Nov. 24, 1931. P. J. PROKOP 1,833,722

AIRSHIP PROPULSION

Filed Oct. 30, 1930 4 Sheets-Sheet 1

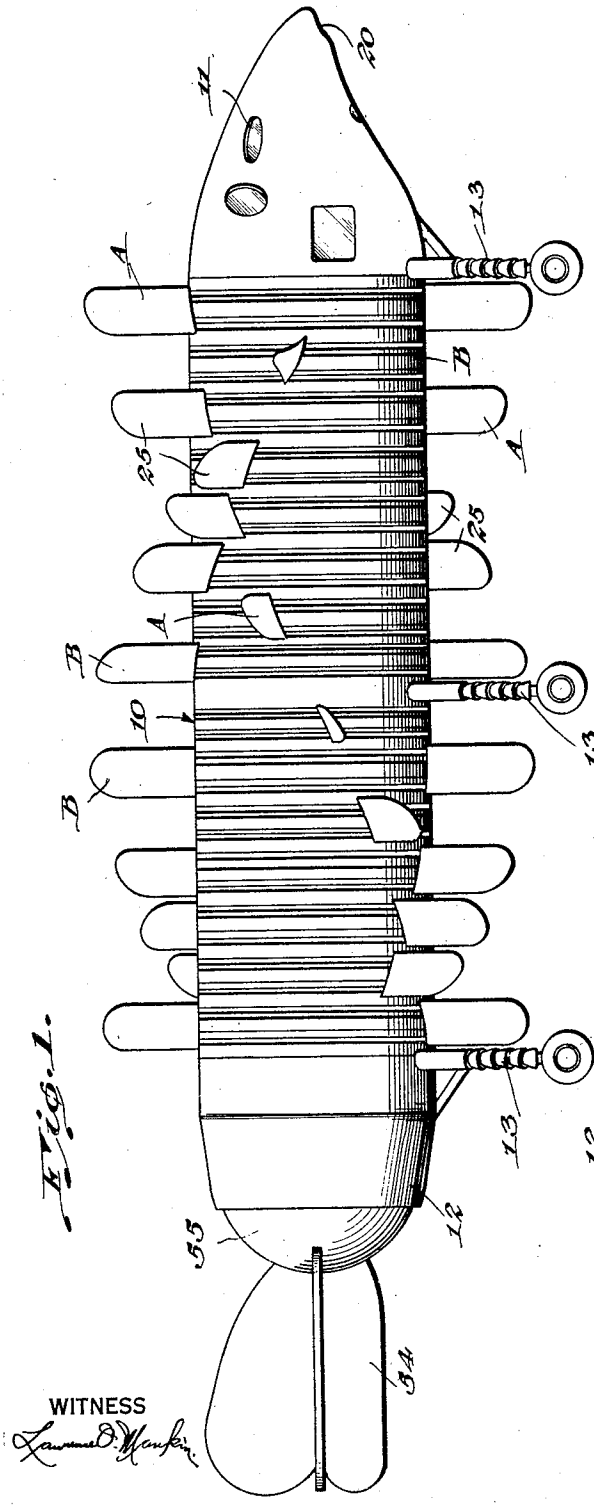



Fig. 1.

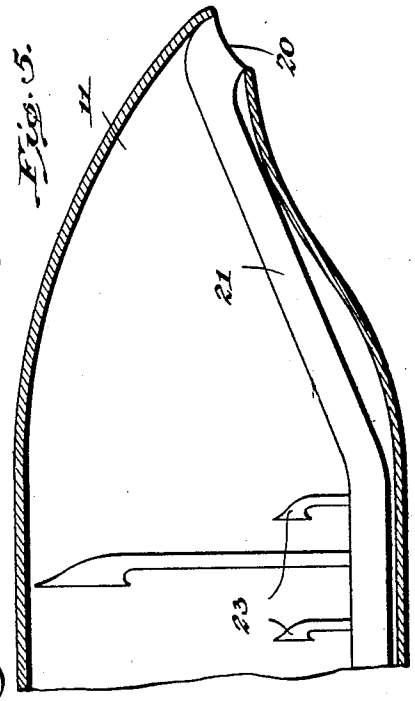



Fig. 5.

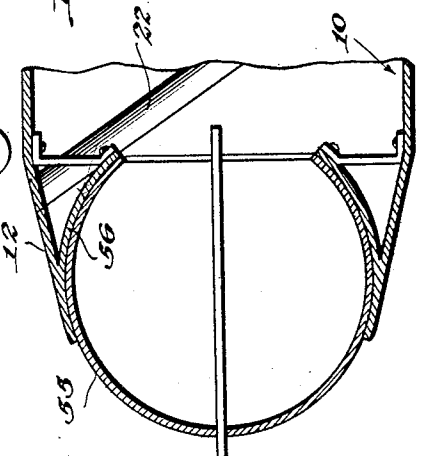



Fig. 6.

WITNESS

INVENTOR

P. J. Prokop,

BY

ATTORNEY

Nov. 24, 1931. P. J. PROKOP 1,833,722

AIRSHIP PROPULSION

Filed Oct. 30, 1930 4 Sheets-Sheet 2

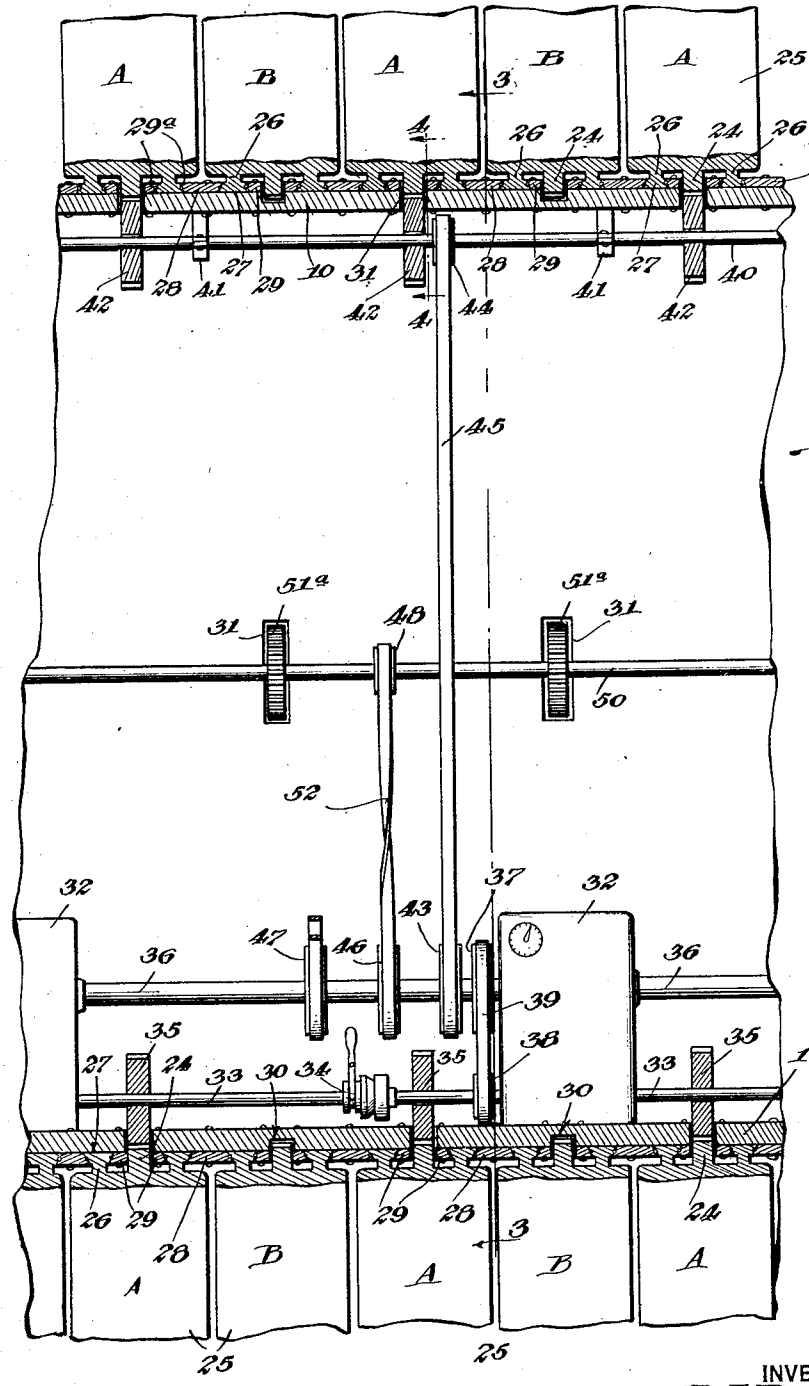



Fig. 2.

WITNESS

Laura O. Mankin

INVENTOR

P. J. Prokop,

BY

Munn & Co

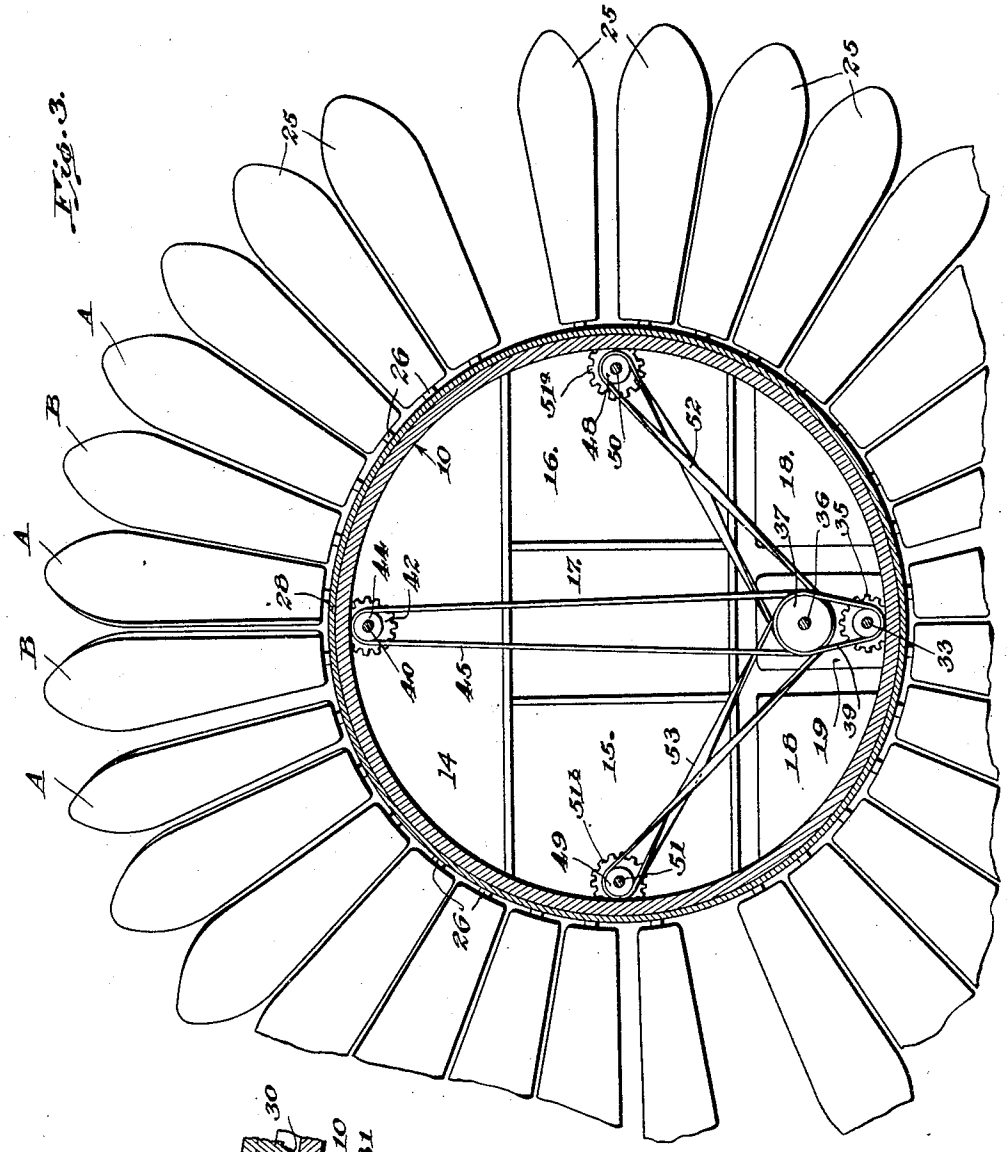
ATTORNEY

Nov. 24, 1931. P. J. PROKOP 1,833,722

AIRSHIP PROPULSION

Filed Oct. 30, 1930 4 Sheets-Sheet 3

Fig. 3.



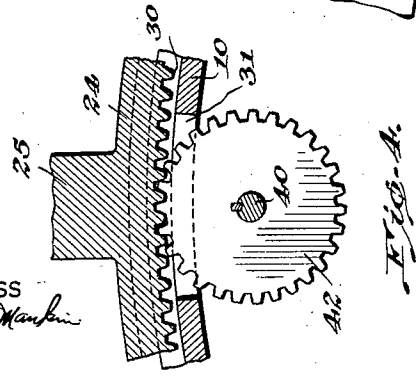




Fig. 4.

WITNESS
Laurence A. Mankin

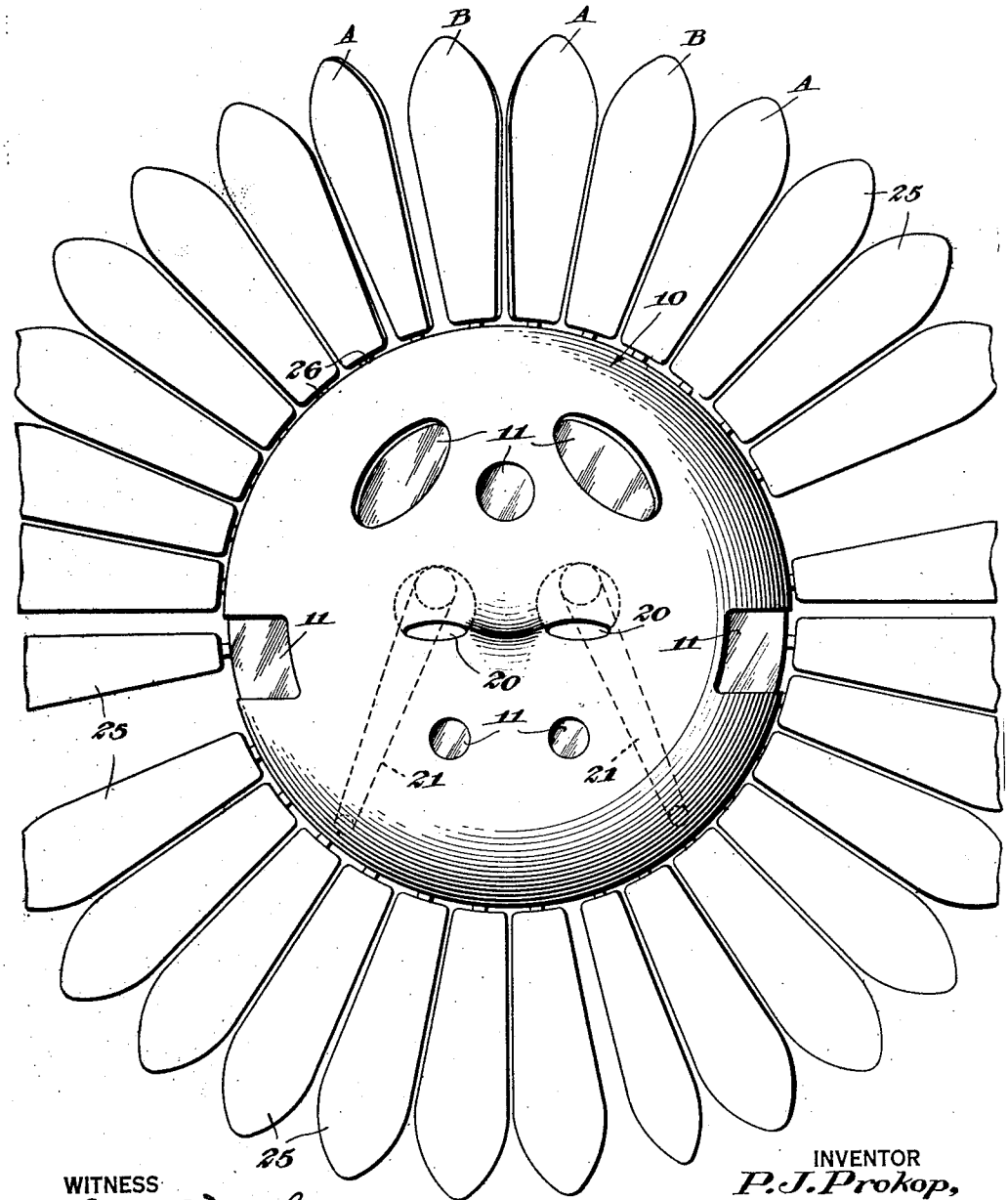
INVENTOR
P. J. Prokop,
BY Munn & Co.
ATTORNEY

Nov. 24, 1931. P. J. PROKOP 1,833,722

AIRSHIP PROPULSION

Filed Oct. 30, 1930 4 Sheets-Sheet 4

Fig. 7.




WITNESS

Lawrence D. Mankin

INVENTOR

P. J. Prokop,

BY Munn & Co.

ATTORNEY

Patented Nov. 24, 1931

1,833,722

# UNITED STATES PATENT OFFICE

PROKOP J. PROKOP, OF BROOKLYN, NEW YORK

## AIRSHIP PROPULSION

Application filed October 30, 1930. Serial No. 492,324.

My invention relates to air navigating vessels of the heavier than air type and is an improvement of my Patent 1,244,367 patented October 23, 1917, and it consists in the constructions, arrangements and combinations herein described and claimed.

It is an object of the invention to provide a craft which may attain great speeds through the application of a new principle of drive for the propellers.

It is a further object of the invention to provide a craft of great load-carrying capacity and in which the use of supporting planes may or may not be employed.

A still further object of the invention is the provision of a craft wherein the propellers rotate around the body of the craft and are disposed substantially throughout the length of the craft or any single portion thereof, alternate propellers being driven in opposite directions, so as to obtain the greatest possible "pull".

Additional objects, advantages and features of the invention will be apparent from the following description considered in conjunction with the accompanying drawings, wherein:

Figure 1 is a side elevation of a craft constructed in accordance with my invention.

Figure 2 is an enlarged sectional view illustrating the drive for the propellers.

Figure 3 is a fragmentary cross section on the line 3—3 of Fig. 2.

Figure 4 is an enlarged detail of the propeller drive, taken on the line 4—4 of Fig. 2.

Figure 5 is a fragmentary detail of the nose of the craft.

Figure 6 is a similar view of the rear portion of the craft.

Figure 7 is an end view of Fig. 1.

In carrying out my invention I provide a projectile-shaped body 10 having a nose 11 and rear portion 12 and suitable landing gear 13.

Referring now to Fig. 3 of the drawings, it will be seen that the body 10 is divided into a plurality of compartments 14, 15, 16 and 17. The compartments 14, 15 and 16 may represent the passenger cabin and the compartment 17, a buffet. Immediately beneath the compartments 15, 16 and 17 provision is made for gas tanks 18, and between these compartments is provided the engine room 19.

In order to provide ventilation upon the interior of the body 10, the nose 11 is apertured as at 20, within which one end of a tube 21 is suitably secured. The forward end of the tube may have any desired shape, and as shown is turned slightly downward to prevent rain, snow etc. from entering the tube. The tube 21 extends through the length of the craft and has exit through the inclined tube 22 at the rear of the craft. At suitable intervals the tube 21 is apertured, and in these apertures there are positioned air discharge funnels 23, a number of such funnels being positioned in the various compartments 14, 15, 16 and 17. It will thus be apparent that ample ventilation is provided, and also that the positioning of the tubes (see Fig. 7) will provide equalized balance and stability to the craft.

The construction and operation of the propellers will now be described, and reference is made particularly to Figs. 1 and 2 of the drawings. Two separate sets of propellers are employed, namely, A and B, the set A rotating in one direction and the set B rotating in the opposite direction, as will be explained more fully hereinafter. The numerous propellers are identically formed and mounted and therefore a description of one, only, will suffice for a full understanding of the invention. The body 10 is of cylindrical contour and is formed from any suitable material. A large ring gear 24 is provided having integrally formed therewith a plurality of propeller blades 25, suitably positioned around the outer circumference of the gear 24. Guide rings 26 integrally attached to the blades 25 and of a diameter to be revolubly mounted upon the body are provided, there being one ring 26 upon opposite sides of the ring gear 24. These guide rings have a base 27 providing a suitable bearing face, and the sides thereof are suitably inclined for a purpose now to be described.

Segmental rings 28 and 29 are provided, having inclined side walls which are com-

plemental to the side walls of the guide rings 26, and suitable anti-friction means 29[a] may be provided as shown. From the foregoing it will be apparent that the propellers are securely retained upon the body and will be permitted to rotate freely therearound.

The body 10 is provided with circumscribing channels 30, in line with respective ring gears 24, the ring gear projecting into the slot, as shown in Fig. 2. At diametrically opposite sides, the channels are slotted as at 31 through which a drive for the ring gears 24 is effected.

The power plant for my craft preferably includes a plurality of engines 32, of any suitable horse power and are preferably connected in tandem by drive shafts 33, as shown, a clutch 34 being interposed between the engines and all of the clutches may be controlled by a master clutch, not shown. Spur gears 35 are keyed upon the drive shaft 33 and project through respective slots 31 and are in mesh with the ring gear 24 so as to drive the propellers indicated as A. A counter-shaft 36 is suitably supported between a pair of the engines 32 and upon this shaft there are keyed pulleys 37. A small pulley 38 is fixed to the drive shaft 33 and a drive belt 39 is trained about the pulleys 37 and 38.

At a point diametrically opposite the drive shaft 33, a counter-shaft 40 is revolubly mounted in bearings 41, and at points alined with the slots 31 there are keyed spur gears 42 in mesh with the ring gear 24 of the propellers indicated by the reference character A. A pulley 43 is fixed to the countershaft 36 and a smaller pulley 44 is fixed to the countershaft 40, a belt 45 being trained about these two pulleys to complete the drive. Thus it will be noted that the propellers A are driven at two diametrically opposite points, and even distribution of power is applied to the ring gear of each set of propellers.

The propellers indicated by the reference character B are driven in the following manner. Upon the countershaft 36 there are suitably keyed pulleys 46 and 47 in alinement with small pulleys 48 and 49 fixed to countershaft 50 and 51 respectively. Respective drive belts 52 and 53 are trained around respective pulleys 46—48 and 47—49, and these belts 52 and 53 are twisted as indicated in Fig. 3, so that the propeller sets B will be rotated-clockwise, or in reverse directions to the propeller sets A.

Upon the shafts 50 and 51 spur gears 51[a] and 51[b] are keyed, these gears projecting through respective slots 31, so as to mesh with the ring gear 24 of the propellers B.

The countershafts 50 and 51 are arranged along the horizontal medial line of the craft and are disposed diametrically opposite each other, to effect an even drive for the ring gears of the propeller sets B.

Reference is now made to Figure 1 of the drawings, wherein it will be seen that the propeller blades 25 of each set A and B are so positioned that they form a continuous convolution from the front of the craft to the rear thereof, and with the set of propellers A rotating clockwise and the propellers B rotating anti-clockwise, a shearing or scissor-like action is produced upon the air stream. This shearing action of the two series of propellers will effect a continuous air push in a straight line longitudinally, as indicated by the arrows, in Fig. 1.

The center of gravity is located well below the center of the body, as indicated by the location of the engines, fuel-tanks, etc. insuring perfect balance of the craft which is further insured by the opposite rotation of the series of propellers.

The steering of the craft may be effected in any manner desired, but in the present instance, the rudder 54 is provided with a spherical element 55 mounted in a spherical socket 56. The rudder 54 may be oscillated by a cable means as illustrated in my Patent No. 1,244,367, patented October 23, 1917.

In effecting the landing or take-off of the craft the motors 32 may be controlled by manipulation of the individual clutches 34 through the master clutch as will be readily understood.

What I claim is:

1. An aircraft comprising a cylindrical body, a plurality of propellers circumferentially rotatable therearound, said propellers having guide rings providing a bearing face, a ring gear carried by said propellers, a power plant, counter shafts mounted in said body, gears upon said countershaft and in mesh with the ring gears of certain of said propellers, a pair of countershafts arranged at right angles to said first named countershaft, gears upon said countershaft and in mesh with ring gears of alternate propellers, and drive means between said power plant and said countershafts for rotating said propellers.

2. An aircraft comprising a cylindrical body, a plurality of propellers circumferentially rotatable there around, said propellers having bearing faces, a ring gear carried by said propellers, a power plant, countershafts mounted in said body, gears upon said countershaft and in mesh with the ring gears of certain of said propellers, a pair of countershafts arranged medially of said body and at right angles to said first named countershaft, gears upon said countershafts and in mesh with ring gears of alternate propellers, and drive means between said power plant and said countershafts for rotating said propellers in alternate directions.

3. An aircraft comprising a cylindrical body having a plurality of guide-ways extending circumferentially of said body, a rotatable propeller anti-frictionally mounted

in each guide-way, said guide-ways having slots communicating with the interior of the body, a ring gear carried by each propeller, a power plant, countershafts revolubly mounted in said body, gears keyed upon said countershafts and projecting through respective slots and in mesh with respective ring gears, and drive means between said power plant and said countershafts for rotating said propellers in alternate directions.

4. An aircraft comprising a cylindrical body having a plurality of circumferential guide-ways, a rotatable propeller in each guide-way, said guide-ways having slots communicating with the interior of the body, a ring gear carried by each propeller, a plurality of power units arranged in tandem and having a drive shaft, a countershaft between each two of said engines, drive pulleys upon said countershaft, a drive pulley upon said drive shaft, a belt trained therearound, a plurality of countershafts revolubly mounted in said body, gears keyed thereon and projecting through respective slots and in mesh with respective ring gears, drive pulleys upon each countershaft, a drive pulley upon said first named countershaft, and drive belts trained about said pulleys, certain of said belts being twisted to rotate certain of said propellers in opposite directions.

PROKOP J. PROKOP.