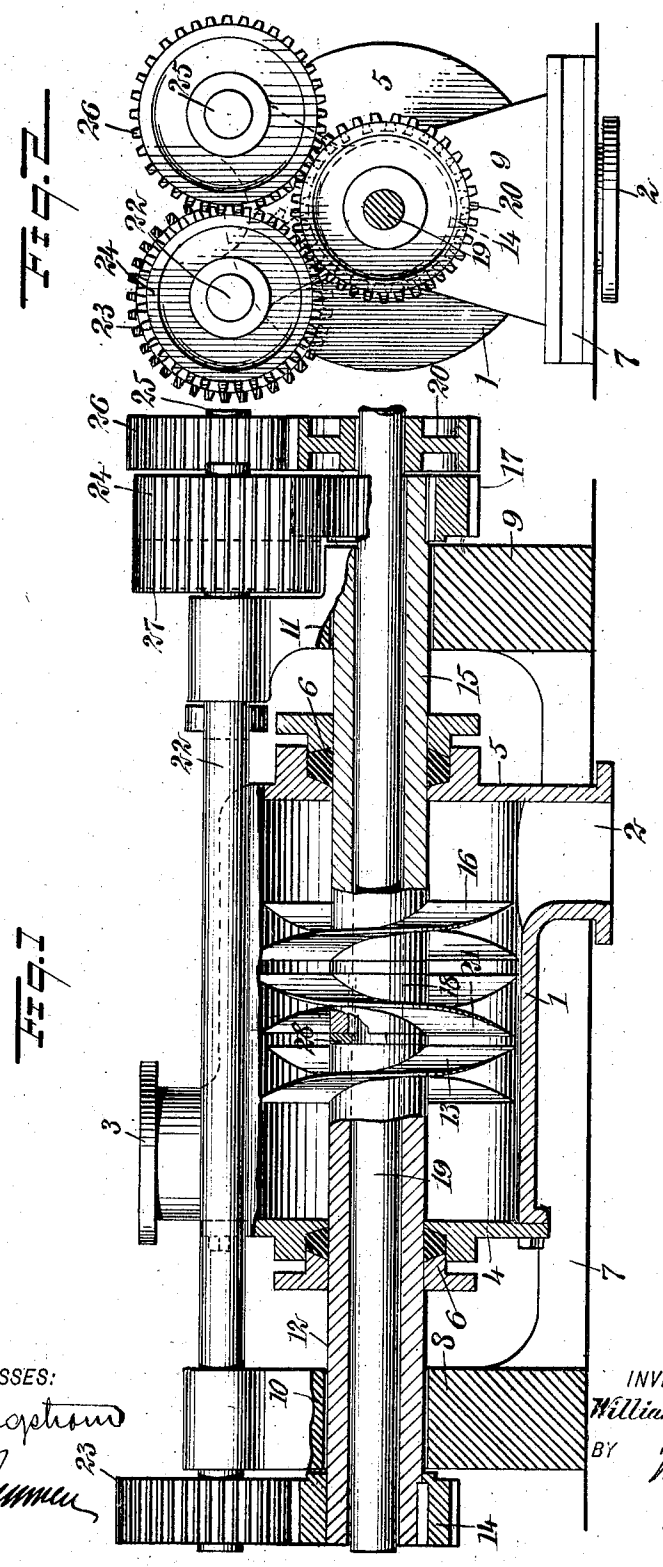
No. 847,735. PATENTED MAR. 19, 1907.

W. Y. CRUIKSHANK.

PUMP.

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WITNESSES:

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WILLIAM Y. CRUIKSHANK, OF FREELAND, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO NIXON MALEY, OF FREELAND, PENNSYLVANIA.

PUMP.

No. 847,735. Specification of Letters Patent. Patented March 19, 1907.

Application filed October 30, 1905. Serial No. 285,008.

To all whom it may concern:

Be it known that I, WILLIAM Y. CRUIKSHANK, a citizen of the United States, and a resident of Freeland, in the county of Luzerne and State of Pennsylvania, have invented a new and Improved Pump, of which the following is a full, clear, and exact description.

This invention relates to pumps, and especially to rotary lift-pumps.

The object of the invention is to construct a pump of the class described having an improved arrangement of the vanes whereby the efficiency of the pump will be much increased.

The invention consists in the construction and combination of parts to be more fully described hereinafter, and definitely set forth in the claim.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in both figures.

Figure 1 is substantially a vertical central section taken longitudinally of the pump, certain parts being shown in elevation; and Fig. 2 is an end elevation of the pump.

Referring more particularly to the parts, 1 represents the pump-barrel, which is supported upon a horizontal axis, as shown. It is provided with an inlet-opening 2 on its lower side and an outlet-opening 3 on its upper side. The ends or heads 4 and 5 of this barrel are provided with openings and supplied with suitable stuffing-boxes 6. A frame 7 is provided, having standards 8 and 9 disposed at opposite extremities thereof, said standards being provided with horizontal openings or bores 10 and 11. In the opening 10 a hollow shaft 12 is rotatably mounted. This shaft passes through the stuffing-box 6 into the interior of the barrel 1, as shown. Near its inner extremity it carries a rigid vane or blade 13. On its outer extremity beyond the standard 8 it carries rigidly a gear-wheel 14, the purpose of which will appear more fully hereinafter.

Rotatably mounted in the opening or bore 11 I provide a similar hollow shaft 15, and the inner extremity of this shaft carries rigidly a blade or vane 16. The outer extremity of this shaft carries rigidly a gear-wheel 17, the purpose of which will appear more fully hereinafter. As indicated most clearly in Fig. 1, the adjacent extremities of the hollow shafts 12 and 15 do not abut, but the space therebetween is bridged by a collar or hub 18, which is rigidly carried upon an inner shaft 19, which shaft extends longitudinally within the hollow shafts, as indicated. This inner shaft extends beyond the gear-wheel 17, at which point it carries rigidly a gear-wheel 20. The hub 18 is provided with a vane or blade 21.

Rotatably mounted in the upper portions of the standards 8 and 9 I provide a main driving-shaft 22. At its left extremity, as indicated in Fig. 1, this driving-shaft carries rigidly a gear-wheel 23, which meshes with the gear-wheel 14, referred to above. At its opposite extremity the shaft 22 projects beyond the standard 9 and carries rigidly a gear-wheel 24, having a broad face. At the right end of the pump, as viewed in Fig. 1, a counter-shaft 25 is mounted to rotate upon a horizontal axis, the same being supported in the standard 9, as shown most clearly in Fig. 2. This counter-shaft carries rigidly a gear-wheel 26, which meshes with the aforesaid gear-wheel 20. It carries also a second gear-wheel 27. (Indicated most clearly in dotted outline in Fig. 1.) This gear-wheel 27 meshes with the broad-faced gear 24 and the broad-faced gear 24 meshes with the aforesaid gear-wheel 17.

From the arrangement described it should be understood that when a rotation is imparted to the shafts the hollow shafts 12 and 15 will be rotated in the same direction, while the inner shaft 19 will be rotated in a reverse direction.

Referring to Fig. 1, it will be seen that the vanes 13 and 16 have an inclination or pitch which is of the same character, simulating the form of a screw. In this figure I have represented its pitch as of a left-hand character. On the other hand, the vane 21, which is carried by the hub 18, has a right-hand pitch, so that it is of an opposite character to that of the vanes 13 and 16. When the pump is being driven in a forward direction, the hollow shafts 12 and 15 will be driven in a left-handed or anticlockwise direction. From this arrangement they will operate to advance the water toward the outlet-opening from the barrel. The vane 16 will of course operate upon the water first. On account of its form this vane, while it

tends to advance the water longitudinally of the barrel, it will also tend to give the water a rotary movement in the same direction in which this vane is rotated. Rotating in this way the water is caught by the vane 21, which is moved in the opposite direction. In this way the vane 21 operates very effectively against the water so as to advance the same toward the vane 13. The vane 21 in operating to advance the water also gives this water a rotary movement in the same direction in which it is moving—that is, in a direction opposite to that in which the vane 13 is advancing. Hence the vane 13 will strike this water also in an effective manner, operating to give this vane a high efficiency, like the vane 21.

In order to provide for wear, I arrange between the hub 18 and the ends of the hollow shafts 12 and 15 collars 28, as shown.

I prefer to give the vane 21 a slightly-increased rotative speed with respect to the vane 16 and also to give the vane 13 a slightly-increased rotative speed with respect to the vane 21, as in this way the slip of the water is reduced and a higher efficiency is obtained. In order to effect this change of speed, I prefer to make the gear-wheels 24 and 17 of equal diameter. I give the gear-wheel 26 one more tooth than the gear-wheels 17 and 24, while I give the gear-wheel 20 one less. From this arrangement the gear-wheel 20 will have a slightly-increased rotative speed. Furthermore, the gear-wheel 23 is formed with two more teeth than the gear-wheels 17 and 24, while the gear-wheel 14 is given two less. From this arrangement evidently the rotative speed of the vane 13 will be slightly greater than that of the vane 21. The gear-wheel 24 is of course interposed between the gear-wheel 27 and the gear-wheel 17 simply for the purpose of reversing the motion, as will be readily understood.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

In a pump, in combination, a barrel, a hollow shaft rotatably mounted in one head of said barrel, a second hollow shaft rotatably mounted in the opposite head of said barrel, screws carried by said shafts and having a pitch of like character, an inner shaft extending through said hollow shafts, a hub on said inner shaft between said hollow shafts and having a screw of an opposite pitch to said first screws, means for driving said inner shaft in one direction, gear-wheels carried rigidly respectively by said hollow shafts, a main driving-shaft extending longitudinally of said pump, gear-wheels carried thereby and meshing respectively with said first gear-wheels, and means for driving said inner shaft from one of said last gear-wheels.

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

WILLIAM Y. CRUIKSHANK.

Witnesses:
NIXON MALEY,
P. B. MCTIGHE.