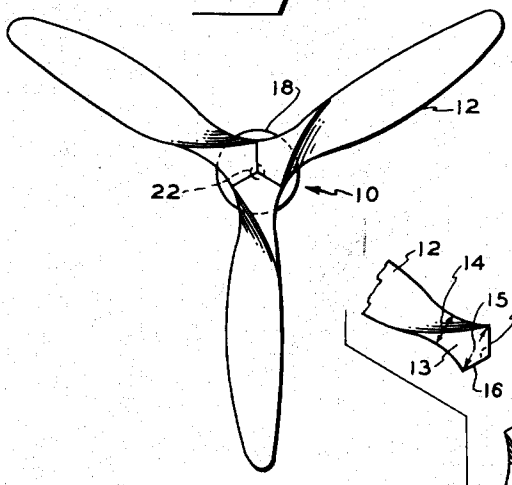
Sept. 21, 1954 L. F. BOULEY 2,689,617

MODEL AIRPLANE SECTIONAL BLADE PROPELLER AND ADAPTER HUB

Filed Dec. 10, 1951

Fig. 1



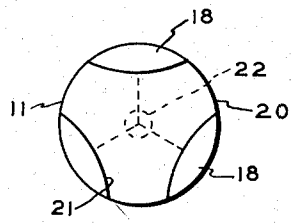
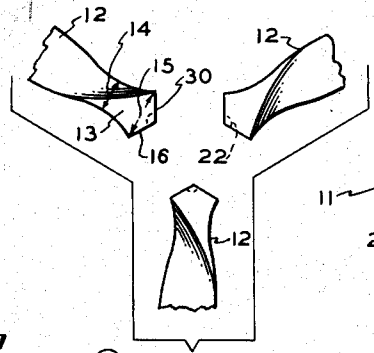


Fig. 4



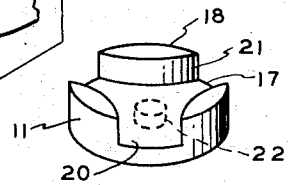
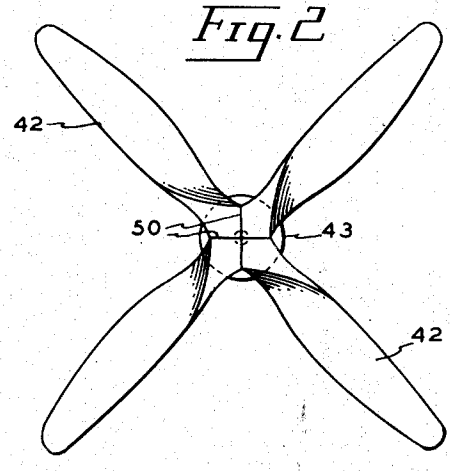


Fig. 5

Fig. 8

Fig. 2



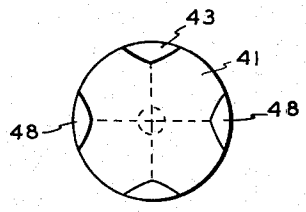
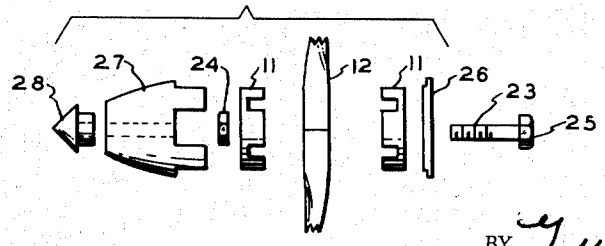


Fig. 6

Fig. 3



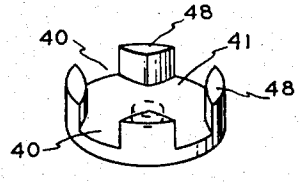


Fig. 7

INVENTOR
LEWIS F. BOULEY

BY Gustave Miller

ATTORNEY

Patented Sept. 21, 1954

2,689,617

UNITED STATES PATENT OFFICE

2,689,617

MODEL AIRPLANE SECTIONAL BLADE PROPELLER AND ADAPTER HUB

Lewis F. Bouley, Riverview, Mich.

Application December 10, 1951, Serial No. 260,919

1 Claim. (Cl. 170—173)

1

This invention relates to model airplane sectional blade propeller and adapter hub and has for an object to provide an improved propeller particularly useful in model airplanes.

A further object of this invention is to provide an improved propeller which is particularly an improvement over the propeller shown in U. S. Patents Numbers 2,411,143 and 2,535,527.

Still a further object of this invention is to provide a propeller wherein the individual blade may be removed and replaced as needed, particularly where one or more individual blades have been damaged or broken, without the necessity or expense of replacing the entire propeller. This invention is particularly intended for use in connection with model airplanes, wherein it very often happens that the airplane propeller is damaged in landing. Instead of then having to replace the entire propeller and hub, an expensive procedure, with this invention, the damaged or broken propeller blades may be removed and be replaced by another similar blade, salvaging all the undamaged propeller blades as well as the usually undamaged hub unit for use in assembling the new blade. By thus providing a plurality of spare propeller blades, the model airplane builder and user may continue to keep his model airplane in use at a minimum expense when a propeller blade is damaged in landing. Also, when several model airplanes using identical propellers are in operation, the model airplane user may use blades for one damaged propeller as spare parts for the blades of another damaged propeller if he runs out of spare propeller blades.

Still a further object of this invention is to provide a propeller consisting of a plurality of substantially identical propeller blades, two or more as may be desired, so long as they are substantially identical and symmetrical, and in addition a hub unit consisting preferably of two identical complementary parts which may be secured together by merely placing the hub unit complementary parts about the hub ends of the propeller blade to provide a complete propeller assembly, which is then reamed through to fit the particular propeller shaft on which it is to be used and held in assembled position by any conventional means for holding a conventional propeller in position on the shaft, and wherein the blades may be removed and replaced by merely removing the propeller assembly from the propeller shaft whereupon the broken blades may be removed and replaced with new blades in the propeller assembly without the necessity of any tools whatsoever.

2

With the foregoing and other objects in view, this invention comprises the combination, construction and arrangement of parts hereinafter set forth, claimed and disclosed in the accompanying drawings, wherein:

Fig. 1 is a plan view of a propeller of this invention, one of the hub members being omitted.

Fig. 2 is a similar view showing a four blade propeller.

Fig. 3 is an exploded side view of the propeller assembly.

Fig. 4 is a plan view of a hub unit member for a three blade propeller.

Fig. 5 is a perspective view of Fig. 4.

Fig. 6 is a plan view of a hub member for a four blade propeller.

Fig. 7 is a perspective view of Fig. 6.

Fig. 8 is an exploded view of a three blade propeller showing its hub ends separated.

There is shown at 10 a three blade propeller made up according to this invention, partially incomplete. The showing in Fig. 1 is incomplete because only one hub unit member 11 is shown for clarity of illustration, but as brought out in Fig. 3, a complete propeller assembly consists of a plurality of individual blades 12 each substantially identical, and a pair of hub unit members 11, each likewise preferably although not necessarily substantially identical to each other or at least complementary to each other.

Each propeller blade 12 has a reduced neck portion 13 having a smaller transverse dimension 14 than its transverse dimension 15 at its hub end 16.

The hub unit consists of at least one cupped disk member 11 including a disk portion 17 having its cupped flange divided into a plurality of spaced apart axially extending flanges 18, the flanges 18 being separated from each other by radial opening recesses 20. Preferably for purposes of symmetry and balance and for ease of manufacture, both hub unit members 11 will be identical, with the height 21 of each flange 18 equal to one-half of the thickness dimension of the hub end 13 of the blade 12, but obviously, the hub unit may be made with one member having its flanges of a height equal to this thickness dimension, whereupon the other hub member would be just merely a plane disk complementary thereto. The inner side walls of the flange 18 will be shaped and curved complementary to the outer edge 22 of the hub blade end 16. The openings 20 between the flanges 18 are such that the hub end of a blade may be placed axially therewithin and when each of the blades 12 is placed in position as shown in Fig. 1, the entire

hub end area consisting of both the openings **20** and the space between the flanges **18** will be filled by the assembled hub ends **16** of the blades **12** in abutting contact with each other. Then the second member **11** of the hub unit is placed thereover to make a complete propeller or propeller assembly. The propeller assembly is then reamed through to provide an opening **22** of a size to fit the particular propeller shaft **23** of the model airplane to which it is to be attached. This may be done by the model airplane builder or user, or this opening **22** may be provided at the time of manufacturing the blades and hub unit members and sold as assembly units, with spare propeller blades having their hub ends similarly reamed through for replacement purposes. However, in view of the fact that the model airplane builder and user may have different size model airplanes with different shafts, he may prefer to ream this opening through himself and then make up the spares himself for a particular airplane propeller shaft.

To mount the propeller, the blades **12** are placed with their hub ends **16** within one cupped hub member **11** as shown in Fig. 1 and then a second complementary hub member **11** is placed thereover, either with the hole **22** already reamed therethrough, or if not, such hole will then be provided by the airplane builder to fit the particular shaft **23**. It is then mounted on the propeller shaft **23** in the usual manner as between a pair of securing nuts **24** and **25** with a washer **26** provided if desired. If desired, a conoidal spinner **27** and securing head **28** may be added such as is illustrated in the patent to Froom, 2,534,662, but such spinner is no part of this invention and may be added or omitted as may be desired by the model airplane builder and user.

As already pointed out, the propeller of this invention may be made up with two or more blades. As thus far described, the propeller is shown as including three blades in which case the hub blade end faces **30** would be at **120** degrees to each other. In Figs. 2, 6 and 7 there is shown the parts for a four blade propeller consisting of identical blades **42** and identical hub unit members **41**. In this case, there would be four flanges **48** with radial openings **40** therebetween and the hub blade end faces **50** are at 90 degrees to each other.

Obviously, the same principles would apply to a two blade propeller wherein only two bosses and two radial openings would be provided in the hub unit member and there would then be a single plane end face. In any form of the invention, if an individual blade **12** or **42** is damaged or broken, it may easily be removed and a new one replaced therefore by merely removing the propeller assembly from its propeller shaft **23** in the usual manner, then separating the two complementary hub unit members, thus allowing the broken or bent propeller blade to be removed in an axial direction from its radial opening in the hub unit member and be replaced by a similar spare blade whereupon the hub unit members are brought together again and the assembly restored to the propeller shaft making the airplane ready for immediate use again.

While the device has been shown and the structure described in detail, it is obvious that this invention is not to be considered as being limited to the exact form disclosed, and that changes in detail and construction may be made therein within the scope of what is claimed, without departing from the spirit of this invention.

Having thus set forth and disclosed the nature of this invention, what is claimed is:

A light weight propeller for a model airplane comprising a hub unit and a plurality of identical individually replaceable propeller blades, said hub unit comprising a circular disc member having a plurality of equally spaced apart and axially extending flanges on one surface thereof defining a unitary propeller hub area therebetween, each propeller blade having a hub end, each of said flanges having a convexly curved side wall for at least one half of the thickness dimension of said hub end, the hub end of each blade having a concavely curved surface on each side a spaced distance from the end thereof adapted to engage on each side a portion of the convexly curved side wall of an adjacent flange, said hub end of each blade further having a pair of flat surfaces one on each side between said curved surface and the end angularly disposed relative to each other and radially disposed relative to said hub unit when assembled, the adjoining flat surfaces of adjacent propeller hub ends being adapted to bear on each other to hold each of said curved surfaces against the adjacent portions of said flanges side walls.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
562,190	Miller	June 16, 1896
1,142,530	Rowthorne	June 8, 1915
1,725,482	Schertz	Aug. 20, 1929
1,909,885	Ogden	May 16, 1933
2,235,605	Bugatti	Mar. 18, 1941
2,534,662	Froom	Dec. 13, 1950
2,535,527	Barkley	Dec. 26, 1950

FOREIGN PATENTS

Number	Country	Date
48,161	Norway	July 14, 1930