United States Patent

Garofalo

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[54] **PROPELLER SPINNER FOR MODEL AIRPLANES**

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[52] **U.S. Cl.** **416/245**

[51] **Int. Cl.** **B64c 11/14**

[58] **Field of Search** 416/245, 212

[56] **References Cited**

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[57] **ABSTRACT**

An impact absorbing, economical to manufacture, easily installed and removed propeller spinner for model airplanes comprising a forward portion and a rear portion joined together through a self-aligning locking means with the blades of the propeller for the model airplane passing outwardly through the rear portion which is supported from the propeller shaft with the forward portion being supported from it.

6 Claims, 4 Drawing Figures

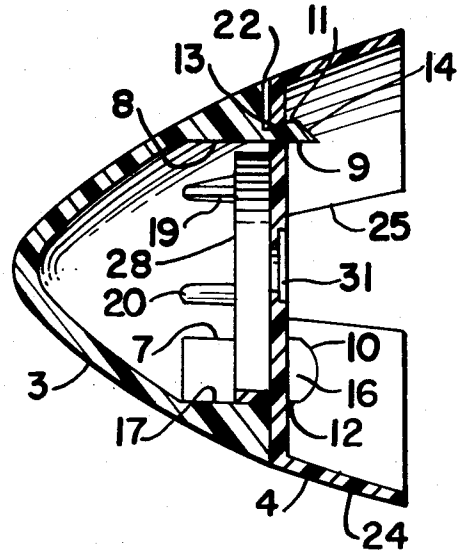


FIG. 1.

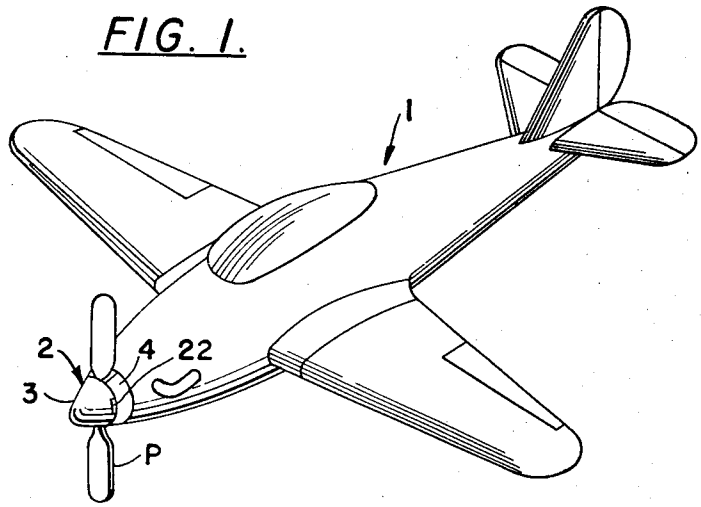


FIG. 2.

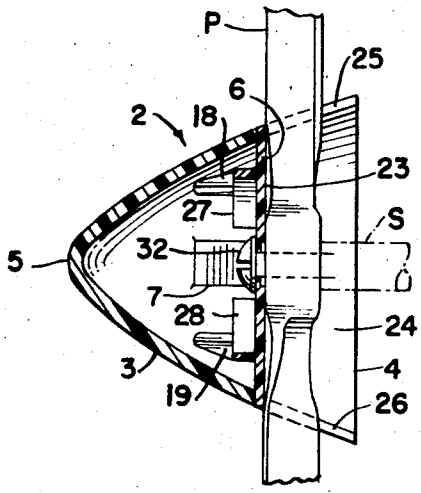


FIG. 3.

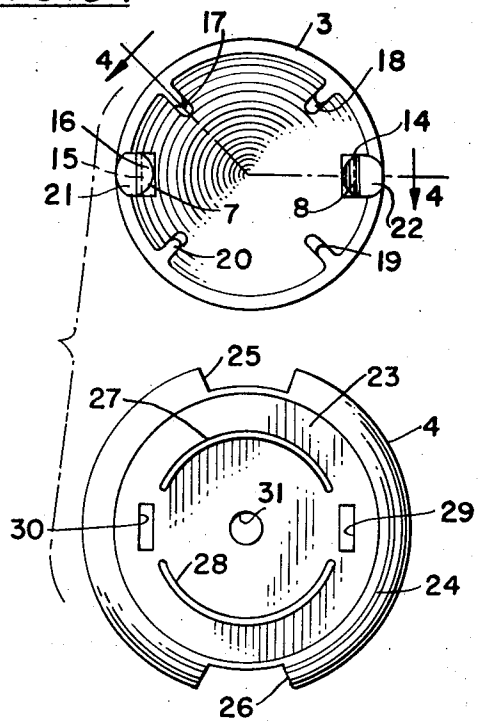
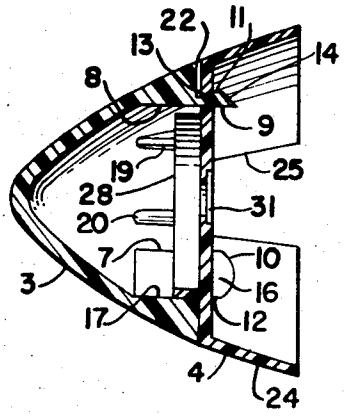


FIG. 4.



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PROPELLER SPINNER FOR MODEL AIRPLANES

BACKGROUND OF THE INVENTION

This invention relates to a propeller spinner for model airplanes, and particularly to such a device which is impact absorbing, economical to manufacture, and exceptionally easy to install and remove or dismount, but which can not either work loose by itself or jam against easy subsequent removal in the course of propeller rotation. The invention relates more particularly to a propeller spinner or hub and cowl construction for model airplanes wherein the propeller is driven by an internal combustion engine.

At least several different types of propeller hub and cowl constructions or as popularly referred to, propeller spinners, are known in the prior art for mounting or assembling on and around the propeller and propeller shaft driven by an engine carried by a model airplane. It is important in such devices that they be economical in construction and easy to mount and dismount, yet at the same time be strong, attractive in appearance, and not susceptible to either jamming or loosening in the course of use.

Prior art propeller spinners for model airplanes have been workably satisfactory, but on the whole they do not provide the economy and simplicity of construction and dependability in operation afforded by the present invention of which actual reduction to practice has been effected. A rather comprehensive showing of the prior art may be obtained by considering U.S. Pat. Nos. 2,534,662 (Froom), 2,535,527 (Barkley), 2,559,882 (Lanier), 2,674,063 (Irwin), and 2,765,858 (Hardy), and British Pat. Nos. 650,956 (Mitchinson et al.) and 671,666 (Borders et al.). This art is now indexed primarily in United States Patent Office Class 46, Subclass 78, with the earlier patents having been indexed originally in Class 170 (now discontinued), Subclass 159.

In one device of the prior art several threaded connections are used for joining the propeller spinner to the propeller shaft and a special tool must be used to disassemble the propeller spinner. As compared with the spinner or spinner assembly of the present invention that device is rather complicated and expensive, and due to the relatively large number of parts involved there is an increased likelihood of undesirable vibrations occuring when the propeller spinner is in use.

In another prior art device reliance is placed on a threaded connection for joining the propeller spinner to the propeller hub and propeller shaft, and the propeller itself is in three pieces joined independently to the propeller hub at points spaced outwardly from the longitudinal axis of the hub. Thus as before in comparison with the device of the present invention the described propeller spinner or hub and cowl construction is relatively complicated and expensive, and is at least somewhat more susceptible to undesirable vibrations occuring due to the eccentric mounting of the propeller segments or blade portions.

In still another prior art device there is a rigid disk mounted behind the airplane propeller around essentially the entire circumference of which the forward or conical portion of the spinner must make a snapped or elastically engaging connection. This is a sturdy assembly but one presenting some difficulty on account

of position and otherwise so far as mounting and dismounting are concerned.

SUMMARY OF THE INVENTION

In the present invention the propeller spinner comprises a forward portion and a rear portion, the rear portion having a forwardly disposed, substantially planar wall and a rearwardly extending generally frusto-conically shaped annular skirt at the periphery of the wall characterized by a pair of diametrically opposed notches or cutout portions through which propeller blades may extend, in the case of a two-bladed propeller. An opening is formed generally centrally through the forward wall for reception of a screw or the like for securing the rear portion of the spinner to a propeller shaft for rotation therewith, and may aid in securing the propeller itself to the shaft depending upon the particular propeller and shaft construction and configuration employed.

The forward portion of the spinner of this invention includes rearwardly extending snap-locking or spring-tongue means disposed to cooperate with complementary locking means in the wall on the rear portion for releasably, yet securely, locking the forward and rear portions of the spinner together. Means are provided on the forward and rear portions, including the snap-locking means, for effecting self-alignment of the forward and rear portions and for bracing the forward and rear portions against relative displacement therebetween when they are assembled together.

The propeller spinner of the present invention is preferably manufactured from material such as plastic or the like, as for example polyethylene or polyproplylene or nylon or ABS materials, i.e., "-Cycolac," which is economical and of light weight and yet which is impact resistant and at least somewhat resilient but at the same time sufficiently rigid for the intended purpose.

OBJECTS OF THE INVENTION

It is an object of this invention to provide a propeller spinner for model airplanes which is simple and economical in construction, and yet which is durable and dependable in operation.

Another object of this invention is to provide a propeller spinner for model airplanes which is light in weight and which is assembled through a simple snap-locking or spring-tongue engagement.

A further object of the invention is to provide a propeller spinner for model airplanes which comprises a forward portion and a rear portion detachably joined together through a snap-locking, self-aligning engagement.

These and other objects and advantages of the present invention as well as its nature and substance will be more clearly perceived and fully understood by referring to the following description and claims considered in connection with the accompanying drawing which is described briefly below.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a top perspective view of a model airplane incorporating a propeller spinner according to the present invention;

FIG. 2 is a sectional view in side elevation of a propeller spinner according to the present invention;

FIG. 3 is an end elevation view of the front and rear portions of the inventive propeller spinner looking toward the front of its rear portion and toward the rear of its forward portion, and

FIG. 4 is a sectional view in side elevation of the propeller spinner of the present invention showing the manner in which its forward portion is snap engaged with its rear portion, this view being taken along line 4—4 in FIG. 3 looking in the direction of the arrows.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawing in detail wherein like reference numbers designate like parts throughout the several views, a model airplane is indicated generally at 1 in FIG. 1. It has or includes a propeller spinner 2 and propeller P secured to its forward or nose portion. Referring next to FIGS. 2, 3 and 4, details of construction of the propeller spinner are shown. Propeller spinner 2 comprises a forward portion 3 and a rear portion 4. The forward portion is a generally conically shaped, shell-type structure having a semi-pointed front end 5 and an open rear end 6. The generally conical shape or forward portion 3 enhances and affords the proper airfoil configuration and streamlined appearance for the model airplane.

A pair of diametrically opposed snap-locking pawls or spring-tongues generally designated 7 and 8 extend rearwardly from the open end 6 of the spinner's forward portion 3, and comprise two longitudinally disposed, relatively narrow arm elements 9 and 10 formed integrally with forward portion 3 and located a relatively small distance radially inwardly from the periphery of the open rear end thereof. The arms 9 and 10 have thickened portions 11 and 12 formed on them at their free ends, characterized by front and rear tapered surfaces 13, 14 and 15, 16 respectively, defining outwardly oriented lips or hooks. These are the immediate locking members. Four equally spaced aligning and bracing flanges or bosses 17, 18, 19 and 20 in diametrically opposed pairs are formed integrally on the inside surface of forward portion 3, and extend toward the open rear end 6 thereof and terminate in the plane of that open end.

The marginal edge of open rear end 6 of the spinner's forward portion 3 is characterized by a pair of notches or recesses 21 and 22 at the snap-locking pawls 7 and 8 for reception through those notches of a suitable tool such as a knife or screwdrive blade or the like to actuate the arm elements 9 and 10 of the pawls. The arm elements and the lips or hook configurations at their rear ends may thus be deflected inwardly for purposes of disconnecting the forward and rear portions 3 and 4 of spinner assembly 2 from each other and allowing the two portions to be separated as described hereinafter.

Rear portion 4 of spinner 2 comprises a generally frusto-conically shaped shell which is complementary in size and shape to the forward portion 3 to maintain the airfoil effect and streamlined appearance of the assembled spinner. The rear portion 4 includes a front, propeller enclosing wall 23 and an outwardly flared annular skirt 24 extending rearwardly from the periphery of wall 23. A pair of diametrically opposed notches 25 and 26 are defined in the skirt portion extending through the marginal edge thereof to the wall 23 for reception therethrough of the two blades of the propeller P. A pair of diametrically opposed, part-circular ridges or ribs 27 and 28 extend forwardly from the front surface of wall 23. These ridges or low walls are formed integrally with the wall 23, and are spaced radially inwardly from the marginal edge thereof and terminate at their opposite ends short of a pair of diametrically opposed, pawl-engaging recesses or openings 29 and 30 through the wall 23.

An opening 31 is formed through the center of wall 23 for coaxial reception therethrough of a screw or bolt or the like 32 for securing the spinner's rear portion 4 and propeller P, at least in the construction shown in FIG. 2, to a propeller shaft S connected to be driven by a suitable motor means (not shown). In use, the propeller P is disposed within the rear portion 4, or the rear portion of the spinner is disposed around the propeller, with the opposite ends or blades of the propeller extending through the skirt slots 25 and 26 and a suitable screw or the like such as 32 passing through the opening 31 in wall 23 and through the propeller hub into threaded engagement with the shaft S for securing the propeller and rear portion 4 of the spinner to the shaft S for rotation therewith. It is to be understood, of course, that the propeller may interfit with the propeller shaft in any suitable way such as a splined fit or connection to insure that rotation of the shaft causes rotation of the propeller with screw 32 serving simply as a retaining device. In the immediate sense, rotation of the propeller causes rotation of the propeller spinner.

The spinner forward portion 3 is then assembled to the rear portion by aligning the snap-locking pawls or spring-tongues 7 and 8 with the pawl-engaging slots or openings 29 and 30 in wall 23, and forcing the enlarged pawl end portions 11 and 12 through those slots. The tapered surfaces 14 and 16 of the pawl ends aid in elastically deflecting the arm elements 9 and 10 of the pawls inwardly while the enlarged pawl end portions are being pushed through the wall slots, and thus reduce the manual effort required to assemble the spinner. After the enlarged portions 11 and 12 at the pawl ends have indeed been pushed rearwardly all the way through slots 29 and 30 the pawl arm elements snap outwardly to engage the hooked configurations of those portions with the back surface of wall or panel 23 of spinner rear portion 4 and achieve the desired locking effect between the forward and rear portions.

The aligning and bracing flanges or bosses 17, 18, 19 and 20 formed on the inside of forward portion 3 of the spinner assembly engage about the outer surfaces of ridges or ribs 27 and 28 formed on the front surface of wall 23 of spinner rear portion 4, and thus aid in aligning the spinner assembly's forward and rear portions initially and then maintaining those portions 3 and 4 securely in proper alignment after they have been assembled to form the completed spinner 2. On account of the construction just described the possibility of the front and rear portions of the spinner assembly becoming misaligned is practically eliminated, thus essentially avoiding any vibrations which might otherwise occur. Further, any possibility of the front portion becoming disengaged from the rear portion in the event the air-

plane lands improperly or has some other accident is substantially removed.

In another and somewhat simpler construction, not illustrated specifically but still readily comprehensible from the given drawing, flanges or bosses **17**, **18**, **19** and **20** are eliminated from the inside of spinner forward portion **3** and ridges or ribs **27** and **28** are defined to a somewhat larger radius or diameter on wall **23** of spinner rear portion **4** so that the outer surfaces of those ribs fit closely within the inner surface of forward portion **3** at its open rear end **6**. Said conversely, in the alternate construction just described the inner surface of spinner forward portion **3** at the rear end thereof engages closely around the outer surfaces of ribs or ridges **28** for the entire lengths of those outer surfaces. The rear edge of spinner forward portion **3** may be thickened slightly inwardly all around.

If it be desired to disassemble the spinner and propeller from the model airplane, the blade of a knife or a screwdriver as aforesaid is extended into the notches or recesses **21** and **22** defined in the marginal edge of forward portion **3** and twisted slightly to generate a wedging action on the arms **9** and **10** of pawls **7** and **8** flexing them inwardly to align their enlarged end portions **11** and **12** with the slots **29** and **30** in rear portion front wall **23**. Then the spinner forward portion **3** may be tipped first one way and then another to pull the pawl end portions forwardly through wall slots **29** and **30**, thus disengaging forward portion **3** of spinner assembly **2** from rear portion **4** thereof and indeed from model airplane **1**. Subsequent removal of screw **32** permits spinner rear portion **4** to be dismounted from propeller shaft S and propeller P.

Construction of the spinner from a material such as polyethylene or polypropylene or nylon or ABS materials, i.e., "Cycolac," or the like renders it light in weight and resistant to breakage and fracture short of breakage due to accidents or mishandling of the airplane. Further, mounting of the rear portion of the spinner assembly entirely on and around the propeller and the propeller shaft simplifies the construction of the spinner with the spinner forward portion being dependent for its support only upon the rear portion and not in any direct manner upon the propeller shaft or the propeller.

This invention may be embodied in several particular forms without departing from the spirit or essential characteristics thereof, and thus the presently portrayed and described embodiment in its plurality of constructions is to be understood as being illustrative and not restrictive although it is deemed preferred. Inasmuch as the scope of the invention is defined by the appended claims rather than by the specific description preceding them, all variations and derivations that fall within the metes and bounds of those claims or that constitute their functional as well as conjointly cooperative equivalents are therefore intended to be embraced by them. Protection by Letters Patent of this invention in all its aspects as the same are set forth in the claims hereto annexed and forming part of this specification is sought to the broadest extent that the prior art allows.

I claim as my invention:

1. A propeller spinner for model airplanes comprising a generally conically shaped shell of impact resistant material including a forward portion and a rear portion, there being cooperating locking means and self-aligning means on said forward and rear portions for releasably joining those portions together with said rear portion being configured to be secured to a propeller and propeller shaft, and in which (1) said forward portion has a closed, generally pointed end and an open, enlarged end; (2) said rear portion has a generally planar wall closing one end thereof and substantially commensurate in diameter with said open end of said forward portion and a rearwardly directed skirt extending from the periphery of said wall, and is characterized by an opening in the center of its planar wall to receive means for attaching said rear portion to a propeller shaft and a plurality of notches in its skirt to receive the blades of a propeller passing radially outwardly through said rear portion, and (3) said cooperating locking means is in the nature of a snap-locking means and said snap-locking means and self-aligning means each comprises means on said planar wall of said rear portion and means on said forward portion at the open end thereof, said snap-locking means including a plurality of rearwardly extending, resilient arms on said forward portion at the open end thereof, each disposed at least somewhat radially inwardly from the periphery of said open end.

2. A propeller spinner for model airplanes comprising a generally conically shaped shell of impact resistant material including a forward portion and a rear portion, there being cooperative locking means and self-aligning means on said forward and rear portions for releasably joining those portions together with said rear portion being configured to be secured to a propeller and propeller shaft, and in which (1) said forward portion has a closed, generally pointed end and an open, enlarged end; (2) said rear portion has a generally planar wall closing one end thereof and substantially commensurate in diameter with said open end of said forward portion and a rearwardly directed skirt extending from the periphery of said wall, and is characterized by an opening in the center of its planar wall to receive means for attaching said rear portion to a propeller shaft and a plurality of notches in its skirt to receive the blades of a propeller passing radially outwardly through said rear portion, and (3) said cooperating locking means is in the nature of a snap-locking means and said snap-locking means and self-aligning means each comprise means on said planar wall of said rear portion and means on said forward portion at the open end thereof, said self-aligning means including (i) a plurality of rearwardly directed flanges in said forward portion at the open end thereof terminating in the plane of said open end and (ii) a plurality of forwardly extending part-circular ridges on the front surface of said planar wall of said rear portion disposed radially inwardly of said flanges on said forward portion with said flanges and said part-circular ridges being in cooperatively engaging, interfitting relationship one with another when said forward portion is attached to said rear portion.

3. A propeller spinner for model airplanes according to claim 1 in which said snap-locking means further includes openings in said planar wall of said rear portion disposed in substantial alignment with said arms on said forward portion when said forward and rear portions

are in operative position relative one to another and through which said arms extend when said forward and rear portions are joined together.

4. A propeller spinner for model airplanes according to claim 3 in which said rearwardly extending, resilient arms on said forward portion include thickened portions at their rear, free ends, said thickened portions being adapted to be projected through said openings and received behind said planar wall of said rear portion for joining said forward and rear portions together.

5. A propeller spinner for model airplanes according to claim 4 in which said thickened portions of said arms each are characterized by oppositely sloping surfaces forwardly and rearwardly thereof for reducing resistance to movement of said thickened portions through said openings in the planar wall of said rear portion.

6. A propeller spinner for model airplanes according to claim 4 in which the periphery of the open end of said forward portion is characterized by a plurality of notches each disposed in radial alignment with one of said rearwardly extending, resilient arms and each adapted to receive and permit the through passage of a tool to bear upon and deflect inwardly the arm in radial alignment therewith.

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