ROCKET SHELL CONSTRUCTION
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This invention relates to rocket shell construction and has as its object to provide an improved construction of rocket shell guiding services, namely, the stabilizing fins and the manner in which the stabilizing fins are mounted on the rocket shell.

In the construction of rocket shells, a problem exists with respect to the providing of stabilization fins. The stabilization fins must fulfill the required aerodynamic requirements and at the same time be of reasonable construction cost, and of suitable strength and resistance to withstand operating conditions. This problem is of particular significance which it is desired to use stabilizing fins of plastic material. There is at present an effort to provide a rocket shell, placed with plastic outer body and plastic stabilization fins, and the problem of suitable stabilizing fins is especially significant with respect to such construction.

The principal object of the invention is to provide a rocket shell construction particularly as it relates to the stabilizing fins and the mounting thereof, which is of a nature to meet the condition referred to above.

According to the invention, a rocket shell comprises an elongated body having a forward end portion and a rear end portion, a closure for the rear end portion, a stabilizer fin assembly mounted on the rear end portion, and means securing the stabilizer fin suspension on the body rear end portion. The stabilizer fin assembly includes a plurality of stabilizer fins joined at their base to a stabilizer fin sleeve, and the stabilizer fins extend radially outwardly from the sleeve. The sleeve is positioned about the body rear end portion, and the means interconnecting the stabilizer fin assembly and the body rear end portion comprises means disposed circumferentially about the body rear end portion and which interconnects the stabilizer fin assembly and the body rear end portion in a manner to fixedly secure the stabilizer fin assembly on the body rear end portion to prevent axial and rotational movement of the stabilizer fin assembly on the body rear end portion.

The construction provided by the invention has particular application in respect to training rockets, and hence, in rocket shell utilizing the construction of the invention there can be radial openings through body portion forward of the stabilizer fin assembly and adjacent thereto.

In one form of the invention, the key means interconnecting the stabilizer fin assembly and the body rear end portion can be a spline and integral with either the sleeve or the body rear end portion, the spline extending circumferentially about the part that it is integral with. The part not provided with a spline is then provided with a circumferentially extending groove for receipt of the spline. In the spline construction, the spline fits tightly in the groove provided therefor and secures the stabilizer fin assembly in a fixed position so that it is axially fixed and is restrained against rotation about the body portion of the shell. The stabilizer fin assembly is positioned on the shell body rear end portion by forcing the pin assembly and shell together by moving these parts axially with respect to each other so that the part bearing the groove passes over the spline to the extent that the spline and groove come to opposed relation, whereupon the spline snaps into the groove. One of the parts, either the stabilizer fin assembly or the shell rear end portion, is of material which is resiliently yieldable to the extent that the parts can be assembled in the manner described.

In a preferred construction, the spline is integral with the rear end portion of the shell body.

An alternative manner of mounting the stabilizer fin assembly on the shell by a key interconnection, is to provide at each of the stabilizer fin assembly and the body rear end portion, with a circumferentially extending groove, these two grooves being in communication with the stabilizer fin assembly in the normal mounted position. A split ring then serves as the key interconnecting means, the split ring being positioned in the grooves.

The invention is further described with reference to the accompanying drawings, wherein:

FIG. 1 is an elevational view of a portion of a rocket shell according to the invention;
FIG. 2 is the same as FIG. 1, except that a part of the rocket shell is shown in cross-section; FIG. 3 is a plan view, in cross-section, taken along line III—III in FIG. 1;
FIG. 4 is a view of a stabilizer fin assembly corresponding with FIG. 2; and
FIG. 5 is a plan, cross-section, view taken along line V—V in FIG. 4.

In the embodiment shown in FIG. 1—FIG. 3, the rocket shell comprises a body having a forward end portion 1 and a rear end portion 11. A stabilizer fin assembly is made up of the stabilizer fins 6 which are secured at their base to the sleeve 7. Forward of the stabilizer fin assembly there are radially extending openings 12, and a cup 3 having an exhaust opening 4 is mounted on the rear edge portion of the shell body. This cup is fixedly secured in place by any suitable means such as a tight threaded connection.

The mounting of the stabilizer fin assembly on the shell body rear end portion 11 can be best seen in FIG. 2 and FIG. 3. The body rear end portion is provided with integrally formed radially outwardly extending splines 8; the sleeve 7 of the stabilizer fin assembly is provided with circumferentially extending grooves 8 which receive the splines 9. The splines 9 fit tightly in the grooves so that the stabilizer fin assembly is prevented from moving axially with respect to the body portion, and, further, is prevented from rotating on the body portion. Either the stabilizer fin assembly or the rear end portion of the shell is of such material that it is resiliently yieldable so that the stabilizer fin assembly can be positioned on the rocket shell by forcing the stabilizer fin assembly axially over the splines 9. To facilitate such assembly, the inner forward circumferential edge of the stabilizer fin assembly sleeve 7 is provided with a guide surface 10 so that upon sliding the stabilizer fin assembly sleeve 7 over the rear edge portion of the rocket shell to the extent that the forward portion of the shell 7 engages the rearmost spline 8, the shell presents an inclined surface to the engaged spline, whereupon, when force is applied, the shell can be made to rise up over the spline. The shell can then be forced on to the extent that the slots 8 are in opposed relation to the splines 9, and the splines 9 then snap into the slots 8.

In the embodiment shown in FIG. 4, the key means interconnecting the stabilizer fin assembly and the rocket shell comprises split rings. Thus, each of the stabilizer fin assembly sleeve 7 and the body rear end portion 11 are provided with grooves 14, and the body rear end portion 11 is provided with grooves 15. With the stabilizer fin assembly in its normal position mounted on the rocket shell, these grooves are in opposed and communicating relation. A split ring 16 is disposed in each pair of opposed, communicating grooves and serves to fixedly position the stabilizer fin assembly on the body rear end por-
3. Position in the manner previously described. To position the stabilizer fin assembly on the rocket shell, in this embodiment, the split ring is positioned on the rocket shell, and the stabilizer fin assembly seal is then slid over the split rings to the extent that the grooves 14 in the shell 7 come into opposed relation with the split rings, whereupon the split rings snap into place, bridging the grooves in the shell rear end portion and in the stabilizer fin sleeve 7, providing a key connection between these parts.

The stabilizer fin assembly can be, and preferably is, one piece structure formed of non-combustible plastic. The shell or the shell rear end portion can be of similar material. Where the interconnecting key means for the stabilizer fin assembly and shell rear end portion is a spline integral with one of these parts, the spline can be of the material of the part with which it is integral. Where a split ring is used, the split ring can be of plastic or of a suitable metal.

While particular embodiments of the invention have been described, these embodiments are merely representative and do not define the limits of the invention.

What is claimed is:

1. A rocket shell comprising:
   (a) an elongated body portion having a forward end portion and a rear end portion;
   (b) a closure for the rear end portion;
   (c) a stabilizer fin assembly mounted on the rear end portion, said stabilizer fin assembly including a plurality of stabilizer fins joined at their base to a stabilizer fin sleeve and extending radially outwardly from the stabilizer fin sleeve;
   (d) said sleeve being positioned about the body rear end portion;
   (e) key means disposed circumferentially about the body rear end portion interconnecting the stabilizer fin assembly sleeve and the body rear end portion and fixedly securing the stabilizer fin assembly on the body rear end portion, to prevent axial and rotational movement of the stabilizer fin assembly on the body rear end portion;
   (f) said key means comprising a spline integral with one of said stabilizer fin sleeve and the body rear end portion, the other of said stabilizer fin sleeve and body rear end portion having a circumferentially extending slot receiving the spline and providing said interconnection of the stabilizer fin assembly sleeve and the body rear end portion;
   (g) at least one of said stabilizer fin sleeve and said body rear end portion being resiliently yieldable permitting mounting of the stabilizer fin sleeve on the body rear end portion with said spline engaged as aforesaid by forcing the stabilizer fin sleeve axially of the body rear end portion to the extent that the spline becomes engaged in the circumferential slot as aforesaid.

2. A rocket shell according to claim 1, said rocket shell being a training shell having means defining radially extending openings through the rocket shell, forward of the stabilizer fin assembly and adjacent thereto.

3. A rocket shell according to claim 1, said closure for the rocket shell rear end portion being a cup, said cup receiving a rear edge portion of the body member and being fixedly mounted on the body member.

4. A rocket shell according to claim 1, the stabilizer fin assembly being formed of non-combustible plastic, the stabilizer fin being integral with the stabilizer fin sleeve.

5. A rocket shell according to claim 1, the stabilizer fin assembly being formed of non-combustible plastic, the stabilizer fin being integral with the stabilizer fin sleeve.

6. A rocket shell according to claim 5, said rocket body rear end portion being of non-combustible plastic.

7. A rocket shell comprising:
   (a) an elongated body portion having a forward end portion and a rear end portion;
   (b) a closure for the rear end portion;
   (c) a stabilizer fin assembly mounted on the rear end portion, said stabilizer fin assembly including a plurality of stabilizer fins joined at their base to a stabilizer fin sleeve, said slots being circumferential;
   (d) said sleeve being positioned about the body rear end portion;
   (e) key means disposed circumferentially about the body rear end portion interconnecting the stabilizer fin assembly sleeve and the body rear end portion and fixedly securing the stabilizer fin assembly on the body rear end portion, to prevent axial and rotational movement of the stabilizer fin assembly on the body rear end portion;
   (f) at least one pair of opposed and communicating slots, one of said slots being in the body rear end portion and the other of said slots being in the stabilizer fin sleeve, said slots being circumferential;
   (g) said key means comprising split rings compressed in said slots; and
   (h) at least one of said stabilizer fin sleeve and said body rear end portion being resiliently yieldable permitting mounting of the stabilizer fin sleeve on the body rear end portion with said spline engaged as aforesaid by forcing the stabilizer fin sleeve axially of the body rear end portion to the extent that the spline becomes engaged in the circumferential slot as aforesaid.

8. A rocket shell according to claim 7, said rocket shell being a training shell having means defining radially extending openings through the rocket shell, forward of the stabilizer fin assembly and adjacent thereto.

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