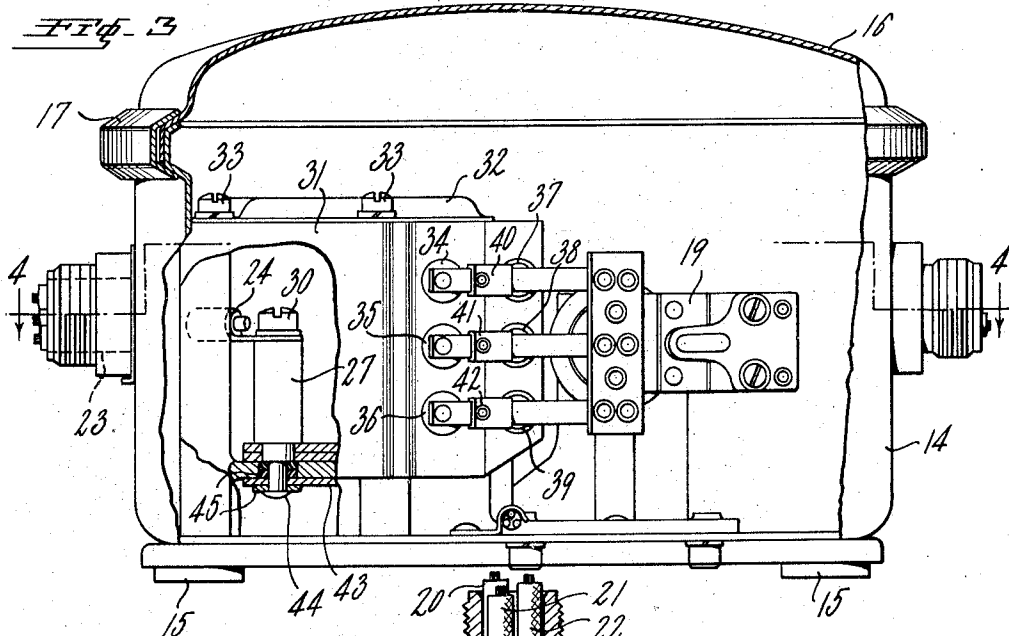
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2 Sheets-Sheet 2



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2,485,241

RADIO-SHIELDED UNIT

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Application April 7, 1945, Serial No. 587,160

3 Claims. (Cl. 123—148)

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This invention relates to shielding means adapted for use with starting units or the like for internal combustion engines and more particularly to new and improved means for shielding such units against radio noise leakage.

Low speed starting units for energizing the magneto of an internal combustion engine from an external power supply during the engine starting or cranking period, known in the art as below the "coming-in speed" of the magneto, have been employed in connection with internal combustion engines and particularly in connection with aircraft engines.

However, due to the fact that magnetos in operation are vigorous radio interference producers, considerable noise which has been produced by the magneto interferes with the operation of radio apparatus which receives power from the same power supply or which is situated in the same locality as the ignition equipment. This radio noise has been caused by the fact that transient impulses produced by the magnetos have been conducted through the starting unit back to the power supply which also supplied power to the radio apparatus and the conducted noise is thereby conducted from the power supply to the radio apparatus by the power supply lines for the radio apparatus.

In the past, low pass filters were placed in the power supply line to ground any such noise voltages and prevent their reaching the power supply. While such an arrangement was satisfactory for some uses, the use thereof was limited because the filters did not have sufficiently wide frequency characteristics to function adequately over a wide wave band. Modern communications practice involves the use of radio receiving equipment operating over a broad frequency band or spectra of frequencies.

It, therefore, is the principal object of this invention to provide new and improved shielding means for a starting unit which will prevent the conduction of any substantial amount of noise from the magneto back to the power supply through the starting unit, without the necessity of using a filter.

Another object of the invention is to provide new and improved means for radio shielding a starting unit.

Another object is to provide a starting unit having portions therefor enclosed by radio shielding means.

Another object is to provide a new and improved relay contact arrangement for a starting unit.

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Another object is to provide a new and improved contact arrangement for a radio-shielded starting unit.

Another object is to provide an arrangement for radio shielding the contacts of a starting unit.

Other objects and advantages of the invention will be apparent from the following description taken in connection with the accompanying drawings. It will be understood that many changes may be made in the details of construction and arrangement of parts, as the preferred form has been given by way of illustration only.

Referring to the drawings:

Fig. 1 is a diagrammatic view of an electrical circuit containing a starting unit; Fig. 2 is a top or plan view of a starting unit embodying the invention with the cover removed; Fig. 3 is a sectional view thereof taken on line 3—3 of Fig. 2, looking in the direction of the arrows; and Fig. 4 is a sectional view taken on line 4—4 of Fig. 3, looking in the direction of the arrows.

Referring more particularly to the drawings wherein similar reference characters designate corresponding parts throughout the several views, the circuit incorporating a starting unit shown embodying the invention comprises a magneto 1 connected by the lead 2 to the ground 3, and connected by the lead 4 to the starting unit 5. The starting unit 5 is connected by the lead 6 to the bus bar 7, and also through the lead 8 in which is provided the ignition switch 9.

The bus bar 7 is connected through the lead 10 to the battery 11 which is connected through the lead 12 to the ground 13.

The starting unit casing 14 is provided with the supporting brackets or arms 15 and the removable cover 16 which is adapted to be retained on the casing 14 by the detachable band 17.

The starting unit includes the booster coils 18, one of which is provided for each of the one or more magnetos with which the device is employed, and the relay 19.

The leads 20, 21 and 22, which connect each of the coils 18 with its respective magneto, enter the casing 14 through the opening 23 and are connected to terminal clips 24, 25 and 26, respectively, which in turn are connected to the terminals 27, 28 and 29 respectively, by screws 30.

Within the casing 14 and surrounding the terminals 27, 28 and 29, is provided the radio shielding terminal housing 31 having the cover 32 detachably secured thereto by screws 33 and an opening in a wall thereof through which the leads to the magneto extend. The terminals 27, 28 and 29 are each connected by a conductor to

its respective contact 34, 35 and 36, which are positioned in a vertical row and extend through the wall of the housing 31. The relay is provided with a series of contacts 37, 38 and 39 similarly positioned in a vertical row, and the yoke-shaped contacts 40, 41 and 42, one for each of the sets of contacts 34 and 37, 35 and 38 and 36 and 39, and each of the yoke-bridging contacts 40, 41 and 42, is adapted to electrically connect the respective pair of contacts when the starter and starting unit are in operation and the relay is energized to connect each magneto with its respective coil and to be otherwise spaced from the contacts to prevent the connection of the coils and magnetos when the unit is not being employed. This prevents the noise-producing currents from being conducted back to the power supply.

The terminal housing 31 is provided with the shielding insulating bottom layer 43 which is secured to the housing proper by screws or the like 44, and insulating washers 45 are provided to make the housing leak-proof.

It is pointed out that because of the removable cover 32, access may be had to the interior of the terminal housing 31. It will be noted that, if desired, the terminal housing 31 could be formed as a complete box molded from plastic or other suitable material or die cast metal with a removable cover, and could be a drawn or spun sheet metal box.

While the invention has been shown applied to a booster starting unit, this has been done merely for the purpose of illustration, and it will be understood that it could be employed in connection with a remote control for a magneto primary circuit or grounding relay or with a reactor type starting unit or vibrating or repetitive starting unit.

It is further pointed out that another advantage of the terminal housing shown is that the outer lid or cover need not be a radio-tight joint as the securing of the lid or cover on the housing as shown and described will sufficiently seal the housing for mechanical security. Furthermore, the lid 16 may be formed with openings therethrough to permit the escape of gases or heat.

While three leads and terminals have been shown, it will be understood that any desired number thereof and similar number of contacts may be employed.

From the foregoing it will be seen that I have provided simple, efficient and economical means for obtaining all of the objects and advantages of the invention.

Having described my invention, I claim:

1. In a unit for connection with the magnetos of an internal combustion engine, a casing, coils

in said casing for connection with each magneto, a relay connected to said coils, said relay having spaced terminals in said casing and a lead extending into said casing from each magneto and connected to its respective terminal, a shielded housing in said casing and enclosing said terminals, said relay being adjacent said shielded housing, and bridging contact means externally of said housing and operated by said relay for electrically connecting said relay with contacts on said housing.

2. In a unit for connection with the magnetos of an internal combustion engine, a casing, coils in said casing for connection with each magneto, a relay connected to said coils, terminals in said casing and a lead extending into said casing from each magneto and connected to its respective terminals, a radio shielded housing in said casing and enclosing said terminals only, said relay being adjacent said shielded housing, said housing having a contact extending through the wall thereof for connecting the relay with each respective set of terminals, and a yoke bridging contact member externally of said housing and operated by said relay for connecting the respective sets of terminals on the relay and housing.

3. In a unit for connection with the magnetos of an internal combustion engine, a casing, a coil in said casing for connection with each magneto, a relay connected to said coils, terminals in said casing and a lead extending into said casing from each magneto and connected to its respective terminal, a radio shielded housing in said casing and enclosing said terminals, said relay being adjacent said shielded housing, said housing having a contact extending through the wall thereof for connecting the relay with each respective set of terminals, and a double-yoke bridging contact externally of said housing and operated by said relay for connecting each of the relay terminals with its respective contact on the relay terminal housing.

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