J. R. HALL.

DEVICE FOR ELEVATING WATER.

APPLICATION FILED JUNE 19, 1909.

967,122.

Patented Aug. 9, 1910.

3 SHEETS—SHEET 1.

Fig. 1.

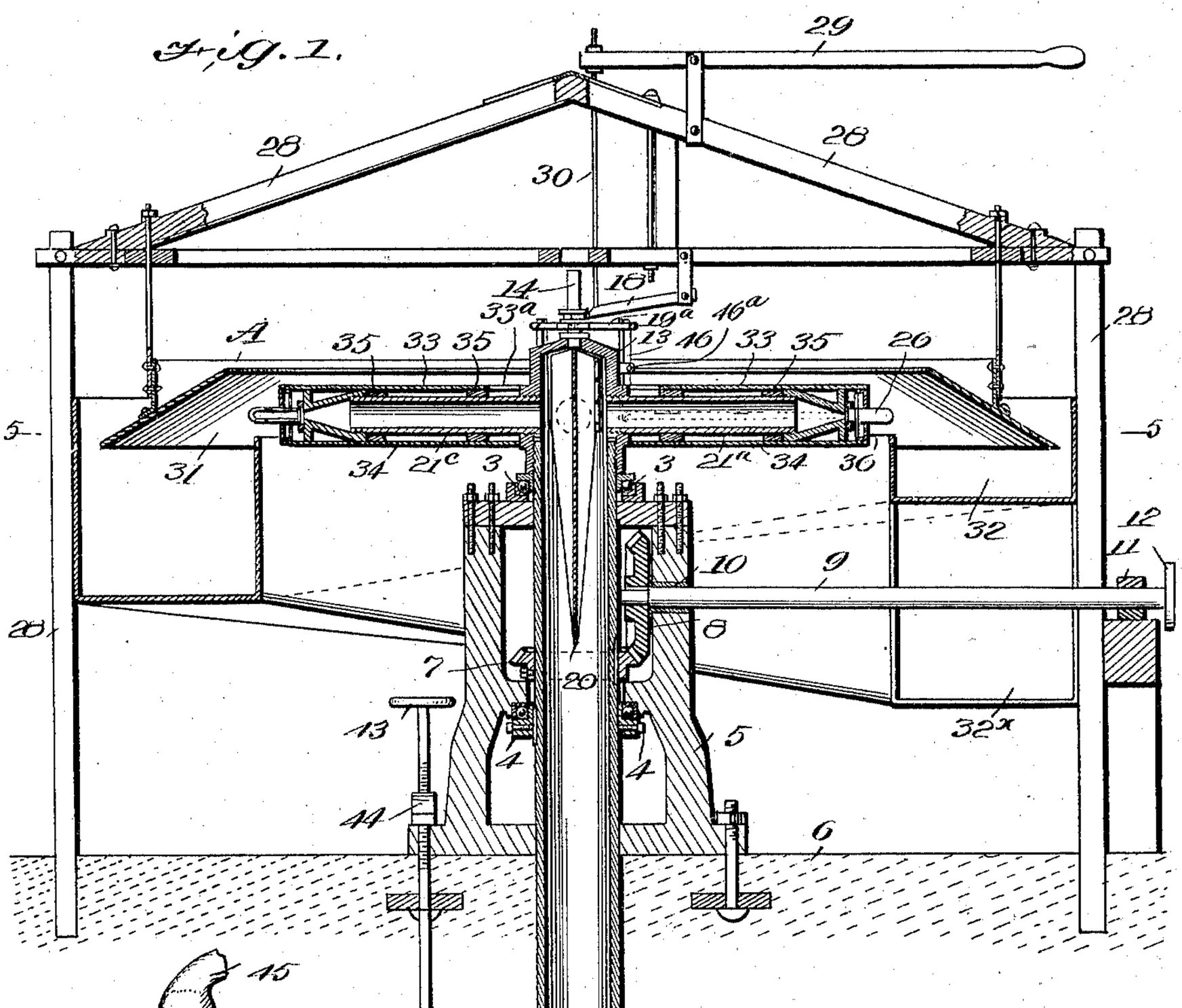


Fig. 2.

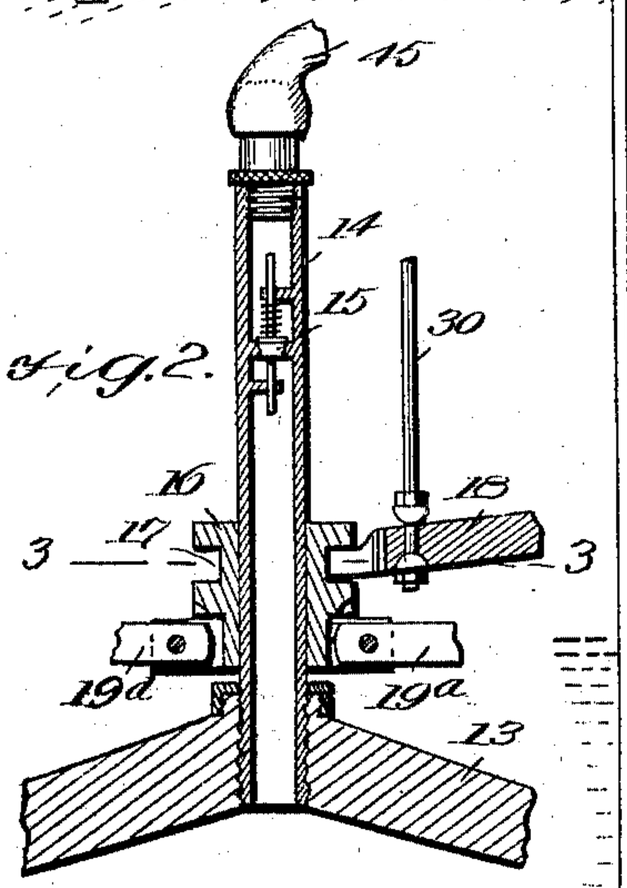
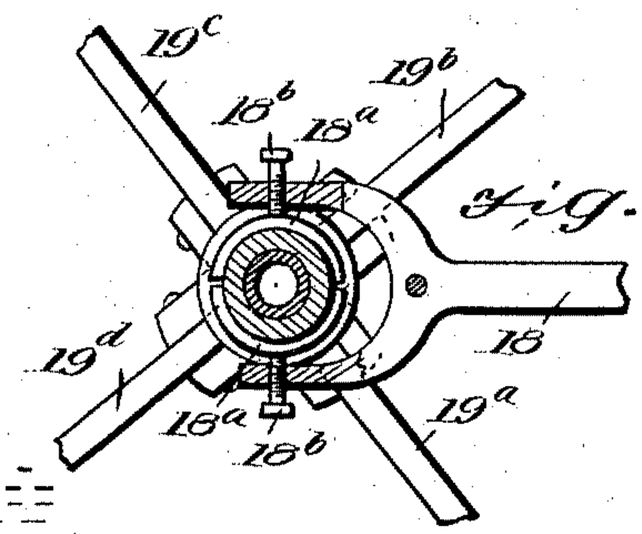


Fig. 3.



WITNESSES

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3 SHEETS—SHEET 2.

Fig. 4.

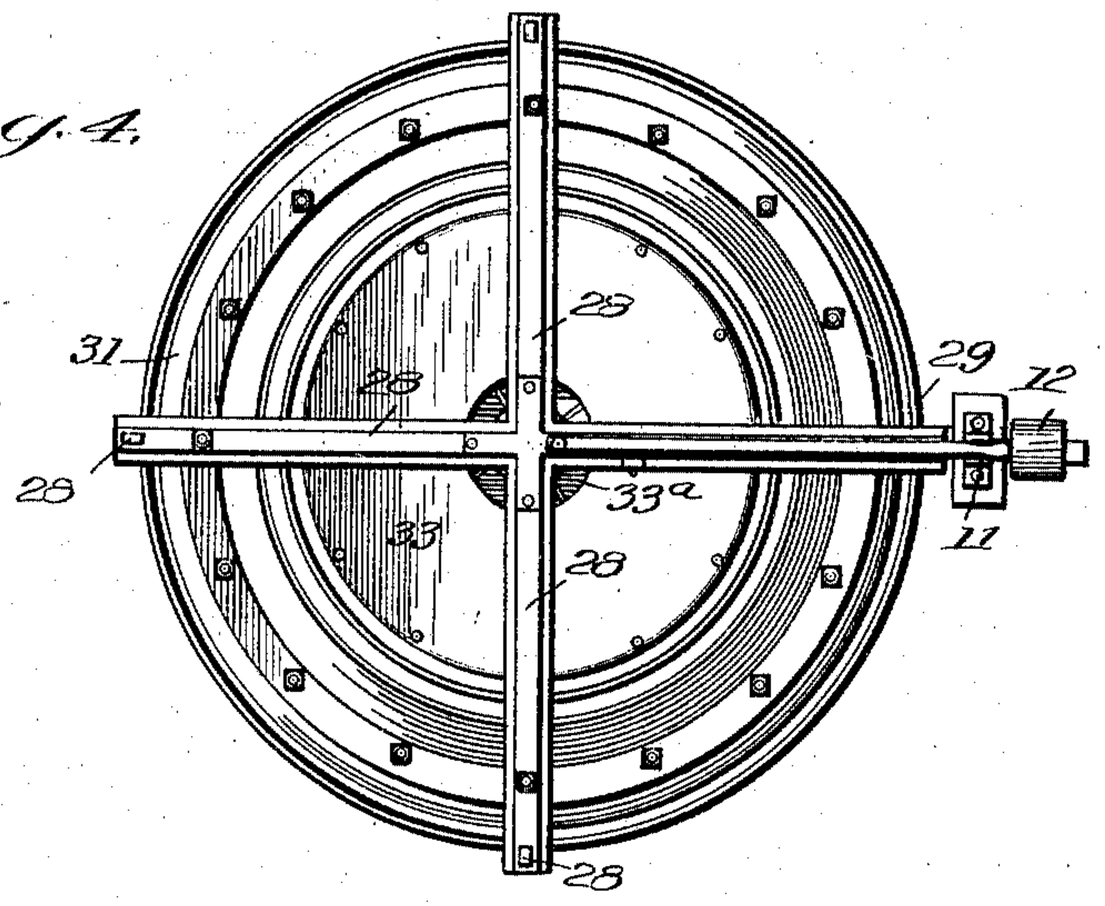
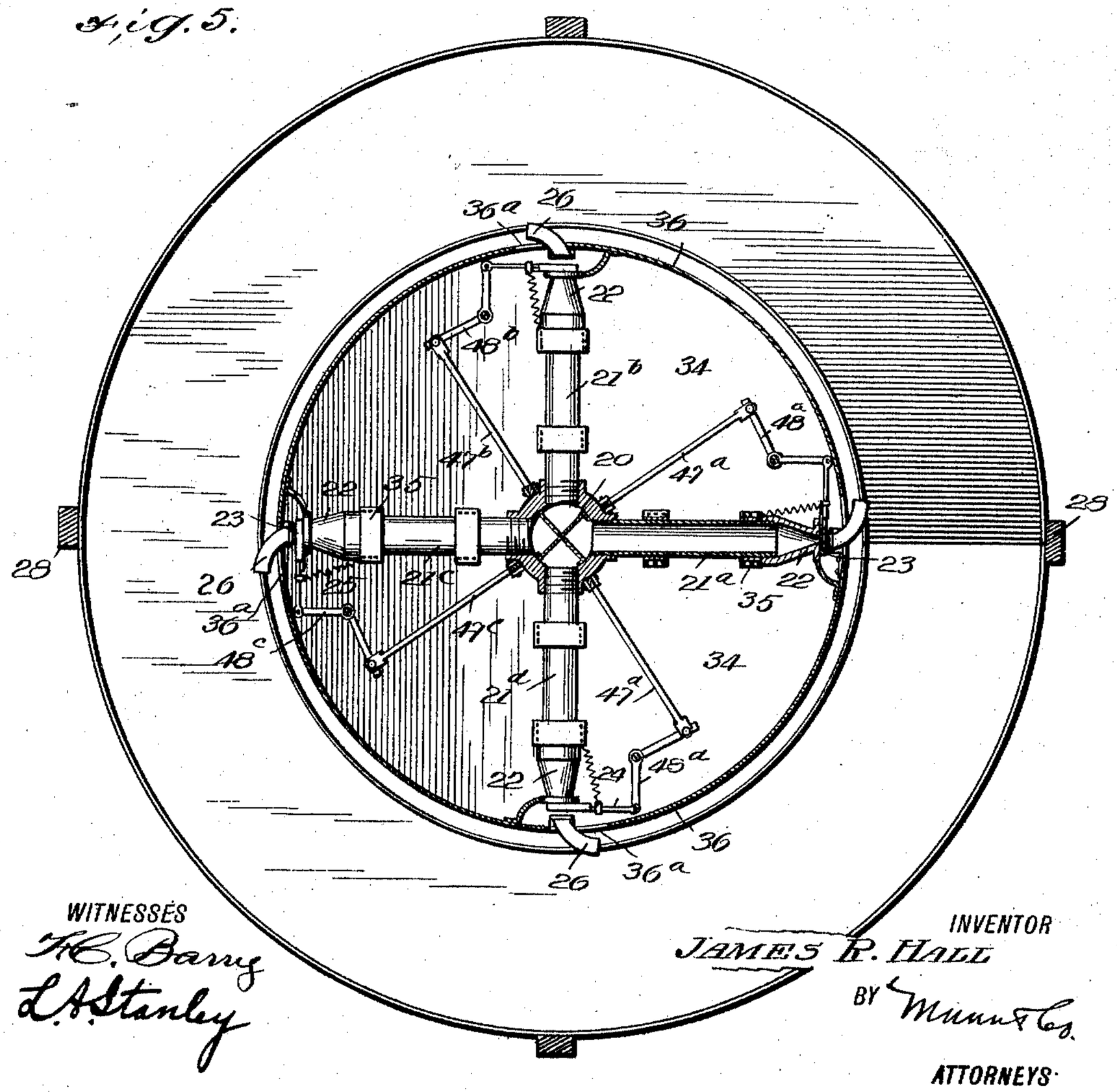


Fig. 5.



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3 SHEETS—SHEET 3.

Fig. 6.

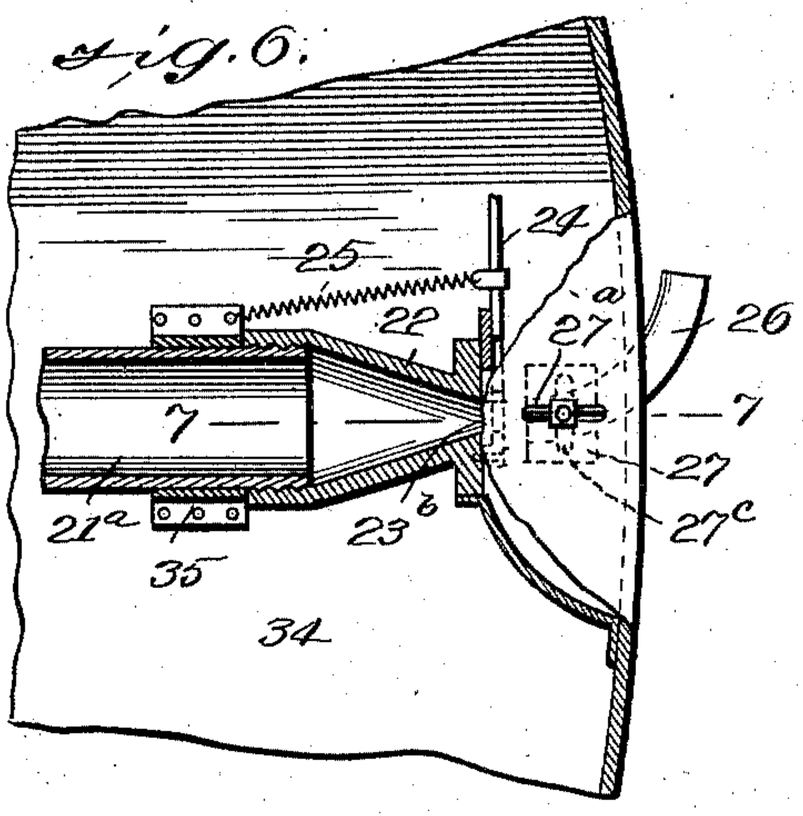


Fig. 7.

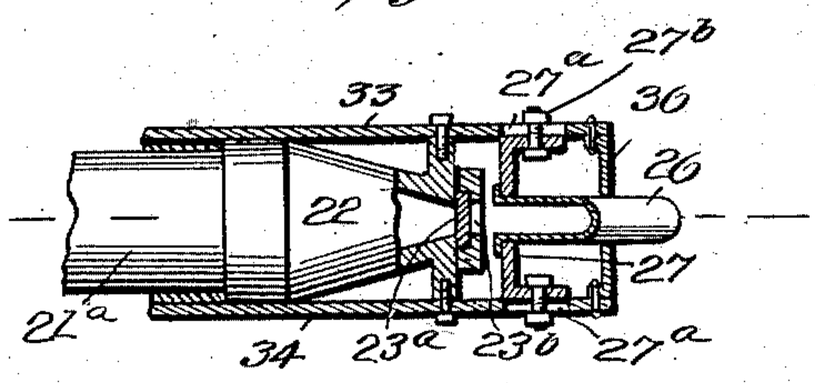


Fig. 9

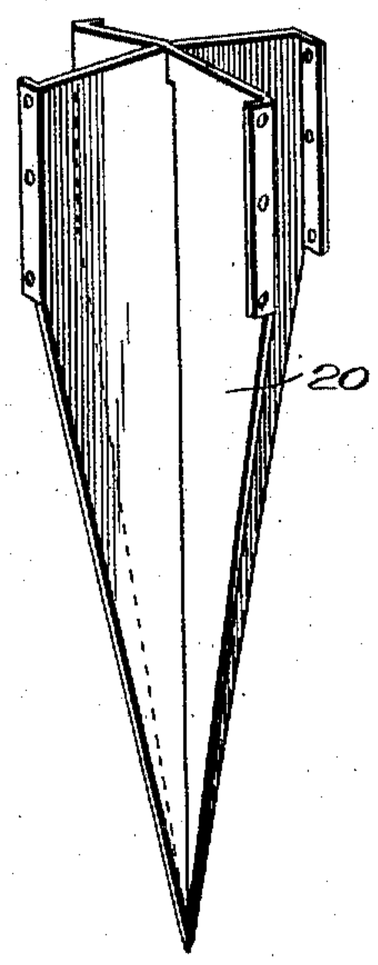


Fig. 8.

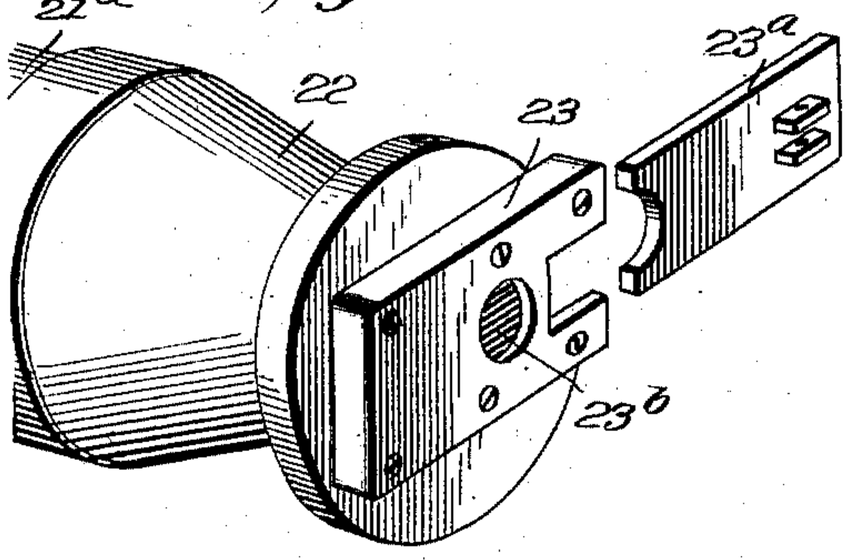
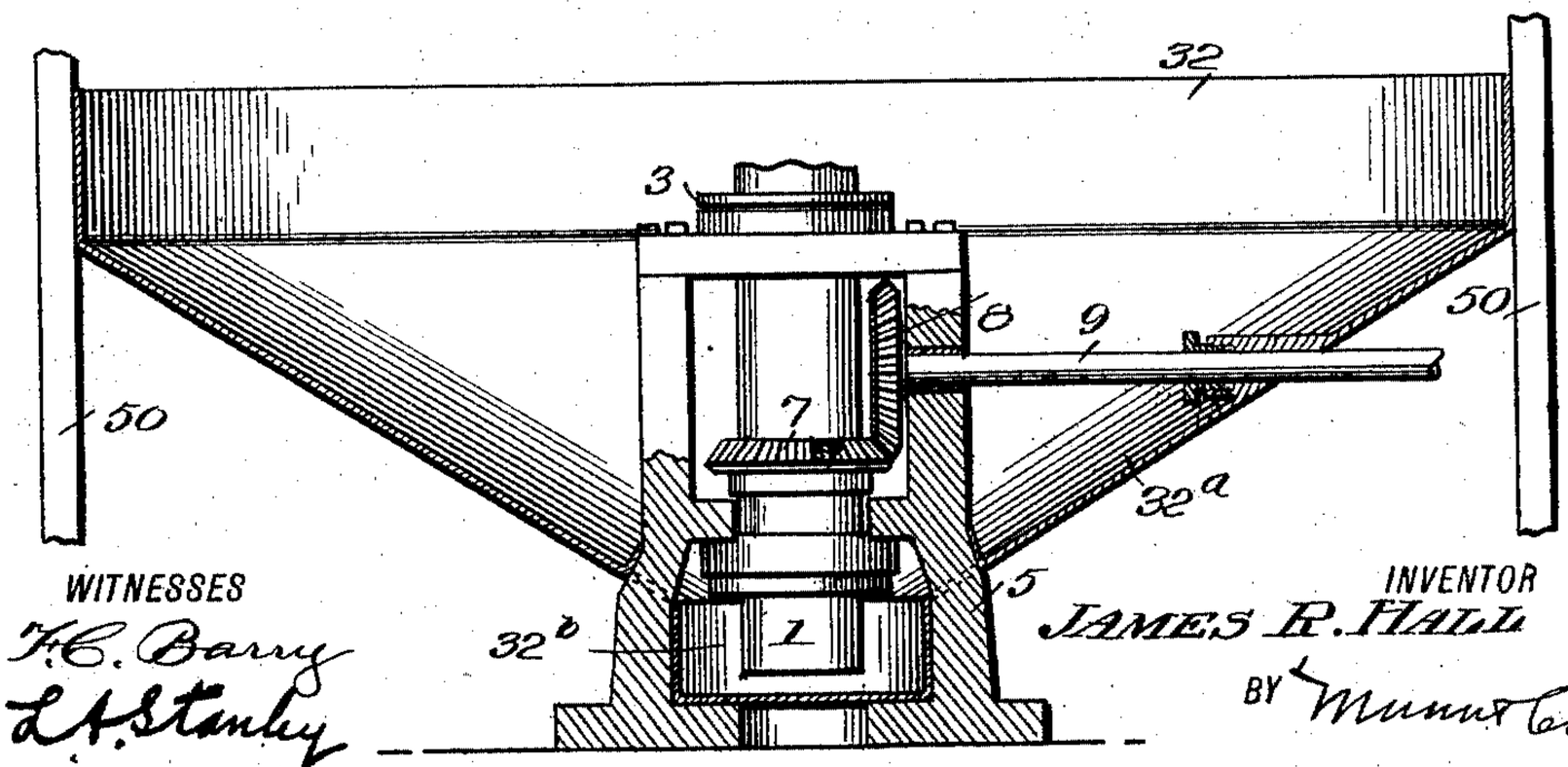


Fig. 10.



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UNITED STATES PATENT OFFICE.

JAMES ROBERT HALL, OF WINNFIELD, LOUISIANA.

DEVICE FOR ELEVATING WATER.

967,122. Specification of Letters Patent. Patented Aug. 9, 1910.

Application filed June 19, 1909. Serial No. 503,101.

To all whom it may concern:

Be it known that I, JAMES ROBERT HALL, a citizen of the United States, and a resident of Winnfield, in the parish of Winn and State of Louisiana, have made certain new and useful Improvements in Devices for Elevating Water, of which the following is a specification.

My invention relates to improvements in means for raising water to a higher elevation and it consists in the constructions, combinations and arrangements herein described and claimed.

An object of my invention is to provide a device in which the raising of the water may be accomplished continuously by means of centrifugal action.

A further object of my invention is to provide means for permitting the water to flow outwardly in a lateral direction from the top of the main pipe and for regulating such flow in such a manner as to cause the force of the outward flow to lift the water in the central tube.

A further object of my invention is to provide means for directing the lateral flow of the water so as to cause it to impact on a moving part of the device thereby increasing the turning movement and lessening the amount of power necessary in the motor.

Other objects and advantages will appear in the following specification and the novel features of the device will be particularly pointed out in the appended claims.

My invention is illustrated in the accompanying drawings in which similar reference characters indicate parts in the several views and in which—

Figure 1 is a central vertical section through one embodiment of my invention; Fig. 2 is a detail view showing a section of the cap or casing and the sliding collar; Fig. 3 is a section along the line 3—3 of Fig. 2; Fig. 4 is a plan view of the upper part of the device; Fig. 5 is a horizontal section through the device approximately along the line 5—5 of Fig. 1; Fig. 6 is a detail view showing a section through one of the nozzles; Fig. 7 is a section along the line 7—7 of Fig. 6; Fig. 8 is a perspective view showing the slide valve for controlling the opening in the nozzle; Fig. 9 is a perspective view of the deflector, and Fig. 10 shows a modified form of the receiving tank.

In carrying out my invention I provide a main tube or pipe 1, which extends down into a body of water such as a well or stream 2, and is rotatably supported upon the upper ball-bearings 3 and the lower ball-bearings 4 of the supporting base 5. The latter may be secured to the ground or floor 6 in any suitable manner. Secured to the pipe 1 is an annular bevel gear 7 which meshes with a similar bevel gear 8 on the end of a drive shaft 9 which is journaled at 10 at one end in the base 5, and at the other end at 11, and which bears the drive pulley 12. The top of the tube 1 is screwed into a cap or casing 13 which has a smaller tube 14 projecting upwardly therefrom. The latter is shown in Fig. 2 and is provided with a spring controlled valve 15 on its interior. On the outer side of the tube is a collar 16 provided with a groove 17 into which the yoked end of a lever 18 projects. The engagement of the lever 18 with the collar 16 is secured by means of the shoes 18^a, see Fig. 3, which are regulated by the set screws 18^b. The lower end of the collar 17 is pivotally connected with the levers 19^a, 19^b, 19^c and 19^d. Secured to the inside of the cap 13 is a deflector 20 which divides the upwardly flowing stream into four parts.

Referring now Figs. 1 and 5, it will be seen that there are four lateral pipes 21^a, 21^b, 21^c, and 21^d which are screwed into the cap 13 and are provided at their ends with the nozzles 22 whose openings are controlled by the slide valves 23. The nozzle and valve is clearly shown in Figs. 6, 7 and 8. The valve-gate 23^a is arranged to slide inwardly and outwardly to close the opening 23^b. The valve-gate is connected to a valve-stem 24, the latter being connected with the pipe fastening by means of the spring 25 so that the valve-gate is normally under the tension of the spring and will remain in any position in which it is set. Secured at the end of the nozzle 22 but separate from it is an impact trough 26 of the shape shown in Figs. 6 and 7. This trough may be brought nearer or farther away from the end of the nozzle by means of the adjustable plate 27, to which the tube is secured. This is accomplished by passing bolts 27^b through the plates 27 and through radial slots 27^a in the respective upper and lower annular plates 33 and 34. These bolts also pass through slots 27^c in the lateral turned ends of the plates themselves as shown in Fig. 6. By loosening the bolts the plate may be adjusted toward or away from the end of the nozzle or laterally

thereof to the required position. In practice it has been found that where the pipe is immediately in front of the opening there is friction on the sides of the pipe, before the water reaches the curved portion. This friction results in a loss of power. It has been found that where the pipes are moved laterally so as to permit the stream to strike at a certain portion of the curve the greatest turning effect is obtained. This place must be determined by experiment.

Referring now to Fig. 1, it will be seen that I have provided a framework 28 to which a hand-lever 29 is pivotally attached. The inner end of the hand-lever is connected with the lever 18 by means of a rod 30. Suspended from the framework is a conical hood or impact plate 31 to receive the water thrown out from the troughs 26. The lower edges of the impact plate 31 are above a tank 32 which has a spiral shape, as clearly shown in Fig. 1 and which is adapted to receive the water as it drops from the plate 31.

In order to strengthen the laterally projecting tubes 21^a, 21^b, 21^c and 21^d, I arrange an annular plate 33 above the tubes and a similar plate 34 below the tubes with blocks 35 between the plates and the tubes. Thus the plates serve as additional strengthening members. The upper plate is provided with a central opening 33^a. The plates are joined together at their peripheries by a rim 36 through which the troughs 26 project, see Figs. 5 and 7. These plates have openings 36^a for a purpose hereinafter explained.

In Fig. 1, I have shown a means for closing the lower end of the pipe 1 which consists of a plate 37 mounted for rotation at the top of a rod 38 arranged for reciprocation in a guide 39 and actuated by a lever 40 pivoted to a standard 41. The end of the lever is attached by means of a link 42 to a hand-wheel 43 having a collar and sleeve connection 44 whereby the rotation of the hand-wheel will raise the plate 37 up or down as desired.

From the foregoing description of the various parts of the device the operation thereof may be readily understood. With the apparatus set up as described the hand-lever 29 is pressed down, thereby pulling up on the rod 30, raising the collar 16 and the arms 19^a, 19^b, 19^c, and 19^d simultaneously. Each of these arms is pivotally connected to an upright lever 46 which is pivotally mounted on a stud 46^a secured to the cap or casing 13 (see Fig. 1) and which has a pivotal connection at its bottom with the rods 47^a, 47^b, 47^c and 47^d. The latter are connected by means of the bell crank levers 48^a, 48^b, 48^c, and 48^d with the valve stems 24 so that the upward movement of the collar 16 will cause the closing of the valve at the end of each of the nozzles 22. A suction pump (not shown), is attached by means of a flexible connection 45, see Fig. 2, to the pipe 14 and the air is exhausted from the pipe 1, thereby drawing the water upwardly into said pipe and filling the lateral arms 21^a, 21^b, 21^c and 21^d. The motor is started and the pipe 1 is revolved upon its bearings and the lateral arms are carried around with it. When a sufficient speed has been attained, which varies with the length of the arms, size of the pipes and other conditions, the lever 29 is pulled upwardly thereby opening the valves at the ends of the nozzles and permitting the water to flow outwardly by centrifugal action. The force created by the centrifugal action now causes the water to ascend the main pipe 1. As the water passes through the opening 23^b of the nozzle, see Figs. 6 and 7, it shoots across the intervening space into the curved trough 26. The water striking the curved portion of the trough exerts a force which may be resolved into two components at right angles to each other, one in a line parallel with that of the lateral arm and another tangential to the rotating frame 36, and the troughs being turned in a backward direction, this component of the force aids in turning the frame in a forward direction. The position of the troughs 26 is important. They should be so placed as to secure the greatest turning effect. I have found by experiment that the greatest turning effect is secured when the stream is directed at an angle to the curved resisting side of the trough, in other words, when the trough is shifted forwardly so that the impact occurs nearer to the middle portion of the trough than when the end of the trough is exactly in line with the end of the nozzle. As stated above, the action of the stream issuing from the nozzle is that of impact rather than direct pressure. It is obvious, therefore, that the curvature of the trough and the point of impact must be important factors in producing an efficient device. The point of impact is regulated through the shifting means shown in Figs. 6 and 7, already described. As the water passes from the troughs it impinges on the impact or deflector plate 31 and is turned into the receptacle 32 from whence it runs downwardly along the inclined bottom to the opening 32^x, see Fig. 1, from whence it may be taken to any place for use. In order to maintain a constant stream the air can be admitted through the openings 33^a in the plate 33 whence it passes out through the openings 36^a in the plate 36 at the bend of the trough 26. If this precaution is not observed the water issuing from said trough will tend to hug the periphery of the part 36 of the rotating frame. As the water passes upwardly through the pipe 1 it is divided by the deflector 20 so that the

centrifugal action begins before the water reaches the level of the lateral arms.

An additional means of filling the main pipe 1 and the lateral arms with water is provided in the apparatus shown in Fig. 1. By manipulating the hand wheel the plate 37 may be brought up against the bottom of the pipe 1. The small tube 14 at the top of the pipe may be removed and water may be poured in through the opening until the main pipe and the lateral arms are completely filled. The pipe 14 may then be replaced. The main pipe and the lateral pipes are then set in rotation, the plate 37 turning on the bearing 38. As soon as a sufficient speed has been developed the plate 37 may be moved downwardly again, the valves at the nozzles may be opened and the water will be drawn up in the manner already described.

In Fig. 10, I have shown a modified form in which the receptacle 32 has an inclined bottom 32^a which leads to a central recess 32^b into which the bottom of the pipe 1 projects so that as the water is delivered into the receptacle 32 it runs down immediately to the bottom of the pipe 1 and may be drawn up again by means of the revolving arms. This modification is intended for the purpose of demonstration or for show windows in which the device is inclosed in the glass casing 50 and through which the working of the device may be watched.

I claim:

1. In a device for elevating water, a main pipe mounted for rotation around a vertical axis, laterally extending pipes communicating with said main pipe, a common casing for said pipes comprising upper and lower plates and a connecting rim, a curved trough in proximity to the end of each of said pipes adapted to receive the water from said pipes, means for filling said main pipe and said lateral pipes, means for rotating them and a slide-valve at the end of each lateral pipe for controlling the water delivered to said curved troughs.

2. In a device for elevating water, a main pipe mounted for rotation around a vertical axis, lateral pipes extending therefrom, a restricted nozzle at the end of each of said lateral pipes, a slide-valve secured to said nozzle, means including a system of levers and a sliding collar for operating said slide valves, means for filling said main pipe and said lateral pipes with water, a curved trough arranged to receive water from each of said lateral pipes and to augment the turning movement, an impact plate for receiving the water from the troughs and means for rotating said main pipe and said lateral pipes.

3. In a device for elevating water, a main pipe arranged to rotate around a central axis, a cap secured at the upper end of said main pipe, a series of radiating pipes carried by said cap and communicating with said main pipe, a restricted nozzle for each of said pipes, a curved impact member secured to said nozzle, but separate therefrom, a valve for controlling the exit of water from said nozzle, means for operating said valves simultaneously, said means comprising a hand lever, a sliding collar, a yoked lever arranged to engage said sliding collar and adapted to be operated by said hand lever, and pivoted connections between said sliding collar and each of said slide valves.

4. In a device for elevating water, a main pipe mounted for rotation around a vertical axis, a series of laterally extending pipes communicating with said main pipe, a deflector mounted in said main pipe for deflecting the water into said lateral pipes, a restricted nozzle for each of said lateral pipes, curved troughs for each of said nozzles arranged to receive the water from its individual nozzle, means for adjusting each of said troughs relatively to its respective nozzle, a conical impact plate, a water receptacle underneath said conical impact plate having an inclined bottom and means for rotating said main and said laterally extending pipes.

5. In a device for elevating water, a main pipe mounted for rotation around a vertical axis, a series of laterally extending pipes communicating with said main pipe, a deflector mounted in said main pipe for deflecting the water into said lateral pipes, a restricted nozzle for each of said lateral pipes, a curved trough for each of said nozzles arranged to receive the water from its individual nozzle, and means for adjusting each of said troughs relatively to its respective nozzle.

6. In a device for elevating water, a main pipe mounted for rotation around a vertical axis, a series of laterally extending pipes communicating with said main pipe, curved troughs secured to the ends of said laterally extending pipes, but spaced therefrom for receiving the water delivered by said pipes, and means for adjusting said troughs.

7. In a device for elevating water, a main pipe mounted for rotation around a vertical axis, a series of laterally extending pipes communicating with said main pipe, and impact member secured to the end of each of said lateral pipes, and means for adjusting said impact member with respect to the pipe.

JAMES ROBERT HALL.

Witnesses:
L. A. STANLEY,
SOLON C. KEMON.