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B. B. KORN

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NOSE SECTION-QUICK DISCONNECT

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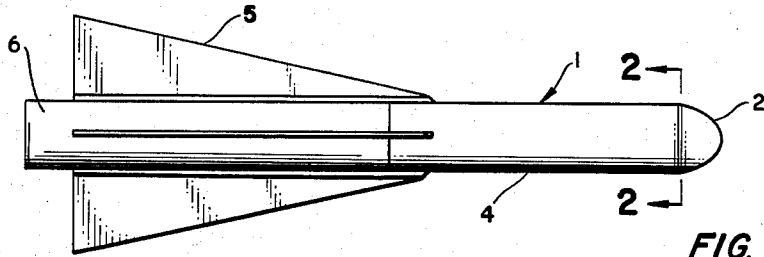


FIG. 1.

FIG. 2.

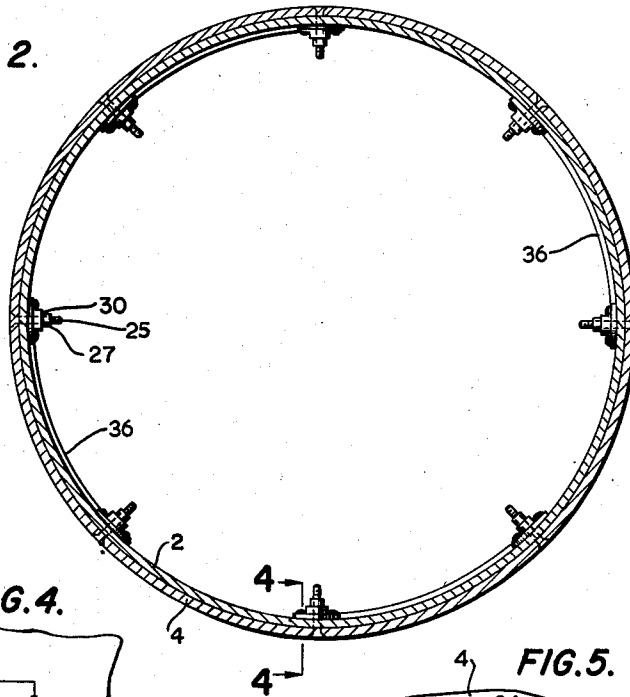


FIG. 3.

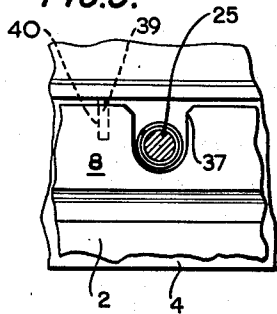


FIG. 4.

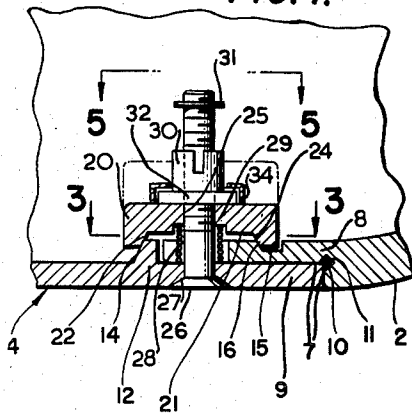
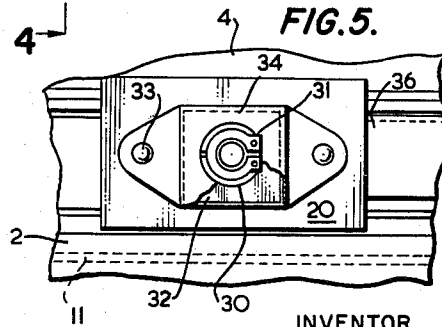


FIG. 5.



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1

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NOSE SECTION-QUICK DISCONNECT

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1 Claim. (Cl. 285—18)

This invention relates to guided missiles, and particularly to an improvement in means for assembling securely together separable sections.

The embodiment herein described permits ready assembly and disassembly of adjacent longitudinal sections without requiring relative rotation.

It is common practice in the field of guided missiles to build such devices in a plurality of functionally separate longitudinal sections. Each section contains one of the various specialized equipments required to perform one of the requisite missile functions, with the several sections fixed together to form a complete unit. In one such missile, for example, the nose portion consists of a radome, with additional fuselage sections containing the guidance mechanism, the explosive load, and the propulsion means.

As the missile is increased in size and weight, it becomes increasingly difficult for personnel to assemble and to disassemble the several sections for periodic maintenance and service operations, particularly in the field.

Adjustments are required in the electronic equipment from time to time, and regular inspections are desirable, to insure that the missiles will properly function on demand.

In the prior art, difficulty has been experienced with certain types of locking arrangements, in that when the separate sections were held together by screw thread means, repeated assembly and disassembly might jam the threads sufficiently so that the sections could no longer be assembled or, in some cases, so that they could not be disassembled for the proper maintenance.

The inability to disassemble a missile after a war head or explosive load has been incorporated therein, is particularly disadvantageous, since it represents a potential hazard to personnel. A missile once so loaded, which cannot be disassembled, must be handled with special care for appropriate disposal.

One method of solving the problem has been described in my application entitled, "Ring Assembly Quick Disconnect Nose," filed July 1, 1957, Serial No. 669,914, and assigned to the assignee of the present case.

The instant invention represents an improvement over that disclosed in my pending application referred to above, particularly adapted for use with the larger and heavier missiles. In the instant case, each of the several sections is joined to adjacent sections by means of a plurality of internal locking members so formed as to draw the adjacent sections tightly together during assembly, and to be readily releasable so that these sections may be separated for normal maintenance.

The present invention utilizes fully the additional strength inherent in the steel shells necessary with rockets in which the speeds employed are such as to require extreme heat resistance. The high temperature steel used is able to maintain its strength even at the elevated temperatures to which the missile is subjected at supersonic speeds. This would not be true with the materials satisfactory for slower speeds. At the same time, the struc-

2

ture is so simple that a minimum of equipment is required to assemble and disassemble the sections, and the likelihood of damage to the parts during such operations has been minimized.

In addition, the present invention makes it impossible for the locking parts to be accidentally lost from the various section assemblies. This is a substantial advantage over prior practice in which particular sizes and shapes of parts were frequently mislaid under field conditions, leading to unserviceability of the equipment.

Thus, it is the primary object of the invention to provide an improved missile structure.

Another object is to provide a missile structure which is capable of ready assembly and disassembly under field conditions.

A further object is to provide a missile structure having a plurality of separable sections which may be readily connected and disconnected.

A still further object is to provide a missile structure which minimizes the possibility of the locking together of the sections once assembled.

These and further objects will be apparent from the description hereafter and the drawings in which:

Fig. 1 is a side elevational view of a missile incorporating the invention;

Fig. 2 is a sectional view taken in the plane indicated by line 2—2 of Fig. 1;

Fig. 3 is a fragmentary view taken as indicated by line 3—3 of Fig. 4, but rotated clockwise 90 degrees to show a detail of the interior construction;

Fig. 4 is a fragmentary sectional view taken as indicated by line 4—4 of Fig. 2, but rotated clockwise 90 degrees to show details of the means for securing the separate sections together; and

Fig. 5 is a fragmentary view taken as indicated by line 5—5 of Fig. 4, but rotated clockwise 90 degrees to show additional details of construction.

Referring now to the drawings for a more detailed description of the invention, there has been shown in Fig. 1 a missile, generally indicated as 1, having a nose or radome section 2, and a fuselage or body section 4, to which are attached a plurality of ailerons 5 for guiding the missile, and a rear section 6. It will be understood that the nose 2 generally contains guidance mechanism forming no part of the present invention, while the fuselage 4 encloses an explosive load or war head. The propelling means may be included in the body section 4, or may be carried in the rear section 6.

It is ordinarily desirable to be able to remove the nose 2 from the fuselage 4, either for replacement of damaged parts or for normal maintenance and adjustment. The fuselage may, in turn, be divided into separate longitudinal sections with the electronic control equipment and the war head located in the forward portion, and the propellant located entirely in the rear section 6. Various other sectional arrangements, including additional longitudinal sections, may be used if desired.

The invention proper is arranged to connect these sections using a minimum of equipment in the way of tools, and is so constructed that the parts will not become unserviceable through use, as has been so often the case where the sectional sections are joined together by screw threads.

The device herein presented, calls for the formation on the rear edge of the radome 2 of a shouldered receiving portion 7 which fits snugly within and against the forward end 9 of the fuselage 4. The joint between the radome section 2 and the fuselage section 4 is additionally sealed by means such as an O-ring 10 seated in a groove 11 formed annularly of the shouldered receiving portion 7. A similar construction may be used to seal the joints between additional rearwardly positioned sections.

A short distance to the rear of the forward end 9 of the fuselage 4, a plurality of transverse buttresses 12 is formed symmetrically about the longitudinal axis of the device, each with a rearwardly inclined face 14. Forwardly of the rear boundary of the receiving portion 7, a radome skirt 8 is formed with an annular locking groove 15. Groove 15 has a forwardly disposed face 16 inclined at an angle similar to that of the rearward face 14 of the buttress 12, but oppositely inclined thereto. The direction of inclination of faces 14 and 16 is such that if a force is exerted against them radially outward of the device, it will tend to pull the radome nose 2 into tight engagement with the shouldered receiving portion 7 at the forward end 9 of the fuselage.

A plurality of locking plates 20 is disposed within and symmetrically spaced about the longitudinal axis of the device. On the side thereof facing outwardly, each of the locking plates 20 is channeled to form a retaining groove 21, having oppositely inclined faces 22 and 24, which are respectively adapted to cooperate with the inclined surface 14 of the buttress 12, and with the inclined surface 16 of the annular groove 15. The number of locking plates 20 utilized is dependent upon the size of the fuselage, and they may be used conveniently with a center-to-center spacing of about two inches. Each of the locking plates 20 has a central aperture 25 through which a conventionally slotted broadheaded bolt 26 may pass freely. Bolt 26 is seated in a suitably chamfered seat 27 either flush with or slightly recessed within the surface of the fuselage 4. A resilient member in compression, such as a coil spring 28, is disposed about bolt 26 within the fuselage 4. Spring 28 tends to force the locking plate 20 inwardly from the fuselage 4 except when held thereagainst by the tightening of a threaded nut 30. Nut 30 is prevented from unintentional disconnection by a cotter pin or locking ring 31 of conventional design. Nut 30 is held against rotation by means such as a square head 32 formed integrally therewith which cooperates with a recessed cap member 34. Cap member 34 is held against rotation by rivets 33 fixed through locking plate 20. Each locking plate 20 is joined to an adjacent plate by means of a retention strap 36. The same rivets may secure the retention strap 36 and the cap member 34 to the locking plate 20. Thus, as the nuts 30 are loosened, the resilient coil springs 28 will force the locking plates 20 inwardly out of engagement with the locking buttresses 12 and 15, but locking straps 36 will hold the respective parts in proper relation to the fuselage 4. On reassembly, the grooves 37 formed in the rear skirt 8 of the nose section 2 will be able to fit around the bolts 26 and be in position to again be secured by the cooperation of the locking plates 20 with the inclined face 14 of the fuselage locking buttress 12 and the inclined face 16 of the nose locking groove 15.

Since all of the mounting screws are symmetrically spaced about the fuselage, it is only necessary during assembly or reassembly to align a key 39 associated with

the nose member 2, with a cooperating key way 40 formed in the fuselage 4, in order that the appropriate plug-in connections may be in proper registry. When the bolt 26 is rotated to draw the nut 30 tightly against the locking plates 20, the assembly will again be secure.

It will be apparent that since the locking plates 20 are so associated with the fuselage that they are not removed during the disassembly of the missile sections, there will be no occasion for the loss of critical fastenings during field operations, and since the tightening of the locking members requires only the use of a screwdriver, it is unnecessary to rely on the presence of special tools which might not always be available to the maintenance personnel. Thus, with the aid of the present invention, even the largest missiles may be provided with mechanism for quick assembly and disassembly without the likelihood of parts being unavailable at critical periods.

I claim:

In a cylindrical container divided transversely into a plurality of sections, means for removably connecting adjacent sections together, comprising: a plurality of threaded securing members symmetrically positioned about and through the forward end of at least one of said sections; a plurality of slots, arranged to receive said securing means slidably, formed in the rear end of at least one of said sections; a buttress formed within at least one of such sections adjacent to the forward end thereof and in longitudinal alignment with each of said securing members; an inclined face formed rearwardly on each of said buttresses; an annular locking groove having an inclined face formed within the rear end of at least one of said sections; a plurality of cap members apertured to fit about said threaded securing members, said cap members being recessed on the outwardly directed portions thereof to define inclined surfaces arranged to cooperate with the inclined surfaces of said buttresses and of said locking groove; means for forcing said cap members against said buttresses and locking grooves, comprising a nut arranged to cooperate threadably with each of said securing members; means for resiliently urging each of said cap members away from said buttresses and locking groove when said nuts are unscrewed from said securing members; means for preventing complete separation of said threaded securing members from said nuts; means for maintaining the connection between each of said nuts and the associated one of said cap members while permitting relative rotation therebetween; rotation-preventing means for securing together adjacent ones of said securing members; and means for producing a hermetic seal between adjacent sections of said container.

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