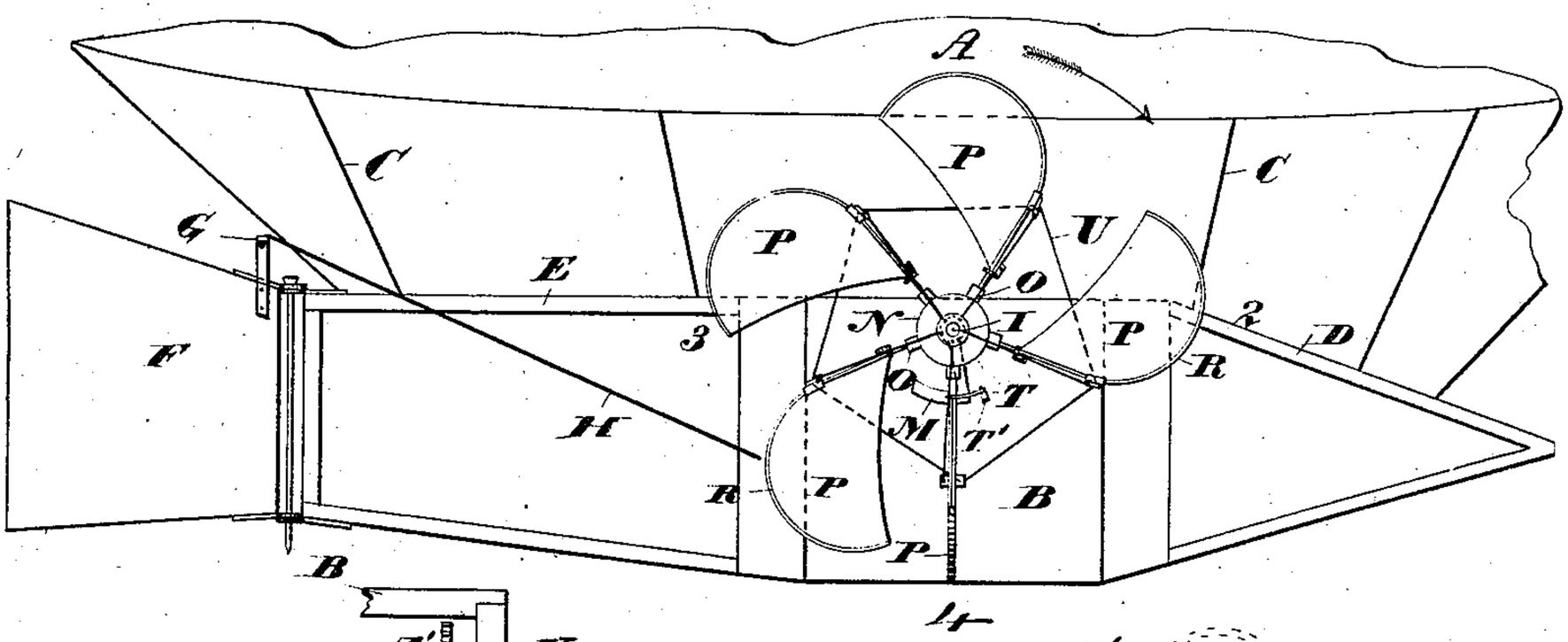
R. W. COWAN & C. PAGE.
Aerial Paddle-Wheel.

No. 204,296. Patented May 28, 1878.

FIG. 1.



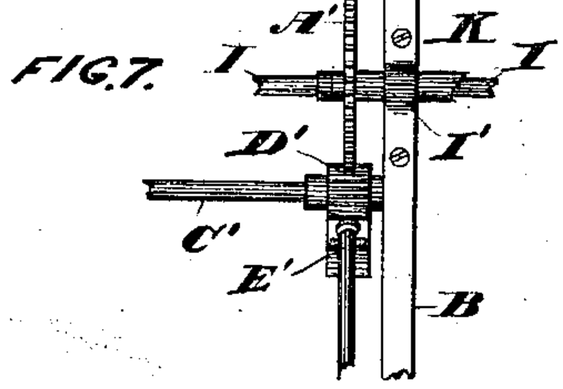


FIG. 7.

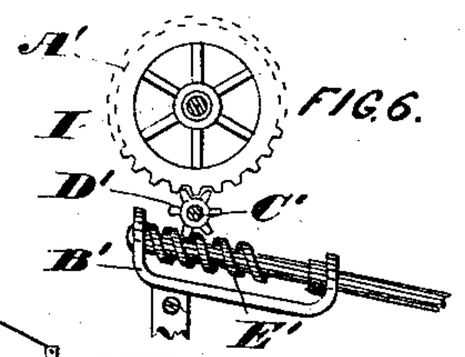


FIG. 6.

FIG. 2.

FIG. 3.

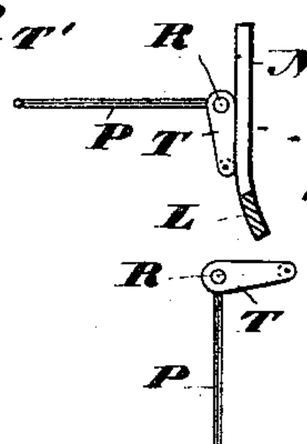
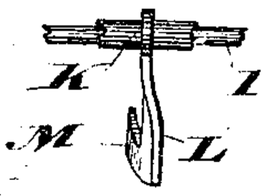


FIG. 4

FIG. 5.



Witnesses.

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UNITED STATES PATENT OFFICE.

RICHARD W. COWAN AND CHARLES PAGE, OF MONTREAL, QUEBEC, CANADA.

IMPROVEMENT IN AERIAL PADDLE-WHEELS.

Specification forming part of Letters Patent No. **204,296,** dated May 28, 1878; application filed April 22, 1878.

To all whom it may concern:

Be it known that we, RICHARD WILLIAM COWAN, of the city and District of Montreal, Province of Quebec, Canada, merchant, and CHARLES PAGE, of the same place, engineer, have invented certain new and useful Improvements in the Construction of Paddle-Wheels for Propelling Balloons and Submerged Vessels; and we do hereby declare that the following is a full, clear, and exact description of the same.

This invention is adapted to propelling a vessel wholly immersed either in air or water, and by the description of it, as applied to a flying-machine, it will be understood how to apply it to a vessel adapted to passing under or wholly submerged in water.

In the annexed drawings similar letters of reference indicate like parts.

Figure 1 is a side elevation embodying our invention. Fig. 2 is a plan of Fig. 1. Figs. 3, 4, 5, 6, and 7 are details.

Letter A is a balloon, only a part of which is shown. Its size will be according to the weight to be lifted. We prefer to make it in the form of a cigar, as that form seems best for passing through a fluid; but other forms may be used if required.

B is the car, suspended by cords C. As the car is short and the balloon long, a frame-work, D E, is attached to the front and stern of the car, to facilitate the securing of the two together, and for giving the car a greater power of governing the direction of the balloon longitudinally, and holding the two steadily in a uniform direction. F is a rudder attached to the frame-work. It is provided with a yoke, G, and lines or rods H, for operating in the ordinary manner.

We do not claim anything new in the above.

Our invention is constructed as follows: In suitable bearings I′, on each side of the car, are carried the two sleeves K; and additional bearings may be carried on out-riggers or bearings suspended from the balloon. Through these sleeves K a shaft, I, passes. On each sleeve is secured an arm, L, having a segmental bar, M. Outside the sleeves K are flanges N on the shaft I. On each flange are secured as many brackets O as it is intended to provide paddles P. These paddles are constructed as follows: Through suitable holes in the brackets O rods R are placed, retained by ordinary collars S, so that they are free to turn about. On each of them is secured a sail, forming the paddle P. On each of the rods R a projection, T, is formed, so situated that when the paddles P are laid parallel with the longitudinal line of the car the projection T of the particular paddle that is opposite the bar M will come in contact with it, (see Fig. 4,) and cause the paddle to turn at right angles to the said line of the car, as shown in Figs. 1 and 2. The bar M is situated near the bottom; therefore the bottom paddle P is turned at right angles to the car, and in these figures it only shows the narrow edge of the bottom paddle; but at this time it is presenting its flat surface to act upon the atmosphere in such a manner that if the paddles P are revolved in the direction of the arrow it will act upon the atmosphere in the same manner as the paddles of a steamship, giving the propelling motion of going ahead.

It will be observed that the length of the bar M is such that before the projection T of the one paddle operated by the bar M has passed it the projection T (see Fig. 3) of the next paddle will have come in contact with the bar. Thus there will always be one of the paddles on each side of the car at right angles to the car.

On the end of each of the projections T is attached, by means of a pin, a friction-roller, T′, for reducing the friction that would otherwise take place. Now, if the bar M is set at the bottom point, opposite 4, in Fig. 1, of the circle of revolution, and the rotation of the shaft is in the direction indicated by the arrow in Fig. 1, the action of the paddles will be to throw the air aft and propel the vessel ahead; but if the bar M is moved to the top or opposite the point I, and the paddles rotated in the same direction, the paddles will cause the balloon to go astern. If the bar M is moved forward or opposite the point 2 the action of the paddles will be to assist the balloon and car to ascend. If moved to opposite the point 3, the action will be to cause it to descend. In like manner, if the bar M

be situated between any two of the cardinal points 1 2 3 4, (if we may so call them,) it it will give an action of the paddles partaking of the nature of the two points between which the bar is situated. By this means considerable command over the motions of the car is developed in addition to that given by the rudder. All the paddles, as soon as they pass the bar M, and until they come in contact with it again in the course of their revolution, are at once laid flat or parallel with the line of the car by the action of the air.

U are stays attached from one rod, R, to the other for mutual support. Beyond N the shaft I extends, and on each of these extensions is secured a small flange, V, to which are attached the rods X.

The particular construction of and arrangement for operating and adjusting the arms L and bar M are as follows: The sleeves K on the shaft I extend through the bearings I′, in which they are held like an ordinary journal, to revolve. On the inner ends are secured equal gear-wheels A′, and on the sides of the car is carried a shaft, C′, under and parallel to the shaft I, on which are secured two equal pinions, D′, arranged to engage with the gears A′, so that the shaft C′, the wheels A′, the sleeves K are each equally rotated on both sides of the car. E′ is a screw, operated by a crank-handle, whose thread intermeshes with one of the pinions D′ and operates the same, only one screw being required for both.

With regard to the means by which power is applied to the shaft I, a pinion or belt-pulley may be secured on the shaft between the bearings I′, and the same driven by any suitable motor or manual power, according to the speed and distance required to be traveled.

When the invention is used for a vessel moving under water it will be constructed as hereinabove described, but the strength of the parts modified for the purpose.

What we claim as our invention is as follows:

1. The combination of the rods R, having sails P and projection T, with the bar M, substantially as and for the purposes set forth.

2. The combination of the flanges N, having brackets O, rods R, projection T, and bar M, substantially as and for the purposes set forth.

3. The combination of the shaft I, having flanges N and brackets O secured thereon, with rods R, paddles P, and bar M, substantially as and for the purposes set forth.

4. The combination of the shaft I, sleeve K, and arm and bar L M, substantially as and for the purposes set forth.

5. The combination of the shaft I, sleeve K, and arm and bar L M, gear-wheel A′, pinion D′, and screw E′, substantially as and for the purposes set forth.

6. The combination of the paddles P, constructed as described, with the bar M, capable of being placed in various positions, as described, whereby the effects of said paddles are changed without changing the direction of revolution of the shaft I, substantially as described.

Montreal, 17th day of April, A. D. 1878.

R. W. COWAN.
CHARLES PAGE.

In presence of—
CHARLES G. C. SIMPSON,
JNO. A. RENNIE.