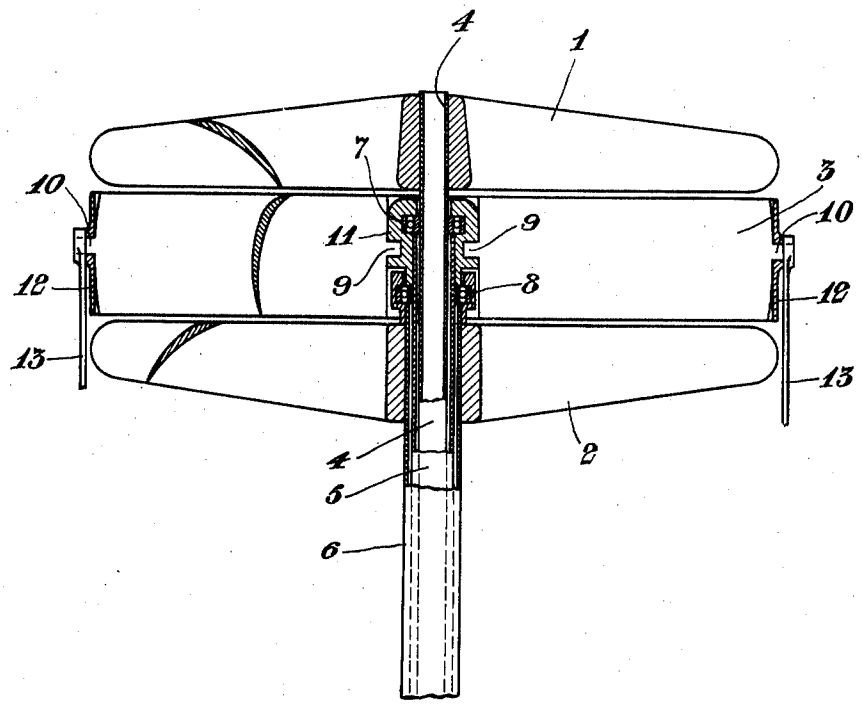
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PROPELLER ARRANGEMENT FOR FLYING MACHINES, AIRSHIPS, AND THE LIKE

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PROPELLER ARRANGEMENT FOR FLYING MACHINES, AIRSHIPS, AND THE LIKE.

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The present invention relates to a propeller arrangement for flying machines, airships, and the like, which consists in a well-known manner of two propellers mounted opposite each other—coaxially—but rotating in opposite directions. Heretofore known propeller arrangements of this type have a very poor efficiency which, it is believed, is due to the fact that the air compressed by the first propeller during its rotation is put to very strong whirling motions and is thrown outwards by centrifugal force, so that the second propeller will work under very unfavourable conditions.

The invention has for its purpose to avoid this disadvantage, and consists principally in that between the two propellers rotating in opposite directions, and which are so constructed that their blades extend practically to the shaft of the propeller, a stationary guide blade apparatus is provided having guide blades which likewise extend practically to the shaft, while the space outside the two propellers is free. The guide blades may suitably be adjustable. Said guide blades form a guide for the air current generated by the first propeller, so that said current can be conducted to the second propeller in the desired direction, owing to which the last mentioned propeller, and therefore the entire propeller arrangement, obtains a considerably higher efficiency. The new propeller arrangement can therefore advantageously be used in such flying machines, so-called helicopters, in which the lifting force is produced by means of propellers rotating around vertical shafts, but the invention may of course also be utilized for the propulsion of ordinary aeroplanes and airships.

In the accompanying drawing a propeller arrangement according to the invention is shown, viewed from the side and partly in section, as an example of the manner in which the invention may be carried out.

The propeller device illustrated is provided with two propellers 1 and 2 and with a guide blade apparatus 3 mounted between said propellers. The upper propeller 1 is secured to a shaft 4, which is made tubular in order to decrease the weight, and which extends through a second tubular and stationary shaft 5, which supports the guide blade apparatus 3, and which in its turn is surrounded by a third tubular shaft 6 to which the lower propeller 2 is secured. The inner shaft 4 is journalled in the stationary shaft 5 by means of a ball bearing 7, and the outer shaft 6 is rotatably journalled on the shaft 5 by means of a second ball bearing 8, in such manner that the three shafts have the same geometrical axis. The two rotatable shafts 4 and 6 are connected by means of a suitable gearing, not illustrated in the drawing, to each other and to a motor in such manner that they may be caused to rotate in opposite directions. The blades of the two propellers which, as shown in the drawing, extend practically to the shaft of each propeller, have their pitch inclined in opposite directions, as indicated by the sections of the blades shown in the left-hand portion of the drawing, so that upon such rotation both propellers produce a downward directed air current. The blades of the guide blade apparatus 3 are provided with journals 9 and 10 by means of which they are rotatably journalled, at the inner ends of the blades in the hub 11 secured to the shaft 5, and at the outer ends of the blades in the outer ring 12. The journals 10 at the outer ends of the guide blades pass out through the ring 12 and support on their protruding ends levers 13 which are connected to a suitable adjustment device, not illustrated in the drawing, by means of which all guide blades can be simultaneously adjusted in the desired inclination with relation to the propeller blades.

As indicated in the drawing, the two propellers should be located as closely as possible to the guide blade apparatus and should have approximately the same diameter, so that the guide blade apparatus will receive practically the entire downward directed air current produced by the upper propeller and conduct said air current to the lower propeller. In this manner the lower propeller will work at a considerably higher efficiency than if the guide blade apparatus were not provided. In order to attain the best efficiency possible at different speeds of the propellers, the inclination of the guide blades should be changed upon variation of the speed of rotation of the propellers. This may be effected automatically, if desired, for instance by means of a centrifugal governor which actuates the abovementioned adjustment device.

The embodiment above described and illustrated in the drawing is only to be regarded as an example, and it will be understood that

the details thereof may be modified in several respects without departing from the principle of the invention.

I claim:

1. A propeller arrangement for flying machines, airships and the like, comprising two propellers arranged coaxially opposite each other and rotating in opposite directions, a shaft for each of said propellers, each of said propellers having blades extending substantially to the shaft of the propeller, a stationary guide blade apparatus intermediate said propellers, and a shaft supporting said guide blade apparatus, said guide blade apparatus having blades extending practically to said shaft, said guide blade apparatus leaving the space outside said two propellers free.

2. A propeller arrangement for flying machines, airships and the like, comprising in combination two propellers arranged coaxially opposite each other and rotating in opposite directions, a stationary guide blade apparatus intermediate said propellers, a tubular stationary shaft supporting said guide blade apparatus, a shaft supporting one of said propellers journalled in said tubular shaft for said guide blade apparatus, and a second tubular shaft for the other of said propellers journalled on and surrounding said tubular shaft for said guide blade apparatus, each of said propellers having blades extending substantially to its respective shaft, and said guide blade apparatus having blades extending substantially to its shaft, said guide blade apparatus leaving the space outside said two propellers free.

3. A propeller arrangement for flying machines and airships, comprising two propellers arranged coaxially opposite each other and rotating in opposite directions, a shaft for each of said propellers, each of said propellers having blades extending substantially to the shaft of the propeller, a stationary guide blade apparatus intermediate said propellers, and a shaft supporting said guide blade apparatus, said guide blade apparatus having blades extending practically to said shaft, said guide blades being rotatable on axes substantially radial to said shaft, said guide blade apparatus leaving the space outside said two propellers free.

4. A propeller arrangement for flying machines and airships, comprising in combination two propellers arranged coaxially opposite each other and rotating in opposite directions, a stationary guide blade apparatus intermediate said propellers, a tubular stationary shaft supporting said guide blade apparatus, a shaft supporting one of said propellers journalled in said tubular shaft for said guide blade apparatus, and a second tubular shaft for the other of said propellers journalled on and surrounding said tubular shaft for said guide blade apparatus, each of said propellers having blades extending substantially to its respective shaft, and said guide blade apparatus having blades extending substantially to its shaft, said guide blades being rotatable on axes substantially radial to said shaft, said guide blade apparatus leaving the space outside said two propellers free.

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