July 31, 1962 C. A. KRYLOV 3,047,302

PROPELLING DEVICE FOR SKIERS AND THE LIKE

Filed Oct. 4, 1960

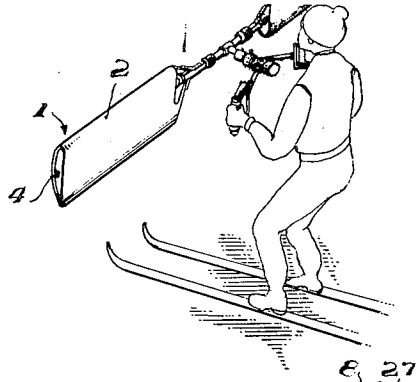


Fig. 1.

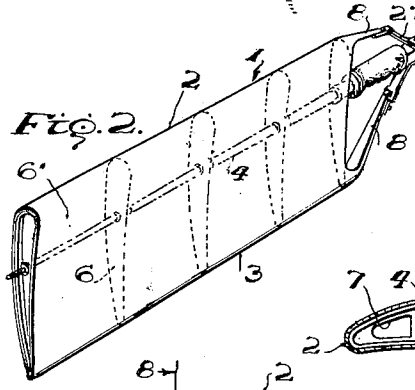


Fig. 2.

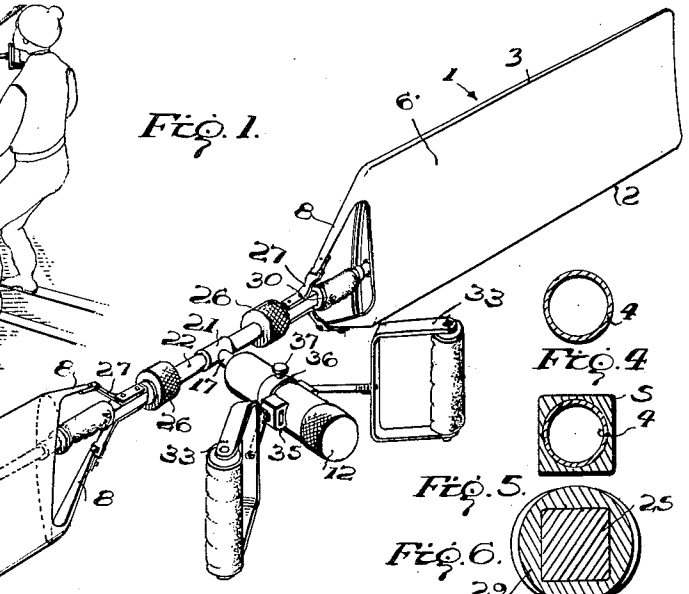


Fig. 4.

Fig. 5.

Fig. 6.



Fig. 7.

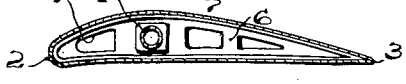


Fig. 8.

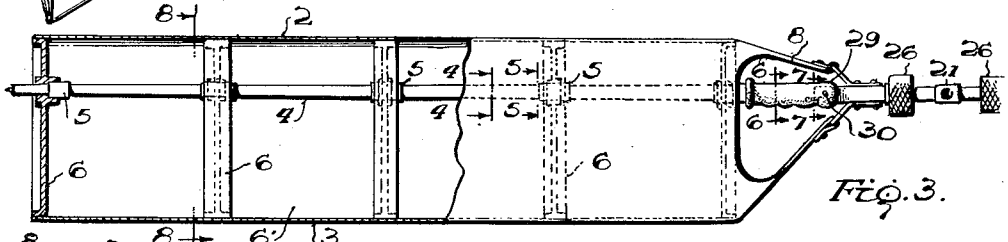


Fig. 3.

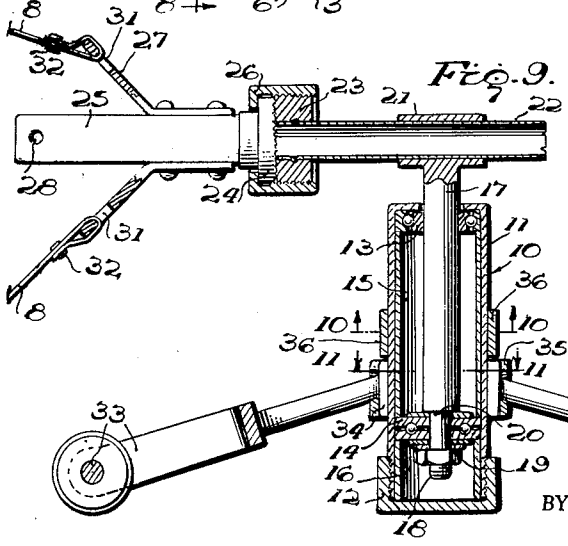


Fig. 9.

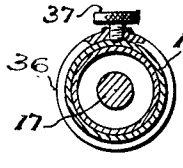


Fig. 10.

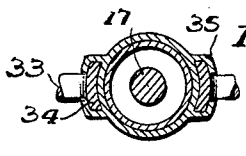


Fig. 11.

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United States Patent Office

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3,047,302
PROPELLING DEVICE FOR SKIERS AND THE LIKE

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Filed Oct. 4, 1960, Ser. No. 60,535
3 Claims. (Cl. 280—11.37)
(Granted under Title 35, U.S. Code (1952), sec. 266)

The invention described herein, if patented, may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

This invention relates to propelling devices for skiers and the like, and has for its primary object to provide a relatively light-weight and inexpensive structure which may be held by the operator and caused to provide a substantial thrust when the wind impinges against a rotor mounted on the structure and causes a rotation of the same.

Another object of the invention resides in the provision of a novel construction of a light-weight rotor in which the blades are formed of a skeletal structure covered by a flexible sheathing, such as plastic or woven fabric.

A still further object of the invention consists in providing light-weight rotor blades in which the skeletal structure may be formed of ski poles to which are fixed a plurality of spaced wing spars of aerodynamic profile for supporting and shaping the sheathing of the blade.

Other objects and advantages of the invention will be apparent from the following description taken in connection with the accompanying drawings, in which:

FIGURE 1 is a fragmentary perspective view of the novel propelling device in use;

FIGURE 2 is an enlarged perspective view of the propelling device;

FIGURE 3 is a plan view of one of the propeller blades with parts broken away to more clearly show its internal construction;

FIGURES 4, 5, 6, 7, and 8 are enlarged detail sectional views through various parts of one of the blades taken on the lines 4—4, 5—5, 6—6, 7—7 and 8—8, respectively, of FIGURE 3;

FIGURE 9 is an enlarged detail sectional view through the bearing and related parts; and

FIGURES 10 and 11 are enlarged detail sectional views through the bearing structures forming part of the present invention taken on the lines 10—10 and 11—11, respectively, of FIGURE 9.

Referring to the drawings in greater detail and by reference numerals, the blades, of which there are two, are indicated generally by the numeral 1 and are formed with leading edges 2 and trailing edges 3. Each blade is preferably composed of a hollow tubular pole 4, preferably an ordinary ski pole from which the usual basket is removed, the pole thus being analogous to the longitudinal frame members or spars of the wings of conventional aircraft. This pole, as clearly indicated in FIG. 3, is provided with a series of spaced washers 5 which are fixed to the pole and are provided with rectangular exterior surfaces on which are mounted five crossbars or ribs 6, each having an aerodynamic profile, as shown in FIG. 8. These crossbars or ribs and the pole itself are preferably formed of durable light-weight alloys, and the crossbars or ribs are provided with cut-out portions 7 to further lighten them. The skeletal wing-form thus provided is covered with a flexible, light-weight covering material 6', such as elastic plastic or a woven fabric. In either event, this sheathing material is shaped to snugly engage over the wing crossbars or ribs 6 and terminates in integral tabs 8. The leading and trailing edges of the

sheathing may be reinforced, if desired, in any preferred manner so as to avoid the possibility of distortion when in use.

The bearing for rotatably supporting the pair of blades 1 is indicated generally by the numeral 10 and consists of a casing 11 provided with a cap 12, and in which is mounted a ball bearing 13 and a thrust bearing 14 longitudinally spaced within the casing 11 by means of the tubes 15 and 16. Supported in these bearings is a shaft 17 having an externally theraded inner end 18 which receives a nut 19, and a shoulder 20 which impinges against the casing of thrust bearing 14.

The outer end of shaft 17 is provided with a transverse sleeve or tubular portion 21 in which is fixed a tube 22, to the outer ends of which are attached the blades 1 in a manner which will now be described.

Each of the blades 1 is mounted on an end of the transverse rod 22 so that the pitch of the blades may be readily adjusted as desired. To this end, an externally threaded washer 23 is fixed to each end of rod 22 to form a head and is provided with teeth on its outer face for cooperation with similar teeth on the inner face of a washer 24 which is fixed to the inner end of a stub shaft 25 to form a head. The teeth on these two heads 23 and 24 may be caused to engage or disengage by means of a nut 26 which is internally threaded and adapted to engage the exterior threads on the head 23, the nut 26 being in the form of an internally theraded sleeve and having an inwardly directed flange on one end thereof as clearly seen in FIGURE 9.

Each of the stub shafts 25 is of rectangular cross-section and is provided with a pair of wings 27 and a transverse aperture 28. The apertured end of each of the stub shafts 25 is received in a hollow portion 29 of the inner end of the ski pole, i.e. the handle of the ski pole or the like 4. This hollow portion is provided with an aperture to be aligned with the aperture 28 of the stub shaft 25 to receive a cotterpin 30 for releasably securing these parts together. The sheathing which covers the several wing crossbars of each blade is secured in position by attaching the tabs 8, heretofore referred to, to the wings 27, as clearly indicated in FIGURE 9, which shows the tabs passing through slots 31 in the wings and secured to themselves by snap fasteners or the like 32.

The hand grips for use in supporting the bearing and wings carried thereby are indicated by the numeral 33 and are provided with enlargements 34 on their inner ends which are slidably received in sockets 35 mounted on opposite sides of the casing 11. A ring 36 slidably mounted on the casing 11 serves to removably secure the handles in position in the sockets 35, and this ring carries a setscrew 37 for securing the ring in locking position on the casing.

In the operation of the device, the pitch of the wings or blades may be adjusted in the manner heretofore indicated to take advantage of the particular circumstances under which the propelling device is being used, and the operator then supports the apparatus in front of him by means of the handles 33, it being understood that the wind is to be at the operator's back or nearly so, so that the wind current will impinge on the wings and cause them to rotate in a well-known manner. With the wings thus set in motion, the propeller will provide a thrust which will draw the skier along the snow in the direction of the wind. The device will also act as a brake in descending a steep slope. The propelling device as illustrated herein is of extremely light weight and may be readily dismantled by loosening the setscrew 37, removing the cotterpin 30, and releasing the snap fasteners 32, whereby the handgrips 33, sheathing 6', wing crossbars or ribs 6, etc., may be packaged to facilitate carrying or storage until again required for use.

In accordance with the patent statutes, I have described what I now consider to be the preferred form of the invention, but inasmuch as various minor changes may be made in structural details without departing from the spirit of the invention, it is intended that all such changes be included within the scope of the appended claims.

I claim:

1. A propelling device for skiers and the like comprising a bearing and its housing, a propeller shaft rotatably mounted in the bearing, a pair of propeller blades fixed to the forward end of the shaft, each blade comprising a ski pole, a series of crossbars spaced along each pole, each crossbar having an aerodynamic profile, a fabric sheath covering each series of crossbars thereby providing blades having the cross-sectional shape of conventional airplane wings, and a pair of hand grips projecting outwardly of the housing for said hearing at positions to be gripped by a skier using the device whereby the skier may be propelled by the wind when the propelling device is so held as to take advantage of the wind currents.

2. A propelling device for skiers and the like comprising a cylindrical bearing housing, bearings mounted at the front and rear of the housing, a shaft rotatably mounted in said bearings and extending outwardly of the forward end of the housing, a pair of propeller blades fixed to the forward end of the shaft, each blade comprising a rod and a series of crossbars spaced along its length, each crossbar having an aerodynamic profile, a fabric sheath covering each series of crossbars thereby providing blades having the cross-sectional shape of conventional airplane wings, and a pair of hand grips secured to said

housing, whereby the skier may be propelled by the wind when the propelling device is so held as to take advantage of the wind currents.

3. An auto rotation propelling device for skiers or the like comprising a shaft, bearing structure to support said shaft for free rotation, hand grips anchored to said bearing structure and projecting outwardly thereof for manually holding said device in operative position, a plurality of blade-forms each comprising an elongated member defining a spar and a series of ribs of aerodynamic profile fixed to said spar in spaced relation longitudinally thereof, means for anchoring said spars to said shaft, said means being angularly adjustable to permit the pitch of said blade-forms to be changed, covers of sleeve-like flexible material to form skins for said blades, said covers each being closed at one end and open at the other to permit the covers to be drawn over a blade-form or removed therefrom, and means on the open end of said cover for tying the same to said blade-form when the cover is in operative position on said form.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,047,302 July 31, 1962

Constantin A. Krylov

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 3, line 17, for "hearing" read -- bearing --; column 4, list of references cited, add the following:

FOREIGN PATENTS

62,963 Netherlands----------Apr. 15, 1949

Signed and sealed this 20th day of November 1962.

(SEAL)
Attest:

ERNEST W. SWIDER
Attesting Officer

DAVID L. LADD
Commissioner of Patents