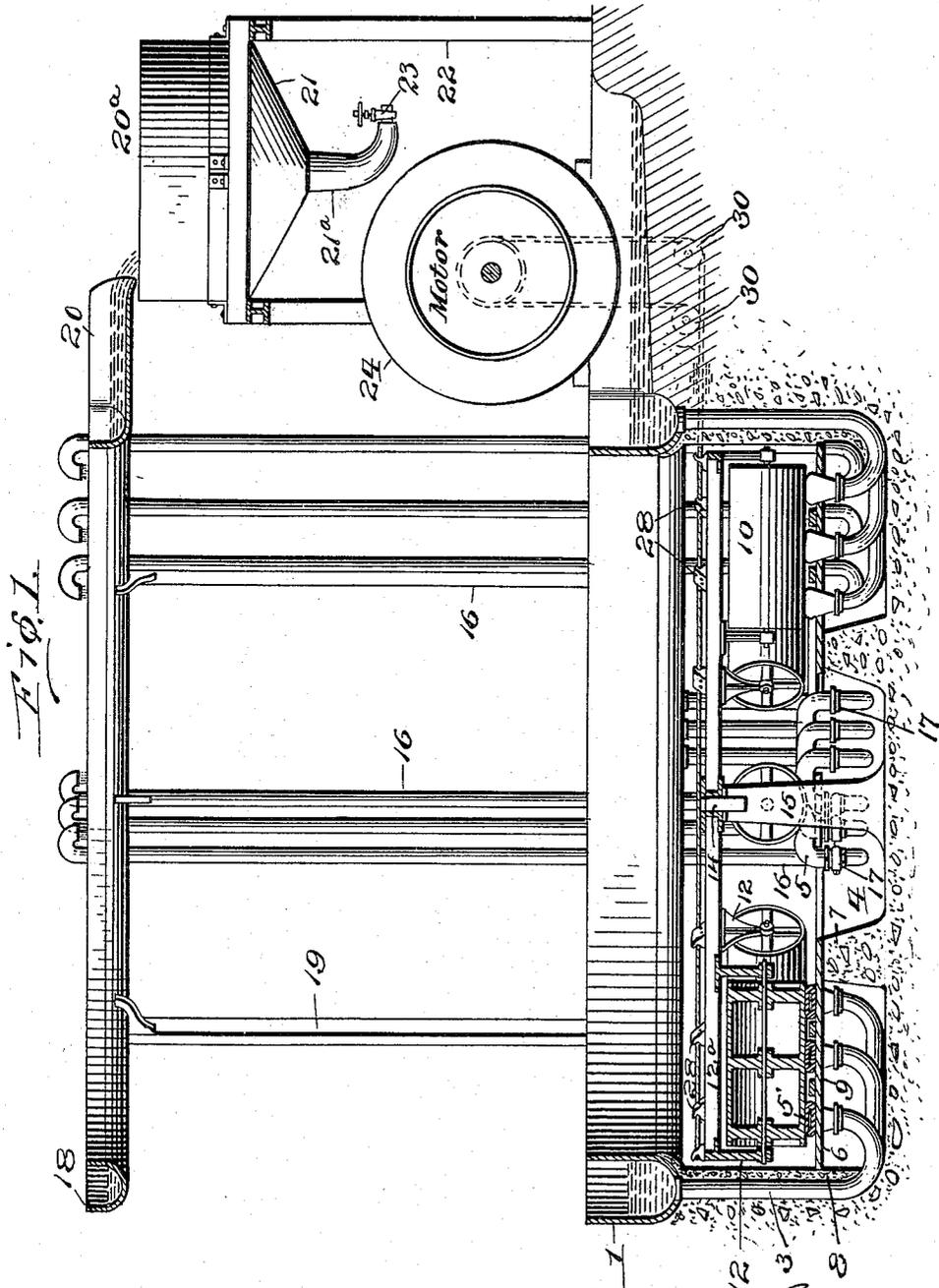


F. SALA & J. VAZQUEZ.  
 MECHANICAL SYSTEM FOR ELEVATING LIQUIDS.  
 APPLICATION FILED APR. 17, 1913.

1,154,938.

Patented Sept. 28, 1915.

2 SHEETS—SHEET 1.



WITNESSES

*M. Fowler Jr*  
*M. Helling*

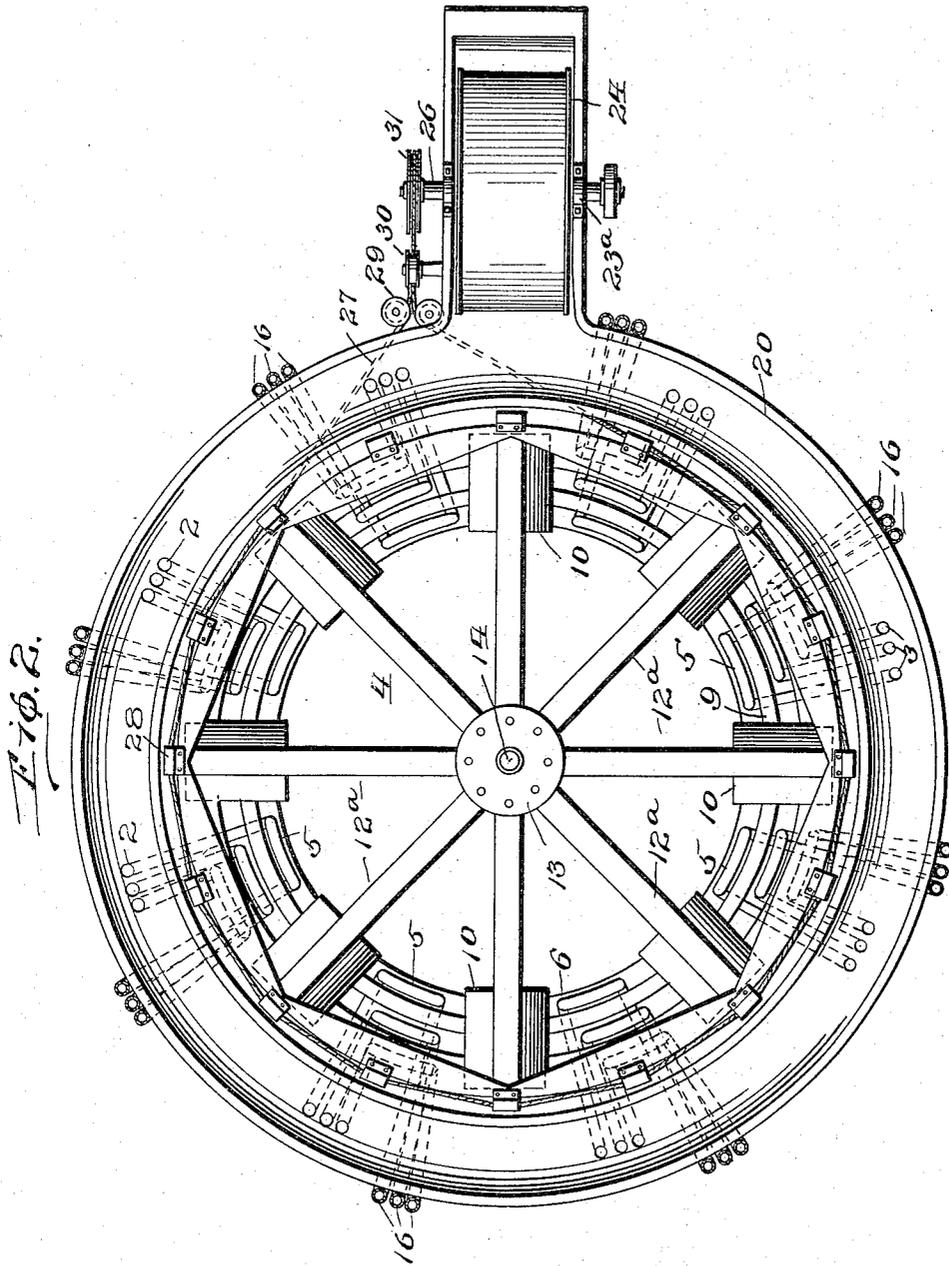
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*Fig. 2.*

WITNESSES

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# UNITED STATES PATENT OFFICE.

FRANCISCO SALA, OF CAIBARIEN, AND JESUS VAZQUEZ, OF YAGUAJAY, CUBA.

MECHANICAL SYSTEM FOR ELEVATING LIQUIDS.

1,154,938.

Specification of Letters Patent. Patented Sept. 28, 1915.

Application filed April 17, 1913. Serial No. 761,813.

*To all whom it may concern:*

Be it known that we, FRANCISCO SALA and JESUS VAZQUEZ, subjects of the King of Spain, residing at Caibarien and Yaguajay, in the Province of Santa Clara, Cuba, respectively, have invented new and useful Improvements in Mechanical Systems for Elevating Liquids, of which the following is a specification.

Our invention relates to a mechanical system for elevating liquid, and has as its principal object, the provision of a new mechanical system utilizing the alternative compression of flexible tubular bodies full of liquid to impel such liquid up to a desired height.

A further object resides in the particular arrangement and combination of parts hereinafter described.

The invention is described in connection with the accompanying drawings, in which, Figure 1 is a sectional elevation taken on a vertical line through the center of Fig. 2. Fig. 2 is a top plan view of an installation made in accordance with our invention.

In the separate views the same part is designated by the same reference character.

Referring more particularly to the drawings, 1 is a ring shaped channel which is preferably built at a level somewhat below that of the ground, although it is not essential that it should be at such a level. Said tank or reservoir 1 is provided with a series of groups of openings such as 2—2 in its bottom, said groups being spaced equidistant around the periphery of the channel. From the openings 2 siphon pipes 3 lead downward into a large excavation 4 where all of said pipes are connected with tubes of flexible material such as 5—5 which rest on a horizontal ring shaped platform 6 which is supported by a ring shaped wall at its inner edge, and by the wall 8 of the excavation at its outer edge. It will be apparent also that the flexible tubes are of a segmental shape. The groups of siphon pipes 3 and the connected tubes 5 are arranged in groups as previously mentioned and each group may contain two, three or four of such pipes and tubes placed close together, and while the groups are spaced apart from one another, the same distance as the groups of openings 2, the arrangement of the groups or pipes being clearly shown in Fig. 2.

The horizontal portions 5' of the tubes of each group are placed concentrically with

the center of the excavation and consequently are parallel with each other. The portions 5' are also separated by means of ring shaped rails or beams 9 fixedly disposed upon the platform 6. Upon these beams or rails 9 roll cylinders or rollers 10 whose shafts 11 are mounted in hanging arms 12, suspended from the radial spokes 12<sup>a</sup> of a large horizontal wheel 13 mounted loosely on a shaft or vertical pivot 14 fixed on a stand or pedestal 15 disposed in the center of the excavation 4. Said tubes 5 run through the platform 6 at each end connecting at one end with the pipes 3 below the platform and at the other end with tubes such as 16 which are disposed about the outer edge of the channel 1 and which, at their lower end, curve up underneath the platform 6 so as to connect with the other ends of the tubes 5. The pipes or tubes 16 are provided with check valves 17 immediately below the platform 6 and at their junction with the ends of the tubes 5, it being understood that the check valves 17 are so arranged as to prevent back flow of water from the pipes 16 to the tubes 5. From the point of their connection with the tubes 5, the pipes 16 pass through the wall 8 and then separately to a point above the level of the ring shaped trough 18 where they are bent over so as to empty into said trough. The ring shaped trough 18 is mounted in a horizontal plane on the stanchions 19 which may be of any desired height, and the channel 18 empties by means of a section 20 into a large reservoir or tank having its bottom in the shape of a funnel 21. The tank 20<sup>a</sup> is supported by a suitable frame such as 22. It will be seen also that the lower end of the funnel 21 is provided with a tubular extension 21<sup>a</sup> at the lower end of which is a valve or way cock indicated at 23.

Suitably disposed on a pair of bearings such as 23<sup>a</sup> is a motor 25 of any approved type power for operating which may be generated in any known manner.

The motor 24 is provided with a shaft 26 on which is a channeled pulley 31 from which the horizontal wheel 13 is driven by means of an endless rope or cable such as 27 which passes from the wheel 31 onto two vertical sheaves such as 30 after leaving which it passes on to two horizontal sheaves such as 29 from which it passes around the grooved block 28 set around the outer edge of the wheel 13 at the top thereof.

The operation is as follows:—Cylinders 10 suspended from the wheel 13 are disposed in the intermediate position between the groups of tubes or hose 5, and it will be seen that all of the hose 5 will be filled by water flowing in freely from the channel 1. If then the movement of the horizontal wheel is initiated around its pivot, the cylinders 10 when rotating on the rails or beams 9, will compress the sections 5' of the hose flattening them, and the water which occupies the sections 5' will be impelled through the check valve 17 toward the vertical tubes 16 discharging in the upper trough 18. From 18 the water will feed the reservoir tank 21, so that by opening the way cock 23 the liquid will be discharged when desired. The movement of the horizontal wheel 23 will continue by means of the transmission effected by the endless cable 27, being uniformly driven by a motor 24. The movement of the wheel 23 must always take place in such a direction that the cylinders will compress the horizontal sections 5' of the hose 5 in such a way that they will always be directed from the siphon pipes 3 toward the tubes 16 so that the liquid cannot come back because of the check valve 17. The tubes 5 having been emptied by the rotation of the wheel 13 are filled immediately by the water flowing in from the channel 1 by means of the pipes 3.

It will be understood from the fact that we have shown an arrangement in which the rotating wheel 13 and the pumping cylinders attached thereto are driven by means of a conventional motor that we might drive our pumping apparatus by means of any suitable motor such as electric or gasolene

engines especially if our pumping apparatus is to be used in irrigation. It will thus be seen that while we have shown and described the preferred form of our invention, various changes may be made therein without departing from the spirit of our invention, and that parts of our invention may be used without utilizing the whole.

Having thus described our invention, what we claim is:—

A mechanical system for elevating liquid comprising in combination, a liquid reservoir in the shape of a ring shaped channel, a series of tubes adapted to discharge liquid from said reservoir by the action of gravity, a circular horizontally disposed platform provided with a series of groups of flexible tubes having their ends secured to said discharge tubes, equally spaced upon said platform, each of said groups comprising a plurality of hose units disposed in parallel relation, said elevating tubes connected to the other end of each of said flexible tubes and a check valve provided for said elevating tubes, and rollers adapted to compress a series of tubes simultaneously the exposed surface of each of said hose units having a length less than the space between adjacent units whereby the water therein is forced through said check valves into said elevating pipes.

In testimony whereof we affix our signatures in the presence of two witnesses.

FRANCO. SALA.  
JESUS VAZQUEZ.

Witnesses:

F. TRUJILLO,  
M. DIAZ.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."