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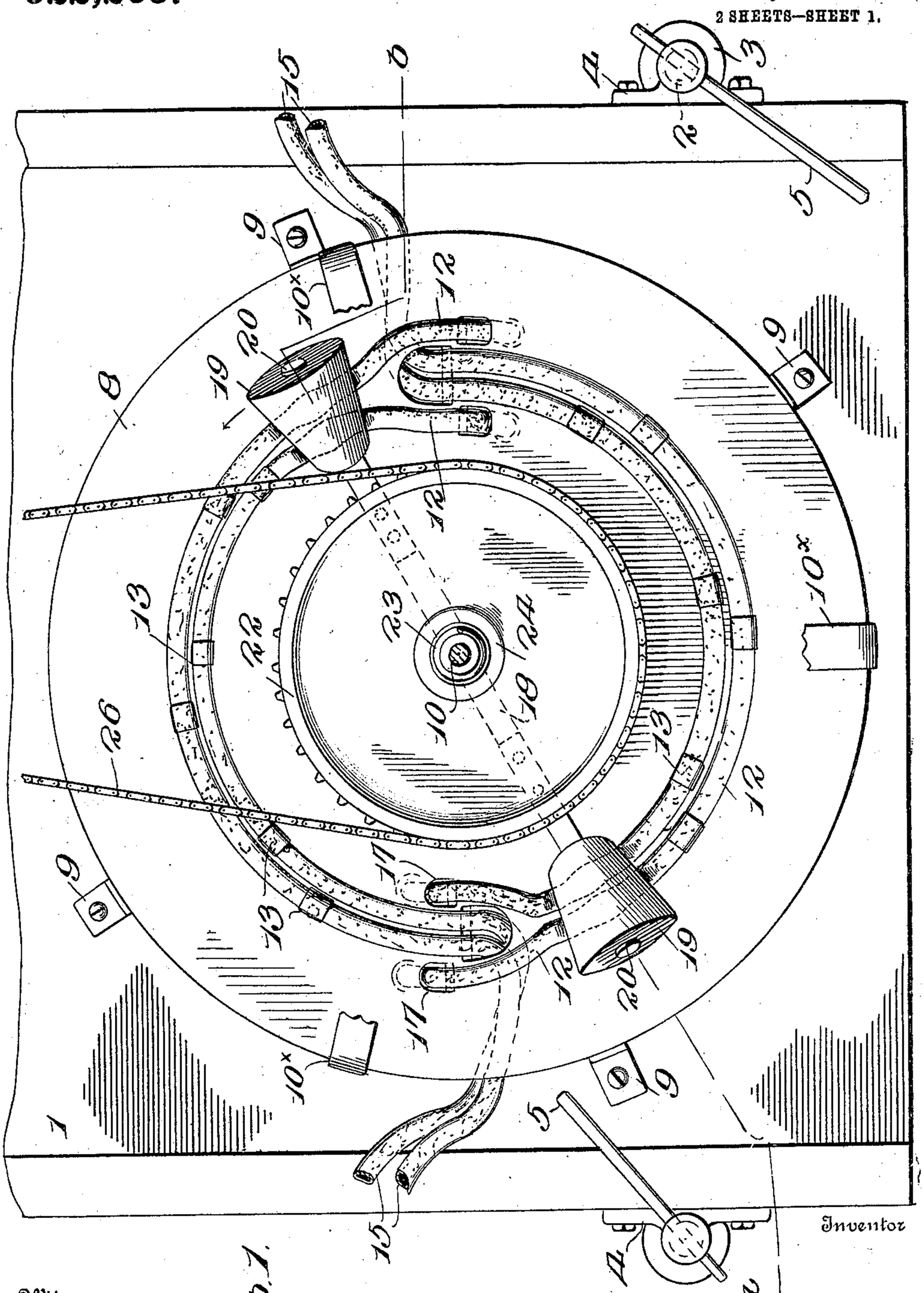
PUMP.

APPLICATION FILED JAN. 19, 1909.

922,205.

Patented May 18, 1909.

2 SHEETS—SHEET 1.



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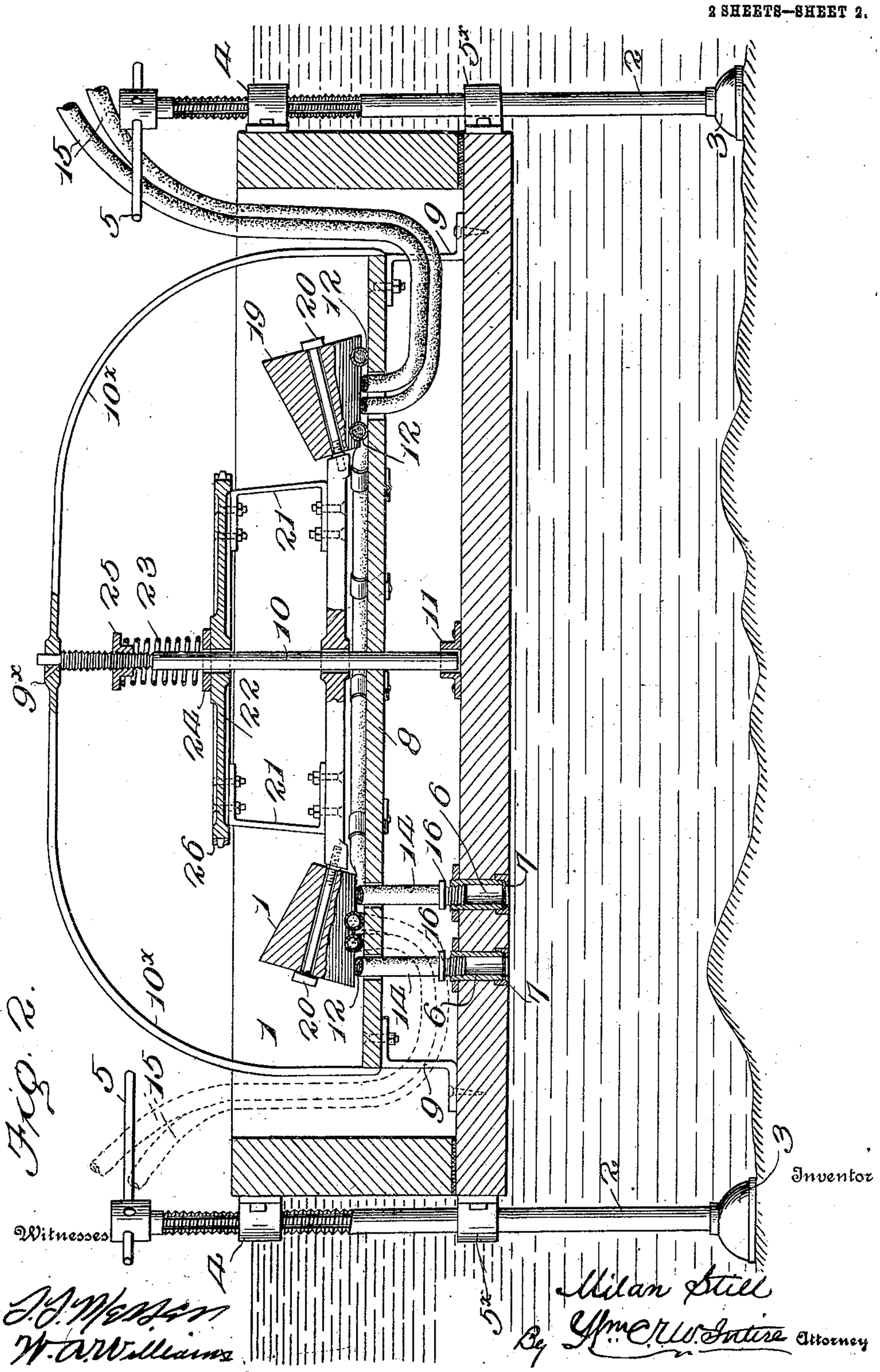

Fig. 2.

UNITED STATES PATENT OFFICE.

MILAN STILL, OF WINONA, WASHINGTON.

PUMP.

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Application filed January 19, 1909. Serial No. 473,154.

To all whom it may concern:

Be it known that I, MILAN STILL, a citizen of the United States, residing at Winona, in the county of Whitman and State of Washington, have invented certain new and useful Improvements in Pumps; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to certain new and useful improvements in pumps, and particularly to that class in which flexible tubes are compressed to expel the water at the delivery or exit locality.

My invention has for its object to provide a pump of the class referred to which shall be simple and economical of construction, and which shall be operative under the laws of gravitation and compression, and which shall also be devoid of valves or pistons of any description whatsoever.

With these ends in view, my invention consists of the features of construction and arrangement hereinafter more fully explained.

In order that those skilled in the art to which my invention appertains may know how to make and operate my improved pump, I will proceed to describe the same, referring by numerals to the accompanying drawings, in which—

Figure 1 is a plan view of my improved pump, and showing its arrangement upon its supporting device, and means for operating it; and Fig. 2 is a vertical section taken on the line *a*—*b* of Fig. 1.

Similar reference numerals indicate like parts in both figures of the drawing.

1 is a scow or boat which is a necessity and upon which the pump and the machinery for operating the same are supported. As this scow or boat is a necessary adjunct to the successful operation of the pump, I will first describe the details of its construction. It is preferably rectangular and of such depth and draft that when the pump is secured in position upon the bottom, as will be hereinafter explained, the pump will be sufficiently below the level of the body of the water upon which the boat rests, to secure a satisfactory flow of the water by gravity and atmospheric pressure through the inlet tubes to the pump proper.

At each corner of this scow or boat is arranged a vertically adjustable leg 2 having at its lower extremity a suitable shoe 3, adapted to contact with the bed of the river or other body of water, as clearly shown in Fig. 2. As one means of adjusting these legs, I have shown them threaded for a suitable distance near their upper ends and supported in a correspondingly threaded lug 4, and a lever or handle 5 at the upper extremity for turning the leg. The lower portion of these legs is smooth and passes through a guiding lug 5×. The object of these adjustable legs is that when the scow or boat has been brought to any locality and floated to any predetermined depth, the legs are lowered and the shoes caused to contact with the bottom of the stream to hold the scow or boat in a level and anchored condition. When it should become necessary for any reason to move the scow or boat to another locality, the legs are drawn up to such height as may be necessary to permit the unobstructed movement of the scow.

At predetermined localities and beneath the pump are arranged metallic tubes 6, equal in number to the desired or preferred number of flexible tubes employed with the pump. The upper ends of the short metallic tubes 6, are threaded to receive a suitable coupling on the ends of the flexible pump tubes, and the lower extremities are equipped with any suitable screen 7 to prevent the passage of gravel or other obstructions.

Having described the general character of the scow or boat, I will now proceed to describe the construction and operation of the pump.

8 is a flat table or support of any suitable material and design, and having a smooth upper surface. This table is secured in horizontal position upon the bottom of the scow and at a sufficient distance from the same to permit the flexible tubes to occupy their proper positions, by suitable means, such for instance as cast iron legs 9, bolted, as shown, to the under side of the table and to the bottom of the scow. This table is located at one end of the scow, while the power and machinery for operating the pump is located at the opposite end, in order that the scow when floated will be level.

9× is a bearing for the upper end of a vertically arranged stationary shaft 10, the lower extremity of which is held in a metallic shoe or support 11. This bearing 9×

has preferably three braces 10× extending to three sides of the scow and are rigidly secured thereto, as clearly indicated.

The flexible tubes into which the water enters by gravity at the inlet ends, and from which it is expelled by pressure, (as will be presently explained), through the outlet or delivery ends, are indicated by the numeral 12. The flexible tubes 12 are arranged in circular form upon the upper smooth surface of the table 8, and secured against radial displacement by suitable yielding or flexible bands 13, the ends of which pass through slots in the table and are suitably secured on the under side of the same. The number and distance apart of these securing bands being a matter of judgment or necessity. I desire to state at this point, however, that I do not wish to be confined to any special means for securing the flexible tubes in position upon the table, as other means than that shown may be employed accordingly as the construction of the supporting table may be varied.

In the drawings I have shown four of the flexible tubes 12, with a corresponding number of inlets and outlets, but I desire it to be understood that I may employ only two of such tubes, or that I may employ any desired number. I now desire to call particular attention to the arrangement of these tubes, regardless of the number employed, and will trace the position of them from the inlet end under the table 8, to the outlet or delivery end over the sides of the scow, and for greater clearness, I will use the reference numeral 14 to indicate the inlet end, and 15 to indicate the outlet or delivery end. At the outset of this explanation, it will be kept in mind that each of the tubes enployed traverses only 180° of the circle, and keeping this in mind, the inlet end 14 being connected to the short metal tubes 6, in the bottom of the boat, by a coupling 16, the tube 12 passes through an inclined slot or opening 17 in the table 8 (See Fig. 1), thence traverses 180 degrees to the opposite side of the table and passes to the under side of the same through openings or slots similar to the slots 17, but inclined in a reverse direction. As I have shown in the drawings the employment of four tubes, I have shown the two outlet ends of the tubes passing through a single and enlarged slot in the table as seen in Fig. 1. After passing to the under side of the table, the delivery end is then brought up and over the side of the scow and suitably connected with any delivery conduit pipe on land. The inlet end of the tube which traverses the opposite 180 degrees of the table is located diametrically opposite that of the one already described, and the outlet end passes downward through a slot adjacent to that through which the other tube passes to the upper surface of the table. With this arrangement of the tubes 12, and by special reference to Fig. 1, it will be seen that the inlet and outlet portions of these tubes at the locality where they pass through the table are supported upon a bridge in the table which is in a plane passing diametrically through the axis of the vertical shaft 10. This construction and arrangement is of importance, as will appear when the operation of the pump is hereinafter described.

Having now described the arrangement of the flexible tubes, I will now explain the mechanism by which they are compressed and the water therein forced out of the exit or delivery ends.

18 is a beam revolubly mounted upon the vertical shaft 10, and carrying at each end a conical roller 19 upon oblique or inclined axles 20. Mounted upon the beam 18 by means of brackets 21, is a sprocket wheel 22 through which the shaft 10 passes, and pressure in a vertical direction upon the flexible tubes is exerted by the weight of beam, rollers and sprocket wheel, and such pressure may when desired be increased by means of a spring 23 surrounding the shaft 10 and confined between a washer 24 and an adjustable nut 25 threaded upon the upper portion of the shaft. It will be obvious that in lieu of, or in addition to the spring 23, weights may be employed for increasing the pressure exerted by the tube compressing rollers. The sprocket wheel is geared with any suitable motor by means of a sprocket chain 26.

The operation of the pump is as follows: The scow of suitable depth having been sunk by its initial or any added weight to the depth indicated by the water line shown in Fig. 2, and the sprocket wheel 22 geared with the motive power, the gravity of the water causes the tubes 12 to be filled through the inlet ends 14, and as the beam 18 and rollers 19 rotate, the weight and pressure of the rollers as they travel away from the inlet ends of the tubes flatten the same as clearly indicated, and cause the water therein to be forced toward and through the outlet ends, while the tubes in rear of the contact of the rollers are free to be again filled by the gravity of the water. As the tubes traverse only 180 degrees, and one set pass up and the other down through the beveled slots or openings in the table 8, as heretofore explained, and as the compressing rollers are diametrically opposite one another, it will readily be seen that as the rollers reach the bridge between the tube openings in the table, they will simultaneously leave one set of tubes and begin the compression of the other, so that the flow of water at the exit ends will be continuous. It will be especially understood that the principle of operation of my improved pump is essentially different from the many collapsible tube pumps heretofore suggested, in that it does not in-

volve the necessary creation of a vacuum or depend upon the same for drawing the water from the source of supply into the collapsible tubes, which is impractical. On the contrary, the tubes resting upon the horizontally disposed supporting table are filled by the gravity and pressure of the water, and one essential feature therefore of my invention resides in locating the tubes and table below the level of the body of water being drawn from.

I of course do not wish to be limited in any degree to the number of tubes, or the material of which they may be composed, nor to the exact details of construction of the means for compressing the tubes, as they may be varied without departing from the spirit of my invention, which resides in the broad feature of locating the pump upon a scow or boat and a suitable distance below the surface of the body of water drawn upon, so that the tubes are filled behind the point of contact therewith of the pressure rollers, and with this broad idea in view I do not wish to be confined to the horizontal disposition of the tubes, although I prefer such arrangement.

My improved pump is especially adapted for irrigation purposes, but may obviously be applied to other uses.

Having described its construction and operation, what I claim as new and desire to secure by Letters Patent, is:

1. In combination with a scow or boat and suitable support therein; a pump located thereon below the water line, and consisting of a plurality of collapsible tubes arranged upon a rigid support, each of said tubes connected at one end with an inlet water passage in the bottom of the scow or boat and passing outwardly through said support, thence traversing a path of substantially 180°, thence passing downwardly through the support, and thence upwardly over the side of the boat, said tubes arranged in reverse directions to complete a path of 360° and passing through the support in opposite directions; and means for progressively compressing the tubes upon their support, whereby the contents of the tubes in advance of the compressor are expelled and the tubes refilled behind said compressor by the gravity and pressure of the source of supply, substantially as hereinbefore set forth.

2. In combination with a scow or boat and a rigid horizontal support arranged therein; a pump consisting of a plurality of collapsible tubes arranged upon said horizontal rigid support near the bottom of the scow or boat and connected at their lower extremity with water inlet passages, then passing upwardly through the support and traversing a path of 180° upon the upper surface of the support, then passing downwardly through the support, and finally upward and over the side of the scow or boat, said tubes traversing the support and passing through it in reverse directions as set forth; a revoluble beam located upon a central vertical shaft and equipped with compressing rollers at either end; and means for revolving the beam and rollers, substantially as hereinbefore set forth.

3. In combination with a scow or boat and a support therein; a pump consisting of a plurality of collapsible tubes arranged upon said support below the water line and communicating at one end with water passages in the bottom of the scow or boat and passing upwardly through the support, then traversing a path of 180°, then passing downwardly through the support and upwardly over the side of the scow or boat, said tubes traversing in reverse directions; a revoluble beam with compressing rollers at either end; means for revolving said beam in one direction; and adjustable means connected with the scow or boat and adapted to contact with the bed of a body of water, substantially as and for the purpose set forth.

4. In combination with a scow or boat and a rigid support therein; a pump consisting of a plurality of collapsible tubes arranged upon said rigid support and traversing in reverse directions through the support and over a path of 180° and communicating at their lower ends with a source of water supply and at their upper ends with a land conduit; a revoluble beam carrying compressing rollers at either end adapted to contact with the collapsible tubes; means for revolving said beam and rollers, and means for regulating the pressure of the rollers, substantially as hereinafter set forth.

5. In combination with a scow or boat and a support arranged therein below the water line, a pump consisting of collapsible tubes arranged upon the support and passing through reversely inclined adjacent openings in the support; diametric compressing rollers mounted upon the tubes and means for moving said rollers continuously in a circular path, whereby the rollers upon releasing one of the tubes from compression will simultaneously begin the compression of the other as hereinbefore set forth.

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

MILAN STILL.

Witnesses:
D. G. STUART,
HENRY C. HAZARD.