

No. 776,573.

PATENTED DEC. 6, 1904.

P. L. WARD.

PUMP.

APPLICATION FILED DEC. 2, 1903.

NO MODEL.

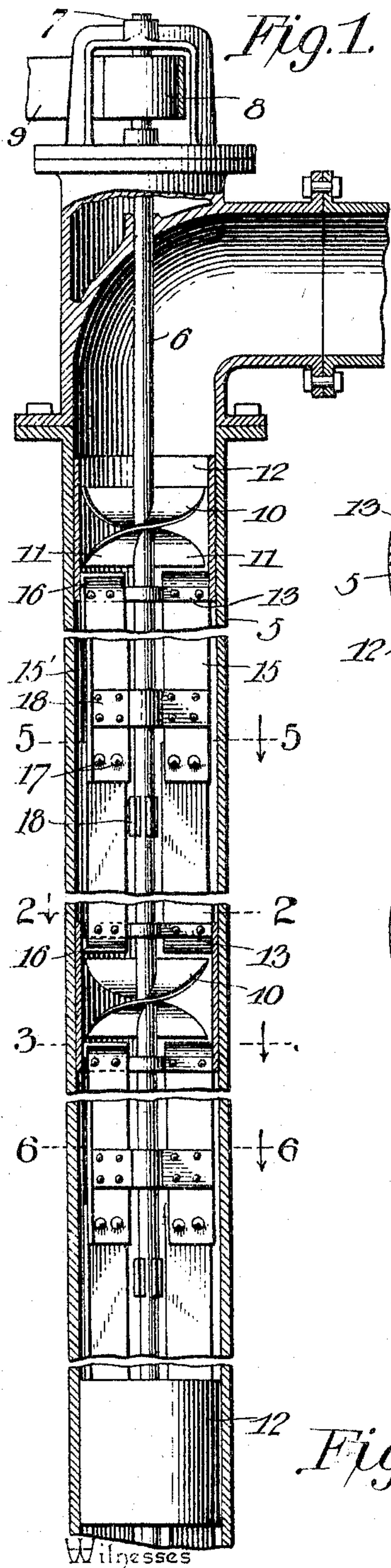


Fig. 1.

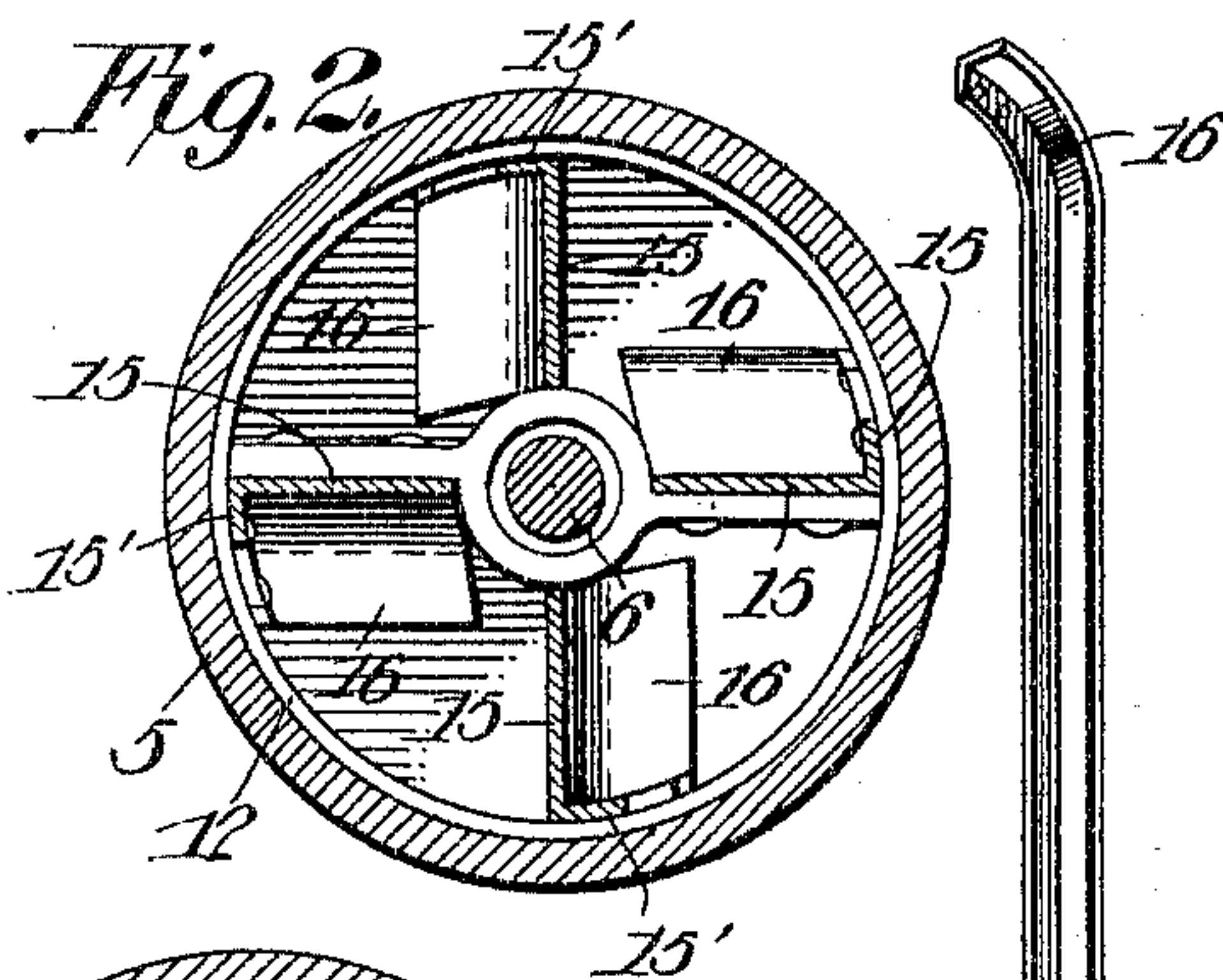


Fig. 2.

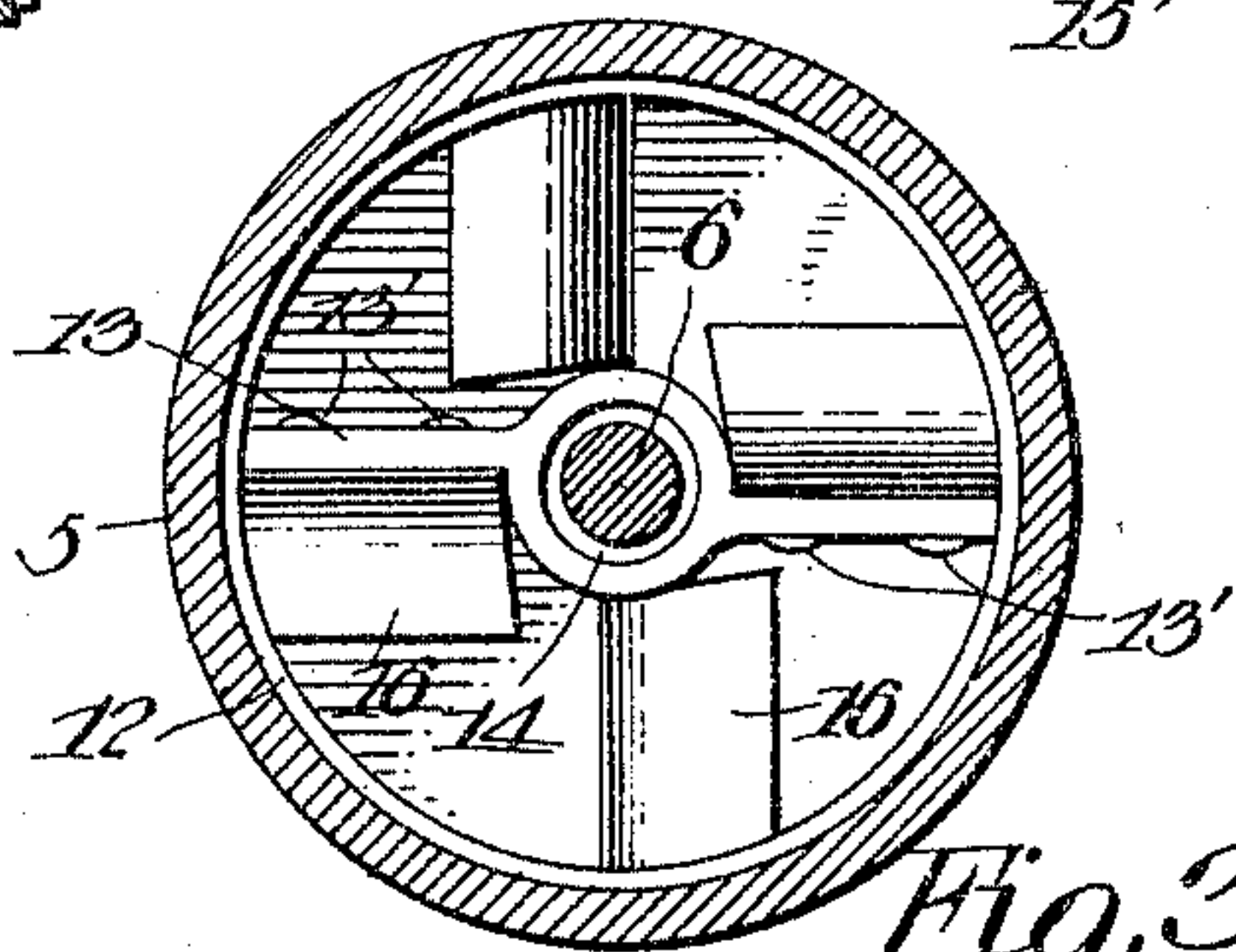


Fig. 3.

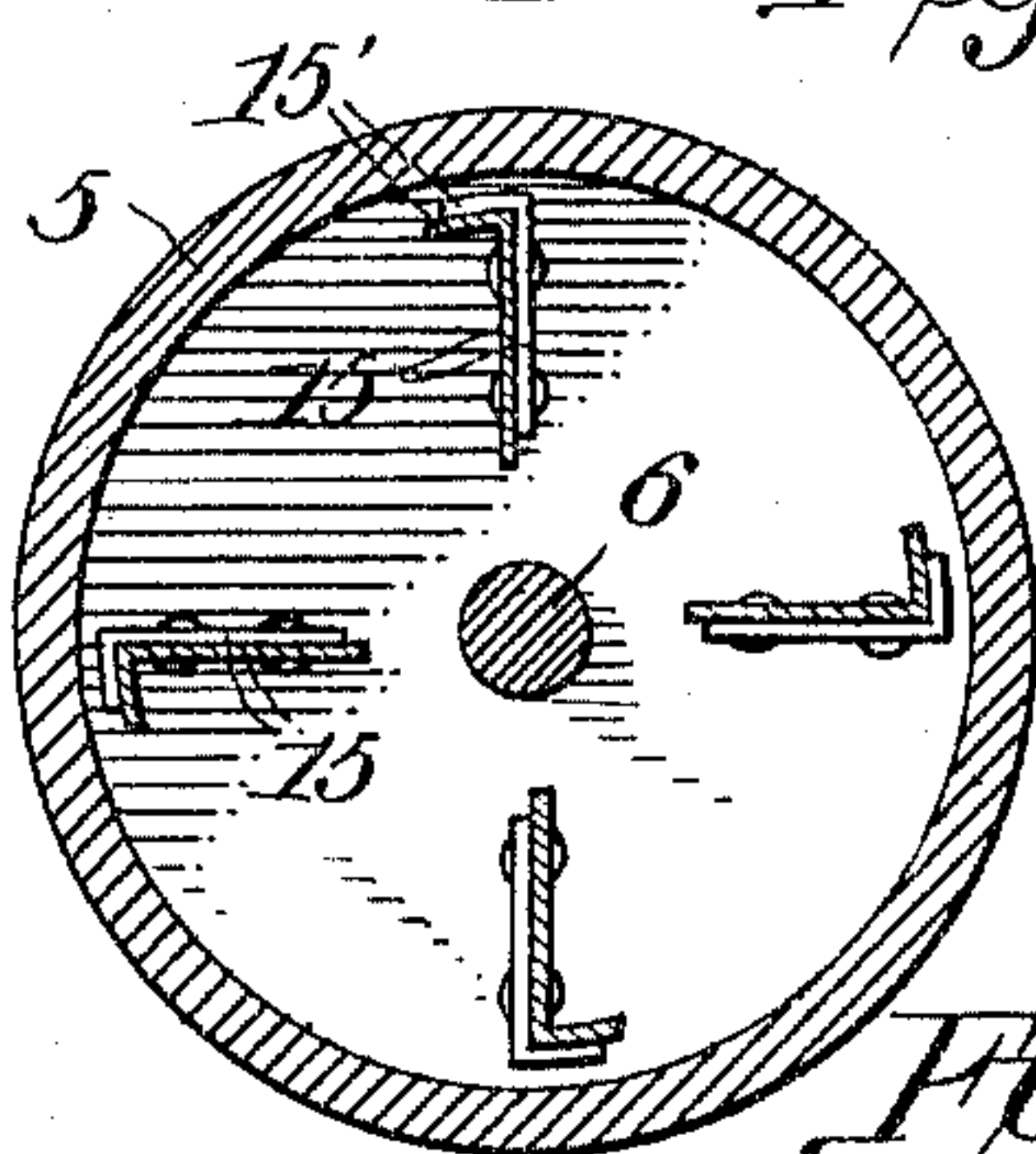


Fig. 4.

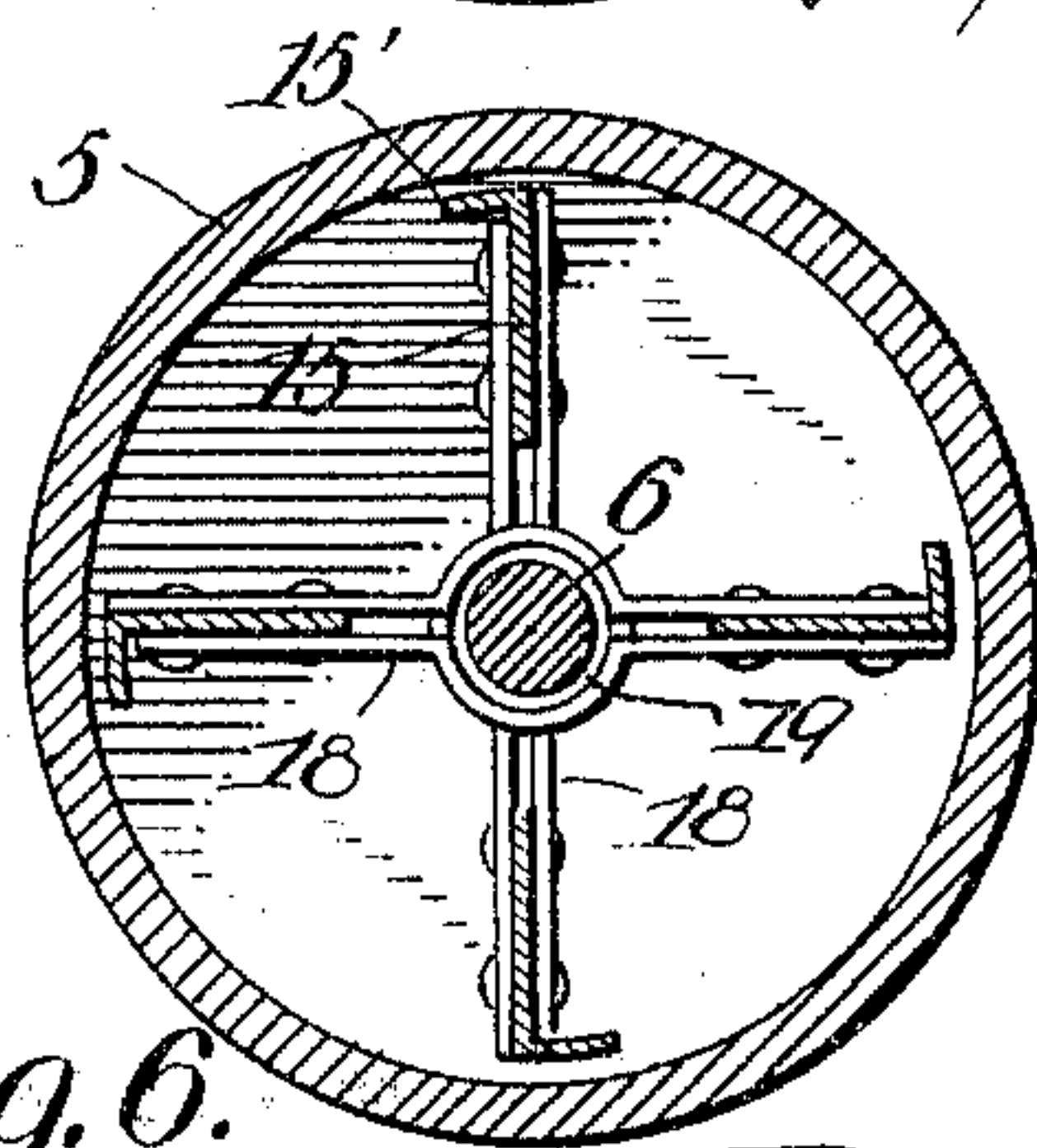


Fig. 5.

Fig. 6.

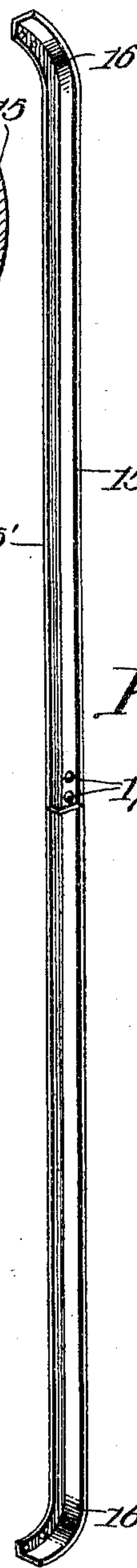


Fig. 6.

Witnesses
E. H. Stewart
L. M. Allen

Perry L. Ward,
Inventor.
by C. A. Snow & Co.
Attorneys

UNITED STATES PATENT OFFICE.

PERRY L. WARD, OF VICTORIA, TEXAS.

PUMP.

SPECIFICATION forming part of Letters Patent No. 776,573, dated December 6, 1904.

Application filed December 2, 1903. Serial No. 183,488. (No model.)

To all whom it may concern:

Be it known that I, PERRY L. WARD, a citizen of the United States, residing at Victoria, in the county of Victoria and State of Texas, have invented a new and useful Pump, of which the following is a specification.

This invention relates to an improved pump especially designed for use in connection with deep-water wells.

The object of the invention is to provide an inexpensive, durable, and efficient pump of this character in which the grinding or cutting action on the pump-casing due to particles of sand or other foreign matter in the column of water is reduced to a minimum, while the lifting power of the pump is materially increased.

A further object of the invention is to provide means for changing the direction of flow of the fluid after it leaves the propeller and means for forcing the fluid upwardly through the pump-casing in a perpendicular or parallel line therewith.

A still further object of the invention is to provide means for deflecting the column of water, so as to cause the same to strike the propeller-blades in a direction opposite to the direction of rotation of the propeller.

In the accompanying drawings, forming a part of this specification, and in which like numerals of reference indicate corresponding parts, there is illustrated one form of embodiment of the invention capable of carrying the same into practical operation, it being understood that the elements herein exhibited may be varied or changed as to shape, proportion, and exact manner of assemblage without departing from the spirit or sacrificing any of the advantages of the invention.

Figure 1 is a vertical sectional view of a pump constructed in accordance with my invention. Fig. 2 is a transverse sectional view on the line 2 2 of Fig. 1. Fig. 3 is a similar view on the line 3 3 of Fig. 1. Fig. 4 is a perspective view of one of the deflectors detached. Fig. 5 is a transverse sectional view taken on the line 5 5 of Fig. 1. Fig. 6 is a similar view on the line 6 6 of Fig. 1.

Referring to the drawings, 5 designates the pump-casing, 6 the pump-shaft, journaled in

suitable bearings 7 at the upper end of well, and 8 a pulley connected through the medium of a belt 9 to an engine or other suitable source of power and by means of which the shaft is rotated. Keyed or otherwise rigidly secured to the shaft 6 are a series of propellers 10, the blades or spiral flights 11 of which are preferably of such inclination and length that the upper end of one will lie immediately over the lower end of the adjacent one, as clearly shown in Fig. 1 of the drawings. Surrounding the propellers 10 are cylindrical casings or shells 12, which prevent the water and particles of sand being thrown forcibly against the pump-casing 5 when the fluid receives its upward impulse, thereby effectively protecting the pump-casing at the point subjected to the most wear. Arranged within the casings 12 are cross braces or spiders 13, provided with central openings 14 for the reception of the shaft 6, said braces or spiders serving as supports for radial blades or wings 15, to which they are secured in any suitable manner, as by rivets 13'.

The radial blades or wings 15, any number of which may be employed, extend substantially parallel with the shaft 6 and are arranged above and below the propellers 10, as shown, said blades or wings being adapted to deflect the column of water after it leaves the propellers and cause the same to flow upwardly in a line parallel to the shaft, thereby materially lessening the amount of power necessary to lift the water. The blades or wings 15 are preferably formed of angle-iron, each blade or wing having one edge thereof bent to form a flange 15' and its opposite ends curved to form deflectors 16, which deflect the water and cause the same to strike the propeller-blades 11 in a direction opposite to the direction of rotation of said propeller, thereby offering greater resistance to the movement of the propeller and increasing the efficiency of the same. The blades or wings 15 may be formed in two or more sections connected together in any suitable manner, as by bolts 17, the flange 15' of each blade, at the curved end thereof, being riveted or otherwise rigidly secured to the inner periphery of the cylindrical casings. As a means for

bracing the blades 15 and preventing vibration of the shaft 6 I provide one or more guides 18, consisting of a pair of plates fastened one on each side of the blades at suitable intervals, each plate being provided with a semicircular socket 19 for the reception of the operating-shaft.

In operation motion is imparted to the shaft 6, which causes a partial vacuum in the tube or casing and forces the water upwardly in contact with the first propeller. As the fluid leaves the first propeller its rotary motion is changed by contact with the wings or blades 15 and said fluid forced upwardly in a straight line until it reaches the deflectors 16, at which point the column of water will be deflected so as to strike the next propeller tangentially and in a direction opposite to the direction of rotation of said propeller. As many propellers may be used on the operating-shaft as desired, the action of the water as it enters and leaves the propellers being the same in all cases. The cylindrical casings 12 prevent the water and sand from being thrown outwardly in contact with the casing 5 and also form a means for supporting the deflecting wings or blades.

By having the radial blades extend the entire distance between the propellers they not only serve to maintain the integrity of the column of water, but cause it to travel upwardly in a path substantially parallel with the axis of the pump-casing, thereby reducing the amount of friction, and consequently increasing the efficiency of the pump.

While I have shown and described the wings or blades as being disposed substantially parallel with the operating-shaft, it is obvious that said blades may be arranged at any angle or inclination with relation to the shaft desired.

Having thus described the invention, what is claimed is—

1. In a pump of the class described, a casing, a propeller, and means for checking the rotative movement of the column of water and guiding it in a direction approximately parallel with the axis of the casing and subsequently deflecting the water at an oblique angle in a direction the reverse of that in which the propeller is rotating.

2. In a pump of the class described, a casing, a plurality of propellers, and means for directing the column of water in a direction approximately parallel with the axis of the casing between successive propellers and for subsequently deflecting said column at an oblique angle into the path of each propeller.

3. In a pump of the class described, a casing, a plurality of propellers, means for directing the column of water in a direction approximately parallel with the axis of the casing between successive propellers, and curved deflectors for changing the direction of the flow of water after it leaves each propeller.

4. In a pump of the class described, a casing, an operating-shaft, a plurality of propellers carried by the shaft, a protective casing surrounding said propellers, and means for directing the column of water in a direction approximately parallel with the axis of the pump-casing between successive propellers and for subsequently deflecting the column at an oblique angle into the path of each propeller.

5. In a pump of the class described, a casing, an operating-shaft, a plurality of spaced propellers carried by the shaft, and longitudinally-disposed blades extending the entire distance between said propellers and provided with terminal curved deflectors for directing the column of water in a direction the reverse of that in which the propeller is rotating.

6. In a pump of the class described, a casing, an operating-shaft, a propeller consisting of one or more flights secured to the shaft, a protecting-shell for the propeller, and a plurality of longitudinally-disposed wings or blades secured to the protecting-shell, said wings or blades having their opposite ends curved to form deflectors.

7. In a pump of the class described, a casing, an operating-shaft, a propeller carried by the shaft, a protecting-shell surrounding the propeller, and a plurality of wings or blades each provided at one edge with a flange secured to the protecting-shell, said wings or blades having their end portions curved to form deflectors.

8. In a pump of the class described, a casing, an operating-shaft, a propeller carried by the shaft, a protecting-shell surrounding the propeller, radial wings or blades secured to the protecting-shell, said wings or blades having their end portions curved to form deflectors and their intermediate portions arranged substantially parallel with the operating-shaft.

9. In a pump of the class described, a casing, an operating-shaft, a propeller carried by the shaft, a protecting-shell surrounding the propeller, wings or blades arranged longitudinally of the shaft and radially of the casing secured to the protecting-shell, said wings or blades having their terminal portions curved to form deflectors.

10. In a pump of the class described, a casing, an operating-shaft, a propeller secured to the shaft, a protecting-shell surrounding the propeller, wings or blades having their terminal portions curved to form deflectors secured to the protecting-shell and guides carried by the wings or blades.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

PERRY L. WARD.

Witnesses:

CHAS. C. ZIRJACKS,
E. B. BARKER.