(No Model.)

4 Sheets—Sheet 1.

J. I. NEWBURG.

HYDRAULIC MOTOR.

No. 565,022. Patented Aug. 4, 1896.

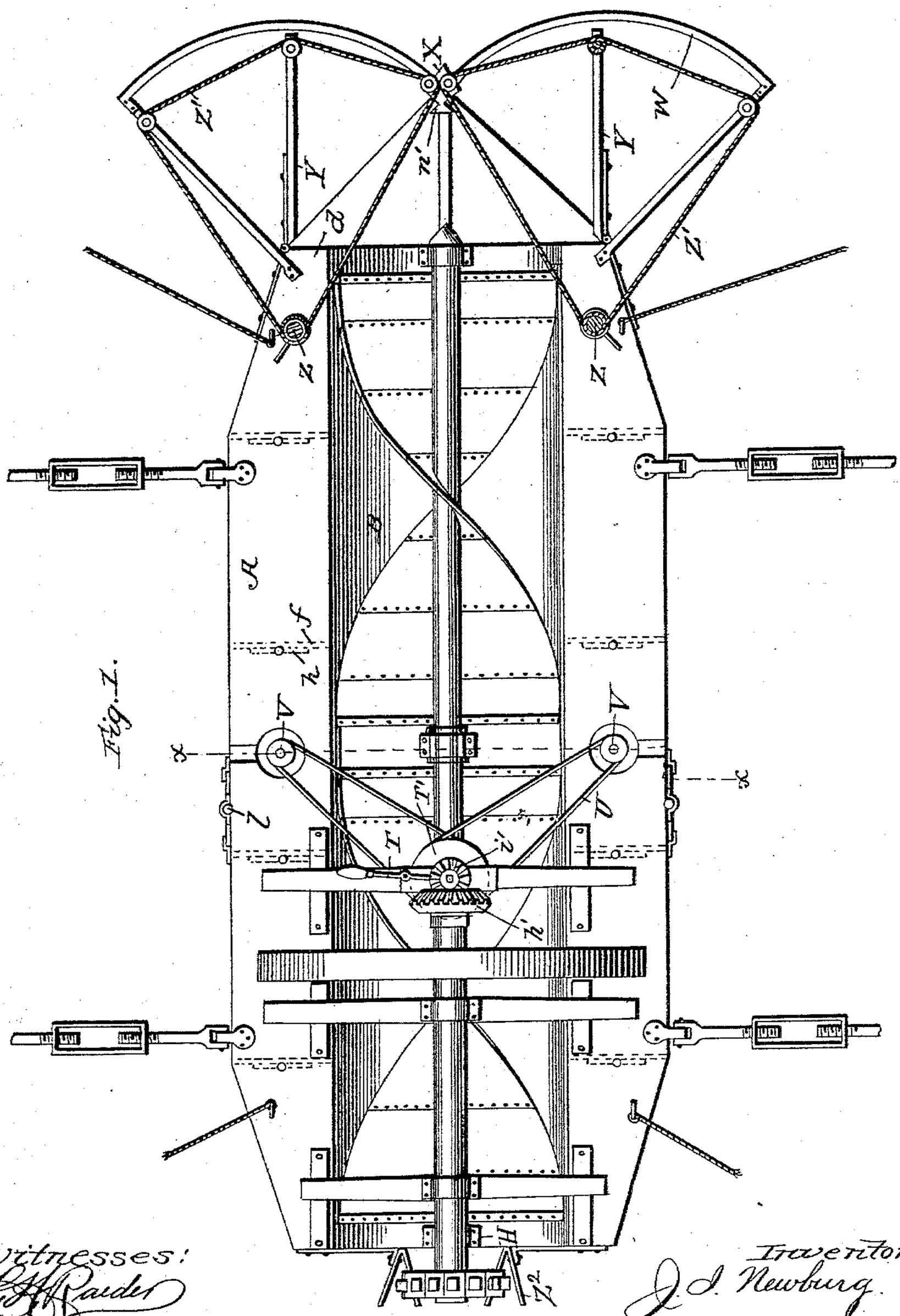


Fig. 1.

Witnesses:
C. H. Raider
K. F. Matthews.

Inventor
J. I. Newburg.
By James J. Sheehy
Attorney

(No Model.)

4 Sheets—Sheet 2.

J. I. NEWBURG.

HYDRAULIC MOTOR.

No. 565,022.

Patented Aug. 4, 1896.

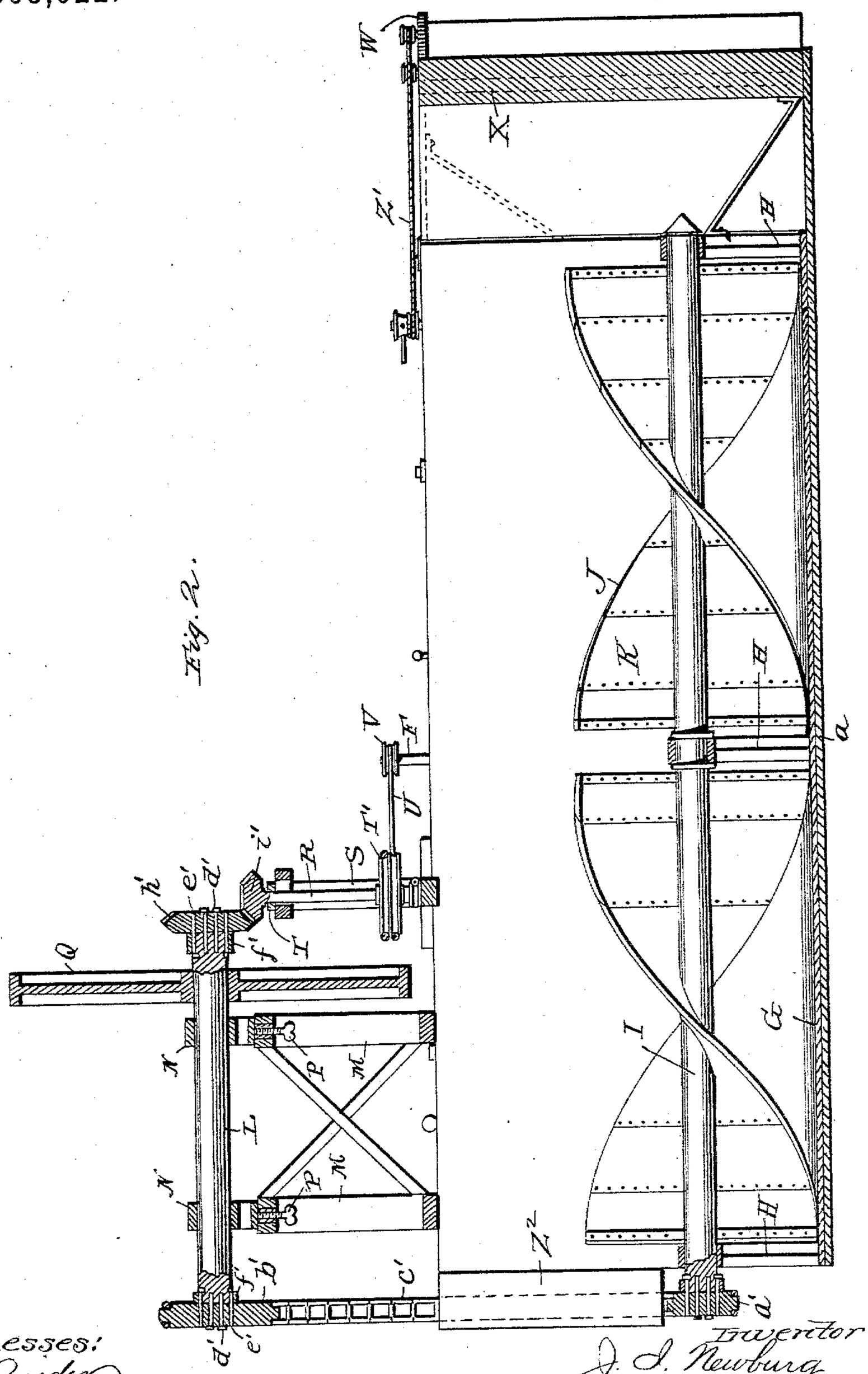


Fig. 2.

Witnesses:
C. H. Raider
N. P. Matthews.

Inventor
J. I. Newburg
By James J. Shelby
Attorney

(No Model.)

4 Sheets—Sheet 3.

J. I. NEWBURG.

HYDRAULIC MOTOR.

No. 565,022. Patented Aug. 4, 1896.

Fig. 3.

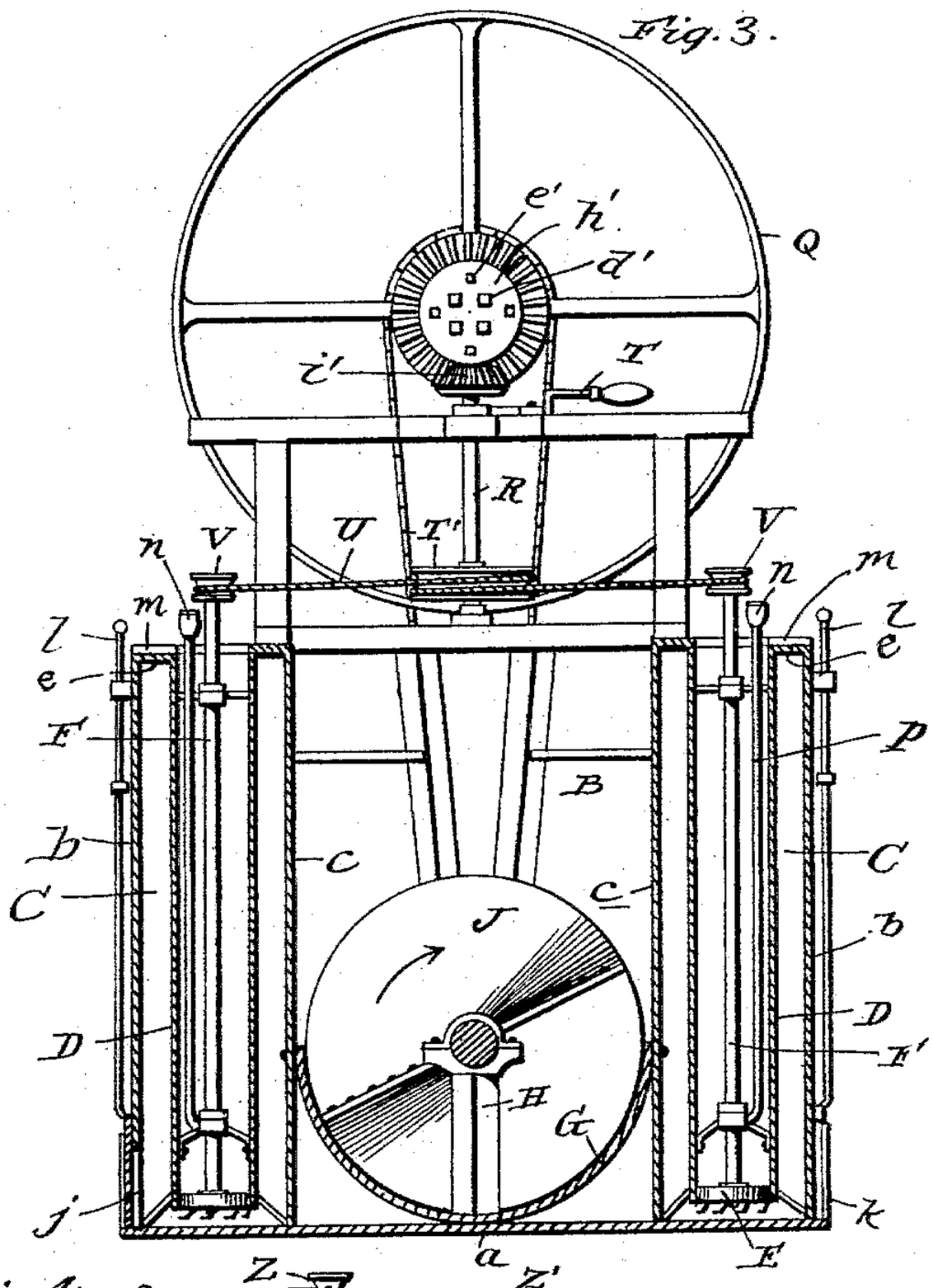
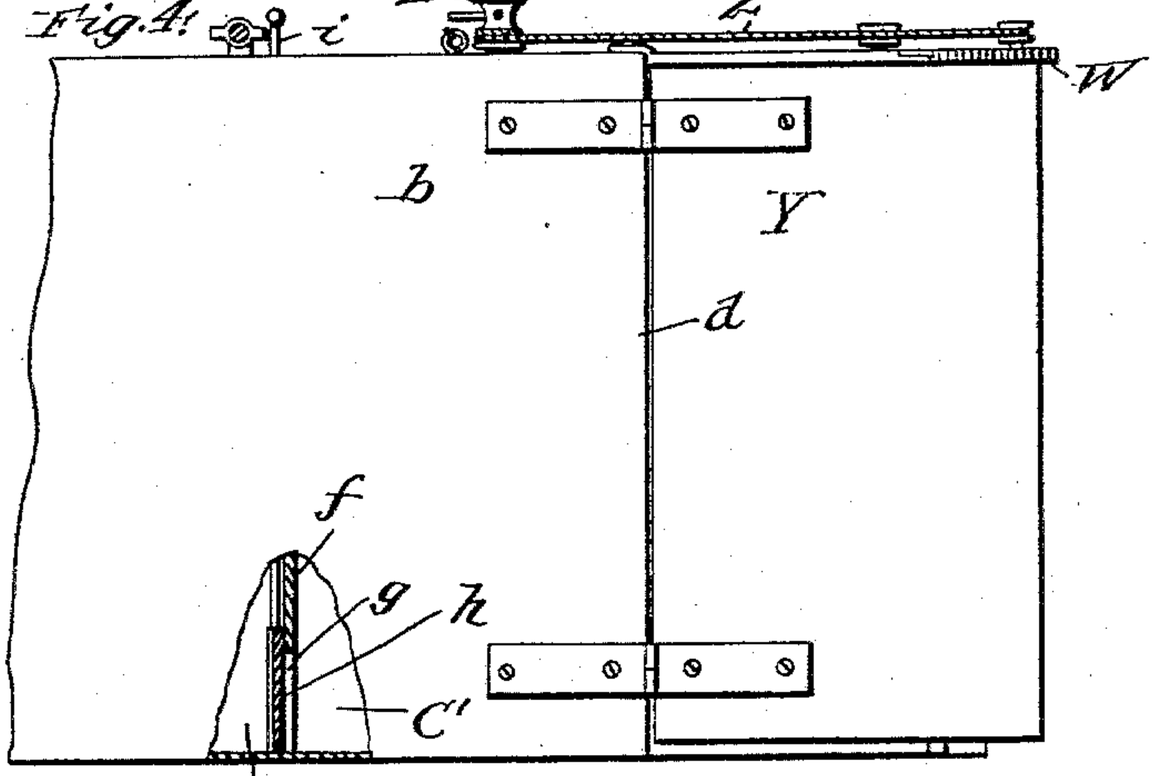


Fig. 4.



Witnesses: C'
C. H. Pauder
R. K. Matthews.

Inventor
J. I. Newburg
By James J. Shelby
Attorney

(No Model.) 4 Sheets—Sheet 4.

J. I. NEWBURG.

HYDRAULIC MOTOR.

No. 565,022. Patented Aug. 4, 1896.

Fig. 5.

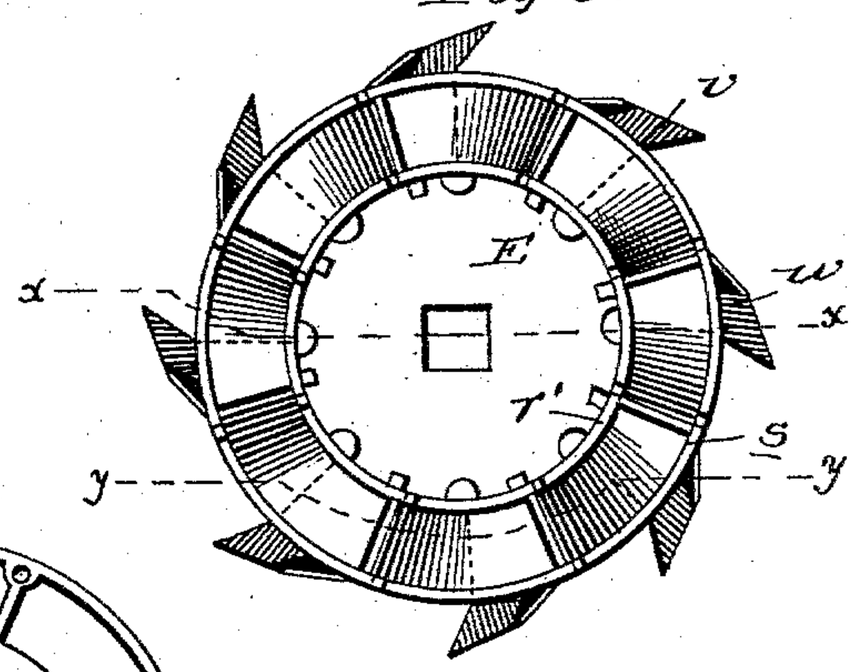


Fig. 6.

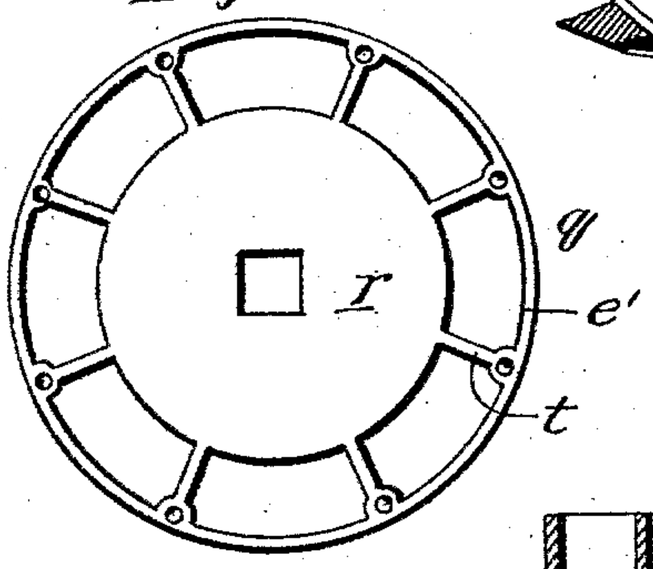


Fig. 9.

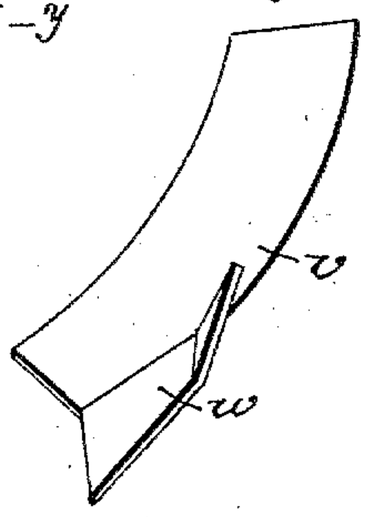


Fig. 7.

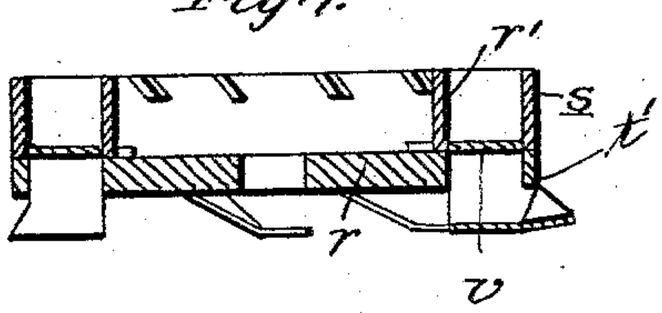
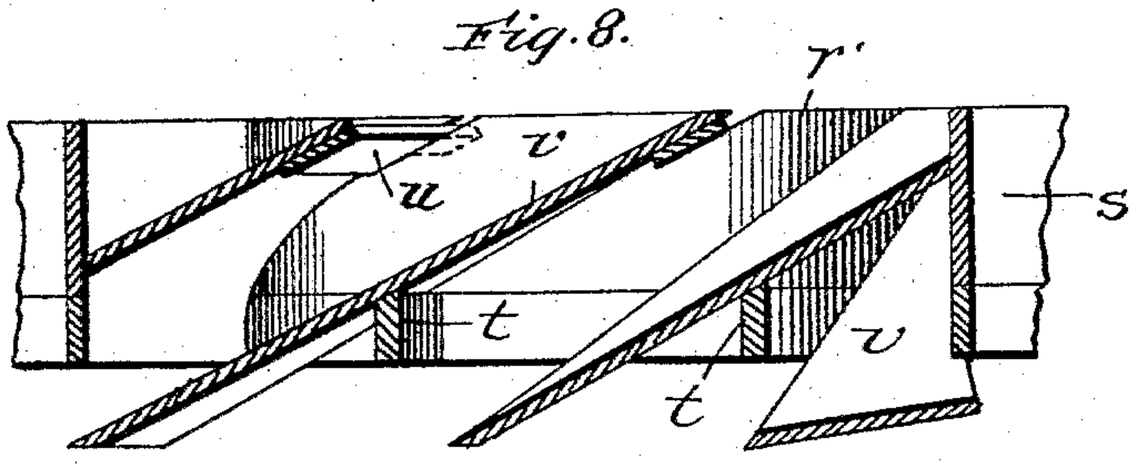


Fig. 8.



Witnesses:
C. H. Raider
W. E. Matthews.

Inventor
J. I. Newburg
By James J. Shuby
Attorney

UNITED STATES PATENT OFFICE.

JOHN ISRAEL NEWBURG, OF VICKSBURG, MISSISSIPPI.

HYDRAULIC MOTOR.

SPECIFICATION forming part of Letters Patent No. 565,022, dated August 4, 1896.

Application filed October 28, 1895. Serial No. 567,160. (No model.)

To all whom it may concern:

Be it known that I, JOHN ISRAEL NEWBURG, a citizen of the United States, residing at Vicksburg, in the county of Warren and State of Mississippi, have invented certain new and useful Improvements in Hydraulic Motors; and I do 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 improvements in that class of hydraulic motors which are designed to be placed in a running stream and be driven by the current thereof; and it has for one of its objects to provide such a motor embodying a longitudinal central water wheel or screw and means whereby a large volume of the current may be concentrated in said channel so as to enable it in its passage through the motor to exert great pressure against the blades of the screw or wheel and thereby forcibly and rapidly rotate the same.

Another object of the invention is to provide a hydraulic motor embodying means whereby it may be readily submerged so as to present the wheel or screw to the full force of the current and means whereby it may be readily raised when it is desired to change its location; and still another object is to provide a hydraulic motor embodying means whereby the entrance to the channel in which the screw-wheel is placed may be readily closed, so as to permit of the motor being stopped when desired.

Other objects and advantages of the invention will be fully understood from the following description and claims when taken in conjunction with the accompanying drawings, in which—

Figure 1 is plan view of my improved motor. Fig. 2 is a vertical longitudinal central section with parts in elevation. Fig. 3 is a transverse section taken in the plane indicated by the line *x x* of Fig. 1. Fig. 4 is a detail side elevation, partly in section, of the up-stream end of the motor. Fig. 5 is a plan view of one of the rotary water elevators or pumps. Fig. 6 is a plan view of the main frame or body of one of the water elevators or pumps. Fig. 7 is a section taken in the plane indicated by the line *x x* of Fig. 5. Fig. 8 is a section taken in the plane indicated by the line *y y* of Fig. 5, and Fig. 9 is a perspective view of one of the scoops or spoons of the water-elevators removed.

In the said drawings similar letters designate corresponding parts in all of the several views, referring to which—

A indicates the frame or support of my improved motor. In the preferred form of my invention this main frame or support in the form of a float is provided with a bottom *a*, which extends its full length and width, the side walls *b*, which also extend its full length, and the inner longitudinal walls *c*, which also extend the full length of the float and serve, in conjunction with the bottom *a* and with an auxiliary bottom hereinafter described, to form the longitudinal central channel B, the purpose of which will be presently described. The longitudinal walls *b c* are connected at their ends by transverse walls *d*, and they serve, in conjunction with said walls *d*, the bottom *a*, and the top walls *e*, to form the longitudinal compartments C. (Better illustrated in Fig. 3 of the drawings.) These longitudinal compartments C are divided by the vertical transverse partitions *f* into the several subcompartments C′, and the said partitions *f* are provided adjacent to their lower ends with openings *g*, (see Fig. 4,) controlled by vertically-slidable valve-gates *h*, having handles *i*, whereby it will be seen that communication may be readily effected between the middle subcompartments C′ and the subcompartments on opposite sides of the same when desired, for a purpose presently described.

Formed in the outer side walls of the middle subcompartments C′, as better shown in Fig. 3, are openings *j* for the entrance of water from the stream. These openings *j*, like the openings *g*, are controlled by vertically-movable valve-gates *k*, having handles *l* extending to the top of the float, whereby it will be readily seen that the water may be readily admitted into the middle subcompartments C′ from the stream, and as readily excluded therefrom when desired. From the middle subcompartments C′ water may be readily admitted to the subcompartments on opposite sides of the same by simply opening the gates *h*, and in this way the entire float A may be submerged, or when desired for any reason

one end only may be submerged, it being simply necessary when the entire float is to be submerged to open the gates *k* and all of the gates *h*, and when but one end is to be submerged to open the gates *k* and the gates *h*, opening into the subcompartments at the end to be submerged. In this way it will be observed that the float may be quickly and easily submerged without effort on the part of the operator or attendant, which is a desideratum.

In order to discharge the compartments C of the water therein when it is desired to raise the float, I provide in the middle subcompartments C′ the vertical pump or water-elevator cylinders D, which extend from a point adjacent to the bottom *a* up to and through the top walls *e*, so as enable them to discharge into the gutters *m*, which are formed in or on said top walls *e* and lead to the outer sides of the boat, so as to discharge the water back into the stream. I also provide the rotary water elevators or pumps E, which are arranged at the lower ends of the cylinders D and are fixed on the vertical shafts F, which are journaled in suitable bearings in the cylinders, as shown, and are designed to be lubricated through the medium of the oil-cups *n*, arranged at the top of the float and connected by tubes *p* to the lower bearing of the shaft F, as illustrated.

The rotary pumps or elevators, one of which is illustrated in detail in Figs. 5 to 9, are similar in construction, and therefore a description of the one shown in detail will suffice for both. This pump or water-elevator E may be of any construction suitable to the purposes of my invention, but I prefer to construct it as shown in Figs. 5 to 9. As thus constructed the pump or water-elevator E comprises the main frame or body *q*, having the central solid portion *r* designed to receive the shaft F, the bars *t*, which are preferably formed integral with and extend radially from the central portion *r*, the ring *t′* at the outer ends of the bars *t*, the circular ring *r′*, which is connected to and extends upwardly from the edge of the solid portion *r*, and the ring *s*, which is connected to and extends upwardly from the ring *t′*, the bars *u*, which are inclined in the direction of their width and have their ends arranged in correspondingly-inclined openings in the rings *r′* and *s*, and the inclined scoops or spoons *v*, which are arranged and secured upon the bars *u* and *t*, and are curved in the direction of their length to conform to the periphery of the body or main frame *q*, as illustrated. These scoops or spoons *v* are provided on their outer edges at their forward ends with the outwardly and upwardly extending and preferably integral flanges *w*, which extend beyond the periphery of the frame or body portion and are designed and adapted to draw water into the path of the scoops or spoons, so as to enable said scoops or spoons to scoop it up when the elevators or pumps are rotated.

The rotary pumps or water-elevators are designed to be rotated from the drive-shaft of the motor through the medium of mechanism hereinafter described, and when so rotated they will rapidly take up the water from the compartments C and raise the same to the upper ends of the cylinders D, from whence it will be discharged through the gutters *m* back into the stream. In this way, it will be observed, the compartments C may be quickly and easily discharged of water, and the float raised, so as to permit of the motor being moved from one point to another, or for any other purpose.

Arranged in the longitudinal central channel of the float A above the bottom *a* thereof, and connected to the inner vertical walls *c* of the compartments C, is the concave bottom G of the channel B. This bottom G extends the full length of the float A, as shown, and the space between the said bottom G and the bottom *a* is closed at the forward and rear ends of the float, so that the water will take through the channel above the bottom G.

H indicates standards in the channel B, which rise from the bottom G, and are preferably of angular form in cross-section, as shown, so as to offer but a minimum amount of obstruction to the passage of the water. I indicates the shaft of the screw-wheel J, which is journaled in the said standards H, and K indicates the blades of the said screw-wheel, of which there are preferably four employed, as shown. These blades K extend spirally around or partly around the shaft I and conform to the curvature of the bottom G of the channel, whereby it will be seen that the current rushing through the channel will exert a pressure against said blades, and will consequently forcibly and rapidly rotate the screw-wheel. The shaft I of the screw-wheel J is provided at its rear end with a sprocket-wheel *a′*, and the drive-shaft L, journaled in bearings above the float, is also provided at its rear end with a sprocket-wheel *b′*, the two wheels being connected, as illustrated, by a sprocket-chain *c′*, which is designed and adapted to transmit motion from the shaft I of the screw-wheel to the shaft L. The sprocket-wheels *a′ b′* are fixedly connected to the ends of the shafts by screw-bolts *d′*, which take through the wheels and into the shafts, and the connection of the said wheels to the shafts is further strengthened by the bolts *e′*, which rest in grooves in the shafts and extend through the wheels and have their heads arranged in notches in the shaft and are secured in position in the grooves and notches of the shaft by collars *f′*, which surround them, as shown. In this manner the sprocket-wheels are strongly and securely connected to the shaft, and yet may be readily removed when necessary.

M indicates suitable supports which are connected to and rise from the compartments C and bridge the channel B, and N indicates the bearings in which the shaft L is jour-

naled. These bearings N are arranged above the supports M and are adjustably supported upon the same by the screws P, which take through threaded bearings in the top bars of the supports M and have their upper ends connected in a swiveled manner to the bearings, so as to permit of their being turned to raise or lower the said bearings. When the bearings N are raised, it will be observed that the shaft L will also be raised and all slack in the sprocket-chain c' will be taken up.

The shaft L is preferably provided with a balance-wheel Q, and at its forward end it has a beveled gear-wheel h', which is preferably connected in the same manner as the wheels a' b', and is designed for the engagement of the beveled pinion i' upon the upper end of the shaft R. This shaft R is journaled in a swiveled manner at its lower end in a support S, and extends through a slot in the upper bar of the support and has its upper portion journaled in a lever T, fulcrumed upon the support, as better shown in Fig. 3, whereby it will be seen that its pinion i' may be moved into and out of mesh with the gear-wheel h' on shaft L, for a purpose presently described. Adjacent to its lower end the shaft R is provided with a pulley T', which is preferably provided with two peripheral grooves to receive the belts U, which also take around pulleys V upon the upper end of the pump-shafts F, whereby it will be seen that when the shaft R is moved to carry the pinion i' into mesh with the gear-wheel h' the shafts F will be rotated and the pumps actuated by the motor, while when the shaft R is moved by the lever T to carry the pinion i' out of mesh with gear-wheel h' the pumps, and consequently the removal of the water from the compartments C, will be stopped. The pumps may also, when desired, be actuated by hand through the medium of hand-wheels or other suitable devices (not illustrated) placed on the shafts F.

Rising from the upstream end of the float-bottom a, which is extended beyond the compartments C and braced at its upper end by the braces W, which are connected to the compartments C, is an upright X, which is of an angular form in cross-section, so as to offer but a minimum amount of obstruction to the passage of the water, and is shouldered, as indicated by n', for a purpose presently described, and connected in a hinged manner to the forward or upstream ends of the compartments C are the gates Y, which are designed and adapted when opened to guide a large volume of water into the channel B, and when closed to exclude the water from said channel, so as to prevent it from rotating the screw-wheel and actuating the motor. The said gates Y rest, when closed, against the shoulders of the upright X, and they may be opened and closed through the medium of any suitable mechanism. I prefer, however, to effect such movements of the gates through the medium of the winches Z, which are mounted upon the compartments C and the cables Z', which are wound around the winches and connected at opposite ends to the gates and take around sheaves on the braces W and post X, as shown. With this construction it will be observed that when the winches are rotated in one direction the gates will be opened, and when rotated in the opposite direction the gates will be closed, and it will also be observed that by locking the winches against rotation, which may be done by any suitable means, the gates will be held in the position to which they have been adjusted.

In the practice of the invention the motor is secured against movement in a stream by stay ropes or cables connected to the banks of the stream or in any other suitable manner and when properly submerged in the manner described is ready for operation. In operating the motor the gates Y are opened sufficiently wide to afford a flaring entrance for the water. By reason of this it will be observed that a large volume of water will enter between the gates and will be guided thereby to the forward end of the channel B, which it will enter and traverse in a concentrated stream, and in consequence of this will exert great pressure against the blades of the screw-wheel and will forcibly and rapidly rotate the same. The rotation of the screw-wheel is transmitted to the shaft L by mechanism before described, and from said shaft the power may be taken in any approved manner for driving various kinds of machinery. When it is desired to stop the motor, it is simply necessary to close the gates Y, so as to exclude the current of water from the channel B, and when it is desired to raise the float of the motor to permit of it being moved from one point to another, it is simply necessary to place the pinion i' in mesh with the gear-wheel h', when the pumps will be actuated in the manner before described.

In order to prevent the sprocket-chain c' from obstructing the passage of the current from the downstream end of the channel B, I provide the V-shaped guards Z^2, which are supported by brackets connected to the compartments C and are arranged in front of the said chain, as illustrated.

It will be observed from the foregoing that I have provided a hydraulic motor which, while cheap and durable, is capable of being operated without effort on the part of the attendant or attendants, and it will also be observed that by reason of the construction of my improved motor the current of a stream may be concentrated so that it will rush through the channel B with great force and power and enable the motor to drive heavy machinery at a high rate of speed.

I have in some respects specifically described the construction and relative arrangement of the parts of my improved motor in order to impart a full, clear, and exact understanding of the same, but I do not desire to be understood as confining myself to such

exact construction and arrangement, as such changes or modifications may be made in practice as fairly fall within the scope of my invention.

Having described my invention, what I claim is—

1. In a hydraulic motor, a float having a longitudinal channel provided with a concave bottom, and also having water-compartments on opposite sides of the longitudinal channel, partitions dividing the compartments into subcompartments and provided with valved openings connecting the subcompartments valved induction-openings communicating with one of each series of subcompartments and adapted to let water from the stream into said compartments, the screw water-wheel journaled in suitable bearings in the longitudinal center of the float and having blades conforming to the curvature of the concave bottom of said channel, the upright X, supported at the forward end of the float, the braces connecting said upright and the sides of the float, the gates hinged to opposite sides of the float and adapted, when closed, to bear against the shoulders of the upright, the winches mounted on the float, sheaves mounted on the post X, and the braces thereof, the cables connected to the gates and wound upon the winches and passed around the sheaves, pumps or water-elevators for removing water from the compartments of the float, a shaft L, journaled in suitable bearings upon the float, mechanism intermediate of the shaft L, and the pumps or water-elevators for actuating the latter, sprocket-wheels fixed on the shaft L, and on the shaft of the water-wheel, a sprocket-chain connecting said sprocket-wheels, and the V-shaped guards arranged in front of the chain, substantially as and for the purpose specified.

2. In a hydraulic motor, the combination of a frame or support having a longitudinal channel for the passage of water, a screw-wheel journaled in suitable bearings and arranged lengthwise in said channel, the upright X, supported at the forward end of the frame or support and having shoulders, the braces connecting said upright and the sides of the frame or support, the gates hinged to opposite sides of the frame or support and adapted when closed to bear against the shoulders of the upright, the winches mounted on the float, sheaves mounted on the post X, and the braces thereof, and the cables connected at their opposite ends to the gates and wound upon the winches and passed around the sheaves, substantially as specified.

3. In a hydraulic motor, the combination of a float having a longitudinal central channel for water, a water-wheel journaled in suitable bearings and arranged in the channel of the float, a drive-shaft arranged upon the float above the water-wheel, sprocket-wheels fixed on the shafts of the water-wheel and the drive-shaft, a sprocket-chain connecting the sprocket-wheels and adapted to transmit motion from the water-wheel to the drive-shaft and the V-shaped guards arranged in front of the chain, substantially as and for the purpose set forth.

4. The combination of a shaft having longitudinal grooves in its periphery and seats or notches at the rear ends of the grooves, a-wheel arranged on the end of the shaft, bolts taking through the wheel and into the shaft, bolts extending through the wheel and arranged in the grooves of the shaft and having their heads seated in the seats or notches of the shaft, and a ring surrounding the latter bolts and the shaft, substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN ISRAEL NEWBURG.

Witnesses:

D. J. LENKER,

GUSTAV SINA.