F. FRONZ.

PADDLE WHEEL, PARTICULARLY FOR USE ON AIR SHIPS.

APPLICATION FILED APR. 16, 1908.

929,298. Patented July 27, 1909.

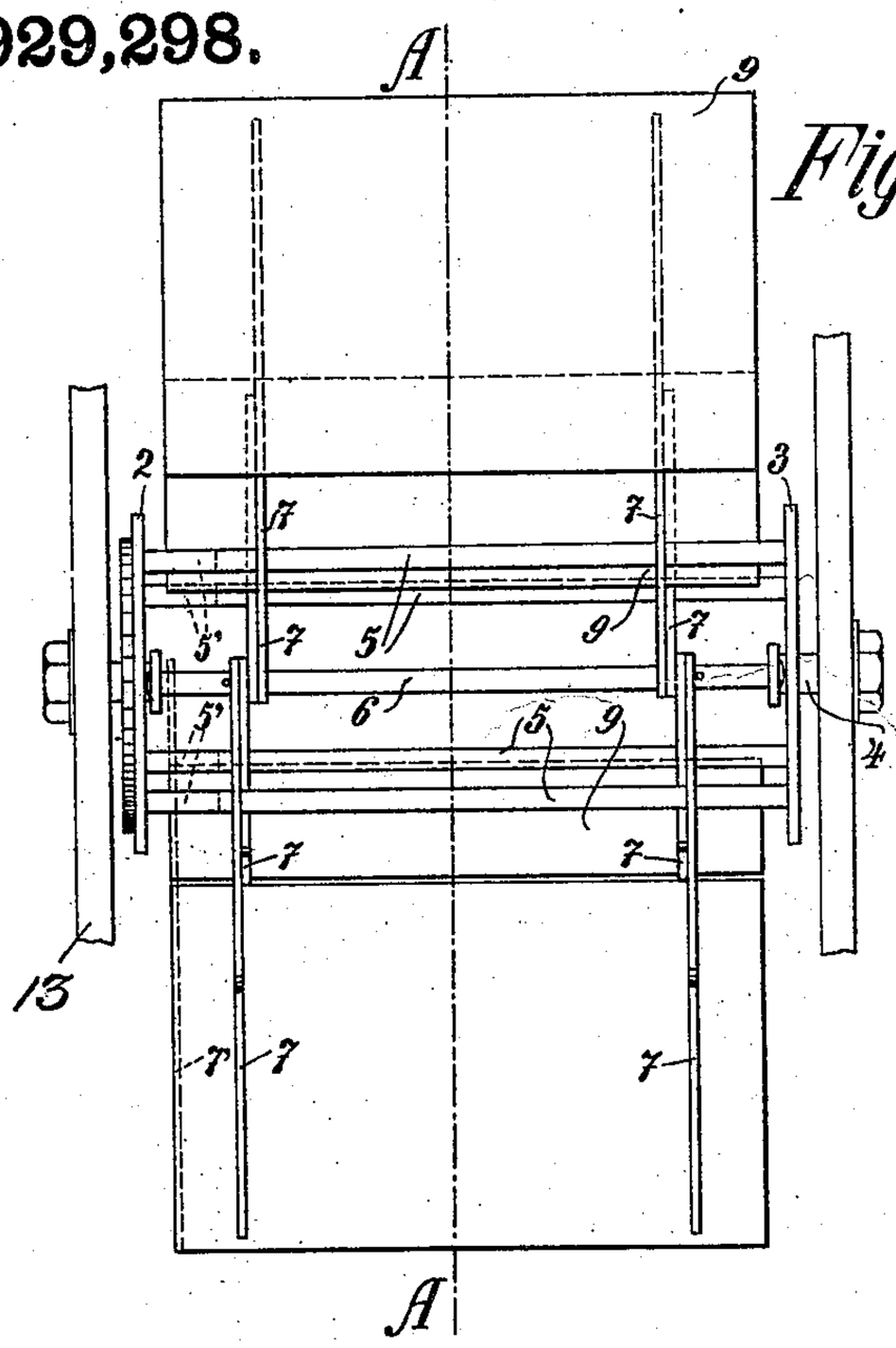

Fig. 1

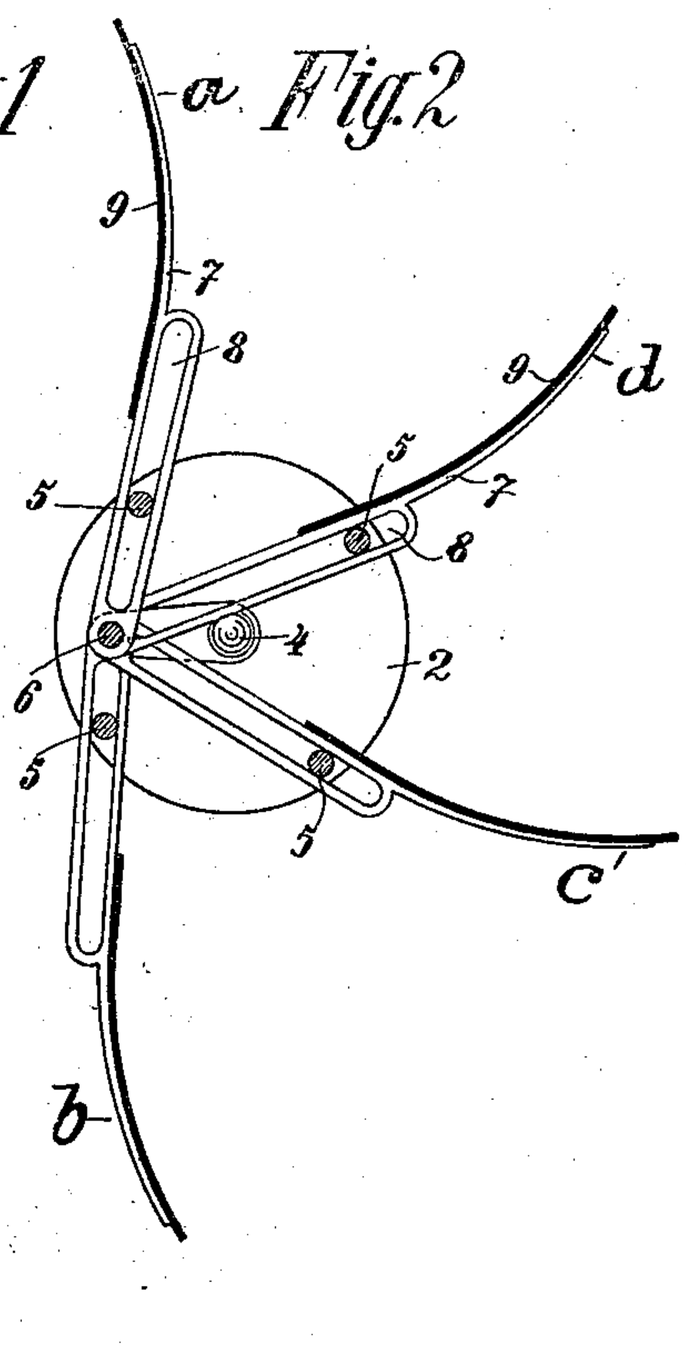

Fig. 2

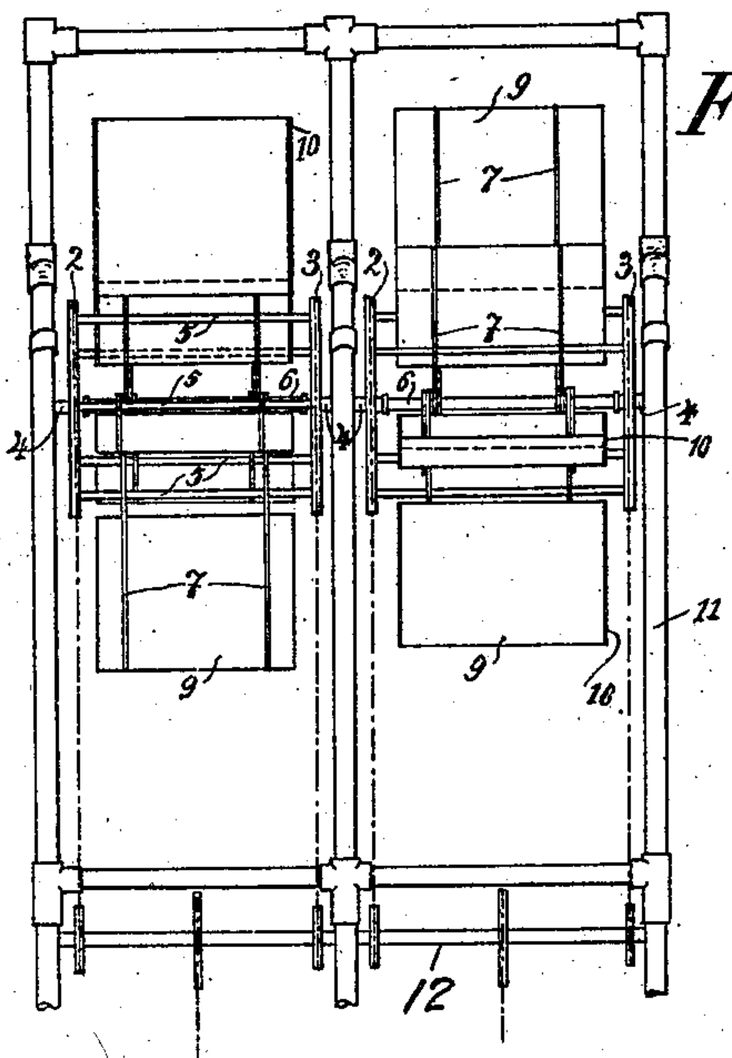

Fig. 3

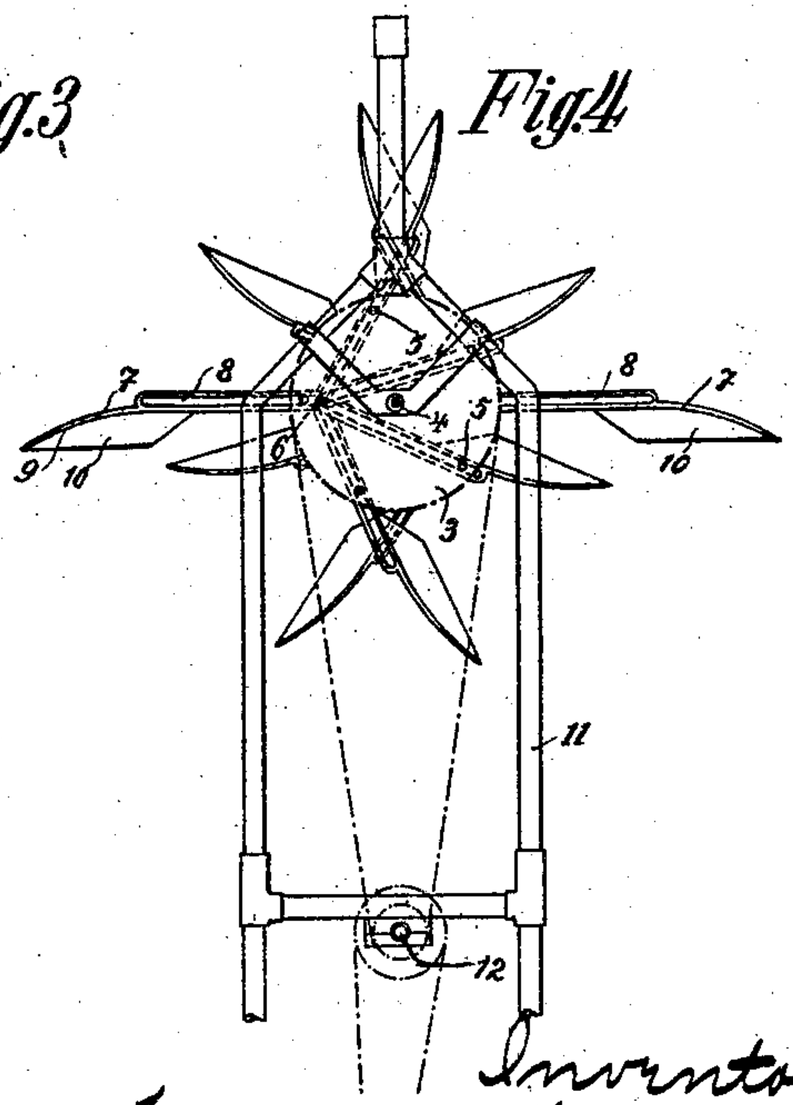

Fig. 4

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UNITED STATES PATENT OFFICE.

FRANCESCO FRONZ, OF GORIZIA, AUSTRIA-HUNGARY, ASSIGNOR TO FRANCESCO SKERL, OF TRIEST, AUSTRIA-HUNGARY.

PADDLE-WHEEL, PARTICULARLY FOR USE ON AIR-SHIPS.

No. 929,298. Specification of Letters Patent. Patented July 27, 1909.

Application filed April 16, 1908. Serial No. 427,525.

To all whom it may concern:

Be it known that I, FRANCESCO FRONZ, a subject of the Emperor of Austria-Hungary, and residing at Gorizia, in the Province of Gorizia and the Empire of Austria-Hungary, have invented certain new and useful Improvements in Paddle-Wheels, Particularly for Use on Air-Ships, of which the following is a specification.

This invention relates to improvements in propellers for air ships of that character wherein the propulsive force is expended for the purpose of causing the ship to rise, the propulsion of the ship in horizontal or inclined directions being effected by the usual aerial propellers.

One of the principal objects of this invention is to provide a propeller, having a plurality of blades, which will cause the blades to act downwardly with great propelling power and causing the blades passing from a downward to an upward position to offer the slightest possible resistance to the air in counteraction of the downwardly propelling blades so that the ascending movement of the ship will not be retarded by the travel of the blades from a downward to an upward position.

The invention will be more fully described in connection with the accompanying drawing and will be more particularly pointed out and ascertained in and by the appended claims.

In the drawing:—Figure 1 is a view in front elevation of a single propeller embodying the main features of my invention. Fig. 2 is a sectional view on line A—A of Fig. 1. Fig. 3 is a front view of two propellers arranged to coöperate with each other in accordance with the invention. Fig. 4 is a side elevation of a modified construction of the propeller blades.

Like numerals of reference designate similar parts throughout the different figures of the drawing.

Referring to Figs. 1 and 2, 13 designates a frame in which is rigidly mounted a stationary crank member 4 having a forwardly and preferably horizontally projecting crank portion 6. The crank portion 6 forms a common pivot to which all of the blades are secured and about which they are revolved in a manner which will hereinafter more fully appear. A driving member, which may be in the form of a disk 2 is concentrically mounted upon the base of the crank member 4 and may be driven by a belt or sprocket chain in any desired manner. A disk 3 may also be mounted rotatably on the opposite base of the crank member 4. It will be noted by reference to Fig. 2 that the disks 2 and 3 are concentrically disposed with respect to the base of the crank member 4 whereas they are eccentrically disposed with respect to the crank portion or common pivot 6. The disks 2 and 3 are provided with a plurality of blade actuating members which may as shown consist of rods 5, one for each disk. The rods 5 extend between and are rigidly connected with the disk and are concentrically disposed with respect to the base of the crank member 4 and are spaced equal distances apart from each other. The distance between the center of the crank member 4 and the rods 5 exceeds the distance between the crank member 4 and the common pivot 6 so as to permit the rods 5 to readily pass beyond the pivot 6.

The blades are indicated at 9 and are provided with arms 7 which extend inwardly and are all mounted upon the common stationary pivot 6 in a manner to swing thereabout. The arms 7 are slotted at 8 and the rods 5 extend through said slot. It will be readily understood by reference to Fig. 2 that when the disks 2 and 3 rotate the rods 5 engaging the arms 7 will rotate the blades about the common pivot 6. In order to attain the desired results the common pivot 6, which is eccentrically arranged with the centers of the disks 2 and 3 is also disposed in horizontal alinement with the centers of said disks although it will be understood that this exact disposition is not essential. By reference to Fig. 2 it will be seen that as the rods 5 approach the common pivot 6 in a contra-clockwise direction the movement imparted to the blades 9 will gradually increase because of the continuously decreasing distance between the pivot 6 and the approaching rod 5. Thus the blade *a* will, from the vertical position shown in Fig. 2, descend at a rapidly increasing rate of speed until its actuating rod 5 approaches an alined position with the pivot 6 and the crank base 4 whereupon said rod 5 will gradually move away from the pivot 6 whereupon the movement of the blade *a* will gradually decrease in speed as it attains the position shown by blade *b* however it will be understood that

throughout its sweep of movement from the upper to the lowermost position the blade *a* will exert an ascending propulsive force at a very great velocity. After the blade *a* reaches the position of blade *b* its speed will gradually decrease because the rods 5 will gradually move away from the common pivot 6 and the subsequent upward movement of the blade will be very slow in comparison with its downward movement. The position of the rod 5 of blades *c* and *d* with respect to the common pivot 6, in comparison to the position of the rod 5 of blades *a* and *b* with respect to the pivot 6 clearly indicates the material decrease in speed of the blades traveling upwardly with respect to the blades traveling downwardly. It will thus be seen that substantially the maximum efficiency of downward propulsion and the resultant ascending action imparted to the ship is utilized and that the ascending action is retarded by the upwardly traveling blades only to a minimum or imperceptible extent. In practice it is found that the displacement of the blades *c* and *d* and the reaction of such displacement upon the ascending action of the ship is so slight as to be incalculable.

In order to obtain a practically vertical ascending action I desirably employ two propelling devices so that one device will neutralize any tendency of the other device to impart a lateral movement to the ship during its ascent and to also prevent a rotative or oscillating movement about its vertical axis of the ship.

Fig. 3 shows one arrangement of the foregoing characters wherein two propelling devices as set forth in Figs. 1 and 2 are axially arranged. In this form the crank members 4 are arranged in a frame 11 and both of the disks 2 and 3 are driven by sprocket chains from a driven shaft 12, to which motion may be applied in any desirable manner, not shown.

In Fig. 4 a side elevation is shown illustrating the arrangement of Fig. 3 in which the blades 10 are dished or concave transversely.

I claim:—

1. An ascending aerial propeller for airships comprising in combination, a plurality of blades, a single stationary pivot to which all of said blades are secured, the centers of pivotal connection of said blades with said stationary pivot being in fixed coincident relation with the axis thereof, less driving means having its axis eccentrically disposed with respect to said pivot and in fixed relation thereto, and means concentrically disposed with respect to said driving means and connecting the same with said blades for actuating the latter.

2. An ascending aerial propeller for airships comprising in combination, a plurality of blades, a single stationary pivot to which all of said blades are secured, the centers of pivotal connection of said blades with said stationary pivot being in fixed coincident relation with the axis thereof, and driving means having its axis eccentrically disposed with respect to said pivot and in fixed relation therewith and provided with concentrically disposed elements for rotating said blades about said pivot.

3. An ascending aerial propeller for airships comprising in combination, a plurality of blades, a single stationary pivot to which all of said blades are connected, the centers of pivotal connection of said blades with said stationary pivot being in fixed coincident relation with the axis thereof, and means eccentrically disposed with respect to said pivot and having its axis in fixed relation with respect to said stationary pivot for rotating said blades about said pivot and imparting a rapid downward movement to said blades and a relatively and materially reduced speed of upward movement thereto.

4. An ascending aerial propeller for airships comprising in combination, a plurality of blades, a single stationary pivot to which all of said blades are secured, the centers of pivotal connection of said blades with said stationary pivot being in fixed coincident relation with the axis thereof, and rotary means eccentrically disposed with respect to said pivot for moving said blades around said pivot and having its axis in fixed relation with respect to said pivot and imparting a relatively rapid downward movement to said blades and a relatively and materially reduced upward movement thereto.

5. An ascending aerial propeller for airships comprising in combination, a plurality of blades, a single stationary pivot to which all of said blades are connected, the centers of pivotal connection of said blades with said stationary pivot being in fixed coincident relation with the axis thereof, and a plurality of actuating members for said blades concentrically disposed about an axis eccentric with respect to said pivot and in fixed relation with respect thereto.

6. An ascending aerial propeller for airships comprising in combination, a plurality of blades, a single stationary pivot to which all of said blades are secured, the centers of pivotal connection of said blades with said stationary pivot being in fixed coincident relation with the axis thereof, and a plurality of actuating members slidably connected with said blades and concentrically disposed about an axis eccentric to said pivot and in fixed relation with respect thereto.

7. An ascending aerial propeller for airships comprising in combination, a stationary crank member, a plurality of blades connected with the crank portion thereof, driving disks rotatably mounted on the base

portions of said cranks, and connecting rods concentrically disposed on said disks and engaging and operating said blades.

8. An ascending aerial propeller for airships comprising in combination, a stationary crank, a plurality of blades all connected with the crank portion, driving disks rotatably mounted on the base portions of said crank members, and rods concentrically disposed on said disks and slidably engaging said blades to rotate the same about said crank portion.

9. An ascending aerial propeller comprising a plurality of coöperating wheels, each wheel comprising a plurality of blades, a single stationary pivot to which all of the blades are connected, the centers of pivotal connection of said blades with said stationary pivot being in fixed coincident relation with the axis thereof, and means movably connected with said blades for imparting a rapid downward movement thereto and a relatively and materially reduced speed of upward movement thereto.

10. An ascending aerial propeller comprising a plurality of coöperating wheels, each wheel comprising a plurality of blades, a single stationary pivot to which all of the blades are secured, the centers of pivotal connection of said blades with said stationary pivot being in fixed coincident relation with the axis thereof, and means for rotating said blades about said pivot and imparting a rapid downward movement to said blades and a relatively and materially reduced speed of upward movement thereto.

In testimony whereof I affix my signature in presence of two witnesses.

FRANCESCO FRONZ.

Witnesses:

HENRY LOWE,

VINCENT BURES.