

[54] SPINNER ASSEMBLY FOR MODEL AIRPLANES

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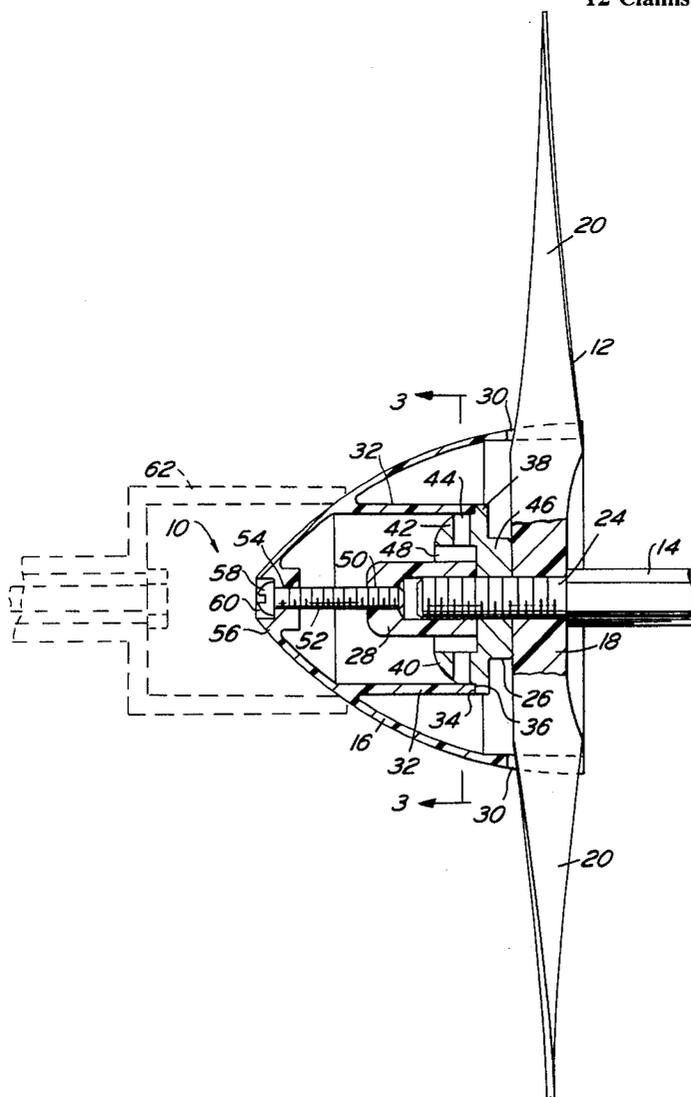
[57] ABSTRACT

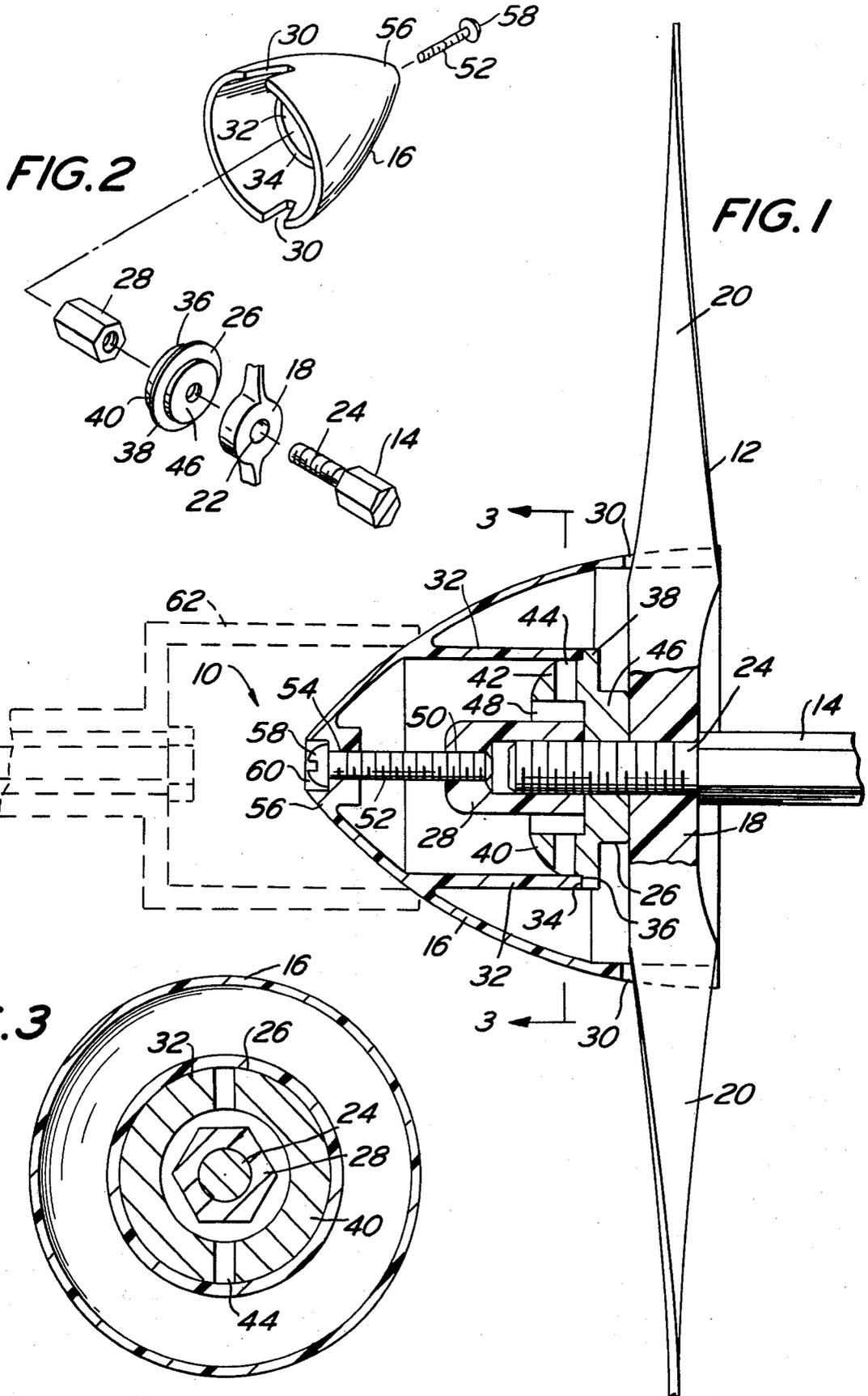
A spinner assembly is provided for model airplanes which is particularly suited for engagement by a starter motor for starting the airplane engine. In order to reduce the stress and strain on the nose cap and propeller resulting from the use of starter motors, the inner surface of the nose cap is provided with a cylindrical flange for frictionally engaging the shoulder portion of the inner of two nuts which holds the propeller on the propeller shaft. In this manner some of the torque or rotational force imparted by the starter motor is transmitted to the propeller shaft through the stronger portions of the nose cap instead of through the weaker outer periphery of the nose cap and the propeller itself. The nose cap is preferably fastened to the propeller shaft and tightened against the shoulder of the inner or first nut by means of a screw through the apex of the nose cap and into the cap of a second or lock nut which secures the propeller on the shaft.

[56] References Cited
UNITED STATES PATENTS

1,382,836	6/1921	Juclson	416/208
1,668,972	5/1928	McCauley	416/245
2,270,575	1/1942	Bahr	416/245 X
3,703,341	11/1972	Garofalo	416/245
3,822,963	7/1974	Goldberg	416/245

12 Claims, 3 Drawing Figures





SPINNER ASSEMBLY FOR MODEL AIRPLANES

BACKGROUND OF THE INVENTION

The present invention relates to spinner assemblies for model airplanes. More particularly, the present invention is directed to spinner assemblies which are specially suited for use in connection with starter motors for starting model airplane engines.

For a number of years now it has been popular among model airplane enthusiasts to use starter motors for starting the engines of model airplanes. Such starter motors generally comprise a motor driven shaft having a rotating cup attached to the end thereof. The cup is placed in frictional engagement with the spinner or nose cap of the model airplane, whereby the torque of the starter motor is transmitted to the propeller shaft of the airplane to start the airplane engine. Examples of such starter motors are disclosed in U.S. Pat. Nos. 2,475,750 and 2,625,143, as well as my copending application Ser. No. 489,318, filed July 17, 1974, entitled "Housing For Starter Motor".

In order for the spinner to transmit the torque from the starter motor to the propeller shaft, there must be some connection or engagement of the spinner with either the shaft itself or the propeller. It has been known for some time to cut notches in the rear edge of the spinner in order for the spinner to engage the blades of the propeller. Examples of such spinners having notches are illustrated in U.S. Pat. Nos. 2,559,882; 2,674,063; 2,765,858 and 3,703,341. It has also been known for some time to attach the spinner to the shaft by means of a screw at the front or apex of the spinner, which screw is connected to the shaft by means of an adapter. Examples of such arrangements are illustrated in U.S. Pat. Nos. 2,534,662 and 2,559,882.

The use of notches in the nose cap or spinner to transmit the torque of the starter motor to the propeller shaft has its disadvantages in that the periphery of the nose cap where the notches are located is the weakest part of the nose cap. Accordingly, undue stress and strain may be placed on these portions of the nose cap, as well as the blades of the propeller. The screw joining the nose cap or spinner to the propeller shaft is similarly unsuited for absorbing the entire torque from the starter motor, and in fact the spinner or nose cap may simply turn under the screw without transmitting the torque to the propeller shaft, unless some means is provided to positively lock the screw and nose cap to prevent relative rotation.

Accordingly, it would be desirable to have a spinner or nose cap assembly which will transmit the torque of the starter motor to the propeller shaft without exerting undue stress or strain on the propeller blades, the periphery of the nose cap or the fastening means for the nose cap.

BRIEF SUMMARY OF THE INVENTION

The above and other disadvantages of the prior art are alleviated by the apparatus of the present invention which relates to spinner assemblies for attachment to the threaded propeller shaft of a model airplane comprising a propeller, a generally conical hollow nose cap and two threaded nuts for fastening the propeller to the shaft, the first nut abutting against the propeller hub and the second nut locking the first nut in place. The improvement comprises providing the spinner assembly with flange means extending from the interior sur-

face of the nose cap and shoulder means on the first threaded nut, such that the flange means frictionally engages the shoulder means when the nose cap is in operating position.

Preferably, the nose cap is connected to the propeller shaft by a screw which passes through the front or apex of the nose cap and is threaded into the cap of the second or lock nut. Tightening of the screw not only secures the nose cap but also forces the flange means of the nose cap into frictional engagement with the shoulder means of the first nut.

BRIEF DESCRIPTION OF THE DRAWINGS

For the purpose of illustrating the invention, there is shown in the drawings a form which is presently preferred; it being understood, however, that this invention is not limited to the precise arrangements and instrumentalities shown.

FIG. 1 is a side elevation view, mostly in section, illustrating the spinner assembly of the present invention.

FIG. 2 is an exploded perspective view of the various parts which comprise the spinner assembly of the present invention.

FIG. 3 is a sectional view of the spinner assembly of the present invention taken along line 3—3 of FIG. 1.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings wherein like reference numerals refer to like elements throughout the three figures, there is illustrated a spinner assembly, generally indicated as 10. The spinner assembly 10 comprises a propeller 12, a propeller shaft 14 and a nose cap or cowl 16.

The propeller 12 comprises a hub portion 18, lying generally within nose cap 16, and blade portions 20, which extend beyond the outer periphery of the nose cap 16. Although the propeller 12 shown in the drawings has only two blades 20, it will be understood that the propeller may have any number of blades desired, such as three or four blades, as known in the art.

The hub 18 of propeller 12 is provided with a hole 22 for mounting the propeller 12 on propeller shaft 14. Shaft 14 is provided with a threaded end portion 24, and propeller 12 is mounted thereon by sliding the threaded portion 24 through hole 22 and screwing first and second threaded nuts, 26 and 28 respectively, onto the threaded portion 24. The first threaded nut 26, which will be referred to as the starter nut, abuts against the hub 18 of propeller 12, while the second threaded nut 28, which will be referred to as the lock nut, abuts against the opposite side of starter nut 26 and locks the starter nut 26 in place. That is, lock nut 28 prevents starter nut 26 from being backed off without first loosening lock nut 28.

The nose cap 16 comprises a hollow, thin-walled, generally conical member which covers or encloses the remainder of the spinner assembly except for the blade portions 20 of propeller 12. The nose cap is usually not a perfect cone, but is slightly rounded in overall contour to provide the best aerodynamic characteristics.

As is known in the art, nose cap 16 may be provided with cut out portions in the form of notches 30 on each side where the blade portions 20 of propeller 12 extend from the spinner assembly. These notches may be of various shapes, as illustrated for example in the patents

cited above, and the particular shape or size of these notches 30 is not critical to the present invention. In fact, in view of the improvement of the present invention, as discussed below, it is not necessary that nose cap 16 be provided with any notches 30 at all. Instead, nose cap 16 could terminate short of the blade portions 20 of propeller 12 so that there is a 360° opening between nose cap 16 and the engine housing (not shown) of the model airplane.

Up to this point, the spinner assembly described is entirely conventional. Moreover, all of the components of the spinner assembly 10 may be made of conventionally used materials, including wood, metal and/or plastic. Although wooden propellers are still sometimes used in model airplanes, it is most common nowadays to use a relatively rigid thermoplastic such as polystyrene or polypropylene to form both the propeller and the nose cap. While the propeller and nose cap should be made of a material which is relatively rigid so as to withstand substantial distortion under normal stress conditions, the material should nevertheless be somewhat flexible and resilient in order to absorb shock and the impact of crashes. The propeller shaft and threaded nuts may be made of any suitable metal, but are preferably made of a lightweight metal such as aluminum.

Turning to the improvement according to the present invention, nose cap 16 is provided with a flange means 32 which extends from the inner surface of nose cap 16. As best shown in FIGS. 1 and 3, flange means 32 comprises a cylindrical wall which extends parallel to the axis of propeller shaft 14, as well as the axis of conical nose cap 16.

Although flange means 32 has been shown as a continuous wall, it will be understood that a discontinuous flange could be used. However, a continuous wall is preferred in order to provide the maximum rigidity to the flange means 32. Moreover, it is preferred, as indicated in FIG. 1 that the flange means 32 be molded integrally with the remainder of nose cap 16.

In the operating position of nose cap 16 (i.e., when the spinner assembly is completely assembled), the end 34 of flange means 32 remote from the inner surface of the nose cap 16 frictionally engages a shoulder means 36 on starter nut 26. Shoulder means 36 comprises a right-angled ledge formed by a first flange 38 and a second flange 40 on starter nut 26. First flange 38 extends radially to the axis of shaft 14 and perpendicular to the end 34 of flange means 32. Second flange 40 projects generally perpendicularly from first flange 38 and generally parallel to the cylindrical flange means 32. As a result, there is formed a shoulder means 36 which is frictionally engaged by flange means 32, the end 34 of flange means 32 engaging the surface of first flange 38 from which second flange 40 extends, and the outer circumference of second flange 40 engaging the inner surface of flange means 32.

In order to allow for a tight frictional or interference fit between the inner surface of flange means 32 and the outer surface of second flange 40, it is preferred that the outer wall of flange 40 be rounded as shown at 42, so that flange means 32 may be slipped over second flange 40. In addition, second flange 40 is provided with holes 44 through which a bar wrench or pin may be inserted in order to tighten starter nut 26 onto the threaded portion 24 of propeller shaft 14.

As shown in FIGS. 1 and 2, starter nut 26 is provided with a base or pedestal portion 46 which abuts directly

against hub portion 18 of propeller 12. Also, starter nut 26 is provided on the opposite side with a recess 48 formed by the inside surface of second flange 40. Recess 48 need only be of sufficient diameter to permit turning of lock nut 28, and is preferably large enough to allow insertion of the socket of a socket wrench.

Lock nut 28 may be formed from a conventional cap nut. However, according to the present invention, the lock nut will have a threaded hole 50 provided in the cap portion of the lock nut 28. In the assembled position, lock nut 28 is tightened against the starter nut 26 to prevent starter nut 26 from being backed off of the threaded portion 24 of propeller shaft 14, without first loosening lock nut 28.

Nose cap 16 is then fastened to propeller shaft 14 by screw 52 which threads into the threaded hole 50 in the cap portion of lock nut 28. Screw 52 passes through a non-threaded hole 54 in the apex 56 of nose cap 16. If desired, the head 58 of screw 52 may be recessed into the apex 56 of nose cap 16, as shown in FIG. 1. After tightening screw 52 the recess 60 may then be filled with a putty or rubber-like material, if desired, to form the tip or point of nose cap 16.

As screw 52 is tightened in threaded hole 50, the end 34 of flange means 32 is forced tightly against shoulder means 36 on starter nut 26. This creates a frictional fit between flange means 32 and shoulder means 36. As a result, when the cup 62 (shown in phantom in FIG. 1) of a starter motor is applied to the outer surface of nose cap 16, the entire spinner assembly 10 is turned on shaft 14 to start the model airplane engine.

Since the rigid flange means 32 is capable of transmitting the torque of the starter motor to shaft 14 by means of the frictional engagement with shoulder means 36, there is relatively little stress and strain on the blade portions 20 of propeller 12, or on the relatively less rigid extremities of nose cap 16 adjacent notches 30 or on screw 52. In addition, flange means 32 provides more rigidity and reinforcement for the outer surface of nose cap 16, so that nose cap 16 will not be dented or pushed in by contact from the cup 62 of the starter motor.

The present invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof and, accordingly, reference should be made to the appended claims, rather than to the foregoing specification as indicating the scope of the invention.

I claim:

1. In a spinner assembly for attachment to a threaded propeller shaft of a model airplane comprising a propeller having hub and blade portions, a generally conical, hollow nose cap, and first and second threaded nuts for fastening said propeller to said threaded shaft, said first threaded nut abutting against said propeller hub and said second threaded nut abutting against the opposite side of said first nut from said propeller hub, the improvement comprising flange means extending from the interior surface of said nose cap and shoulder means on said first threaded nut, said flange means frictionally engaging said shoulder means when said nose cap is in operating position.

2. Apparatus according to claim 1 wherein said flange means comprises a cylindrical wall, said cylindrical wall extending parallel to the axis of said threaded shaft.

3. Apparatus according to claim 2 wherein said shoulder means comprises first and second flanges extending from said first threaded nut, said first flange extending radially to the axis of said threaded shaft and said second flange extending from said first flange and generally parallel to said cylindrical wall.

4. Apparatus according to claim 3 wherein said first and second flanges extend substantially around the entire circumference of said first threaded nut.

5. Apparatus according to claim 3 wherein the outer circumference of said second flange is in frictional engagement with the inner surface of said cylindrical wall.

6. Apparatus according to claim 3 wherein the end of said cylindrical wall remote from the inner surface of said nose cap frictionally engages the surface of said first flange from which said second flange extends.

7. Apparatus according to claim 1 wherein said second threaded nut is a cap nut, said cap nut having aperture means in the cap portion thereof for receiving fastening means from said nose cap.

8. Apparatus according to claim 7 wherein said nose cap has aperture means in the apex thereof for receiving fastening means.

9. Apparatus according to claim 8 wherein said nose cap is fastened to said propeller shaft by screw means extending through said aperture means in said nose cap and into threaded engagement with said aperture means in the cap portion of said cap nut.

10. Apparatus according to claim 9 wherein said flange means is forced into frictional engagement with said shoulder means by tightening said screw means.

11. Apparatus according to claim 1 wherein said nose cap is provided with cut out portions whereby said blade portions of said propeller pass through the walls of said nose cap.

12. Apparatus according to claim 11 wherein said cut out portions comprise notches in the walls of said nose cap remote from the apex thereof.

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