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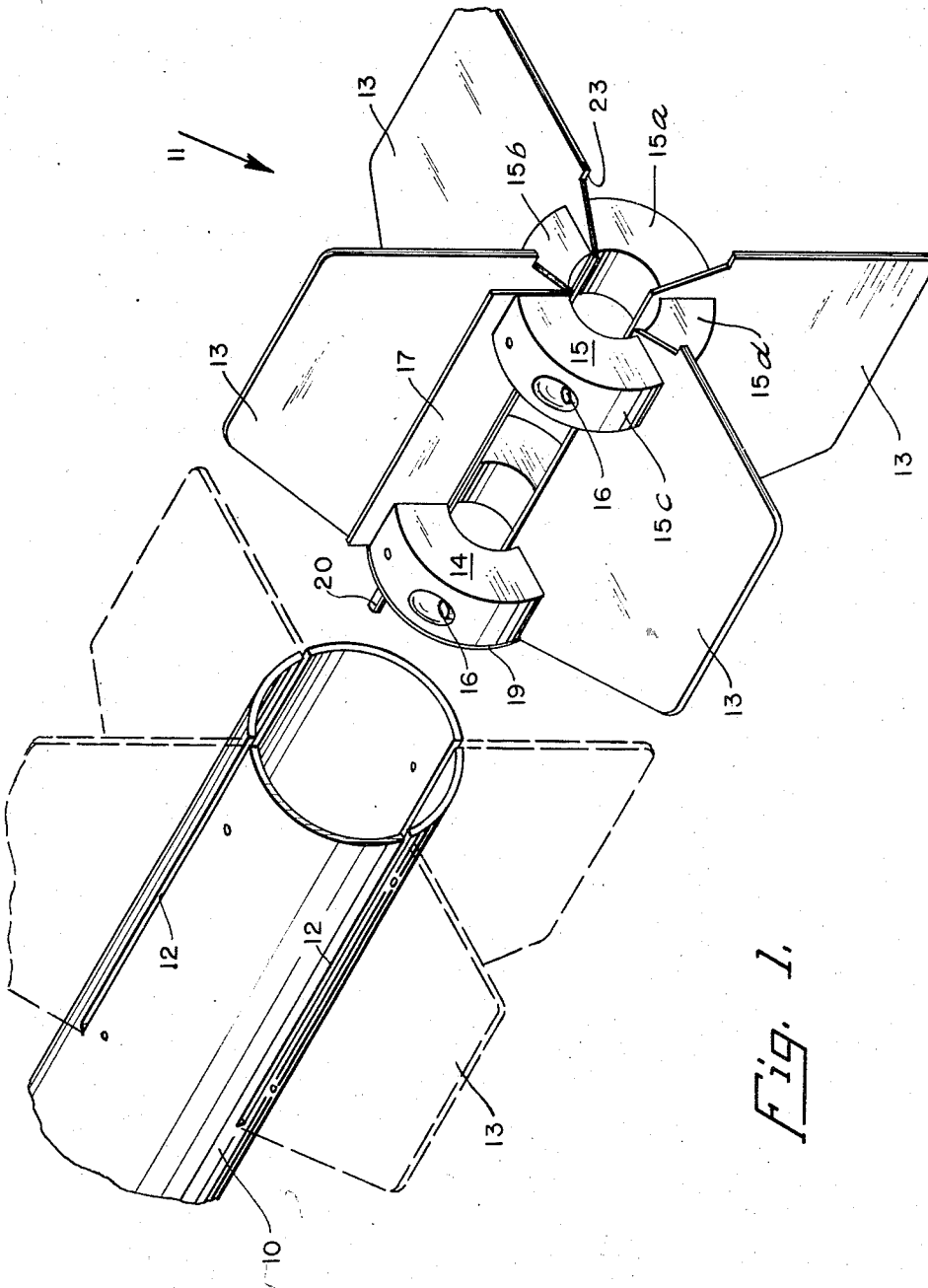
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ROCKET FIN ASSEMBLY

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3 Sheets-Sheet 1



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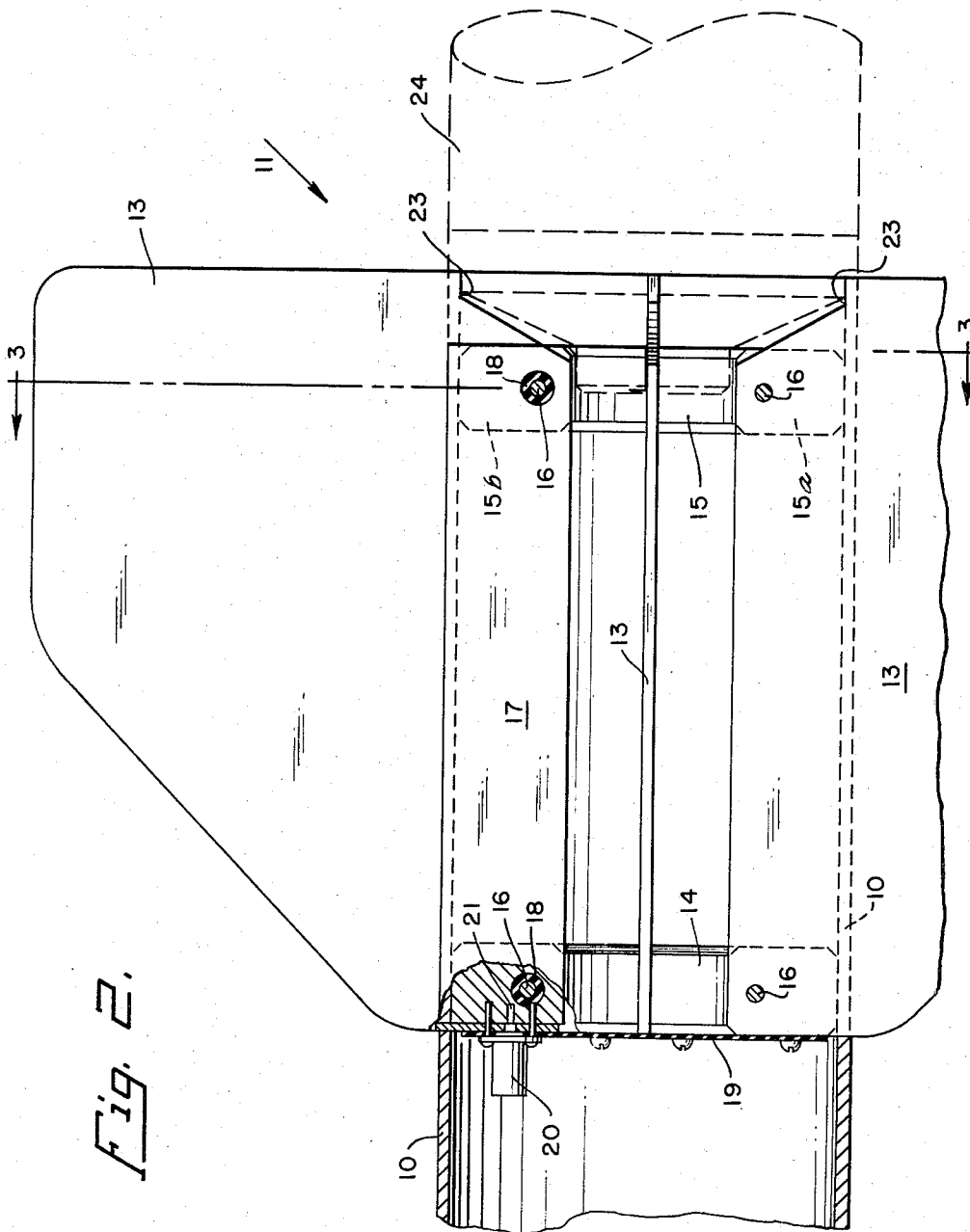


Fig. 2.

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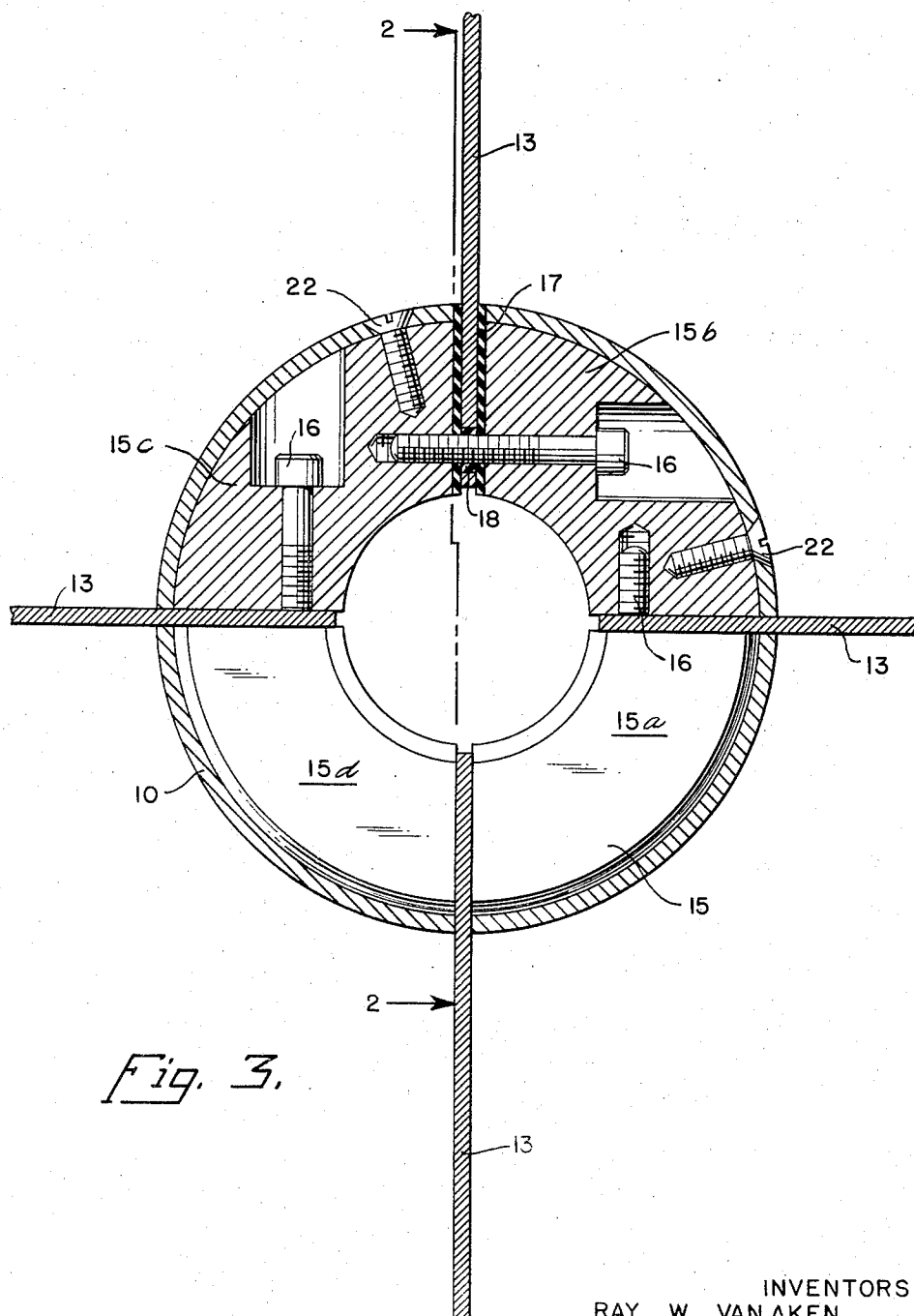
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ROCKET FIN ASSEMBLY

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12 Claims. (Cl. 102—50)

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The invention described herein may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

The present invention relates to rockets and more particularly to an improved fin assembly for free flight models of rockets.

To enable an accurate determination of the flight characteristics of a particular rocket design to be made from an aerodynamic analysis of the flight characteristics of its prototype in free flight, it is necessary that the prototype be aerodynamically clean; that is, it is necessary that the external surface of the prototype be substantially free of interruptions which would alter its aerodynamic characteristics in free flight. Complete freedom from surface interruptions has, in the past, been difficult to achieve owing to a lack of a satisfactory fin attaching arrangement which would provide for a utilization of at least one of the fins as a telemetering antenna. The design problem was further complicated by the necessity that provision be made for the connection of a booster unit to the prototype for propelling it to a point in space where its free flight could be initiated.

The present invention provides a relatively simple fin assembly for free flight rocket models which assembly is adapted to be easily and quickly secured to the casing of the rocket model in a manner which avoids all undesired interruptions in the external surface of the rocket casing whereby an analysis of the aerodynamic characteristics of a model in free flight will provide an accurate pre-assessment of the flight characteristics of the full scale rocket. Moreover, the present invention provides for the utilization of one or more of the fins as a telemetering antenna and for attachment of a booster unit for initially propelling the model to the desired altitude or velocity.

In accordance with the foregoing, an object of the present invention is to provide an improved fin assembly for rockets.

Another object of the invention is to provide an improved fin assembly especially adapted for free flight rocket models.

Still another object of the invention is to provide a fin assembly as in the foregoing which is adapted to be easily and quickly attached to the rocket casing in such a manner that all undesired interruptions in the casing are avoided.

Still a further object of the invention is to provide a fin assembly as in the foregoing wherein a plurality of fins are fixed to a pair of spaced rings to form an integral unit which may be slidably received within the rocket casing with the fins projecting through axially extending slots therein and wherein further a selected one or selected ones of said fins may be insulated from the remainder of the fin assembly so as to provide for a telemetering antenna.

Another object of the invention is to provide an improved fin assembly as in the foregoing wherein there is

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provided an arrangement for attaching a booster unit to the rocket model.

Other objects and many of the attendant advantages of the present invention will become apparent as the same becomes better understood from the following detailed description in conjunction with the annexed drawings wherein:

Fig. 1 is a perspective view showing the present fin assembly preparatory to its insertion into the rocket casing, with the fins shown by phantom lines in their assembled position within the casing;

Fig. 2 is a longitudinal sectional view, taken substantially along line 2—2 of Fig. 3, of the after body of the rocket embodying the improved fin assembly of the present invention with a booster unit shown in phantom lines as being attached thereto; and

Fig. 3 is a transverse sectional view taken substantially along the line 3—3 of Fig. 2.

Referring now to the drawings and more particularly to Fig. 1, there is illustrated a cylindrical casing 10 which may comprise, for example, the outer casing of a free flight rocket model, and at 11 the improved fin assembly of the present invention. Rocket casing 10 has formed therein a plurality of axially extending slots 12 opening through one end of casing 10, as shown, and adapted to have received therein the fins 13 of the fin assembly 11. In general, fin assembly 11 in addition to fins 13, includes a central core comprising a pair of axially spaced rings 14 and 15 to which the fins 13 are, in a manner herein-after described, secured whereby to form an integral unit. Rings 14 and 15 have an outer diameter substantially equal to the inner diameter of rocket casing 10 whereby the fin assembly 11 may, as previously stated, be slidably positioned within rocket casing 10, with the fins projecting through the slots 12 as indicated in phantom lines in Fig. 1.

Referring now to Fig. 3, it will be seen that each of the rings 14 and 15 may comprise a plurality of segments. Thus, for example, ring 15 may comprise segments 15a, 15b, 15c and 15d and between each adjacent pair of which segments one of the fins 13 is disposed. A plurality of bolts 16 extending between adjacent pairs of segments serve to form the assembly into an integral unit and to rigidly secure the fins 13 to the ring members 14 and 15. In order to provide for the utilization of one of the fins 13 as a telemetering antenna there is positioned on either side thereof a spacer member 17, more clearly shown in Figs. 1 and 2, which are comprised of a suitable electrically insulating material whereby the selected fin will be electrically insulated from the remainder of the rocket structure. The adjacent connecting bolts 16 may be provided with insulating sleeves 18 therearound so as to completely isolate the fin. Affixed to the forward face of ring 14 is a disc 19 (Fig. 2) of electrically insulating material for retaining in spaced relationship with ring 14 the base of a connector 20 which is adapted to be coupled to suitable telemetering equipment, not shown, within the rocket casing 10. Connector 20 is affixed to insulator 19 as by small screws, as shown, and has provided thereon a prong 21 for forming an efficient electrical connection in between connector 20 and the insulated fin 13. Fin assembly 11 is adapted to be rigidly secured within the rocket casing 10 by means of screws 22, shown in Fig. 3, which are threaded into each of the rings 14 and 15 and which have their outer surfaces flush with the cylindrical surface of rocket casing 10. The after end of the fins 13 may be notched as shown at 23 (Fig. 2) whereby to permit insertion of a booster unit, shown in phantom lines at 24, which is adapted to be frictionally engaged within the after end of casing 10 for propelling the free

flight model to a point in space where its free flight may be initiated.

It will be apparent from the foregoing description that the present invention provides a relatively simple and easily attachable fin assembly for rockets and more especially for free flight rocket models which eliminates undesired interruptions in the external surface of the rocket to which it is attached and which provides for a relatively simple and efficient manner of insulating one or a desired number of rocket fins to provide for a telemetering antenna and which further provides for the connection of a booster unit.

Obviously, many modifications are possible in the light of the above teachings as, for example, rings 14 and 15 may each be made in one integral piece, instead of in segments as illustrated herein, and merely notched to receive the fins which would be retained within the notches by any suitable fastening means such as screws or bolts similar to those illustrated at 16. It is therefore to be understood that within the scope of the appended claims the present invention may be practiced otherwise than as specifically described herein.

What is claimed is:

1. In a rocket, a hollow casing open at the after end and having a plurality of longitudinally extending slots opening through said after end, a fin assembly including a core member slidably disposed within said after end and having affixed thereto a plurality of radially extending fins equal in number to, and projecting through said slots, and means to secure said assembly in the casing, said core member comprising at least one segmental annular ring member, said ring member comprising a plurality of segments equal in number to the number of fins, said fins being positioned with a portion thereof between the adjacent ends of said segments, and means for drawing adjacent ends of said segments towards one another to form the said annular ring member and to form a clamped joint clamping the segments and fins together in an integral assembly.

2. The arrangement according to claim 1 wherein at least one of said fins is electrically insulated from the remainder of the rocket structure so as to permit the use thereof as a telemetering antenna.

3. The arrangement according to claim 1 wherein the after end of said fin assembly is recessed for receiving the forward portion of a booster unit.

4. In a rocket, a hollow cylindrical casing open at the after end and having a plurality of longitudinally extending slots opening through said after end, a fin assembly including a core member comprising a pair of axially spaced ring members having a plurality of radially extending fins affixed thereto slidably disposed within said casing with said fins projecting through said slots, and means for securing said fin assembly to said rocket casing, each of said ring members comprising a plurality of segments equal in number to the number of fins, said fins being positioned with spaced portions thereof between the adjacent ends of said segments of each of said

axially spaced ring members, and means for drawing adjacent ends of said segments towards one another to form the said annular ring members and to clamp the segments and fins together in an integral assembly.

5. The arrangement according to claim 4 wherein strips of electrically insulating material are disposed on opposite sides of at least one of said fins whereby to electrically insulate said fin from said ring members, said strips extending into the slot receiving said fin whereby to insulate said fin from the rocket casing and having their outer end surfaces flush with the outer surface of the rocket casing.

6. The arrangement according to claim 5 wherein said fins are notched at their after ends whereby to permit the insertion of a booster unit into the after end of said casing.

7. A rocket fin assembly comprising a plurality of individual fins, a central core adapted to be slidably inserted within the open aft end of a rocket casing, said core comprising at least one annular ring member, said ring member being comprised of a plurality of segments equal in number to the number of fins, said fins being positioned with a portion thereof between the adjacent ends of said segments, means for drawing adjacent ends of said segments towards one another to form said annular ring member and to clamp said segments and said fins together in an integral assembly.

8. A rocket fin assembly according to claim 7 in which said central core comprises a pair of axially spaced annular ring members.

9. The arrangement according to claim 7 wherein said core comprises a pair of axially spaced annular ring members.

10. The arrangement according to claim 7 wherein a pair of strips of electrically insulating material are disposed on opposite sides of at least one of said fins for electrically insulating said one fin from the remainder of the fin assembly whereby to permit the use of said one fin as a telemetering antenna.

11. The arrangement according to claim 7 wherein one end of said fin assembly is recessed to receive a booster unit.

12. The arrangement according to claim 1, wherein at least one of the fins has a sheet of electrically insulating material placed on either side of the area of connection to said segmental ring and the clamped joint is effected by means electrically insulating the fin from the remainder of the assembly.

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