

March 11, 1941.

E. A. ROBERTSON

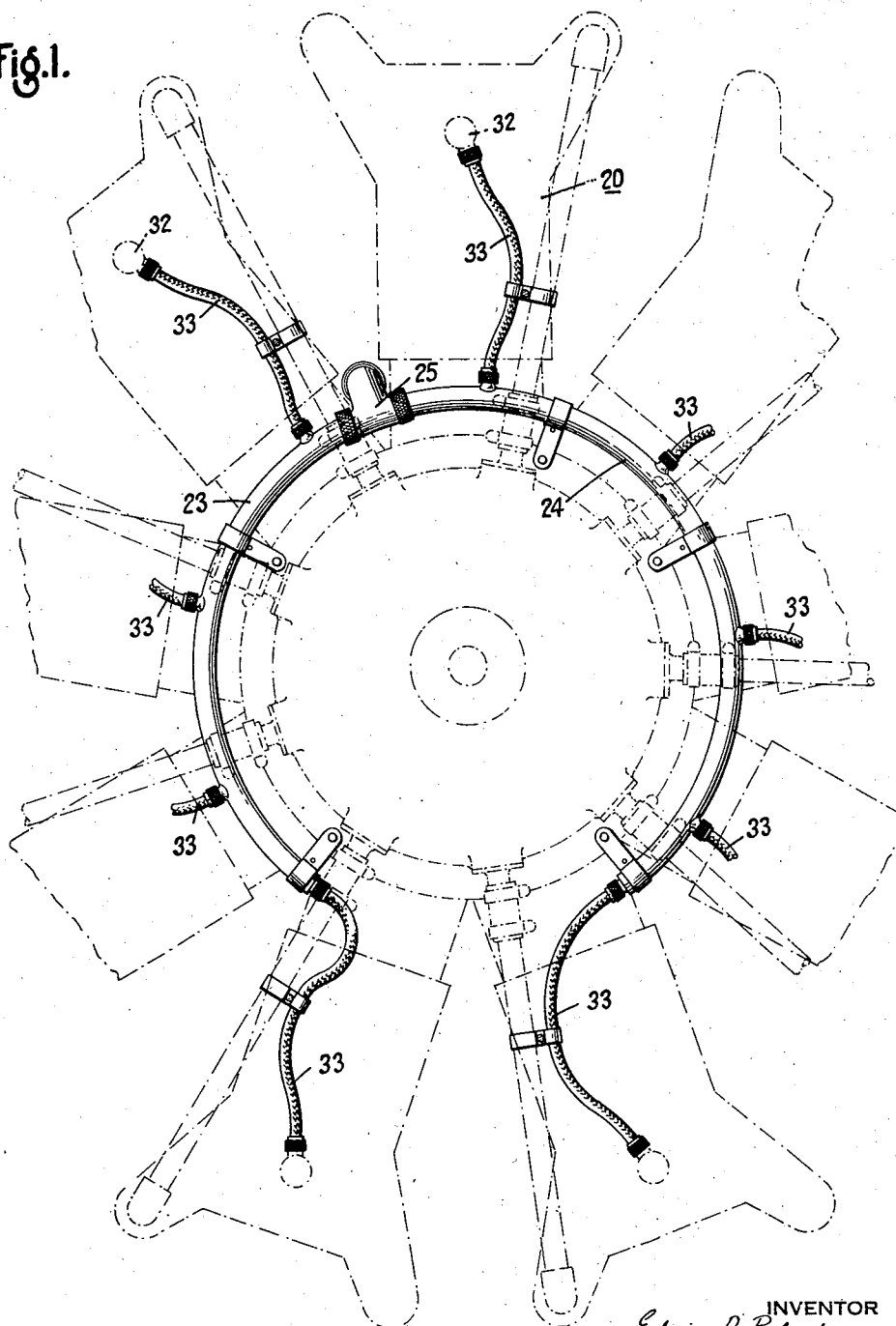
2,234,579

SHIELDED IGNITION MANIFOLD SYSTEM

Original Filed Aug. 10, 1935

4 Sheets-Sheet 1

Fig. 1.



INVENTOR
Edwin A. Robertson
BY
J. Bascom Smith
ATTORNEY

March 11, 1941.

E. A. ROBERTSON

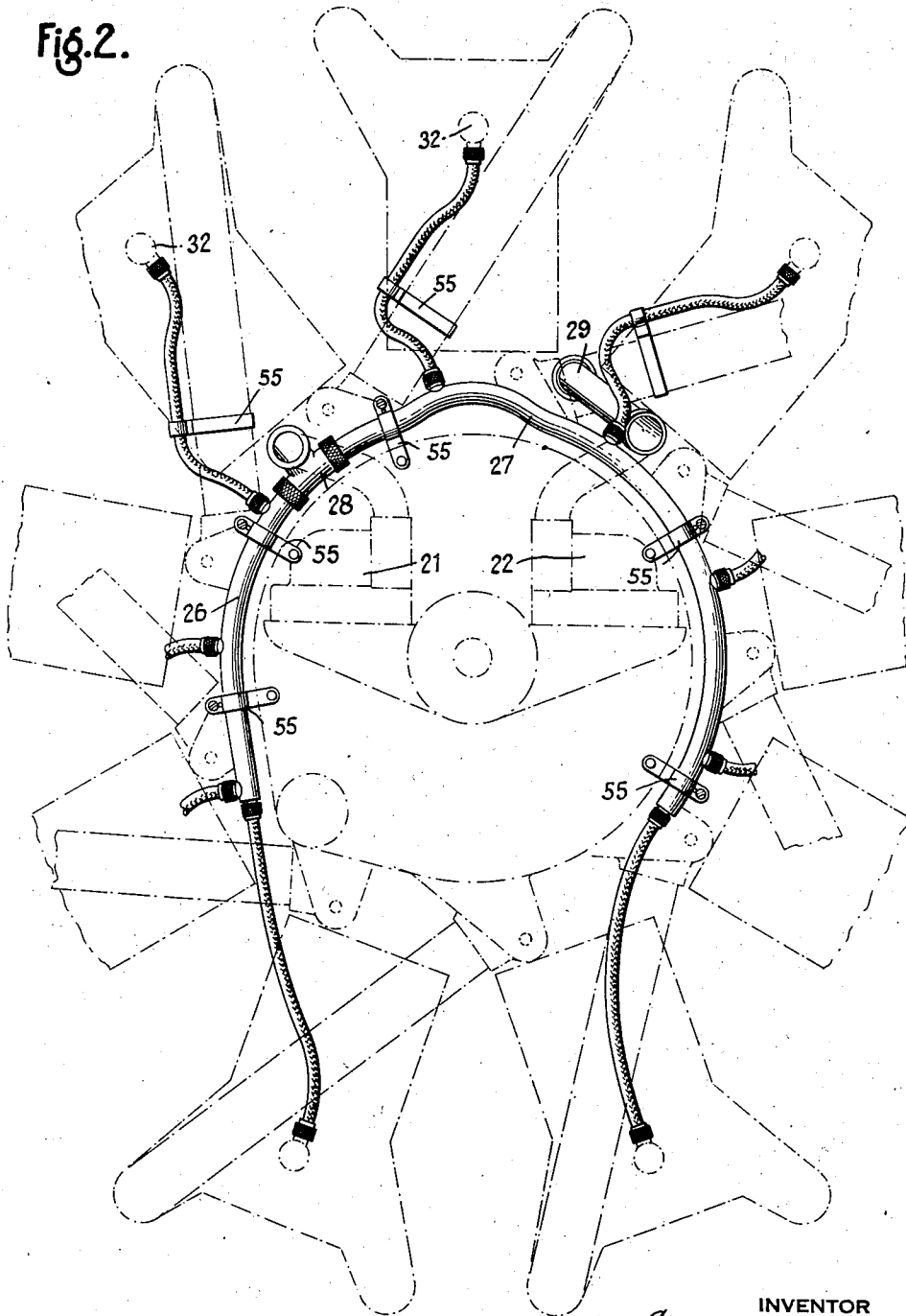
2,234,579

SHIELDED IGNITION MANIFOLD SYSTEM

Original Filed Aug. 10, 1935

4 Sheets-Sheet 2

Fig. 2.



INVENTOR
Edwin A. Robertson
BY
F. Dascom Smith
ATTORNEY

March 11, 1941.

E. A. ROBERTSON

2,234,579

SHIELDED IGNITION MANIFOLD SYSTEM

Original Filed Aug. 10, 1935

4 Sheets-Sheet 3

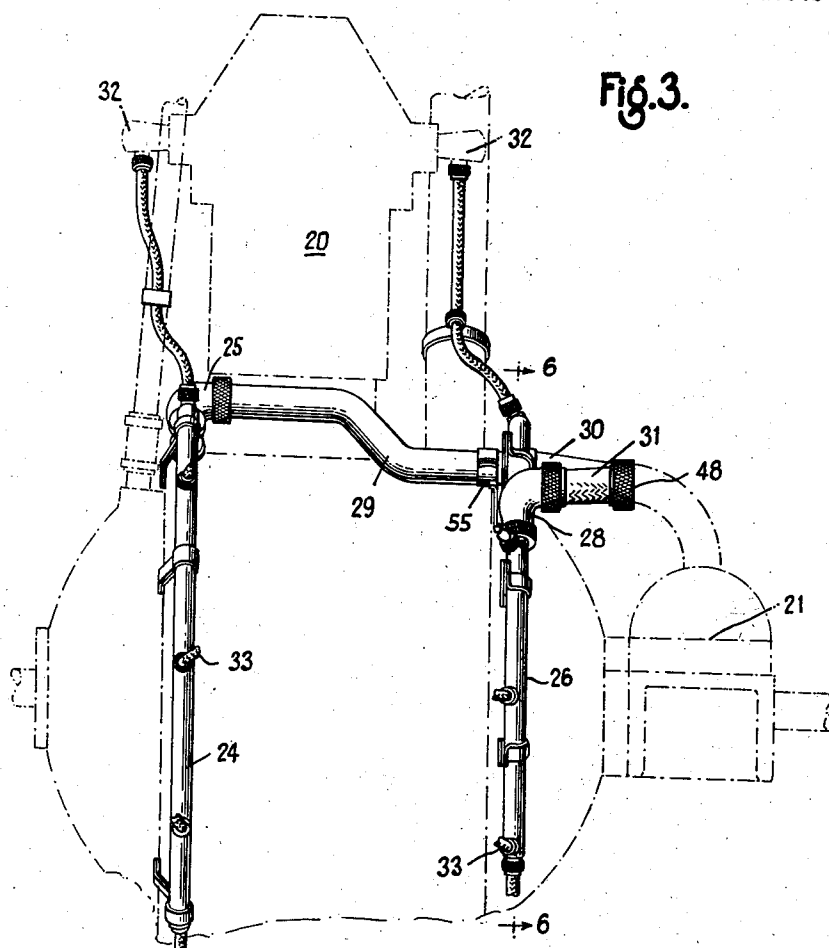
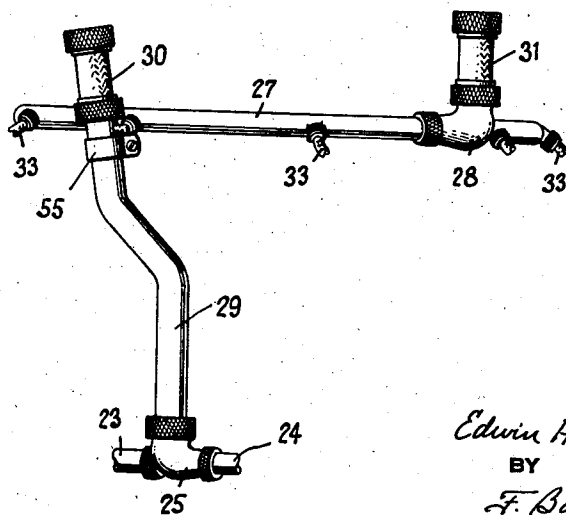


Fig. 4.



INVENTOR
Edwin H. Robertson
BY
F. Bascom Smith
ATTORNEY

March 11, 1941.

E. A. ROBERTSON

2,234,579

SHIELDED IGNITION MANIFOLD SYSTEM

Original Filed Aug. 10, 1935

4 Sheets-Sheet 4

Fig. 5.

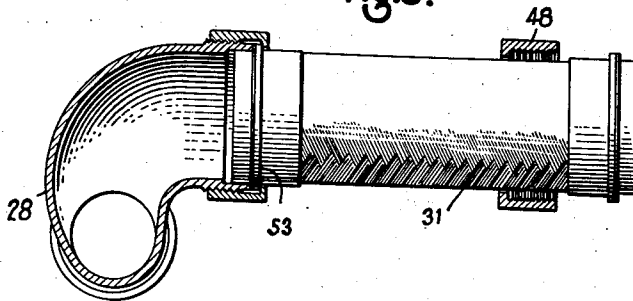


Fig. 7.

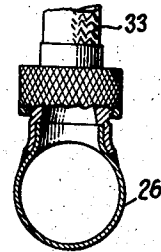


Fig. 6.

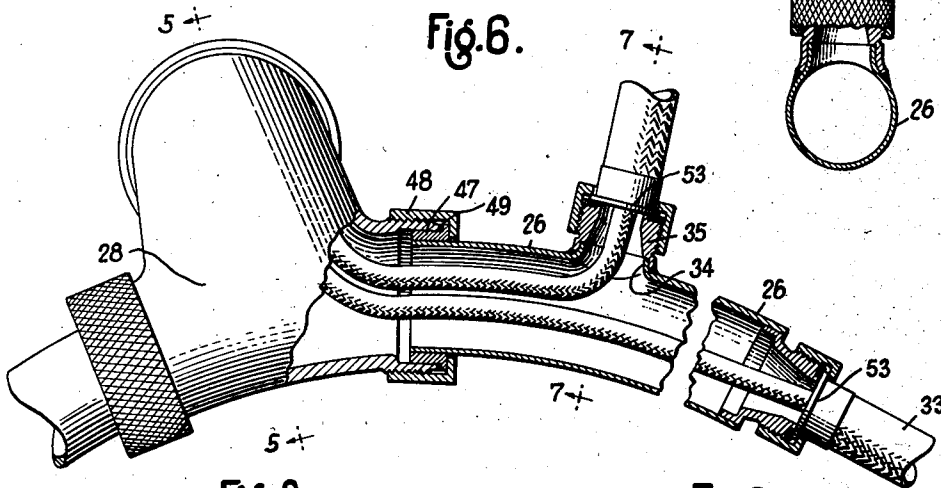


Fig. 8.

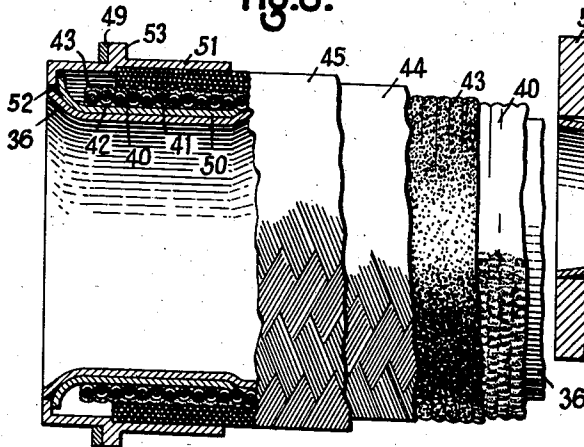
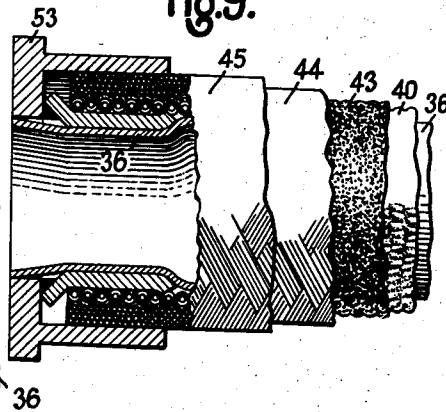


Fig. 9.



INVENTOR
Edwin A. Robertson
BY
F. Bascom Smith
ATTORNEY

UNITED STATES PATENT OFFICE

2,234,579

SHIELDED IGNITION MANIFOLD SYSTEM

Edwin A. Robertson, Sandusky, Ohio, assignor, by
mesne assignments, to Bendix Aviation Corpo-
ration, South Bend, Ind., a corporation of Dela-
ware

Original application August 10, 1935, Serial No.
35,683. Divided and this application May 24,
1940, Serial No. 336,920

6 Claims. (Cl. 123-148)

This invention relates to ignition manifolds for internal combustion motors and has for a general object the provision of improvements in this art.

5 More particularly, the invention relates to a manifold of the pull-in type which is shielded to prevent disturbance with radio reception by stray currents from the ignition wires housed therein.

10 The present application is a division of my co-pending application, Serial No. 35,683, filed August 10, 1935, for Shielded ignition manifold system.

15 Among the more specific objects of the invention are the provision of a manifold which can be readily assembled on a motor, for example, on an airship where space about the motor is very limited; which permits the insulated ignition wires to be pulled in easily and without injury to the insulating covering; which includes improved flexible sections which will hold their cross-sectional shape even when bent and prevent the opening up of braided metal shielding placed thereon; and which in other
20 respects constitutes an advance in the art.

The invention may be more readily understood by reference to the accompanying drawings of an illustrative embodiment thereof wherein:

30 Fig. 1 is a front end elevation of a radial motor equipped with a manifold embodying the present invention;

Fig. 2 is a rear elevation of the same;

Fig. 3 is a side elevation;

Fig. 4 is a partial top plan view;

35 Fig. 5 is a section, partly in elevation taken on the line 5-5 of Fig. 6;

Fig. 6 is a section taken approximately on the line 6-6 of Fig. 3;

40 Fig. 7 is a section taken on the line 7-7 of Fig. 6;

Fig. 8 is an enlarged section, partly in elevation, of one end of a flexible trunk member; and

Fig. 9 is a similar view of a flexible branch member.

45 Referring to the drawings, there is shown in pale broken lines in Fig. 1 a motor 20 on which the manifold is adapted to be mounted. A radial motor is selected for illustration because a radial motor normally offers the most serious problems in manifold design. However, the invention is intended for various types of motors and various types of vehicles. On the motor, also shown in pale broken lines (Fig. 2) there are shown two magnetos 21 and 22 which are
50 conventionally employed for furnishing current

to the spark plugs on the front and back sides of the motor respectively.

The manifold assembly—sometimes referred to as harness—is shown in full lines. It comprises some rigid sections and some flexible sections. Herein there are shown the curved rigid trunk sections 23, 24 on the front united by a T-coupling 25 and the curved rigid sections 26, 27 on the rear united by the T-coupling 28. A rigid tube 29 extends from the front T-coupling 25 through the motor between the cylinders. The front and rear assemblies are connected with the two magnetos (Figs. 3 and 4) by the flexible tubes 30, 31, respectively. The assemblies are connected with suitable parts at the
15 spark plugs—for example, shielding covers 32—by flexible tubes 33.

Thus broadly, there is seen to be provided a manifold having a number of separable parts which are so designed as to permit the convenient assembly thereof upon the motor as well as the convenient insertion therein of the insulated conductors. The assemblage is particularly facilitated by having portions of the rigid conduit system mounted on opposite sides
20 of the motor. This also permits short leads to the spark plug to be used.

The rigid tubular sections 23, 24, 26, 27, may be formed of any suitable metal which is a good electrical conductor and which has good abrasion resisting qualities. For example, a brass tube plated on the outside with cadmium has been found to be satisfactory.

At the points where the conductors emerge for the spark plugs (Figs. 6, 7) the tube is pierced and pushed outward in smooth curvature to form nipples 34 over which the union fittings 35 are secured, as by soldering. It will be seen that the end of the nipples are disposed well back within an annular recess of the shell of the fitting 35 where they will not interfere with or injure the insulated conductors when the latter are drawn therethrough.

In order to avoid excessive corona discharge and capacitance loss between the metal tube and the conductors, it may be desirable to line the manifold with insulating material. Rubber may be used and one method of applying it which has given good results is to place a lining tube within the metal tube, expand it by pressure and cement it in place; or the rubber may be applied by a plating process. Another method which has proved satisfactory is to heat a cellulose tube—as, for example, by soaking it in hot water—until it softens somewhat, then to
55

front and rear of said engine, a metallic radio shield enclosing the high tension terminals of each of said magnetos, a shielding conduit detachably secured at one end to each of said magneto shields and having the other ends thereof detachably secured to one of said manifold tubes, a metallic shield for each of said spark plugs, and a shielding conduit detachably connected to each of said spark plug shields and one of said manifold tubes whereby an electric conductor connecting one of said magneto terminals and one of said spark plugs is completely shielded.

5. In a dual ignition engine of the radial type having two magnetos and a plurality of spark plugs, the combination therewith of a radio shielding ignition harness comprising rigid metallic manifold tubes mounted on the front and rear of said engine, a metal-shielded conduit detachably secured at one end to each of said magnetos and having the other ends thereof detachably secured to one of said manifold tubes, a metallic shield for each of said spark plugs, and a metal-shielded conduit connected to each of said spark plug shields and one of said

manifold tubes whereby an electric conductor connecting one of said magneto terminals and one of said spark plugs is completely shielded.

6. In a dual ignition aircraft engine of the radial type having two magnetos and a plurality of spark plugs, the combination therewith of a radio shielding ignition harness comprising rigid metallic manifold tubes mounted on the front and rear of said engine, a plurality of metal-shielded conduits each detachably secured at one end to one of said magnetos and at the other end to one of said manifold tubes, a metallic shield for each of said spark plugs, a plurality of metal-shielded conduits each connected at one end to one of said spark plug shields and at the other end thereof to one of said manifold tubes, and a plurality of electrical conductors each electrically connected to one of said spark plugs and a terminal of one of said magnetos and each slidably extending through one of said first-named conduits, one of said second-named conduits and at least a portion of one of said rigid manifold tubes, whereby each of said conductors is completely shielded.

EDWIN A. ROBERTSON.