

July 5, 1938.

R. H. STONE

2,123,162

RADIO SHIELDING OF ENGINE IGNITION

Original Filed Jan. 23, 1936 3 Sheets-Sheet 1

FIG. 1

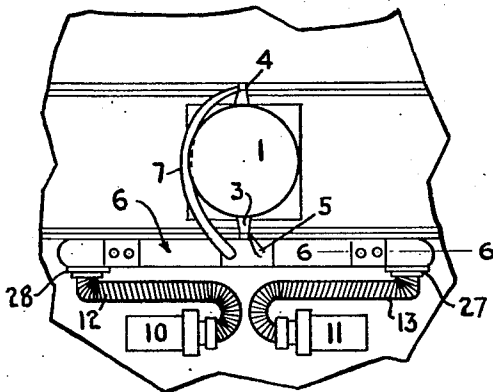
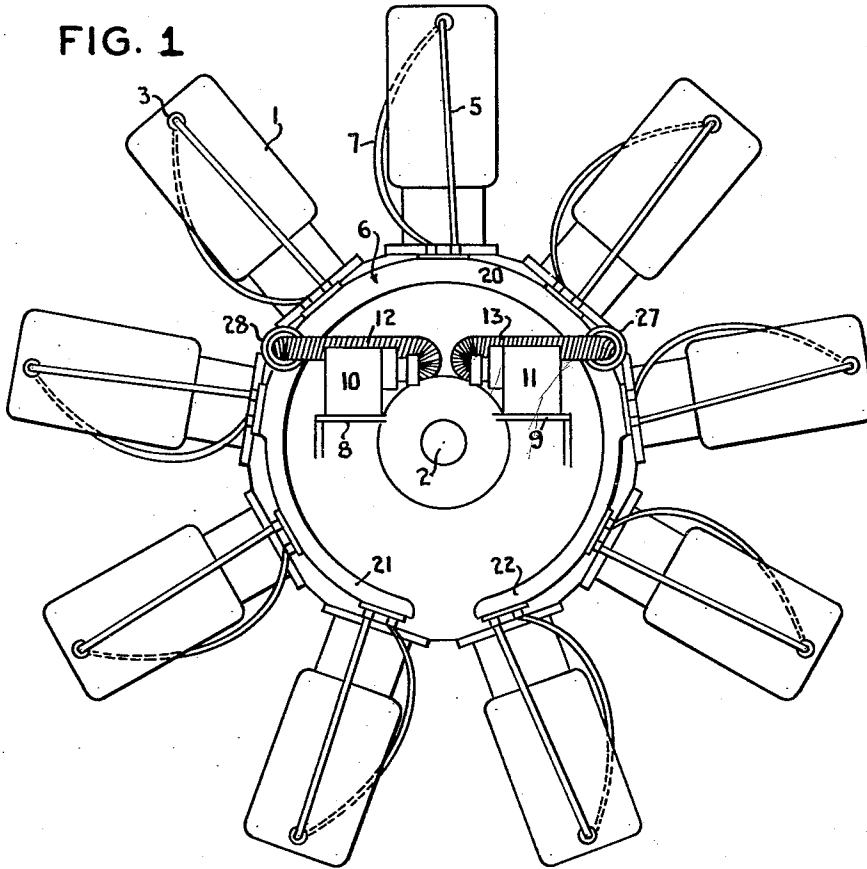


FIG. 2

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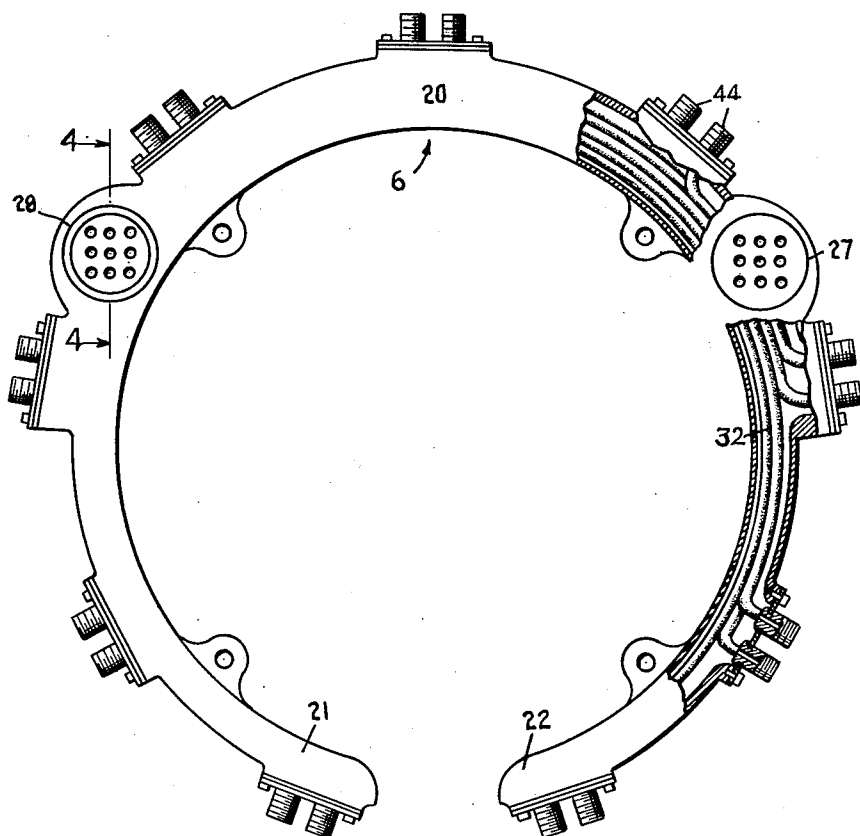
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3 Sheets-Sheet 2

FIG. 3



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Original Filed Jan. 23, 1936 3 Sheets-Sheet 3

FIG. 4

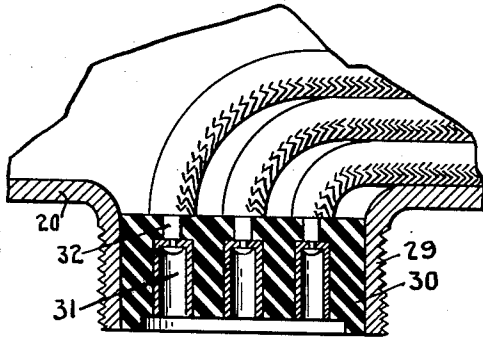


FIG. 6

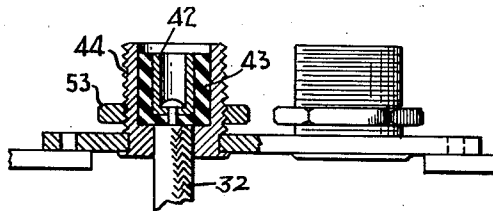


FIG. 5

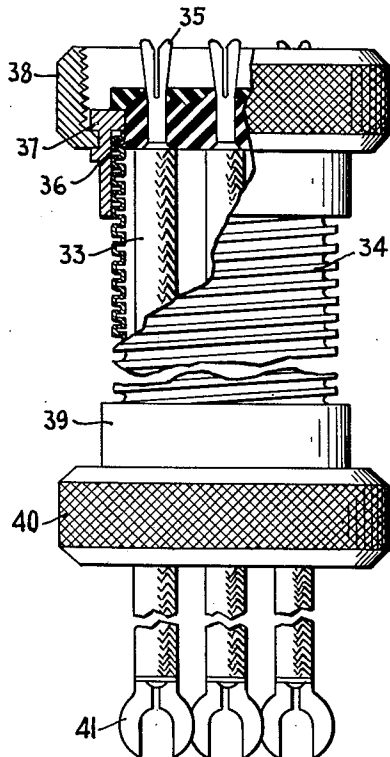
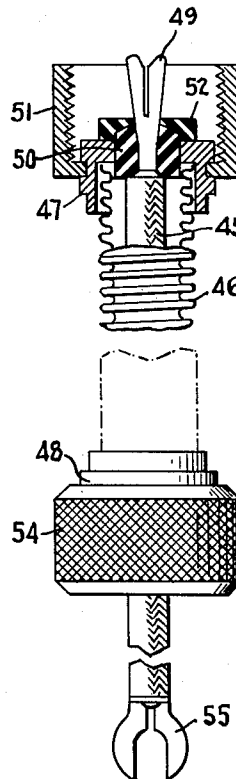


FIG. 7



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UNITED STATES PATENT OFFICE

2,123,162

RADIO SHIELDING OF ENGINE IGNITION

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Original application January 23, 1936, Serial No.
60,425. Divided and this application April 6,
1938, Serial No. 200,349

9 Claims. (Cl. 123—148)

This invention relates to the shielding of ignition wires of internal combustion engines so that their effect upon neighboring radio apparatus will be reduced or entirely eliminated.

5 The present application is a division of my prior application Serial Number 60,425 filed January 23, 1936.

One of the main objects of the invention is to provide efficient radio shielding means for the
10 ignition conductors.

A further object of the invention is to provide a manifold to and from which the spark plug leads are readily attachable and detachable.

15 A further object of the invention is to provide a manifold to and from which the leads to the magneto or other source of ignition current are readily attachable and detachable.

A further object of the invention is to provide a manifold having cross connecting wires therein between the magneto leads and the spark plug leads such that some or all of the leads from the manifold may be attached or detached without disturbing the conductors within the manifold.

Other and ancillary objects of the invention will appear hereinafter.

In the accompanying drawings which illustrate the invention—

Fig. 1 is a front elevation of an aeroplane engine to which the invention is applied;

30 Fig. 2 is a top plan view of the apparatus of Fig. 1, partly broken away;

Fig. 3 is a front elevation of the manifold for the ignition wires on an enlarged scale, and partly broken away to show a longitudinal section;

35 Fig. 4 is a fragmentary section on the line 4—4 of Fig. 3 showing in enlarged cross section the socket connection on the manifold to which the wires in the manifold are connected;

40 Fig. 5 is a side elevation on the same scale as Fig. 4, of a magneto lead, partly broken away to show a section of the flexible lead from the manifold to the magneto having plug connections adapted to cooperate with the socket contacts of
45 Fig. 4;

Fig. 6 is to the same scale as Figs. 4 and 5 and is a side elevation of the nipples and socket contacts of the manifold whereby the lead wire from the manifold and the conduit enclosing the same
50 may be secured to the manifold wire, the view being broken away to show a section on the line 6—6 of Fig. 2;

Fig. 7 is a side elevation, partly broken away to show a central longitudinal section, and to the
55 same scale as Figs. 4, 5 and 6, of a flexible con-

ductor to establish connection between the manifold and a spark plug, and a flexible conduit therefor, this structure being adapted to cooperate with the structure of Fig. 6.

Referring to the drawings and first to Figs. 1 5 to 7 inclusive, the radial type of internal combustion engine as commonly used in aeroplanes and as shown in front elevation in Fig. 1, has the radial cylinders 1 distributed about the engine shaft 2 in a manner as is well understood in the construction of such engines. Each of the cylinders is provided with a spark plug 3 at the forward (the propeller) side and another spark plug 4 at the rear of the cylinders. Corresponding to each of the cylinders there is a conduit 5 leading 15 to the forward plug 3 from the manifold 6 and leading from the said manifold to each spark plug 4 is a conduit 7.

Mounted upon brackets 8 and 9 on the forward portion of the engine are magnetos 10 and 11 for 20 supplying ignition current to the spark plugs. The ignition wires extending from the usual timer (suitably connected with the magneto 10) pass through a flexible metal conduit 12 to the manifold 6, and similarly the conductors from the 25 timer which is associated with the magneto 11 are conducted to the said manifold through a flexible metal conduit 13.

Within the manifold 6 are cross connecting conductors whereby appropriate ones of the conductors leading from the timers and magnetos to the manifolds are connected with the several conductors in the conduits 5 and 7 leading to the various spark plugs. The timers and magnetos being enclosed in metal, the conduits from the 35 timers to the manifold being of metal, the manifold casing being of metal and the conduits from the manifold to the spark plugs being of metal and joining a metal shield about the spark plug, it will be seen that the ignition will be shielded 40 so that it will not unduly affect neighboring radio apparatus.

The manifold 6 comprises a tubular metal casing 20 the outer ends 21 and 22 of which are enclosed.
45

The manifold is provided with an enlarged outlet 27 housing socket contacts for connecting the conductors from the magneto 11 with the cross connecting conductors within the manifold and similarly upon the other side is an enlarged outlet 28 housing similar means for connecting the conductors from the magneto 10 with the cross connecting conductors within the manifold. This housing and arrangement of contacts is the same for both of the structures, 27 and 28 and is illus-
55

trated in Fig. 4 wherein it appears that the outlet comprises a threaded nipple 29 formed in the manifold 20 and within the nipple is secured an insulation block 30 within which are mounted the nine socket contacts 31 (one for a spark plug of each cylinder), each of the sockets being secured in conducting fashion to a conductor 32. Each of the conductors is covered with insulation so as to be individually insulated in a manner as is well understood.

To establish connection with the magneto on each of the conductors 32, there are provided nine individually insulated wires 33 enclosed in a flexible metal tube or conduit 34, which tube or conduit may be constructed as described in the Patent No. 1,198,392 Louis H. Brinkman, September 12, 1916. Each of the conductors 33 is secured to and forms an electrical contact with the spring plug contact 35 adapted to enter within and make contact with one of the socket contacts 31. The nine plug contacts 35 are mounted in an insulation block 36 secured in a metal coupling member 37 into which the end of the conduit 34 is secured in a fluid-tight fashion, as by soldering. Swiveled upon the coupling member 37 is the interiorly threaded screw nut 38 adapted to be screwed upon the nipple 29 and to draw the member 37 and the nipple into secure fluid-tight relation when the nut 38 is tightly screwed home upon the nipple 29. When the parts are thus clamped together by the nut 38 each of the plug contacts 35 will respectively be entered within and make contact with its appropriate socket contact 31.

The other end (the magneto end) of the conduit or tube 34 is secured in a coupling member 39 similar to the coupling member 37 and in which the end of the tube 34 is secured in a similar manner. Also there is swiveled upon the member 39 an interiorly threaded nut 40 similar to the nut 38 and by which the conduit may be secured in a tight manner to a nipple upon the magneto and timer casing, which nipple is similar to the nipple 29 upon the manifold. Instead, however, of the magneto end of the conductors 33 terminating in plug contacts, each of the nine conductors is provided with a spring contact clip 41 adapted to be connected with the timer terminals.

Each of the nine conductors 32 in the manifold respectively leads to and is connected with a plug contact 42 mounted in a block 43 of insulation secured in a screw-threaded nipple 44 mounted upon the manifold. It will be observed that the conductors 32 leading from and connected with one magneto will be respectively connected with one of a pair of socket contacts, the nipples and contacts being arranged in nine pairs about the manifold as clearly appears in Fig. 1, and one of each pair is connected with one magneto and one plug of one set of spark plugs, while the other is connected with the other magneto and a plug of the other set of spark plugs.

Each socket contact 42 is connected with its respective spark plug by a flexible lead comprising an insulated conductor 45 (see Fig. 7) encased in a flexible metal tube or conduit 46 which may be of the same construction as the conduit 34. One end of the conduit is secured in a tight and secure manner in the coupling member 47, while the other end of the conduit is similarly secured in a similar coupling member 48. One end of the conductor is secured and connected to a spring plug contact 49 adapted to enter within and establish electrical connection with the socket

contact 42 when the parts are in operative relation. The contact 49 is mounted in an insulating block 50 secured in the coupling member 47. Swiveled upon the member 47 is an interiorly threaded nut 51 adapted to be screwed upon the nipple 44 and hold the parts securely together with the plug 49 within and contacting with the socket contact 42.

A soft rubber gasket or washer 52 is provided so that a tight connection is formed when the nut 51 is screwed home upon the nipple 44. In order to prevent loosening of the connection between the coupling member 47 and the nipple 44, a lock nut 53 is provided which may be jammed against the nut 51 and hold it from becoming loosened.

The coupling member 48 at the other end of the tube 46 is also provided with a swiveled internally threaded nut 54 similar to the nut 51, the nut 54 engaging with a nipple on the spark plug casing so as to firmly and tightly secure the parts together.

The end of the conductor 45 opposite the plug contact 49 is provided with a contact clip 55 adapted to be secured to the usual binding post at the top of a spark plug in the manner in which ignition conductors are ordinarily secured.

It will be observed that in the foregoing described structure, the manifold structure 6 is sealed fluid-tight so that no moisture can enter therein and is provided with detachable plug switch connections whereby the magneto conductors and also the leads to the spark plugs may be detachably connected with the conductors within the manifold which appropriately connect the respective spark plug leads and magneto conductors. This permits the magneto leads or any of the spark plug leads to be removed and replaced without disturbing the conductors within the manifold or disturbing more than the lead which it is desired to remove or replace. This is of great value especially as regards the spark plug leads which are the most liable in practice to injury or deterioration.

While the invention has been illustrated in what is considered its best application, it may have other embodiments without departing from its spirit and is not, therefore, limited to the structures shown in the drawings.

What I claim is:

1. The combination with a manifold for the ignition conductors of an internal combustion engine, said manifold adapted to embrace the engine shaft, of spark plug leads leading from the said manifold to the spark plugs and magneto leads establishing connection between the said manifold and a magneto, said manifold providing a radio shielding casing for the ignition conductors, said manifold having an insulated contact mounted in its wall, a spark plug lead terminating in a contact adapted to engage with the aforesaid contact mounted in said manifold, a radio shielding conduit for the last mentioned lead and a coupling for detachably securing said conduit to said manifold.

2. The combination with a manifold for the ignition conductors of an internal combustion engine, said manifold adapted to embrace the engine shaft, of spark plug leads leading from the said manifold to the spark plugs and magneto leads establishing connection between the said manifold and a magneto, said manifold providing a radio shielding casing for the ignition conductors, said manifold having an insulated contact mounted in its wall, a magneto lead terminating in a contact adapted to engage with the aforesaid con-

tact mounted in said manifold, a radio shielding conduit for the last mentioned lead and a coupling for detachably securing said conduit to said manifold.

5 3. The combination with a manifold for the ignition conductors of an internal combustion engine, said manifold adapted to embrace the engine shaft, of spark plug leads leading from the said manifold to the spark plugs and magneto
10 leads establishing connection between the said manifold and a magneto, said manifold providing a radio shielding casing for the ignition conductors, said manifold having insulated contacts mounted in its wall, a spark plug lead and a mag-
15 neto lead terminating in contacts adapted to engage with the aforesaid contacts mounted in said manifold, radio shielding conduits for said leads and couplings for detachably securing said conduits to said manifold.

20 4. The combination with a manifold for the ignition conductors of an internal combustion engine, said manifold adapted to embrace the engine shaft, of spark plug leads leading from the said manifold to the spark plugs and magneto
25 leads establishing connection between the said manifold and a magneto, said manifold comprising a radio shielding casing containing cross connecting conductors, insulated contacts adapted to cooperate with removable contacts of the mag-
30 neto leads, said contacts being mounted on said manifold and electrically connected with said cross connecting conductors and other insulated contacts mounted on said manifold and adapted to be detachably connected with leads from the
35 spark plugs, the last mentioned contacts being also mounted on said manifold and electrically connected with said cross connecting conductors.

5. A radio shielded spark plug lead comprising in combination an ignition conductor, a radio
40 shielding metal covering about said conductor, means for insulating said conductor from said covering, said lead having at one end means for detachably connecting said covering with a shield for a spark plug and the adjacent end of said con-
45 ductor being adapted for connection with a spark plug, the other end of said lead having means for detachably connecting said conductor with a conductor in the ignition manifold and means for detachably connecting said covering with the
50 manifold, the said means for detachably connecting the conductor with a conductor in the ignition manifold being a member of a plug and socket connection adapted to cooperate with the other member of such connection mounted in the
55 manifold.

6. A radio shielded spark plug lead comprising in combination an ignition conductor a flexible radio shielding tube about said conductor, means for insulating said conductor from said

tube, said tube having at one end a coupling member for detachably connecting said tube with a shield for a spark plug and the adjacent end of said conductor being adapted for connection with
5 a spark plug, the other end of said tube having a coupling member for detachably connecting said tube with a manifold and the adjacent end of said conductor having connected thereto one member of a plug and socket connection adapted to cooperate with the other member of such con-
10 nection mounted on the manifold.

7. A radio shielded spark plug lead comprising in combination an ignition conductor, a radio shielding metal covering about said conductor, means for insulating said conductor from said
15 covering, said lead having at one end means for detachably connecting said covering with a shield for a spark plug and the adjacent end of said conductor being adapted for connection with a spark plug, the other end of said lead having
20 means for detachably connecting said conductor with a conductor in the ignition manifold and means for detachably connecting said covering with the manifold, the said means for detachably connecting the conductor with a conductor
25 in the ignition manifold being an electric contact terminal adapted to cooperate with another contact terminal mounted on the manifold.

8. A radio shielded spark plug lead comprising in combination an ignition conductor a flex-
30 ible radio shielding tube about said conductor, means for insulating said conductor from said tube, said tube having at one end a coupling member for detachably connecting said tube with a shield for a spark plug and the adjacent end of
35 said conductor being adapted for connection with a spark plug, the other end of said tube having a coupling member for detachably connecting said tube with a manifold and the adjacent end of said conductor having connected thereto an
40 electric contact terminal adapted to cooperate with another contact terminal mounted on the manifold.

9. The combination with a manifold for the ignition conductors of an internal combustion engine, said manifold adapted to embrace the engine shaft, or spark plug leads leading from the said manifold to the spark plugs and magneto
45 leads establishing connection between the said manifold and a magneto, said manifold providing a radio shielding casing for the ignition conductors, said manifold having an insulated contact mounted in its wall, a spark plug lead terminating in a contact adapted to engage with the aforesaid contact mounted in said manifold,
50 and a radio shielding conduit for such spark plug lead.

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