

(No Model.)

2 Sheets—Sheet 1.

O. O. GOSERUD.
WATER ELEVATOR.

No. 556,844.

Patented Mar. 24, 1896.

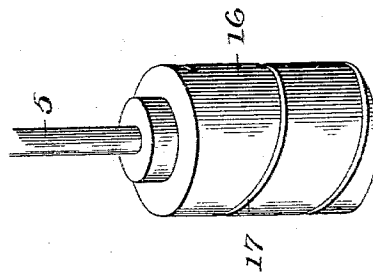
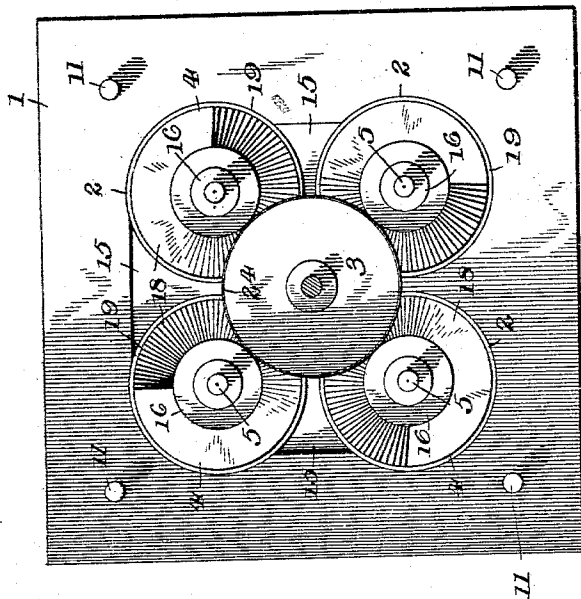


Fig. 4.

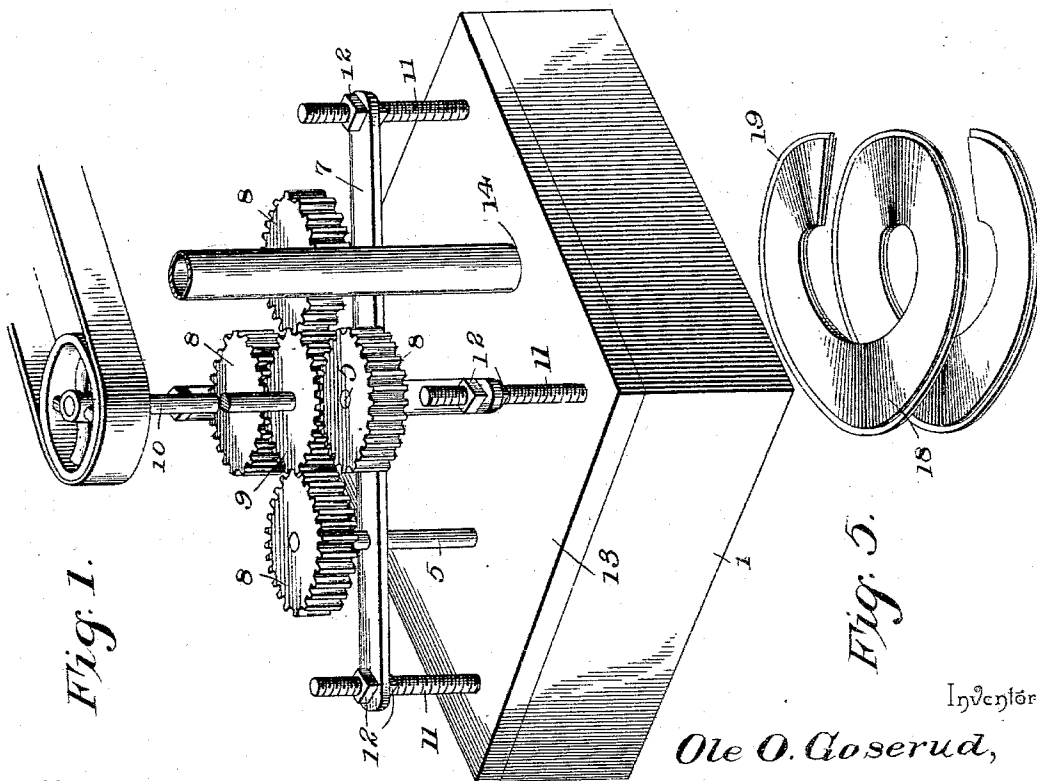


Fig. 1.

Fig. 5.

Witnesses

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(No Model.)

2 Sheets—Sheet 2.

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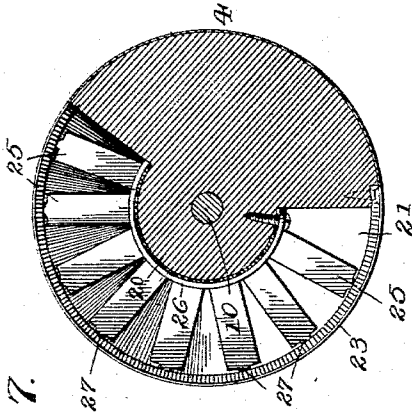


Fig. 7.

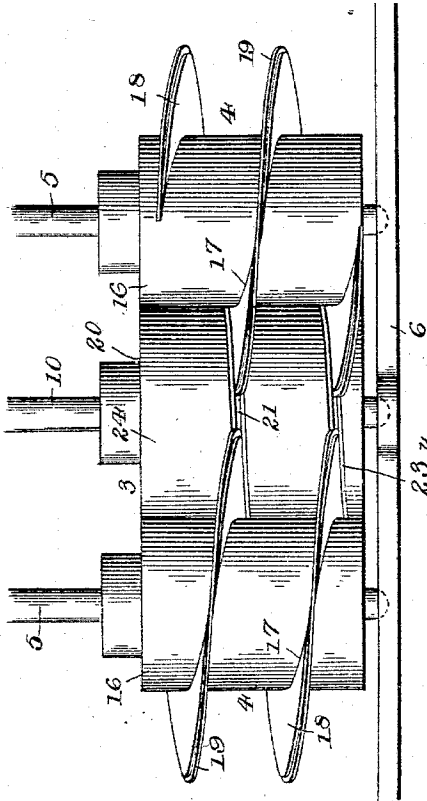


Fig. 3.

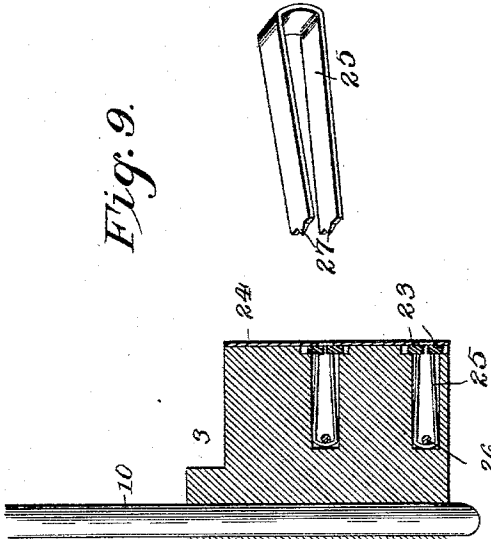


Fig. 9.

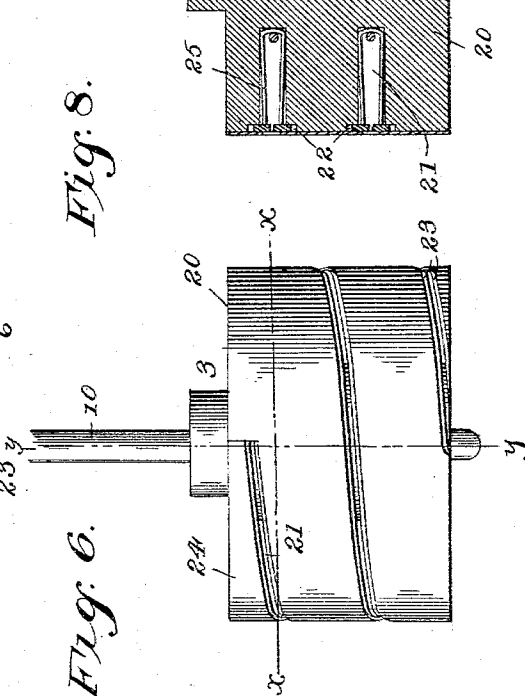


Fig. 8.

Fig. 6.

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UNITED STATES PATENT OFFICE.

OLE O. GOSERUD, OF GRANT COUNTY, SOUTH DAKOTA.

WATER-ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 556,844, dated March 24, 1896.

Application filed May 8, 1895. Renewed February 11, 1896. Serial No. 578,956. (No model.)

To all whom it may concern:

Be it known that I, OLE O. GOSERUD, a citizen of the United States, residing in Grant county, (near Summit P. O.,) South Dakota, have invented a new and useful Water-Elevator, of which the following is a specification.

This invention relates to that class of devices for lifting water and other fluids which embody in their construction lifting-screws operating in a casing, and which are rotated to effect a lifting or raising of the water, and has for its object to provide a structure of compact form and possessed of great lifting capacity, and which will obviate the pressure and friction incident to long columns of water or fluid in that class of fluid-elevators employing a long lifting-screw extending from the well or cistern to the point of discharge.

Other objects and advantages will appear from the following description, taken in connection with the accompanying drawings, in which—

Figure 1 is a perspective view of a water-elevator embodying the essence of the invention. Fig. 2 is a plan view with the cover and operating-gearing removed. Fig. 3 is a side elevation of the lifting-screws detached from the casing. Fig. 4 is a detail view of a core forming the body of one of the lifting-screws, the spiral plate being detached. Fig. 5 is a detail view of the spiral plate detached from its core. Fig. 6 is a side elevation of the master-screw. Fig. 7 is a plan section on the line X X of Fig. 6. Fig. 8 is a cross-section on the line Y Y of Fig. 6. Fig. 9 is a detail view of one of the springs employed for pressing the packing-strips on the sides of the spiral plates.

The casing 1 will have a series of circular openings 2 disposed in vertical relation and grouped about a central opening in which is fitted the master-screw 3. These circular openings 2 will be of like diameter, and the lifting-screws 4 placed therein will be of such diameter as to fit close against the sides of the said openings 2 and preserve a watertight joint therewith. The number of circular openings 2 can be varied without departing from the spirit of the invention, four being shown, as this number will be generally

employed in the construction of water-elevators embodying the invention. The lifting-screws 4 will be of like construction, and will have shafts 5, which are stepped at their lower ends in a support 6, and which are journaled at their upper ends in a corresponding support 7 above the casing, and each shaft 5 will have a gear-wheel 8, which is in mesh with a master gear-wheel 9 on the shaft 10 of the master-screw 3, whereby the master-screw and the lifting-screws will rotate in unison. The shaft 10 will be projected to a convenient point and provided at its upper end with suitable gearing for operating the device.

The supports 6 and 7 may be of suitable construction for effecting the desired purpose, and, as shown, comprise two bars, which are crossed and welded together at the point of crossing, and which are secured together by tie-bolts 11 passing vertically through the casing 1, the upper support 7 being held between jam-nuts 12, mounted upon the upper threaded portions of the tie-bolts 11, one of each pair on opposite sides of the said support 7.

A cover 13 closes the upper ends of the openings 2, the lower ends of the said openings being open, and this cover is provided with openings for the passage of the several shafts and tie-bolts and with an opening 14 for the discharge-pipe, by means of which the water or other fluid is conveyed to the point of discharge. The several openings 2 communicate at their upper ends beneath the cover 13, so that the water or fluid elevated by the different lifting-screws 4 will find its way to the common discharge-opening 14, and to effect this communication the upper portions of the inwardly-extending webs are cut away, as shown at 15.

The lifting-screws 4, as previously intimated, are of similar construction, and comprise a core 16 having a spirally-formed kerf 17, which receives the inner edge portion of the spiral 18, forming the screw proper. This spiral 18 is formed of two plates or strips, between which is comprised the packing 19, by means of which a close joint is obtained between the screws and the walls of the openings 2, the outer edge portions of the plates being held together by rivets or bolts in the usual way, and the inner edge portions be-

ing clamped between the walls of the spiral kerf 17.

The master-screw 3 comprises a core 20, having a spiral groove 21, which is enlarged at its outer side, as shown at 22, to receive the packing-strips 23, by means of which a water-tight joint is obtained between the sides of the spiral groove 21 and the sides of the spirals 18 of the several lifting-screws. The outer faces of the packing-strips 23 come flush with the outer side of the core 20 and are held in place in the enlarged portions or seats 22 by means of a metal strip 24 secured to the outer face of the core 20 and having the opposing edges of the volutes spaced apart a sufficient distance to receive the spirals of the lifting-screws. A series of approximately U-shaped springs 25 are fitted in the spiral groove 21 and are retained therein by a fastening-wire 26, which is secured at one end to the inner wall of the groove 21 and at its opposite end to the other extremity of the said groove and extends throughout the length of the said groove and bears against the inner wall thereof. The U-shaped springs 25 have their free ends extending outwardly and terminating in points 27, which enter the packing-strips 23 on opposite sides of the groove 21 so as to form positive engagement therewith and press the said strips close against the sides of the spirals 18, and a shoulder is provided on each side of the points 27 to prevent the points 27 from penetrating too far into the packing-strips. These U-shaped springs 25 are provided in sufficient number to attain the desired result in a satisfactory manner and have their free ends formed so as to press the packing-strips 23 together and against the sides of the spirals 18, and these U-shaped springs 25 will be formed of flat strips of spring metal, which are doubled upon themselves and are held in fixed relation within the spiral groove 21 by having their contiguous inner edge portions touching. The several packing-strips 23 and 19 may be of rubber, leather, or any suitable material generally employed for packing purposes and which will not be materially affected by moisture.

In assembling the parts the master-screw 3 occupies a central position relative to the circular openings 2, and the lifting-screws 4 are fitted in the circular openings 2 and have the inner portions of their spirals entering the spiral groove 21 of the master-screw, and by this disposition of the parts the adjacent portions of the lifting and master screws touch, and the latter forms a closure for one side of each of the circular openings 2, thereby admitting of each lifting-screw 4 performing its function independently of the others, but all co-operating to elevate the water to a common discharge-opening, from which it is conveyed to the required point for use by a suitable pipe or pump-stock. The master-screw 3 of itself performs no function in the lifting of the water, but admits of the plurality of

lifting-screws 4 being arranged closely together and in a compact form and obviates the provision of a complete circular opening for each lifting-screw to operate in, as a portion of the master-screw intersects and projects into each opening 2 a distance corresponding to the depth of that portion of the spiral 18 from the face of the core 16 to the working edge of the said spiral.

By the gearing hereinbefore described the several screws will be rotated in unison, and the lifting-screws will revolve in the same direction and opposite to the movement of the master-screw, and the contiguous or adjacent portions of the lifting-screws will travel in opposite directions relatively to one another and in the same direction with the adjacent portions of the master-screw.

In the operation of the invention the device is placed in the well, cistern, tank, or other place containing the fluid or water to be elevated, and the several screws being rotated the lifting-screws 4 will elevate the fluid in their respective openings to the upper portion of the casing, from which it will pass by a suitable conveyer to the point of discharge.

From the foregoing it will be seen that the structure is compact, which is a feature of vital importance, and that it is capable of elevating a large volume of fluid in comparison to the space occupied thereby, and that the several lifting-screws distribute the pressure and make it possible to operate the device with less power than usually required for lifting a like column of fluid.

Other objects and advantages are apparent, and it will be understood that changes in the form, proportion, and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

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

1. A fluid-elevator comprising a centrally-disposed master-screw having a spiral groove, and a plurality of lifting-screws grouped about the master-screw and having the inner portions of their spirals entering the groove of the master-screw, and having their body portions touching the outer sides of the master-screw and forming substantially a water-tight joint therewith, substantially as set forth.

2. A fluid-elevating device comprising a casing having a series of circular openings disposed about a central line, a master-screw occupying a central position and having its outer portions intersecting with the inner portions of each of the said openings, and having a spiral groove, and lifting-screws operating in the said circular openings and having the inner portions of their spirals entering the groove of the master-screw, and having their body portions touching and forming substantially a water-tight joint with the outer sides of the said master-screw, substantially as set forth.

3. A fluid-elevating device comprising a casing having a series of circular openings which are open at their lower ends and have communication at their upper ends, which
5 upper ends are closed by a cover having a discharge-opening common to the space communicating with all of the said openings, a master-screw centrally disposed with respect
10 to the circular openings and projecting into the inner sides thereof, and having a spiral groove, a series of lifting-screws arranged in the circular openings and having their spirals extending into the spiral groove of the master-screw, and having their body portions
15 touching and forming a water-tight joint with the sides of the master-screw, substantially as set forth.

4. In a fluid-elevator, a lifting-screw comprising a body, or core, having a spiral kerf
20 formed therein, and a spiral comprising two strips, or plates, between which is fitted a packing, and which have their inner edge portions held together and fitted into the said spirally-formed kerf, substantially as set
25 forth.

5. In a fluid-elevator, a master-screw for the purposes described, having a spirally-formed groove and having packing-strips located upon opposite sides of the said groove, and
30 approximately-U-shaped springs fitted in the spiral groove and having their outer end portions engaging with the packing-strips to hold the latter together in a yielding manner, substantially as described for the purpose set
35 forth.

6. In a fluid-elevating device, a master-screw for the purposes described, provided with a spiral groove, packing-strips located upon opposite sides of the said groove, ap-

proximately-U-shaped springs fitted in the
40 groove and having their outer portions engaged with the said packing-strips, and a fastening-wire secured to the inner wall of the groove and passing through the closed ends
45 of the said springs to retain them in place, substantially as described.

7. In a fluid-elevating device, a master-screw for the purposes described, having a spiral groove which is enlarged at its outer
50 side, packing-strips fitted in the enlarged portions upon opposite sides of the said groove, suitably-disposed springs for holding the packing-strips together in a yielding manner, and a strip secured to the outer face of the master-screw and extending in a spiral direction and serving to retain the packing-strips
55 within the enlarged side portions of the groove, substantially as set forth.

8. A fluid-elevator comprising a casing having a series of circular openings disposed
60 about a central line, open at their lower ends and closed at their upper ends by a cover which is provided with a discharge-opening in communication with all the said openings, a centrally-disposed master-screw, a series of
65 lifting-screws having their spirals extending into the groove of the master-screw, upper and lower supports, and intermeshing gearing provided on the shafts of the several screws for rotating the latter in unison, substan-
70 tially as described.

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

OLE O. GOSERUD.

Witnesses:

A. FOSS,

L. S. HOUGEN.