

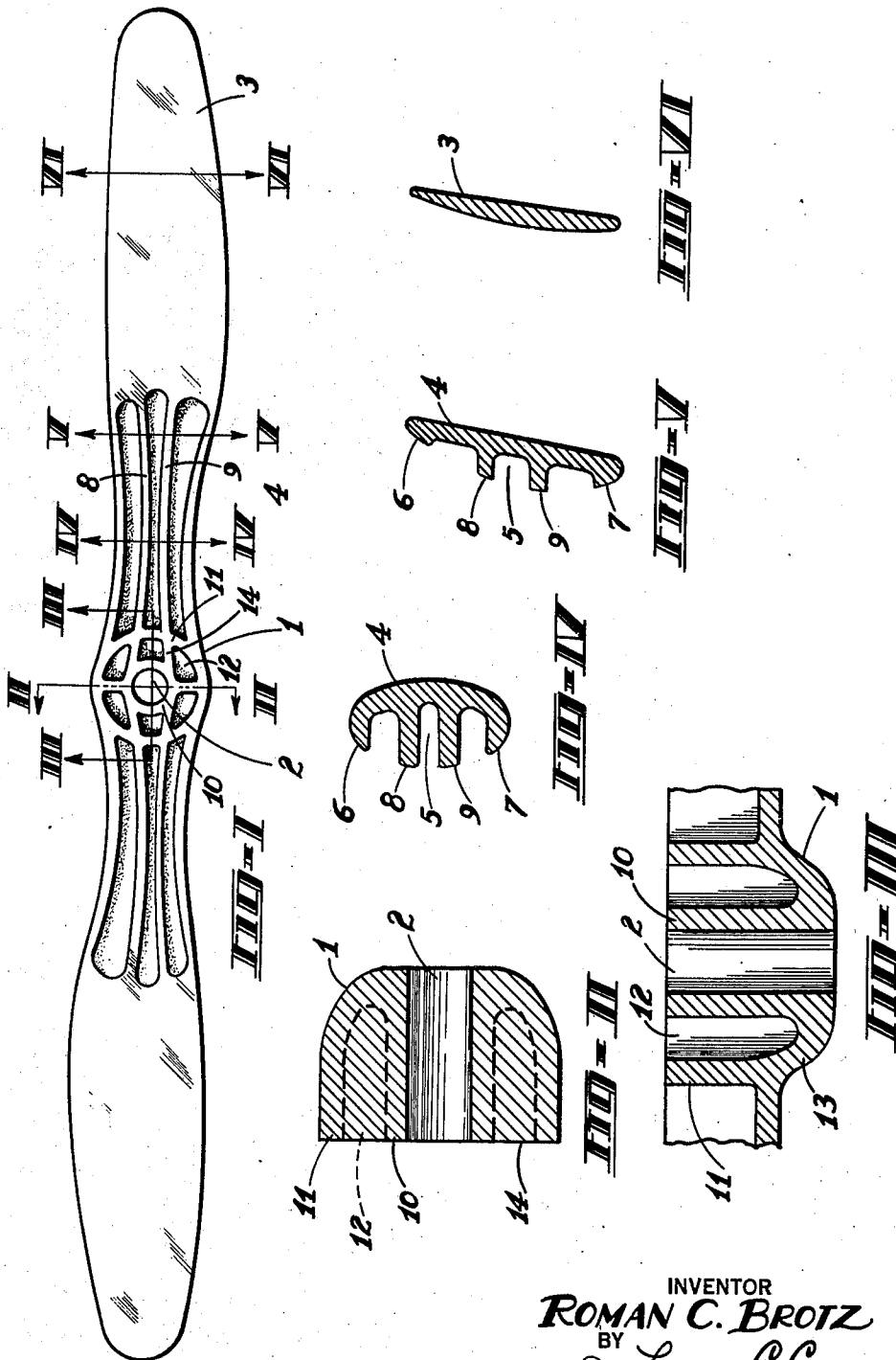
April 11, 1944.

R. C. BROTZ

2,346,552

PROPELLER

Filed May 27, 1939



INVENTOR
ROMAN C. BROTZ
BY *Lyman C. Conger*
ATTORNEY

UNITED STATES PATENT OFFICE

2,346,552

PROPELLER

Roman C. Brotz, Kohler, Wis.

Application May 27, 1939, Serial No. 276,165

3 Claims. (Cl. 170-159)

My invention relates to improvements in propellers or air screws of a type used for propulsion or traction, the moving of air or other gases for ventilation or exhaust, the generation of power by wind velocity and other similar purposes.

Such propellers have heretofore, due to the necessity for strength to withstand the centrifugal and other stress placed thereon, been formed with the hub and portion of the blade adjacent thereto relatively thick and heavy with respect to the working portions of the blade. This, while it provides the necessary strength, is disadvantageous in that it increases the weight and requires considerable material. It is particularly disadvantageous where the material from which the propeller is formed is one which undergoes chemical change during the molding thereof, since the relatively thick section may not be affected in the same manner as the thinner sections. For example, in the molding of such a propeller from a phenolic plastic which is cured by the application of heat and pressure the thicker sections adjacent the hub are likely to be imperfectly cured unless the curing is carried on for an exorbitant length of time.

It is an object of my invention to obviate these difficulties by a construction which will provide the necessary strength yet conserve material and reduce weight.

It is a further object of my invention to provide such a construction in which the various portions of the propeller are of substantially similar thickness in cross section.

With the foregoing and related objects in view the invention consists in the construction and method of manufacture of the propeller illustrated in the accompanying drawing, in which—

Figure 1 is a plan view of the suction side of a propeller constructed in accordance with the invention, and Figures 2, 3, 4, 5 and 6 sectional views taken, respectively, along the lines 2-2, 3-3, 4-4, 5-5 and 6-6 of Figure 1.

The propeller consists of a hub 1 provided with a central aperture 2 to receive the shaft of a power transmitting or receiving device, a plurality of blades or main working portions 3, connected to the hub 1 by an intermediate or connecting portion 4.

The intermediate portion 4 is preferably, as illustrated in Figure 4, of ovoid configuration and of much greater total thickness in cross section than the blade 3, the thickness being reduced and the longitudinal axis lengthened as it approaches the blade 3, as illustrated in Figure

5, to give the outwardly flaring construction illustrated in Figure 1.

The propeller thus far described is of conventional construction; however, instead of forming the intermediate portion 4 of a solid mass of material, I provide therein a channel 5, defined by the side walls 6 and 7, of greatest depth adjacent the hub 1 and decreasing in depth as it recedes from the hub until it merges with the surface of the blade 3, as illustrated in Figure 1.

Where the requirements of strength indicate, I provide within the channel 5 longitudinally extending raised ribs or webs 8 and 9. It will be understood that any convenient number of webs may be provided or the height thereof varied as strength requirements indicate.

The hub 1 is formed with a tubular shaft receiving portion 10 having an annular raised web 11 spaced therefrom to form a circular channel 12, closed at the pressure side of the propeller by the connection 13 between the tubular portion 10 and the web 11.

Where strength requirements indicate, connecting webs 14 may be provided to connect the tubular portion 10 and the annular web 11 and some of said webs may form, in effect, extensions of the longitudinal webs 8 and 9.

The pressure side of the propeller may be of any conventional pitch or configuration.

The construction results in a considerable saving of material and consequent reduction in weight without sacrificing strength.

Furthermore, it will be noted that all portions of the propeller are of substantially similar thickness in cross section, hence, when molded of plastic or similar material, no portion requires a longer curing period than the other portions and the propeller may be made as an integral unit.

The specific construction herein disclosed is for the purpose of illustration only and it will be obvious that numerous changes may be made in the details thereof, hence I do not limit myself to such details but claim all constructions within the scope of the appended claims.

I claim:

1. In a propeller, the combination of a hub comprising a shaft receiving portion, an annular web spaced therefrom to form a channel therebetween, a portion connecting said shaft receiving portion and said annular web and interconnecting webs extending between said shaft receiving portion and said annular web, a plurality of blades and intermediate portions con-

necting said blades and said hub, each of said intermediate portions being provided with a longitudinally extending channel and each of said channels being provided with one or more longitudinally extending webs, said channel and said longitudinally extending webs merging in said blade, all of said parts being of substantially similar thickness in cross section.

2. In a propeller, the combination of a hub comprising a shaft receiving portion, an annular web spaced therefrom to form a channel therebetween, a portion connecting said shaft receiving portion and said annular web and interconnecting webs extending between said shaft receiving portion and said annular web, a plurality of blades and intermediate portions connecting said blades and said hub, each of said intermediate portions being provided with a longitudinally extending channel and each of said

channels being provided with one or more longitudinally extending webs, said channel and said longitudinally extending webs merging in said blade.

3. In a propeller formed of thermo-setting resinous material, the combination of a hub, a plurality of blades and intermediate portions connecting said blades and said hub, each of said intermediate portions being formed on the suction side thereof with a longitudinally extending channel and each of said channels being provided with one or more longitudinally extending webs, the walls of said channel and said webs being all of substantially equal thickness in cross section, said channel being of greatest depth and said webs of greatest height adjacent said hub and said channel and said webs merging into said blade.

ROMAN C. BROTZ.