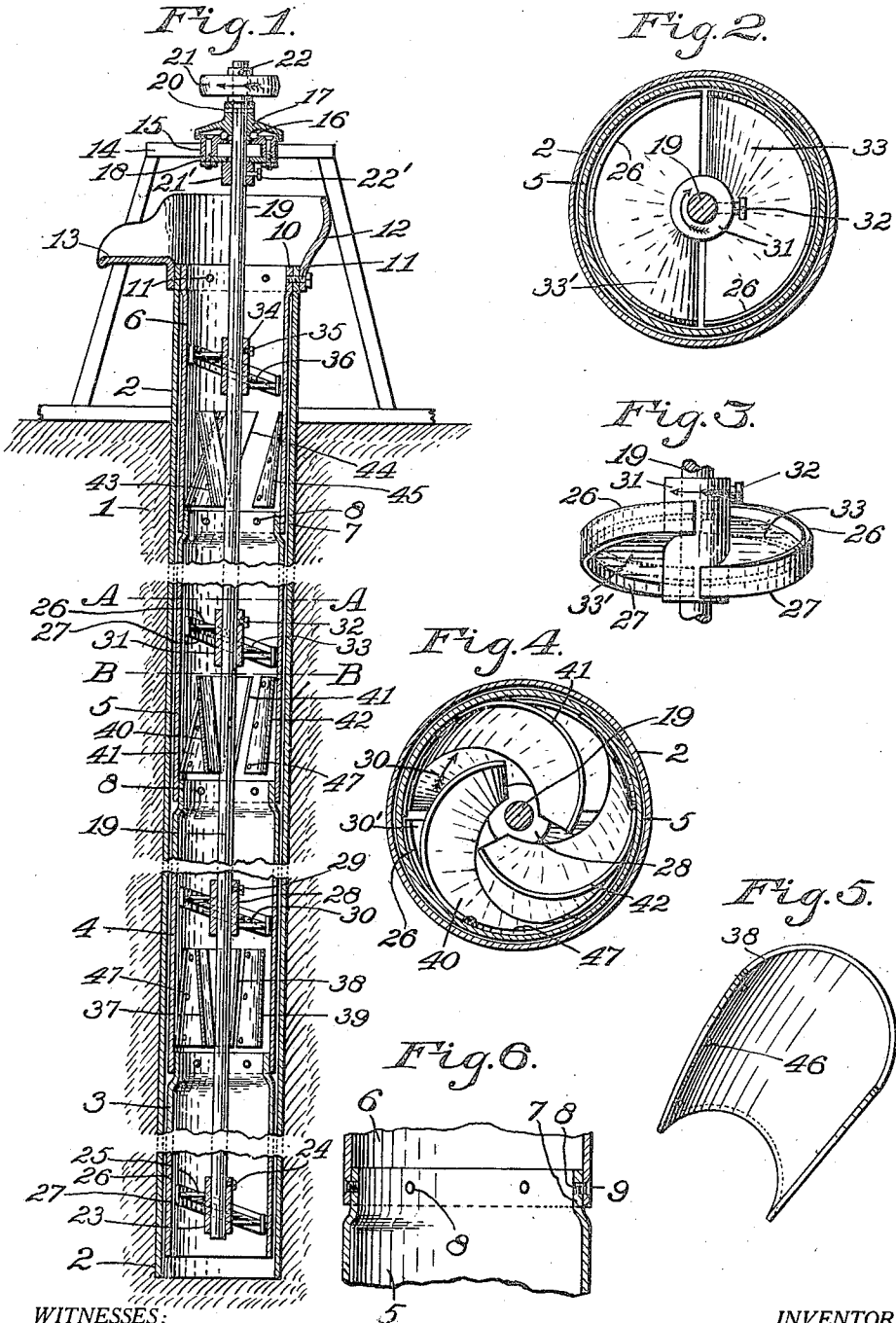


A. E. TRIPP.
 ROTARY PUMP.
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934,859.

Patented Sept. 21, 1909.



WITNESSES:

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ROTARY PUMP.

934,859.

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To all whom it may concern:

Be it known that I, ALBERT E. TRIPP, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Rotary Pumps; and I do declare the following to be a full, clear, and exact description of the invention, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

This invention relates to the class of pumps that are designed to raise water from wells, the invention having reference more particularly to a pump that is adapted to be used in wells of considerable depth and for raising considerable volumes of water, the pump being adapted to be used either in driven wells or in excavated wells and also in cisterns or elsewhere.

The object of the invention is to provide a highly efficient and cheaply constructed pump that will be durable and economical in use.

The invention consists in an improved pump comprising a tube, a rotative shaft in the tube provided with a plurality of impellers of novel form of construction, and a plurality of sets of curved and flared guides arranged in the tube and supported in a stationary manner below the impellers; and the invention consists further in the novel parts, and combinations and arrangements of parts, as hereinafter particularly described and defined in the accompanying claims.

Referring to the drawings Figure 1 is a vertical central sectional view of the pump connected with a well and broken away in parts; Fig. 2, a horizontal sectional view as at the plane of the line A A in Fig. 1 with the impeller in changed position rotatively; Fig. 3, a side elevation of one of the impellers on its shaft; Fig. 4, a horizontal sectional view on the line B B in Fig. 1; Fig. 5, a perspective view of one of the guides; and Fig. 6, a fragmentary vertical central sectional view of the pump cage for guiding the impellers and shaft and also for supporting the guides.

Similar reference characters in the drawings indicate corresponding elements or features of construction.

In the drawings the numeral 1 indicates a section of the earth or ground in which is a well tube or casing 2 forming the wall of

the well that is open at its bottom to receive water from the earth. A cage is inserted in the well removably and may suitably comprise any suitable number of sections of tubing as 3, 4, 5, 6 connected together in any suitable manner, and when the cage is intended to fit closely into the well tube the upper end of each section preferably is swaged, so as to form a relatively small end 7 that is inserted in the lower end of the adjacent section and secured thereto by screws 8 having flush heads 9, so that there will be no external projections on the cage which may be composed of any suitable metal.

The cage is continuous from the upper portion of the well down to a sufficient depth to extend below the water level, and when used in relatively close connection with the well tubing need not be water tight, nor have water tight joints where the sections are connected together, but the cage may be made water tight throughout its length in case the pump is to be used in a well having large diameter, so that the cage would not be close to the wall of the well, in which case the cage would serve as a pump barrel in which the water would be raised. When the cage is constructed so as to fit closely into the well tube 2 it is obvious that the cage may be more or less open in parts, if desired, in order to facilitate construction thereof of built-up parts.

In the construction shown the upper end 10 of the uppermost section 6 of the cage is slightly spread out, so as to fit against the inner side of the well tube 2, to which it is secured by bolts 11 which serve also to secure a suitable pump top 12 having a spout 13 to the top of the well.

A suitable frame 14 is provided at the top of the well, and it supports a housing 15 in which bearing-balls 16 are arranged in a suitable ball-race or a cup, a cone-bearing 17 being arranged on the bearing-balls. The housing preferably has a bottom plate 18 attached thereto through which extends a rotative shaft 19 which is secured in the cone-bearing 17 by a pin 20, the shaft extending down into the well nearly to the lower end of the cage. A pulley 21 is secured to the shaft 19 above the cone-bearing by a pin 22, and the guide collar 21' is secured to the shaft beneath the bottom plate 18 by a set screw 22', but if desired the collar may in some cases be dispensed with.

In order to lift the water from the well a

suitable number of impellers are secured to the shaft 15 at suitable distances apart, the impellers being all alike and each comprising essentially a hub and one or more spirally arranged blades on the hub, the peripheral portions of the blades being adapted to engage the inner side of the cage for guidance. The lowermost impeller has a hub 23 secured to the lower end portion of the shaft 10 by a set screw 24, a blade 25 extending spirally about a portion of the hub and having an upturned flange 26 and also a downward extending flange 27. Farther up on the shaft a similar hub 28 is secured thereto by 15 a set screw 29, there being spiral blades 30 and 30' on the hub, and farther up on the shaft a hub 31 is secured to the shaft by a set screw 32, spiral blades 33 and 33' being attached to the hub. At a suitable distance 20 higher up a hub 34 is secured to the shaft by a set screw 35 and has a spiral blade 36 thereon. Each impeller preferably comprises two blades, as 33 and 33', arranged with the uppermost ends in one horizontal plane at 25 opposite sides of the shaft and the lowermost ends of the blades in another plane at opposite sides of the shaft, so that the blades may act similarly to a boring-bit or twisted augur. The peripheral edges of the blades 30 are broadened in order to provide bearing surfaces of suitable extent against the inner side of the cage. This is accomplished by forming the flanges 26 and 27 on the edges of the blades, and it is obvious that either 35 one of the flanges might be omitted and that in lieu of the flanges the blades themselves may be made sufficiently thick for the purpose, or the edges thereof otherwise broadened to afford ample bearing surfaces. In 40 the smaller sizes of pumps, however, the blades may be relatively thin throughout.

Just below each impeller a set of guides is suitably secured to the inner side of the cage and each set comprises a suitable number of curved guide wings, as 37, 38, 39 45 formed of sheet metal, each wing having one end thereof secured to the cage and curved away from the cage toward the shaft 19, the lower portion of each wing being 50 curved inwardly more than the upper portion of the wing, so that each wing is flaring and designed to cause the rising water to flow upward past the inclined sides of the wings. Another set of guides comprises 55 wings 40, 41, 42 arranged higher up in the cage, the wings of this set having the upper portions thereof flared away from the shaft to a greater extent than the wings be-

low. Farther up in the cage is another set of guide wings 43, 44, 45 that have their upper portions flared away from the shaft still 60 more than those next below, and it is designed that each higher set of wings in a pump shall be flared outwardly to a greater degree than those next below, in order that 65 the water may have its motion quickened in progression toward the outlet of the pump. Each guide wing, as 38, has rivet holes 46 in one of its edges by which it is secured to the cage preferably by rivets 47. 70

In practical use any suitable power may be applied to the pulley or wheel 21 and the shaft is driven in the direction indicated by the arrows at a high rate of speed; the blades of the impellers all force the water upward 75 and also cause the water to move slightly in a circular direction and being impelled against the guide wings will thereby be caused to rise, so that increased efficiency of the pump will result. 80

Having thus described the invention, what is claimed as new, is—

1. In a pump, the combination with a tubular cage, a shaft rotatable in the cage, and an impeller secured to the shaft to rotate 85 therewith, of a plurality of guides comprising sheet metal wings that are secured to the inner side of the cage below the impeller and are curved at their lower ends inward and extend substantially to the shaft, said 90 wings being curved inward at their upper ends to points approximately midway between the cage and the shaft, both sides of each wing standing at angles to the axis of the shaft. 95

2. In a pump, the combination with a tubular cage, a shaft rotatable in the cage, and a plurality of impellers secured to different parts of the shaft to rotate therewith, of a plurality of sets of guides, each set comprising 100 sheet metal wings that are secured to the inner side of the cage below an impeller and curved inward toward the shaft, the lower ends of the wings extending inward to a greater extent than the upper ends of the 105 wings so that the wings are bodily inclined, and the wings of the sets progressively upward being inclined in greater degree than those below.

In testimony whereof, I affix my signature 110 in presence of two witnesses.

ALBERT E. TRIPP.

Witnesses:

HARRY D. PIERSON,
E. T. SILVIUS.