United States Patent [19]

Lee

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[54] **FLYING TOY PROJECTILE**

[76] Inventor: **Douglas J. Lee,** 1036 1/2 St., Houston, Tex. 77009

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[52] **U.S. Cl.** **46/81**

[51] **Int. Cl.** **A63h 27/14**

[58] **Field of Search** ..... 46/81, 74 B; 124/5, 21

[56] **References Cited**

UNITED STATES PATENTS

3,264,777	8/1966	McCreary, Jr.	46/81
3,496,671	2/1970	Korona	124/21

FOREIGN PATENTS OR APPLICATIONS

585,286	10/1958	Italy	46/81

Primary Examiner—Louis G. Mancene
Assistant Examiner—Robert F. Cutting
Attorney, Agent, or Firm—Kenneth H. Johnson

[57] **ABSTRACT**

A toy projectile which has a channel through the fuselage and is launched from a rod on which the fuselage is slidably mounted, is made more controllable by having the rod engage in the channel as a key in a keyway.

14 Claims, 8 Drawing Figures

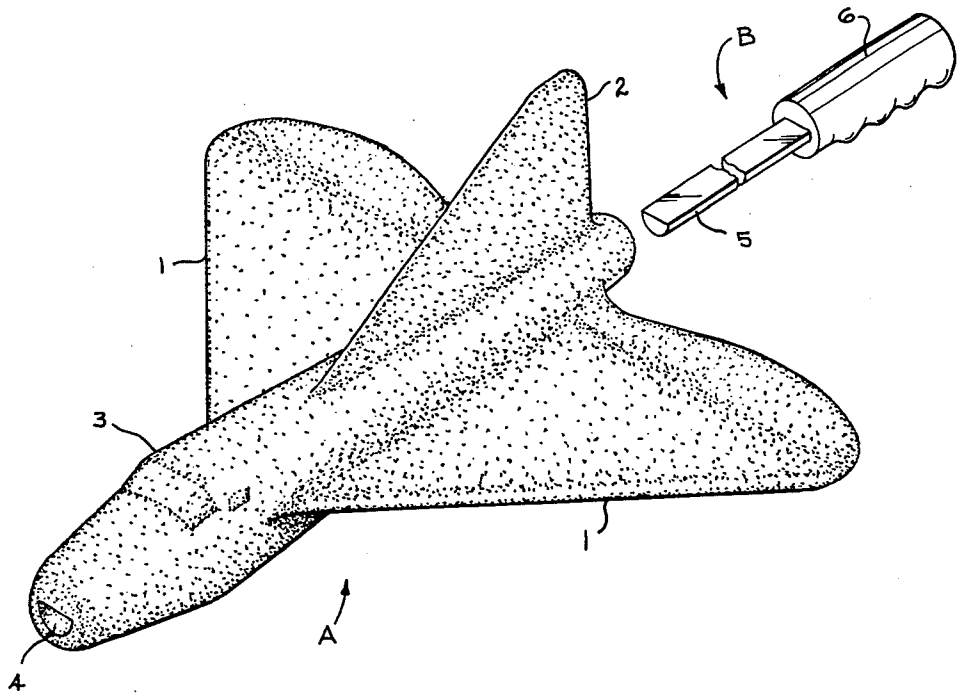
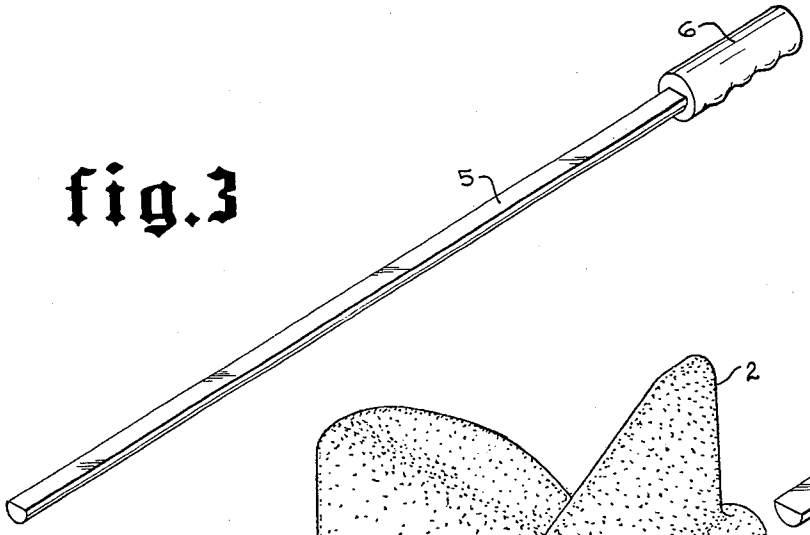


fig.3



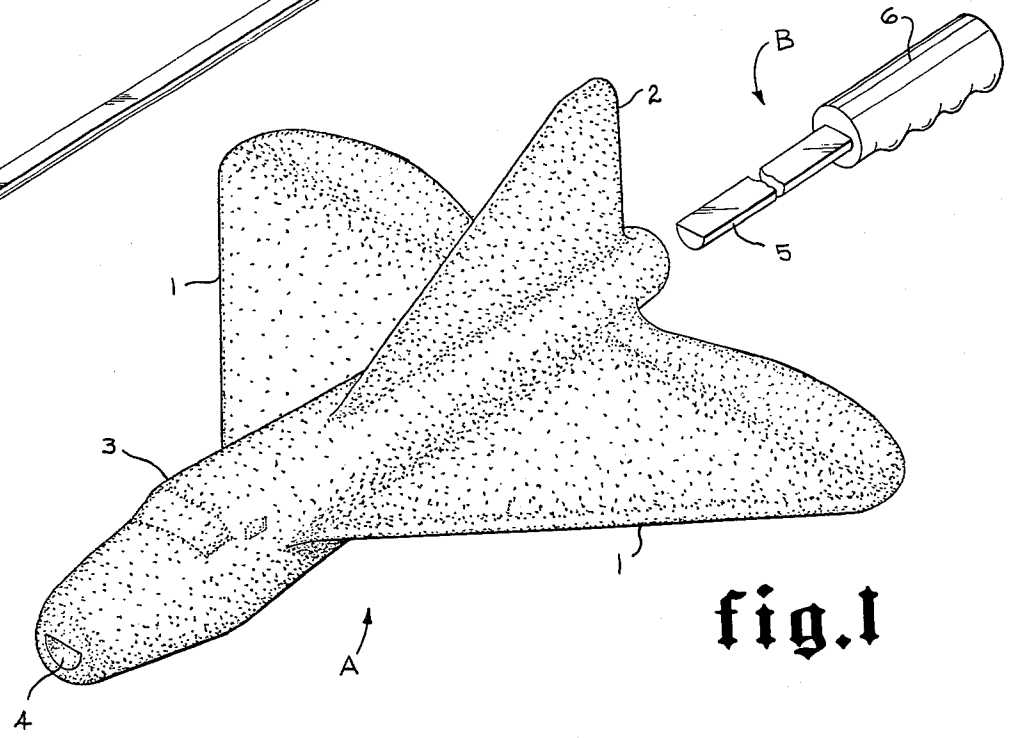
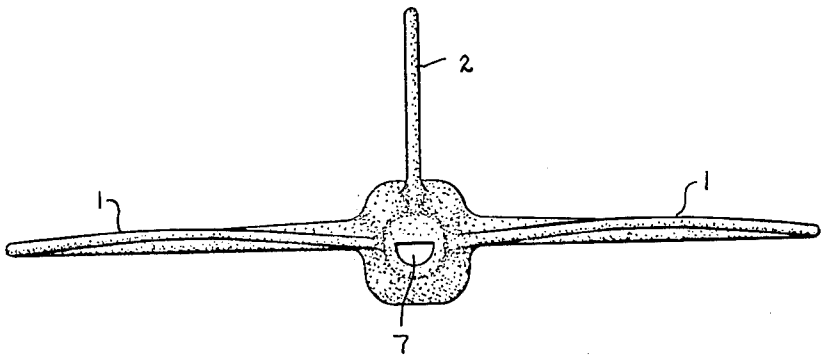


fig.1

fig.2



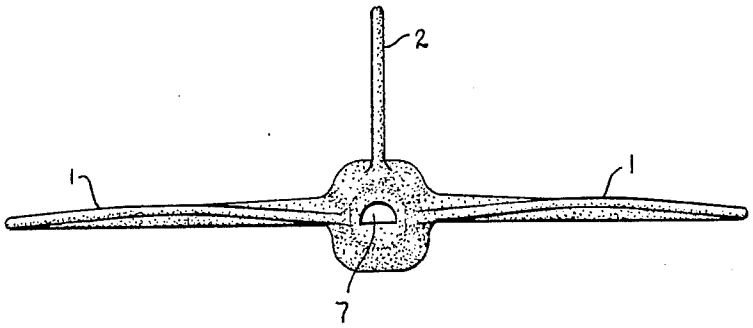


fig.4

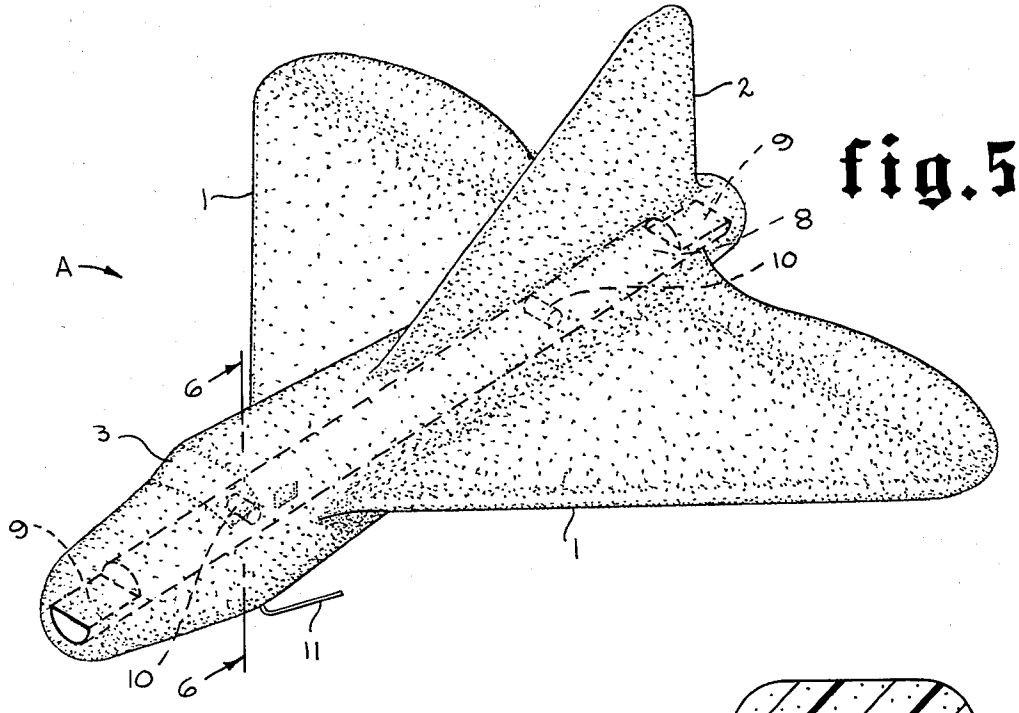


fig.5

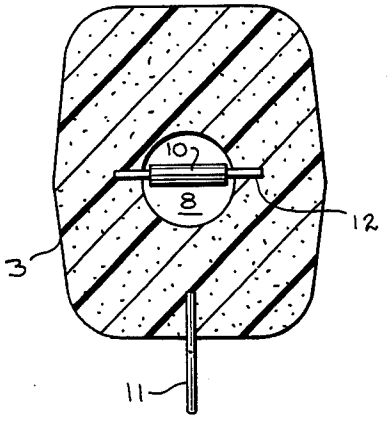


fig.6

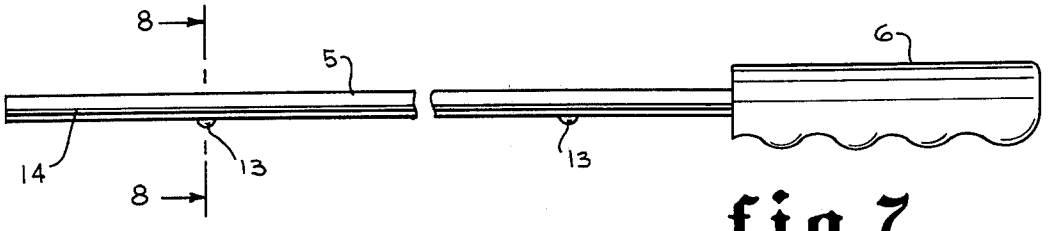


fig.7

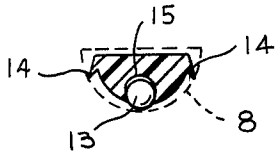


fig.8

FLYING TOY PROJECTILE

BACKGROUND OF THE INVENTION

The present invention relates to a toy projectile or more particularly a toy airplane which is launched into the air from an elongated rod. In particular, this invention relates to projectiles which have no force of their own, such as air screws or jets, but which have the launching force provided to the projectile from an outside source. The principal source of outside power for such projectiles has been hand launching, that is, the projectile, an airplane in this instance, is held in the hand of the operator and the projectile tossed or thrown by the operator. This method works adequately well, however, hand launching may be erratic and is limited in the amount of force that may be applied to projectile. The amount of lift provided to the wings of the projectile is determined by the initial thrust from the hand launching. It has been found in the past that hand launching can be improved if the projectile is launched from a rod. The rod provides a uniform path for the projectile's initial thrust, so that each launch is predictably uniform and in addition, a greater velocity can be applied to the projectile with a minimum of effort. By using the launch rod, an operator can develop the requisite skill of manipulation in only a short while. The launch rod allows the use of principally wrist action. The flight of the projectile from the launch rod for an individual operator is generally of greater length than can be achieved by the operator by hand launching.

A launch rod was employed, for example, in the game projectile described in U.S. Pat. No. 3,264,777, which is representative of the rod launched toys. Generally, a toy projectile consists of a body or fuselage, with wings or fins and a tail assembly and an opening extending longitudinally through the fuselage, which is adapted to fit over the rod launcher. The opening in the fuselage is large enough, such that projectile will move freely along the launch rod. A problem encountered with the arrangement has been the tendency of the projectile to rotate about the axis of the cylindrically shaped rods of the prior art. If the projectile rotates from the horizontal alignment of its center of gravity the flight path will tend to veer off too much to the side. This may be desirable at times, however, it is not controllable with the prior art arrangements.

Since the prior art employed cylindrical rods for launching, the opening through the fuselage has a corresponding cylindrical opening. The regular configuration of the opening through the fuselage can create eddies and internal currents which can so disturb the air behind the projectile that a partial vacuum is formed. This partial vacuum has the same effect as the partial vacuum created by the camber of the wing, but instead of helping to lift the projectile it tends to drive it backward.

Another disadvantage noted with the prior art launch systems has been a certain amount of drag resulting from the friction of the launch rod with the channel through the fuselage.

The opening through the fuselage also serves to reduce the weight of the projectile, since once it is air borne, it is a glider or soaring type of toy dependent not only on the velocity imparted to it by the launch, but on the existing ambient wind and air currents. Thus, the

empty space of the channel does serve a very useful purpose in lightening the plane notwithstanding the disadvantages as noted hereinabove.

A further disadvantage of the prior planes is that they can be launched with high velocity only from the launching rod.

The principal advantages of the present toy projectile are, (1) it has a means of controlling attitude of the projectile to the horizon, (2) it has reduced internal friction between the launch rod and the channel through the projectile and there is reduced drag. Another advantage of the present projectile is the ability of the operator to select and control the flight path of the projectile. A particular feature of the projectile is an adapter that allows the operator to use a sling shot type of launch as an alternate to the rod. A further feature is cooperative interrelationship of the rod and channel and in particular the improvement in the rod to further reduce drag. These and other features and advantages will become apparent from the overall discussion of the toy projectile of the invention.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is an isometric view of the projectile and the launch rod in functional relationship.

FIG. 2 is a rear elevation of the present projectile.

FIG. 3 is an isometric view of a launch rod according to the present invention.

FIG. 4 is a rear elevation of an alternate embodiment of the present projectile.

FIG. 5 is an isometric view of one embodiment of the present projectile and a transparent projection into the fuselage of the projectile.

Flg. 6 is a cross-sectional elevation taken on 6—6 of FIG. 5.

FIG. 7 is a side elevation of one embodiment of a launch rod.

FIG. 8 is an enlarged cross-sectional elevation of the launch rod taken on 8—8 of FIG. 7.

SUMMARY OF THE INVENTION

The present invention relates to improvements in flying toy projectiles. Briefly stated the invention is a system comprising a launching means comprising a rod having at least one flat surface longitudinally thereon and a projectile comprising an elongated fuselage, at least two aerodynamically stabilizing wings projecting from said fuselage and a channel longitudinally through said fuselage, said channel having a configuration adapted to cooperatively receive said rod therethrough and a flat surface to slidably engage said flat surface on said rod to prevent rotation of said projectile about said rod when said rod is engaged through said channel.

DETAILED DESCRIPTION OF THE INVENTION

The projectile may very generally be described as an airplane. However, this is only a very general use of the term and the invention broadly encompasses any aerodynamic structure having lifting or flight characteristics, that is, an airplane of the conventional type, e.g., having wings and tail fin, saucer shaped structures, older bi- or tri-winged airplanes, rockets, and the like.

The projectile may be made of a number of materials such as balsam wood, foamed plastics such as polystyrene, polyurethane; or molded, casted, extruded, vacuum formed or injected plastics such as, ethylene or PVC. Very conveniently the projectile may be pro-

duced from foamed plastic in a single unit, i.e., fuselage, wings and tail are all assembled in a single step by foaming the plastic in the mold. The launch rod may be made of wood, metal or a polymeric material, e.g., have a handle at the end, or may have an offset or dog leg (not shown) adjacent to the handle. This allows the tail of the projectile to set back against the handle. The rod will generally be from about 12 inches to 30 inches in length.

Referring now to FIG. 1 a toy projectile A according to the present invention is shown in perspective. In this embodiment the projectile is represented as an airplane having fuselage 3, wings 1 and tail 2. At the front of fuselage there is a semicircular opening 4. This opening 4 is the entrance into a channel or passageway 8 (shown in FIGS. 5 and 6) which passes through the fuselage 3 and exits at opening 7, adjacent to the tail 2. Also shown in FIG. 1 is a launch means B comprised of launch rod 5 and handle 6. The launch means B is in cooperative alignment with opening 7 and channel 11, such as that existing immediately before the rod is inserted through opening 7 and along channel 8 preparatory for the launch of the projectile or immediately after the projectile A has been launched.

The interrelation and cooperation between the projectile A and launch means B comes about when the projectile is seated onto the rod 5 through channel 8 preparatory for the launching and flight of the projectile. The rod 5 is generally longer than the fuselage 3, but need not be and the projectile is generally seated by means of channel 8, well back, even to abutting handle 6, on the rod 5, with a portion of rod 5 projecting out of opening 4 and extending beyond the fuselage.

In so doing the channel 8 and rod 5 are in cooperative engagement much as a keyway and key, respectively. The rod 5 will have the same configuration as the channel 8 such that said configuration will not allow the projectile to rotate about the rod, thus almost any configuration of channel 8 or portion of the channel and rod 5 corresponding thereto is contemplated other than circular. In FIGS. 1 and 7 it can be seen that configuration of openings 4 and 7 and rod 5 are semicircular.

Referring now to FIGS. 5 and 6, which could be the projectile of FIG. 1, it can be seen that the channel 8 is indeed circular over most of its length, but that plugs 9 have been inserted at both ends of the channel 8 to create semicircular openings 4 and 7. The shape of opening is not critical, so long as it will accommodate a rod having a corresponding shape, such that the cooperative engagement of the rod into the channel will prevent the projectile from rotating about the rod.

This key-keyway arrangement allows the operator to predetermine and control the attitude of the projectile to the horizon. That is, if straight flight away from the operator is desired, then operator can launch the projectile by moving the rod with the projectile seated thereon, shapely down, in same manner a rod in fly casting is handled and as the rod comes into line with the vector of force applied by the forward motion of the rod the projectile will slide off of the rod 5 and into flight. The prior rods were circular so that the projectile could rotate and come off the rod in flight with wings canted angularly to the horizon. The flight path would then be angled to the right or left, rather than on the straight flight path sought by the operator. The present invention can prevent the inadvertent deviation of the project from the selected flight path by seeing that projectile leaves the rod in that path. Similarly, the operator can now select flight paths, such as one angled sharply to the right or left and achieve a launch along said flight path.

Although channel 8 in FIG. 5 is shown as circular with plugs 9 inserted (or molded therein) the entire channel could have a semicircular configuration. Generally the cooperative configuration of the channel 8 can be described as having at least one flat surface therein to cooperatively engage a corresponding surface of a rod to thereby prevent rotation of the projectile about said rod. As noted the flat surface need not be continuous through the channel. A plug 9 only adjacent to tail 2 would serve the same function of the plugs at both front and rear of the projectile as shown in FIG. 5. Similarly a flat surface could be comprised of a series of single member or rods which would function as a surface.

In FIG. 5 a further embodiment is also depicted. Located along the channel 8 are one or more rollers 10. Referring to FIG. 6, the roller 10 is seen to be rotatably mounted on axle 12 such that the surface of roller 10 will be in cooperative engagement with the surface on rod 5. It can be readily appreciated that plugs 9 can be replaced with rollers 10 to create the flat surface as described above. The rollers may cause less drag than the plugs when they contact the rod thus putting more of the force exerted by the operator into momentum of the projectile.

Both the plugs 9 or any other obstruction within channel 8 serve another function which is to destroy the regularity of the round channel and thereby reduce the likelihood of eddies and internal currents within the channel which can so disturb the air behind the projectile that a partial vacuum is formed. The partial vacuum created can be a substantial drag.

Referring now to FIG. 4, an alternate embodiment is shown to that of FIG. 1, in that the semicircular opening 7 is inverted from that shown in FIG. 2, thus the channel 8 would be inverted likewise.

A further feature of its present projectile is its versatility in that hook 11 shown in FIGS. 5 and 11 allows the projectile to be launched from a catapult device much as a sling shot.

FIG. 7 shows the launch means portion of the present invention in another embodiment wherein one or more ball bearings 13 are rollably seated in the rod 5 to further reduce friction as the projectile slides along the rod during launching. Also on the rod are fins 14 which are intended to allow only a point of contact and to keep the major portion of the body of the rod 5 from contacting the inner surface of the channel 8. In FIG. 7 the arrangement of the fins 14 can be better seen and the relationship to the channel 8. The ball bearing 13 can be seen seated in pocket 15 which allows bearing 13 to roll but not come out of the pocket.

The invention claimed is:

1. A system for achieving glider flight comprising a launching means comprising a rod having at least one flat surface longitudinally thereon and a projectile comprising an elongated fuselage, at least two aerodynamically stabilizing wings projecting from said fuselage and a channel extending longitudinally through said fuselage, said channel having a configuration adapted to cooperatively receive said rod therethrough and a flat surface for slidably engage said flat surface

on said rod for preventing rotation of said projectile about said rod when said rod is engaged through said channel.

2. The system according to claim 1 wherein said channel is substantially cylindrical and said flat surface comprises at least a plug at one end of said channel and extending partially into said channel.

3. The system according to claim 2 wherein said rod has a handle on one end thereof.

4. The system according to claim 3 wherein said plut is at the end of said channel nearest said handle.

5. The system according to claim 2 wherein there is a plug extending partially into said channel at both ends of said channel.

6. The system according to claim 2 wherein said channel and flat surface plug form a semicircular slot.

7. The system according to claim 6 wherein said rod has a semicircular cross-section.

8. The system according to claim 1 wherein said channel has at least one roller mounted therein for contacting said rod.

9. The system according to claim 1 wherein said rod has a plurality of ball bearings movably mounted on the surface thereof for contacting said channel and reducing friction and drag.

10. A flying projectile comprising an elongated fuselage, at least two aerodynamically stabilizing wings projecting therefrom and a channel extending longitudinally through said fuselage said channel having at least one flat surface therein extending along at least a portion of said channel.

11. The projectile according to claim 10 wherein said flat surface comprises a plug extending partially into said channel.

12. The projectile according to claim 11 wherein said plug and channel form a semicircular slot.

13. The projectile according to claim 12 wherein a plug partially extending into said channel is adjacent to both ends of said channel.

14. The projectile according to claim 10 wherein a hook extends angularly from said fuselage.

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