(No Model.)

F. B. HANSON.

HYDRAULIC RAM.

No. 422,936. Patented Mar. 11, 1890.

Fig. 1.

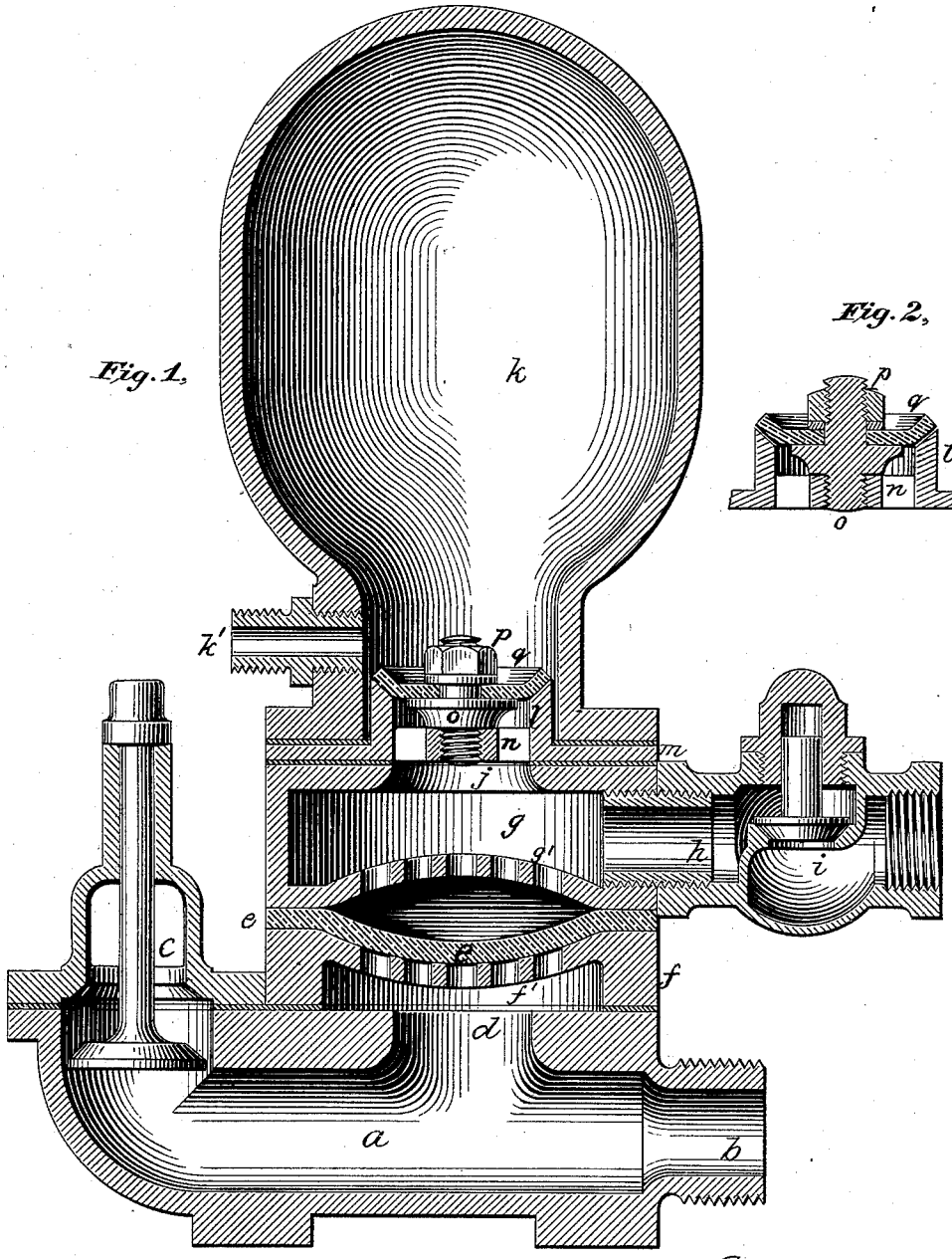

Fig. 2.

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Witnesses
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UNITED STATES PATENT OFFICE.

FRANK. B. HANSON, OF NEW YORK, N. Y.

HYDRAULIC RAM.

SPECIFICATION forming part of Letters Patent No. 422,936, dated March 11, 1890.

Application filed August 1, 1888. Serial No. 281,661. (No model.)

To all whom it may concern:

Be it known that I, FRANK. B. HANSON, a citizen of the United States, residing at New York, county and State of New York, have invented certain new and useful Improvements in Hydraulic Rams, of which the following is a specification.

My invention has for its object to increase the efficiency of hydraulic rams and to generally improve that class of hydraulic rams in which foul or waste water is utilized to raise to a higher level a supply of fresh clean water.

My invention relates to an improved form of valve located between the air-chamber and the forcing cylinder or chamber of the pump or water-raising part of the ram, the same consisting of a tube having its exit end beveled inwardly and a disk of leather or other pliable material secured at its central part at or near the exit end of the tube with its side near the periphery resting on the beveled edge of the tube. By this arrangement a very sensitive and quick-acting valve is produced, responding quickly to the variations of pressures above and below it, and thereby holding a greater percentage of the water forced through it than valves heretofore used in this class of water-raising devices; but to describe my invention more particularly I will now refer to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a vertical section of a hydraulic ram embodying my improvements, and Fig. 2 is a detached sectional view of the improved valve.

The ram shown in the drawings is constructed and operates in the ordinary manner. The driving-chamber *a* is at its lowest part, the foul or waste water entering the same through the inlet *b* and discharging therefrom at the escape-valve *c*. At the upper side of this chamber is an orifice *d*, covered by means of the flexible diaphragm *e*, which is held and rigidly clamped at its edges between the plate *f* and the lower side of the water-raising chamber *g*. The central part *f'* of the plate *f* and the central part *g'* of the lower side of the chamber *g* are concave in form and provided with perforations forming a double-convexed space, in which the diaphragm *e* is free to play.

At the inlet-orifice *h* of the chamber *g* is located the foot or check valve *i* of ordinary construction, and above the outlet-orifice *j*, at its upper side, is placed my new valve, the flange of which is clamped between the top of the chamber *g* and the bottom flange of the air-chamber *k*. This new valve comprises the tubular portion or valve-casing *l*, projecting upwardly from the flange *m* and beveled at its upper end inwardly, which beveled end forms the valve-seat. The bridge *n*, extending across the tubular part *l*, is provided with a central stem *o*, having a shoulder about in line with the lower inner edge of the beveled end of the tubular part *l*, and on this shoulder is clamped by means of the nut *p* the disk *q*, of leather or other suitable pliable material. The valve-disk is flat before being secured in place, and is not formed or pressed into shape to fit the beveled seat, but is caused to adapt itself thereto by its central part being forced against the shoulder of the stem *o*, so that it retains its natural elasticity and bears with a uniform pressure on all parts of the seat. This valve responds instantly to slight excess of pressure below it, the valve-disk *q* leaving the beveled seat but a short distance, as shown at Fig. 2, to allow the fluid to pass through it, and closes promptly as soon as there is an equal pressure above and below it, thus holding all, or nearly all, the fluid passed through it.

The action of the ram will be readily understood. The driving-water entering and filling the chamber *a* closes the escape-valve *c* and raises the diaphragm *e* up against the perforated concaved retainer *g'*, thereby forcing the fresh water to the extent of the displacement of the diaphragm out of the chamber *g*, up through the valve *l q*, into the air-chamber *k*, from which it passes to the place of delivery through the outlet *k'*. The water in the chamber *a* having come to a state of rest, the valve *c* falls, affording a passage for the escape of water from the chamber *a*, the diaphragm *e* being thereby drawn down against the lower retainer *f'*, as shown in the

drawings, and causing another quantity of fresh water to flow into the chamber *g*. Now when the foul or waste water has attained sufficient momentum in the chamber *a* the valve *c* is forced against its seat, closing said chamber, and the diaphragm *e* is again raised to force water out of the chamber *g* as before.

While the improved valve was especially designed for and is particularly adapted to retain the water in the air-chambers of hydraulic rams, it is evident that valves constructed on this principle may be used for other purposes. It is also evident that the general form of the body of the valve may be changed and the angle of the beveled seat of the valve, which is shown in the drawings as of about forty-five degrees, may be varied to suit the requirements of the case without departing from my invention.

Having now described my invention, what I claim, and desire to secure by Letters Patent, is—

The combination, substantially as hereinbefore set forth, of the tubular valve-casing beveled inwardly on its inner upper edge to form a valve-seat, a valve-support within the casing, between which and the casing an opening is left on all sides, a pliable disk secured at its center only approximately on a line with the lower edge of the beveled valve-seat and having an annular upturned or beveled edge conforming with the valve-seat.

In witness whereof I have hereunto set my hand, at New York, county and State of New York, this 25th day of July, 1888.

FRANK. B. HANSON.

Witnesses:
ALFRED SHEDLOCK,
G. H. STARRETT.