

(No Model.)

C. J. FOSTER.
PULP STRAINER AND CLEARER.

No. 436,345.

Patented Sept. 16, 1890.

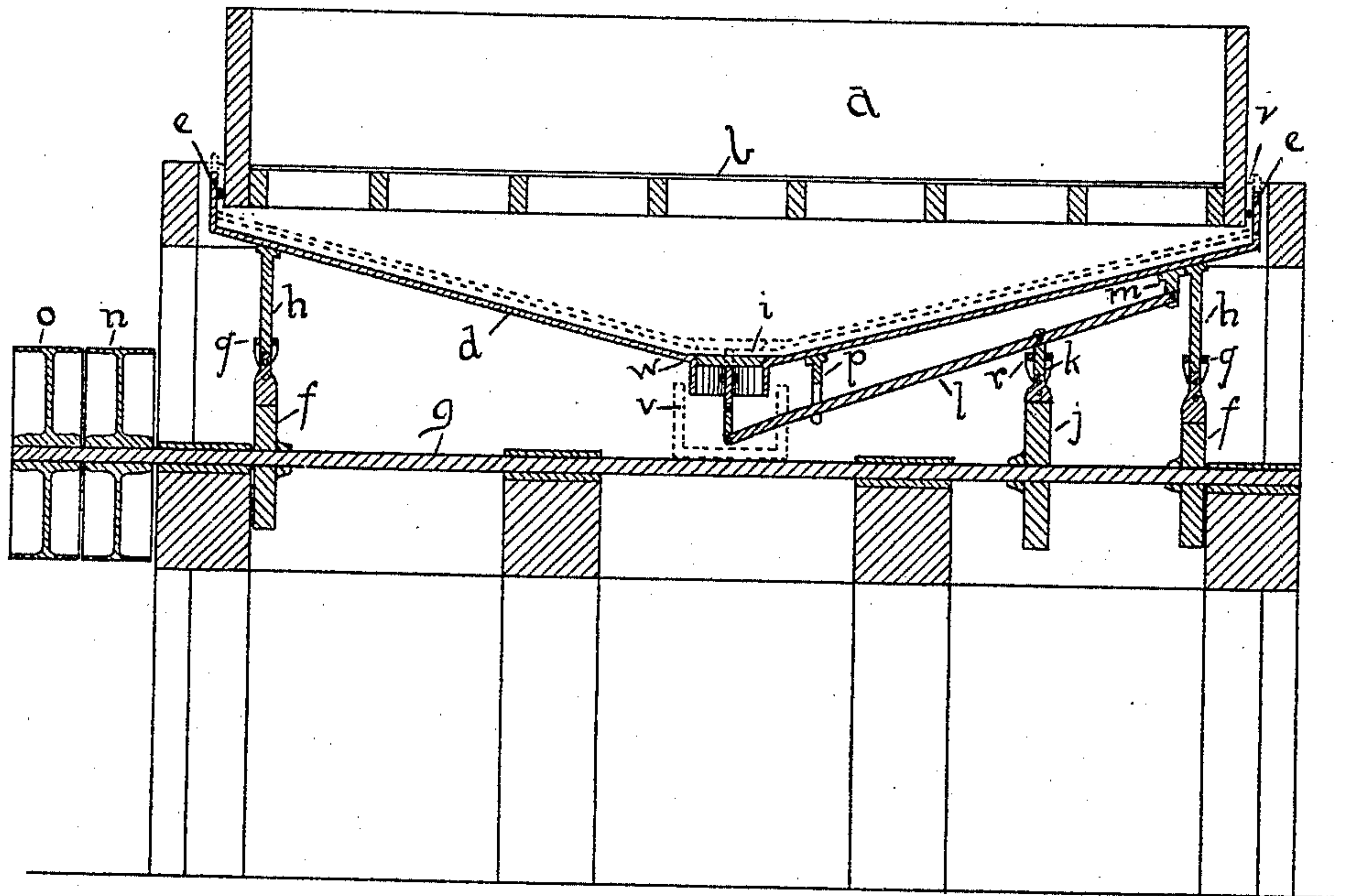


FIG. 1.

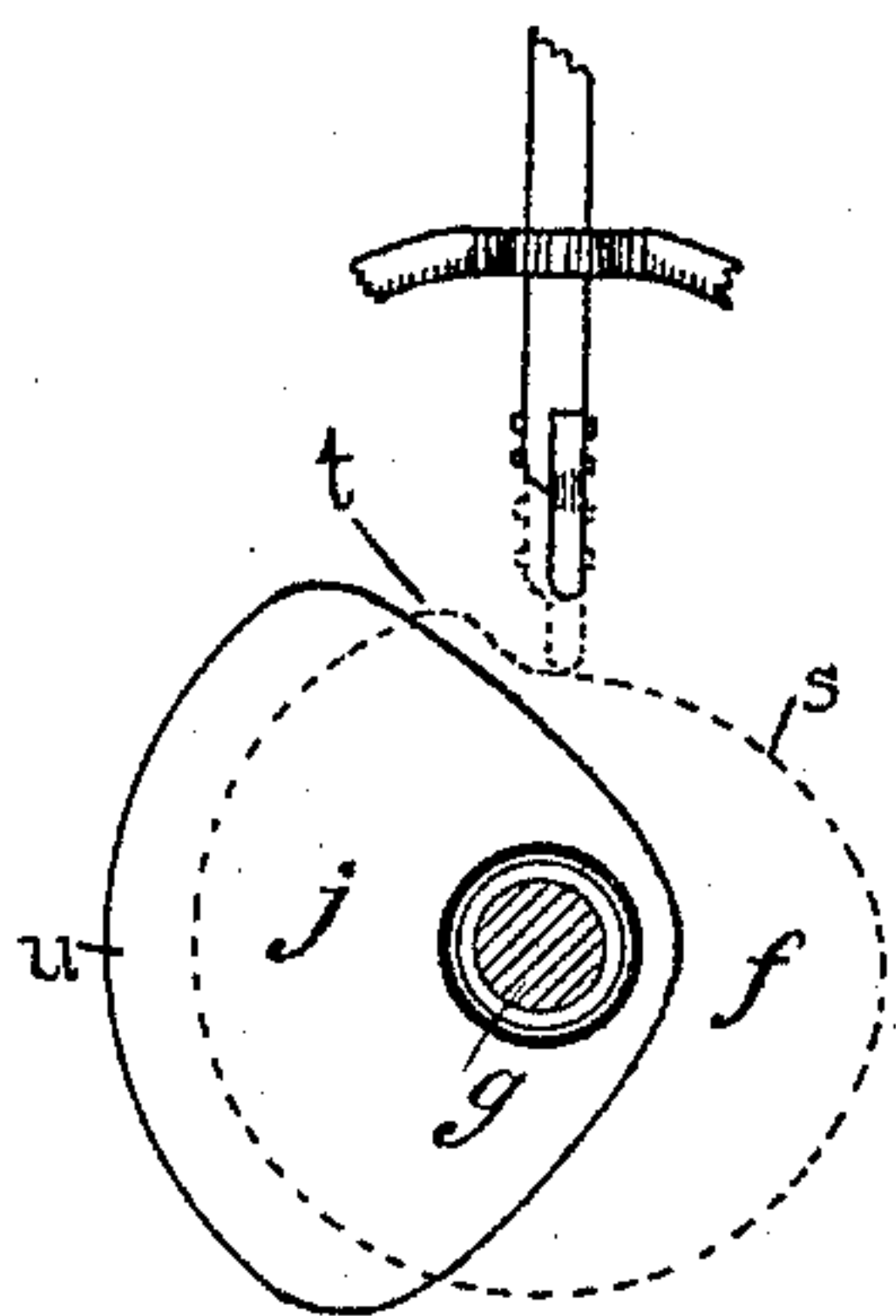


FIG. 3.

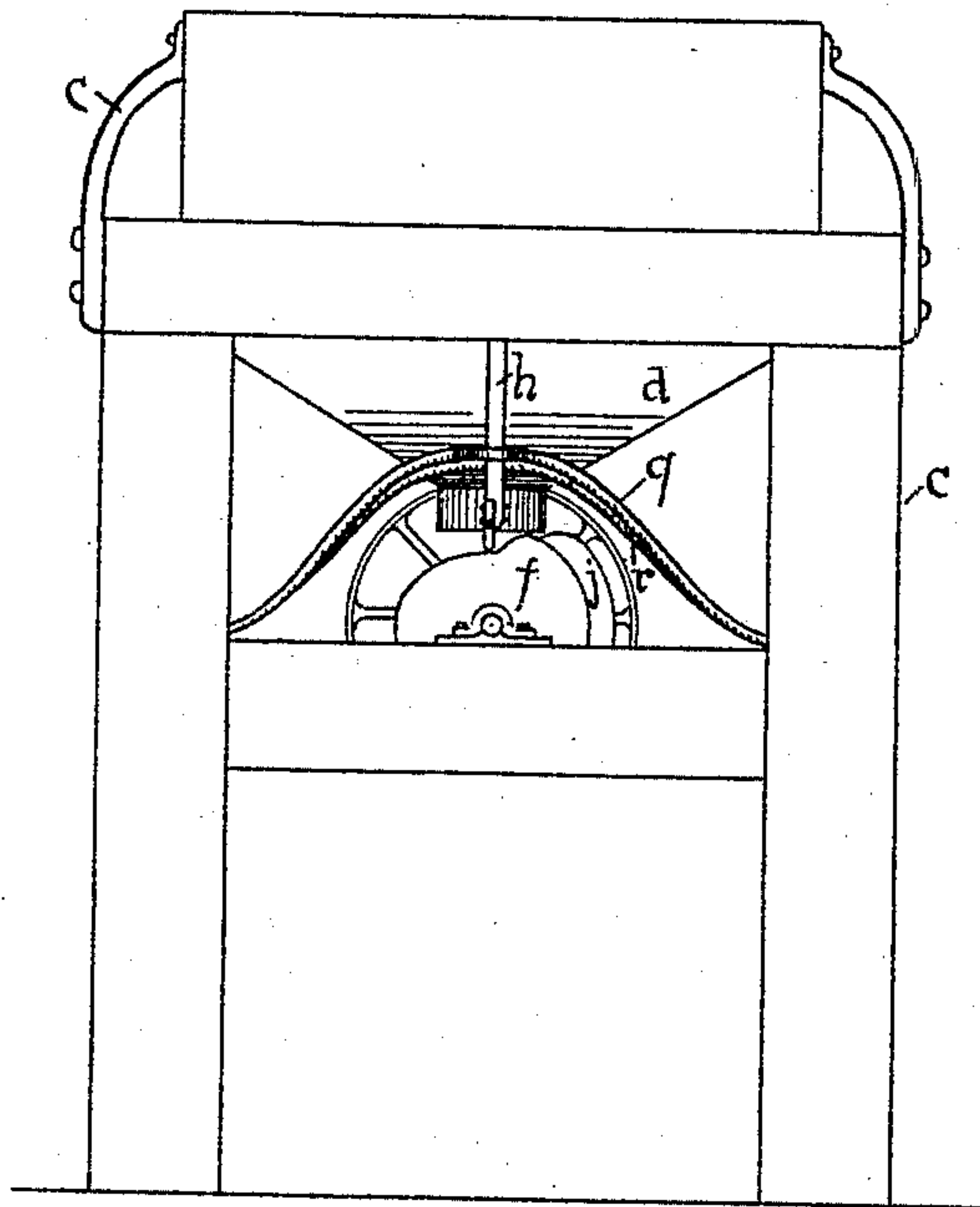


FIG. 2.

Witnesses.
Charles E. B. King.
J. W. Richardson

Inventor.
Charles J. Foster.
per atty.
Elgin C. Merrill

UNITED STATES PATENT OFFICE.

CHARLES J. FOSTER, OF WESTBROOK, MAINE.

PULP STRAINER AND CLEARER.

SPECIFICATION forming part of Letters Patent No. 436,345, dated September 16, 1890.

Application filed November 4, 1889. Serial No. 329,187. (No model.)

To all whom it may concern:

Be it known that I, CHARLES J. FOSTER, of Westbrook, in the county of Cumberland and State of Maine, have invented certain new and useful Improvements in Pulp Strainers and Clearers; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in pulp-screening machines. It consists of a stationary vat having a screen in the bottom thereof, a diaphragm connected to said vat by a suitable packing and having a valve therein, and means for imparting a vibratory motion to said diaphragm and to open and shut said valve at stated times with reference to the position of said diaphragm, in such manner that the upward or clearing force of the machine shall be greater than the downward or straining force.

In the drawings herewith accompanying and making a part of this specification, Figure 1 is a central vertical section of my improved machine; Fig. 2, an end elevation; and Fig. 3 is a detail showing cams and connecting-rods for the diaphragm and valve and the position of the cams on the shaft relative to each other, the cam and connecting-rod that operates the diaphragm being shown in dotted lines, and same letters refer to like parts.

In said drawings, *a* shows a hopper or vat into which the pulp is placed before straining, and *b* the strainer-plate in the bottom thereof, said vat being supported by a suitable frame *c*.

Beneath the vat is a diaphragm *d*, arranged so as to form a more or less nearly air-tight connection between it and said vat and to have a vibratory movement in a vertical direction.

The upper sides of the diaphragm *d* may extend up between the outside of the vat and the inside of the supporting-frame. This serves to steady the diaphragm.

Between the diaphragm *d* and the vat *a* is a packing *e* to make a tight connection, that shown in the drawings being a cylindrical rub-

ber, which will roll up and down as the diaphragm vibrates. Instead of the rubber shown, a leather or other flexible substance may be stretched from the outside of the vat to the diaphragm to form the packing.

The diaphragm receives a vibratory motion from cams *f*, arranged upon the shaft *g* so as to strike against the connecting-rods *h*, rigidly attached to the diaphragm. These cams *f* have the shape substantially as shown in the dotted lines in Fig. 3, having the part *s*, in which the diameter gradually decreases, and the part *t*, in which it suddenly increases, so as to give the diaphragm a very sudden upward motion, to hold it at its highest elevation for half, more or less, of the revolution of the cams and then permit it to drop slowly.

The bottom of the diaphragm may slope toward a common center, and has in said bottom a valve *i*, adapted to open and shut by means of a cam *j*, having a segment *u*, which engages the connecting-rod a part of the time only, set on shaft *g*, and a connecting-rod *k*, attached to a lever *l*, one end of which is pivoted at *m* to the diaphragm and the other adapted to carry the valve *i*.

The operation of the valve *i* with reference to the movement of the diaphragm may be seen by the arrangement of the cams *f* and *j* with respect to each other on the shaft *g*, as shown in Fig. 3.

n and *o* are fast and loose pulleys, respectively, for operating the machine, and *p* is a stay to steady the lever which carries the valve, and *q* and *r* are stays to support the connecting-rods *h* and *k*, respectively.

The operation of my improved machine is as follows: The ground pulp is introduced into the vat and the diaphragm filled with water, the valve *i* being closed, as shown in the drawings. The shaft *g*, with its cams, is then revolved, the part *t*, striking the connecting-rods, forces the diaphragm upward with a sudden movement, and the diaphragm being full and the valve closed a part of the contents of the diaphragm is forced up through the holes in the strainer-plate, thus keeping said holes from being stopped up by the pulp or any foreign substance. As soon as the diaphragm is raised as far as cams *f* will carry it, the cam *j* strikes the connecting-rod

k, which operates the valve-lever and opens
 the valve, allowing a portion of the contents
 of the diaphragm to escape therethrough. As
 the contents of the diaphragm escape through
 5 the valve, an equal quantity of the pulp in
 the vat passes down through the holes in the
 strainer-plate. As the shaft *g* continues its
 revolution, the cam *f* at length ceases to hold
 up the valve and it returns to its seat, and
 10 thereafter the cams *f* permit the diaphragm
 to fall gradually preparatory to being again
 forced up to clear the strainer-plate, and so
 on continually. It will thus be seen that the
 upward force is sudden and violent to effect-
 15 ually clear the screen, while the downward
 force is gradual and easy to draw or suck the
 pulp through the strainer.

The advantages of my improved machine
 consist in the fact that it does not get clogged,
 20 it does not suck through the screen any coarse
 matter, it has a greater clearing force than
 straining force, the packing is all on the out-
 side where it can be easily looked after to
 prevent wear, the pulp is strained more evenly,
 25 and the machine is cheaper than others, in
 that it does more work in a given time.

Having thus described my invention and its
 use, what I claim, and desire to secure by Let-
 ters Patent of the United States, is—

30 1. The combination, in a pulp-screening ma-
 chine, with a stationary vat having a screen
 in the bottom thereof, of a vibratory dia-
 phragm, a suitable packing between said vat

and diaphragm, a valve in said diaphragm,
 and mechanism, substantially as set forth, for 35
 imparting a vibratory motion to the dia-
 phragm and to open and close the valve, as
 and for the purposes set forth.

2. In a pulp-screening machine, the combi-
 nation, with a stationary vat having a screen 40
 in the bottom thereof, of a diaphragm con-
 nected to said vat by a suitable packing and
 having an escape-valve therein, and means
 for imparting a vibratory motion to said dia-
 phragm and to open and shut said valve at 45
 stated times with reference to the position of
 said diaphragm, for the purposes set forth.

3. In a pulp-screening machine, the combi-
 nation, with a stationary vat having a screen 50
 in the bottom thereof, of a vibratory dia-
 phragm, a suitable packing between said dia-
 phragm and vat, and escape-valve in said dia-
 phragm, and mechanism, substantially as set
 forth, adapted to impart to said diaphragm a
 vibratory motion of varying velocity and to 55
 open and shut said valve at stated times with
 reference to the position of the diaphragm, as
 and for the purposes set forth.

In testimony that I claim the foregoing as
 my own I affix my signature, in presence of 60
 two witnesses, this 24th day of October, A. D.
 1889.

CHARLES J. FOSTER.

Witnesses:

ELGIN C. VERRILL,
 WILLIAM HENRY CLIFFORD.