No. 608,003.

Patented July 26, 1898.

G. G. McLAUGHLIN.

PUMP.

(Application filed Apr. 22, 1896.)

(Model.)

Fig:1.

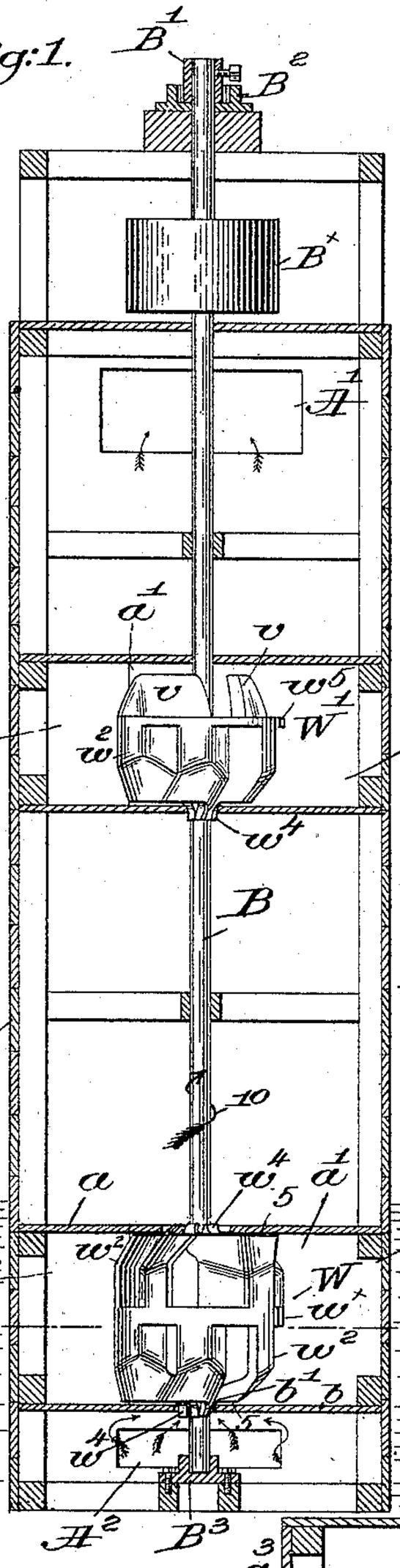

Fig:2.

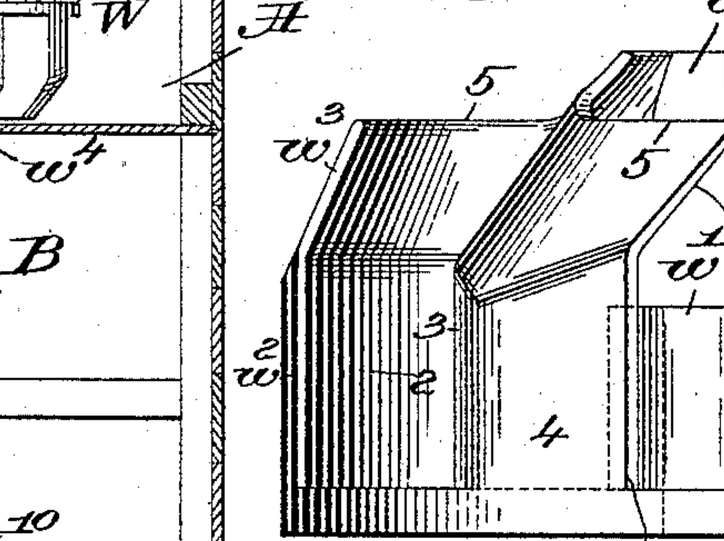

Fig:3.

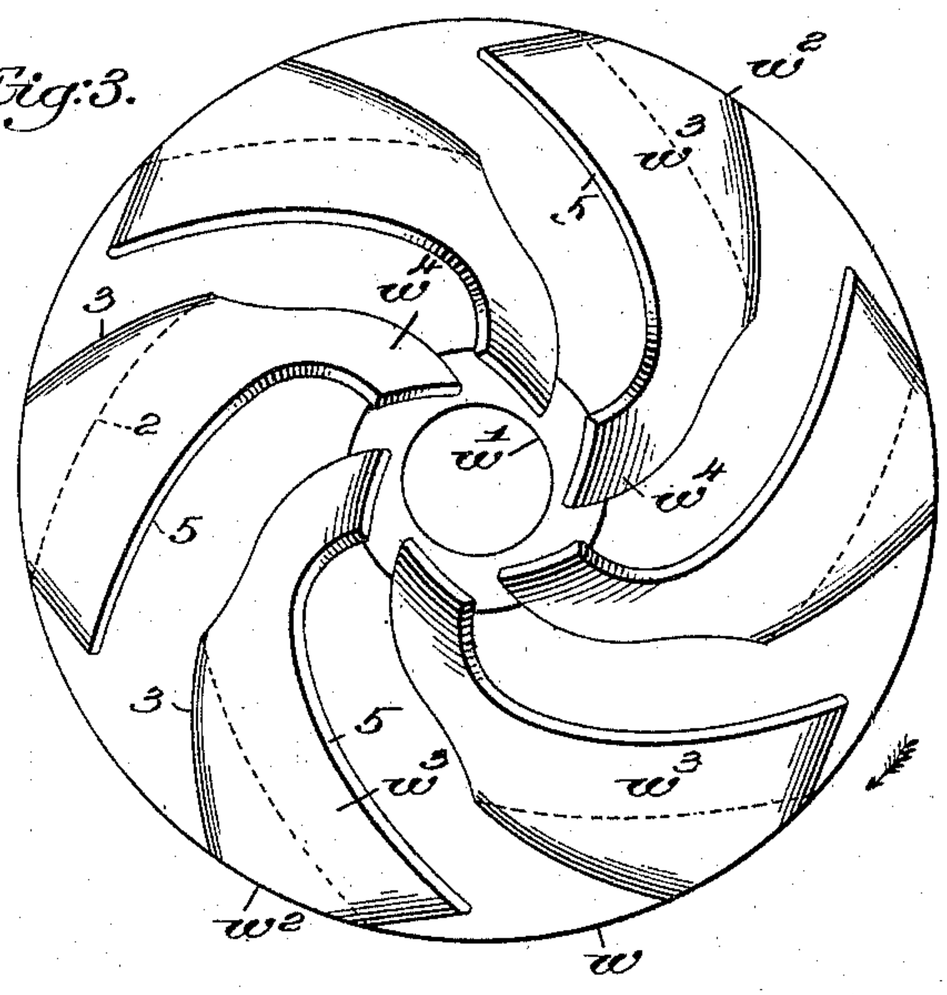

Fig:4.

Fig:5.

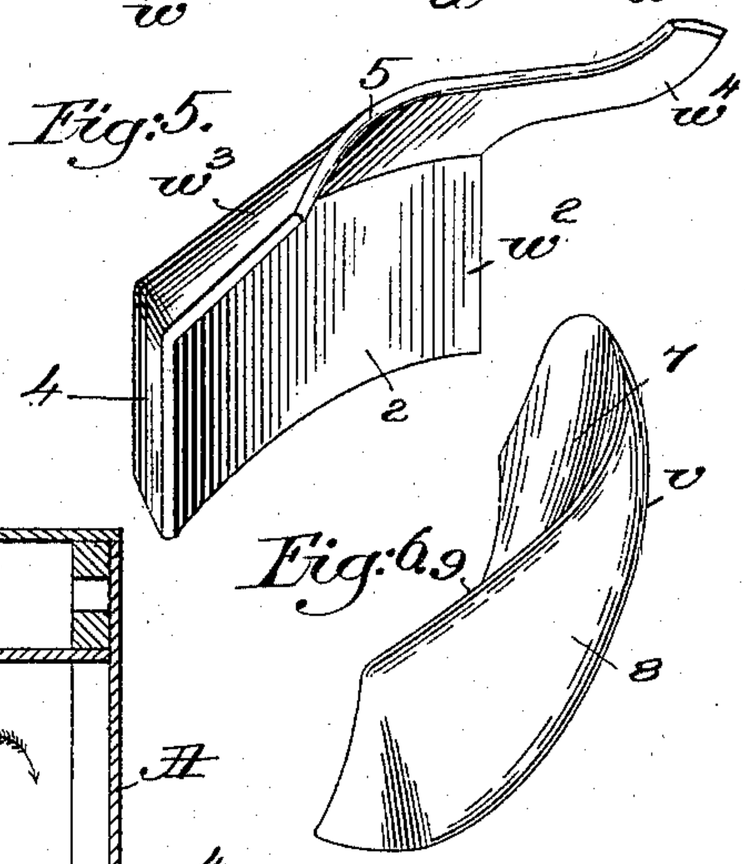

Fig:6.

Witnesses.
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UNITED STATES PATENT OFFICE.

GEORGE GILMAN McLAUGHLIN, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO JOHN C. EDWARDS, OF BROOKLINE, MASSACHUSETTS.

PUMP.

SPECIFICATION forming part of Letters Patent No. 608,003, dated July 26, 1898.

Application filed April 22, 1896. Serial No. 588,600. (Model.)

To all whom it may concern:

Be it known that I, GEORGE GILMAN McLAUGHLIN, of Boston, county of Suffolk, and State of Massachusetts, have invented an Improvement in Pumps, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

This invention relates to rotary pumps; and it has more particularly for its object the production of a novel and powerful wheel used in such pumps, whereby for a given size of wheel and speed of rotation, and thereby motive power, a much greater lifting and discharging power is attained than by any similar form of pump now known to me.

Other features of my invention will be hereinafter fully described in the specification and particularly pointed out in the claims.

Figure 1 is a vertical sectional view of one form of pump embodying my invention. Fig. 2 is a transverse section thereof on the line $x\,x$, Fig. 1. Fig. 3 is an enlarged plan view of one of the pump-wheels. Fig. 4 is a side elevation thereof. Fig. 5 is a detached perspective view of one of the wheel-blades viewed from its inner side, and Fig. 6 is a similar view of an auxiliary vane to be described.

The pump-case A, Fig. 1, is represented as a two-story case in order to show various applications of my invention, said case having a discharge-opening A′ and one or more inlet-openings A^2.

As shown in Fig. 1, the case is provided with two wheel-chambers A^3 A^4, and as both are constructed in the same manner only the former will be described in detail. The chambers have, respectively, a top a and bottom b, the latter having a suction-opening b' thereon (see Fig. 2) and the former an opening of sufficient size to admit the wheel-shaft B, the bottom b extending entirely across the case A, while the top a is narrower than the full width of the case, the free edges of said top being connected by vertical walls or shields a' a^2 to the bottom b. Said walls or shields extend from opposite sides of, but not all the way across, the case A, as best shown in Fig. 2, to leave upright outlet-openings a^3 a^4 from the wheel-chamber to the case, the direction of flow being indicated by arrows in Fig. 2.

The wheel-shaft B has a collar B′ fast thereon to rest on a bearing B^2 at the upper end of the case, suspending the shaft, and I have also shown it as provided with a lower step-bearing B^3, rotation being transmitted to the shaft from a suitable source of power by a band or belt passed around the pulley $B^\times$, in this instance the shaft being rotated in the direction of arrow 10, Fig. 1.

The wheel itself may be compound or single, with auxiliary blades or single, as indicated, respectively, by the reference-letters W, W′, and W^2, Figs. 1 and 4, but in each instance consisting, essentially, of a disk and a plurality of peculiarly-constructed blades thereupon.

Considering, first, Figs. 3 and 4, showing a single wheel, a circular disk w has preferably a hub or boss w' thereon, by which it is secured to the shaft, and a plurality of blades w^2, secured to or forming a part of the disk w and symmetrically arranged thereon, the inner vertical face 2 of one blade being preferably parallel to the outer face 3 of the next to form a discharge area equal to the inlet area. Said blades are arranged near the periphery of the disk having the greatest velocity, leaving a substantially clear space at the center for the water drawn therein, as will be described, the peripheral faces 4 of the blades being all in the same circle. Each blade has springing from its radial edge a wing w^3, sweeping up into spiral form at its inner end at w^4 about and in the direction of the wheel-axis and inclined over the space between two blades, as best shown in Figs. 4 and 5, the "radial" edges 5, as they may be called, being in a plane parallel to the disk w up to the root of the spiral w^4.

In using a single wheel it is mounted upon its shaft in such manner that the spiral ends w^4 will extend through the suction-opening b' of the bottom of the wheel-chamber, as in Fig. 1, into chamber A^4, so that when the wheel is rotated said spiral portions of the blades will actually dig or carve, as it were, into the column of water, drawing it with great power into the space between the inner ends of the blades h^2. The high rotary speed of the wheel

then forces the water with high velocity out of the radial discharge-passages between the blades and into the chamber, thence passing up the case and out of the discharge.

With a wheel having a diameter of about five inches and constructed as described I have lifted water about four feet and discharged a stream having an area of over a square foot.

In the chamber A^3, Fig. 1, the compound wheel is shown having blades on both sides of the disk $w^\times$, but oppositely arranged for a double suction, such arrangement enabling me to about double the lifting power of a single wheel of the same diameter.

A single wheel with auxiliary vanes is shown at W′ in the chamber A^4, one of the vanes v being shown separately in Fig. 6, three of the vanes being secured to the upper side of the disk w^5 and extending inward from the periphery toward the center of the disk, the trend of the vanes being substantially that of the upper blades in the compound wheel. The inner faces of the vanes are concaved, as at 7, Fig. 6, and the outer faces convexed, as at 8, and rising from a substantially triangular base to a curved upper edge 9.

With an apparatus arranged as in Fig. 1 water may be lifted about sixteen feet, the single-vaned wheel W′ having an effect very similar to the compound or balanced wheel W.

The plane edges 5 of the wings w^3 move just above the surface of the bottom of the wheel-chamber, as shown, permitting the spiral or screw blade portions w^4 to partially enter the inlet b', which is the preferable manner of mounting the wheel, as I have obtained the best results thereby.

While I have shown the wheel herein as mounted upon a vertical axis, my invention is not restricted thereto, as the wheel may be mounted to rotate on a horizontal axis, the inlet in such case being made in one of the side walls of the wheel-chamber.

Having fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A wheel for rotary pumps, comprising a disk having thereon near the periphery a series of blades mounted thereon to form convolute outlet-channels, and spiral extensions at the inner ends of the blades outwardly turned at their extremities, about and in the direction of the axis of the wheel, leaving a free open central space or chamber within said blades and extensions, substantially as described.

2. A rotary-pump wheel comprising a disk, a series of curved blades thereon at right angles thereto and near its periphery, forming curved outlets of substantially uniform cross-section, and spiral extensions at the inner ends of the blades turned outwardly away from said disk and projecting free about and in the direction of the axis of the wheel, substantially as described.

3. A rotary-pump wheel comprising a disk, a series of blades mounted thereon near its periphery, to form convolute outlet-passages, the curved edges of said blades being extended obliquely over to form wings inclined partially over said passages, and having spiral portions deflected about and in the direction of the wheel-axis, said blades and spiral portions being extended in the same general direction, substantially as described.

4. A rotary-pump wheel comprising a disk, a series of blades mounted thereon near its periphery, to form convolute outlet-passages, said blades being bent over along their curved edges to form wings having their outer edges in a plane parallel to the disk, and spiral extensions at the inner ends on and projecting beyond the straight edges of the wings in the direction of the axis of the wheel, substantially as described.

5. A wheel for rotary pumps, comprising a a disk, having thereon near its periphery two series of blades, one on each side of the disk, each series mounted thereon to form convolute outlet-channels, and spiral extensions at the inner ends of the blades outwardly turned at their extremities in the direction of the axis of the wheel, leaving a free open central space within said blades and extensions, said two series of blades and their extensions being oppositely disposed to each other, substantially as described.

6. In a rotary pump, a wheel-chamber having an inlet-opening, a wheel located within said chamber, said wheel comprising a disk and a series of blades mounted thereon in convolute arrangement near its periphery, to form outlet-passages at the periphery, and spiral extensions at the inner ends of the blades leaving a free central open space between said extensions and the disk, said extensions being extended into the inlet-opening in spiral or screw form to draw liquid into the wheel therefrom, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEORGE GILMAN McLAUGHLIN.

Witnesses:

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NELSON C. SIMMONS.