No. 741,631. PATENTED OCT. 20, 1903.

G. A. CROFUTT.

CONTINUOUS POWER CHAIN OF WATER LIFTS.

APPLICATION FILED JAN. 29, 1901. RENEWED MAR. 19, 1903.

NO MODEL. 3 SHEETS—SHEET 1.

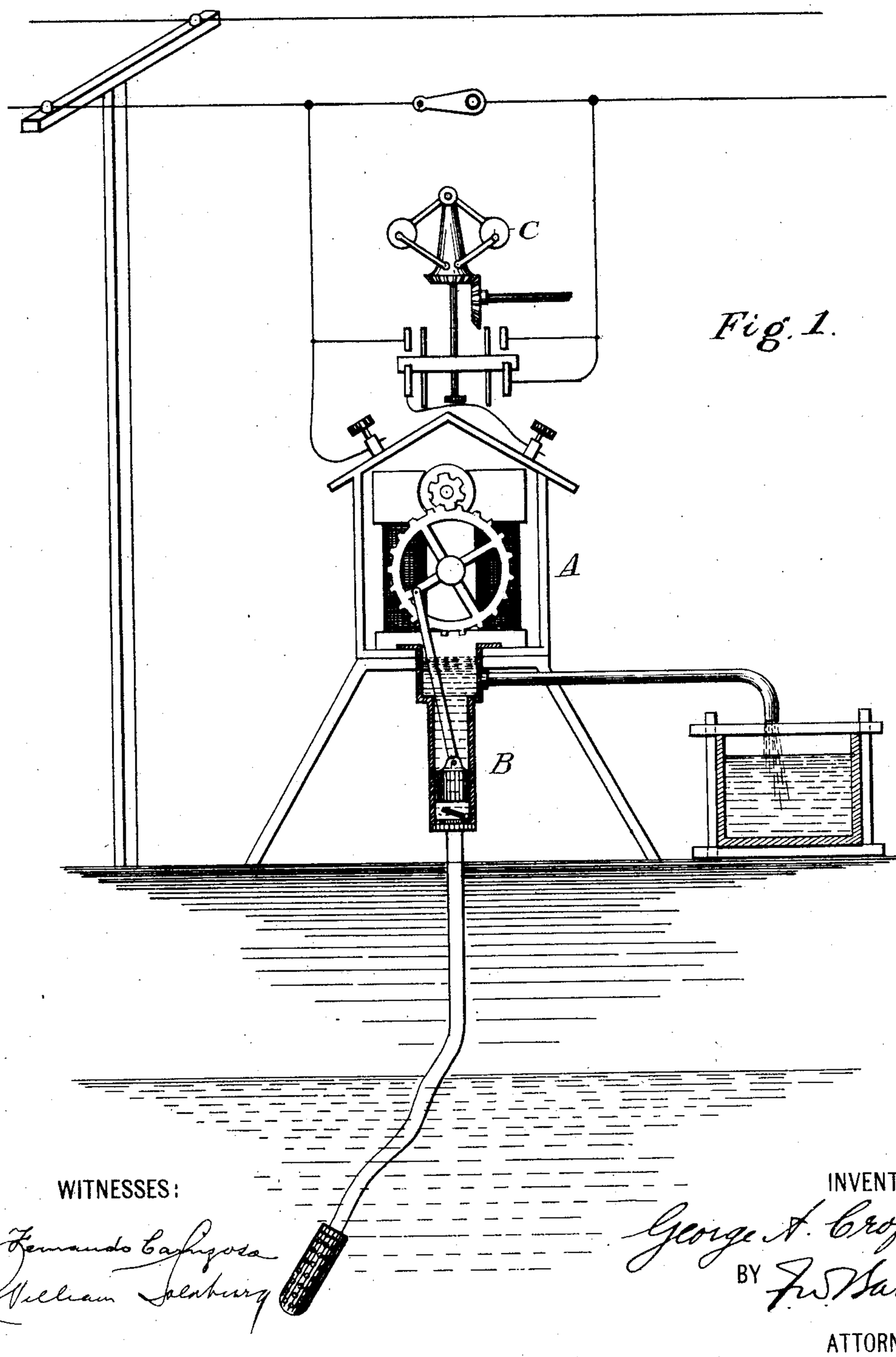

Fig. 1.

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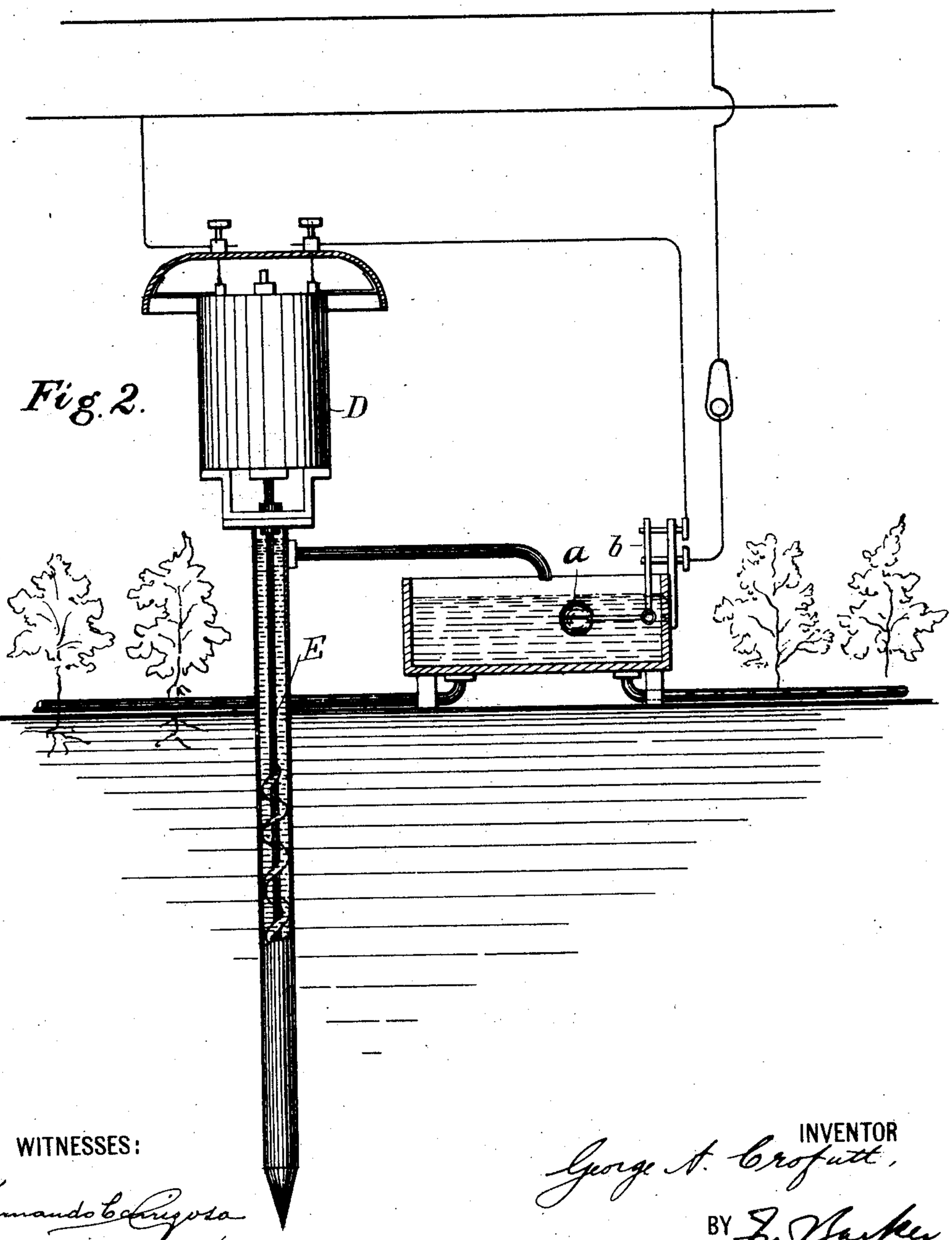
NO MODEL. 3 SHEETS—SHEET 2.

Fig. 2.



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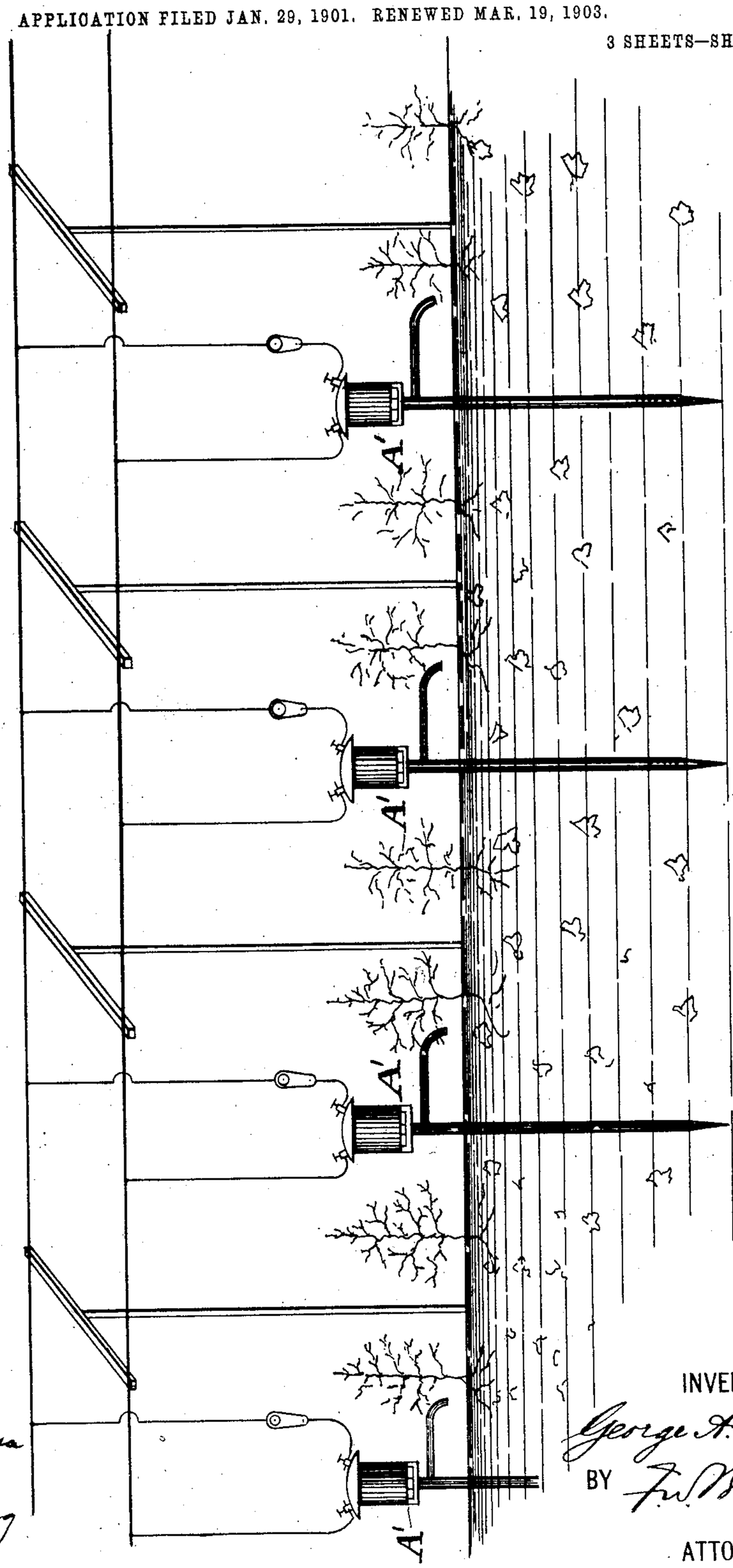
NO MODEL. 3 SHEETS—SHEET 3.

Fig. 3.



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No. 741,631. Patented October 20, 1903.

UNITED STATES PATENT OFFICE.

GEORGE A. CROFUTT, OF HOBOKEN, NEW JERSEY.

CONTINUOUS POWER-CHAIN OF WATER-LIFTS.

SPECIFICATION forming part of Letters Patent No. 741,631, dated October 20, 1903.

Application filed January 29, 1901. Renewed March 19, 1903. Serial No. 148,639. (No model.)

To all whom it may concern:

Be it known that I, GEORGE A. CROFUTT, a citizen of the United States, residing at Hoboken, New Jersey, have invented a new and useful Improvement in Continuous Power-Chains of Water-Lifts, of which the following is a specification.

This invention relates particularly to a method of irrigation, or supplying water to certain arid areas, or to raising, by means of pumps or the like, water, oil, or other liquids simultaneously at a number of different points distant from each other and causing it to flow in desired directions by the operation of a single prime mover.

Taking the subject of irrigation particularly, which is one to which my improvement appertains, and assuming that it is desired to supply water to a certain large tract of land which may have no river, stream, or lake in its vicinity, my purpose is to drive a number of wells about said tract at suitable intervals or spaces apart, preferably in a continuous line, and to provide a suitable pump in each well, or in the event of an open stream or body of water existing in the vicinity to place and set up therein a series of pumps at suitable distances apart. These pumps are then all linked or connected together to a prime mover by means either of an electrical wire, piping for compressed air, water, or steam, an endless moving cable, or other power-communicating conductor. By "linked together" I mean that the operative parts of the pumps are each arranged relatively to the prime mover or power-conductor in a manner to receive a quota of motive force therefrom, so that the complete line may be actuated by a single impulse conveyed by the power-conductor and emanating from a single power plant or station. Leading from each of the pumps may be trenches, tunnels, pipe-lines or other ducts, or other means of conveying the liquid over the tract of land. Briefly, therefore, my idea is to be able to supply water to a large tract of land by simply touching a button at a power-station, and thereby instantaneously causing a flow of water over the said tract of land.

In addition to the function of providing irrigation for an extensive area my apparatus is equally applicable to the purposes of pumping water from mines and other workings and also for pumping oil from oil-wells by arranging a series of pumps and locating each in a suitable position for the intended work, all of the said pumps being linked by a continuous power-conductor, as stated. In like manner dwelling-houses and other buildings in a community requiring a water-supply may be provided each with a pump and said pumps all united by a common power-conductor, such as an electrical wire, the same being supported overhead by poles or laid upon or beneath the surface in suitable conduits and all of such pumps being operated by power emanating from a single power-station.

Other practical uses too numerous to specify will occur to the practical mind for the system of operating a number of pumps spread over a suitable area; but I have contented myself by referring to those uses which appear to me to be most important and practical, although I do not in any degree limit the employment of my system to the uses specified.

Referring, therefore, to the details of my invention and its operation, taking in connection therewith the drawings, Figure 1 represents the detail of one of the pumps used in my system and more particularly described as a suction-pump. Fig. 2 represents a device more particularly known as the "Archimedean screw," and Fig. 3 represents a series of these pumps set up in a system or continuous line.

In the said drawings, Fig. 1 represents a motor or dynamo, as A, geared up to operate a suction-pump, as B, and governed by the usual ball-governor, as C, which in case of racing breaks the current from the main line and throws the said pump out of operation. This is accomplished by arranging the said governor in series with the line.

Fig. 2 represents an iron-clad motor, as D, having the axis of its armature directly connected with the screw, as E, and operated in the usual way from the line, and in case the said pump should run dry or become inoperative from any cause I have provided a float *a* with an angularly-projecting arm *b*, preferably connected in multiple with the

line, so that as the water flows away from the tank the current will be broken, rendering the apparatus inoperative.

In Fig. 3 the letter A′ represents a series of pumps, which may be of the suction type, Archimedean, or any other mechanical form suitable for such purposes. In this instance if we assume the said pumps to be suction-pumps and that they are placed in driven wells at certain predetermined distances apart where each one will have a separate or distinct area or sphere of action over a certain tract of land the capacity of each pump limits the area, and the next pump is arranged in position for the next adjacent space. The water as raised by each pump may be distributed in any known manner, as we have specified before. The manner of distribution from the pumps is no part of my present invention and any known method now in use may be adopted.

Assuming a complete series of pumps A′ to have been placed in position and each capable of raising and delivering water when operated, first, for the practical application of this invention I prefer to use electricity as a motive power; second, I attach in the case of Fig. 1 (the suction-pump) a motor capable of reciprocating the piston of the said suction-pump and operate the same by means of an electrical current passing through the same. In the case of the said well operated by the said pump giving out or some portion of the mechanism becoming inoperative I have arranged in series with the line a governor of the usual type that breaks or connects the circuit in proportion to the speed of the apparatus.

In Fig. 2 I have changed the mechanical electrical construction of my device in that I attach the shaft of an iron-clad motor to the Archimedean screw and operate the same in the usual manner from the line, and in case of the drying up of the said well I have arranged in the tank a float provided with an angular projection that connects with terminals arranged in multiple with the line and holding the circuit as long as the level in the said tank maintains a certain point. It will therefore be seen that by utilizing electricity as our motive power it is possible for us at any particular power-station to set in motion any desired series of pumps in any desired area and that the pumps will supply the said area with a flow of water, and also in case any well in the system should become dry or any part of the operative mechanism governing said well become out of order the said well will be thrown out of the system and the other wells of the system still operate.

Switches may be applied at the motors of the pumps whereby the electrical current may be cut off, if desired, from any one or more pumps in the series when said pumps are not required to be operated.

When a series of pumps are located in mines for pumping the water out therefrom and when said mines are located at an elevation, as is frequently the case, the power-station may be situated at a lower level and the electrical conductor communicate between the power-station and the pumps.

Having now described my invention, I declare that what I claim is—

1. In a system of irrigation, a series of pumps located at points distant from each other, each of said pumps having a motor to operate it, a single source of power, an electric conductor communicating between said source of power and all of the motors, and means for automatically disconnecting the supply of electricity to one of said motors when the pump ceases to raise fluid.

2. In a system of irrigation, a series of water-supplies located at points distant from each other and below the surface to be watered, a series of pumps arranged one at each water-supply, a motor for each pump to operate it, a single source of power, an electrical conductor communicating between said source of power and all of said motors, and means for automatically disconnecting the supply of electricity to one of said motors when the pump ceases to raise water.

3. In a system of irrigation, a series of water-supplies located at points distant from each other and below the surface to be watered, a series of pumps arranged one at each water-supply, a motor for each pump to operate it, a single source of power, an electrical communication between said source of power and all of said motors together with a governor for each motor and means whereby a lack of water-supply causes a governor to automatically disconnect the supply of electricity to the motor of any pump in the series that is devoid of water.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 25th day of January, 1900.

GEO. A. CROFUTT.

Witnesses:
JAMES S. WARWICK,
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