2 Sheets—Sheet 1.

G. W. PARSONS.

CANAL LOCKS AND DAMS.

No. 180,056. Patented July 18, 1876.

Fig. 1.

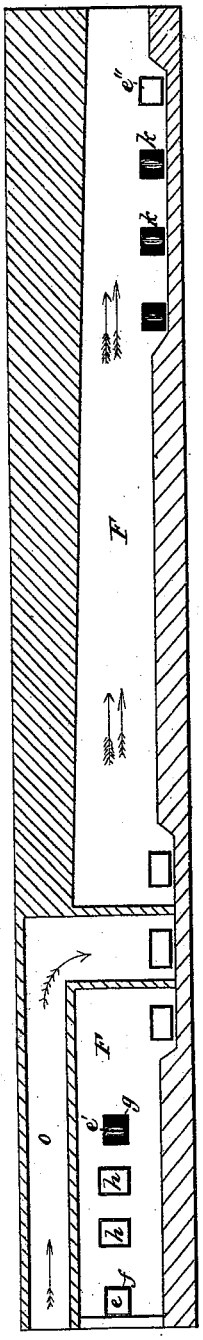


Fig. 2.

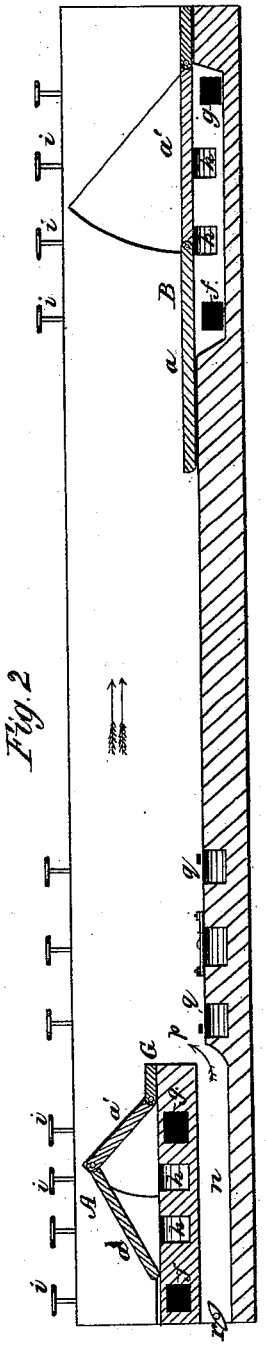
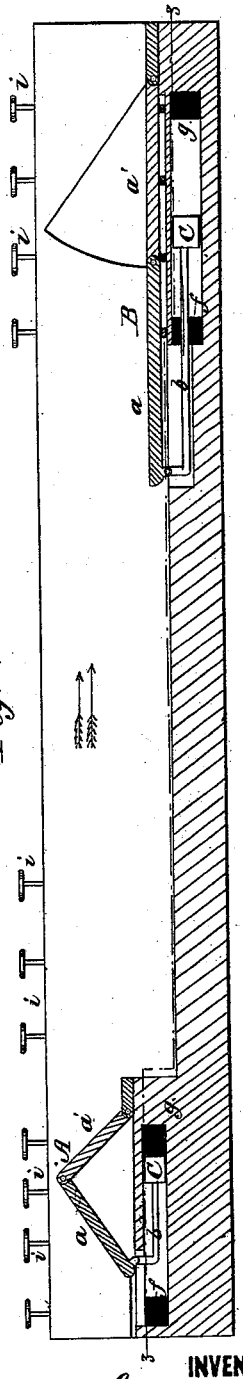


Fig. 3.



WITNESSES:

A. W. Kart.

John C. Kenyon

INVENTOR:

Geo. W. Parsons

BY Munn & Co.

ATTORNEYS.

2 Sheets—Sheet 2.

G. W. PARSONS.

CANAL LOCKS AND DAMS.

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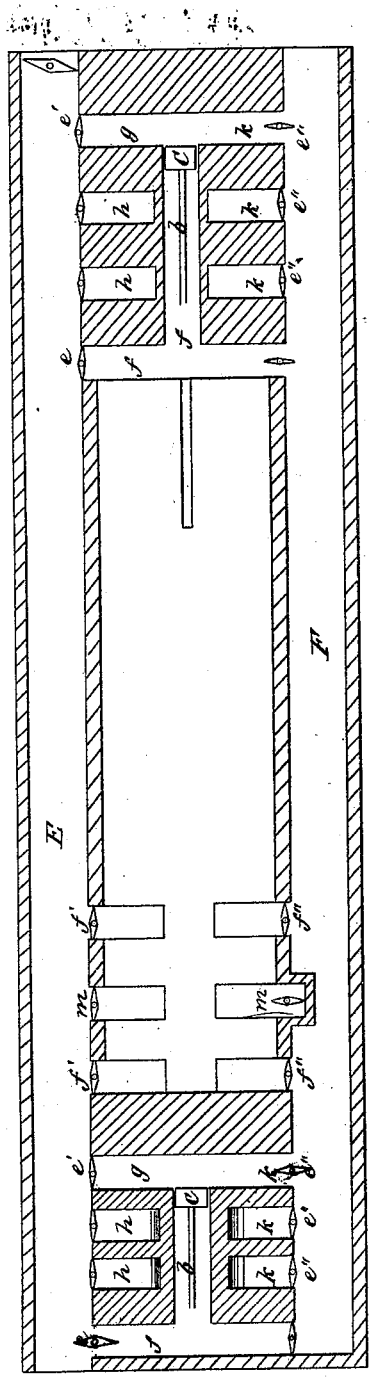

Fig. 4.

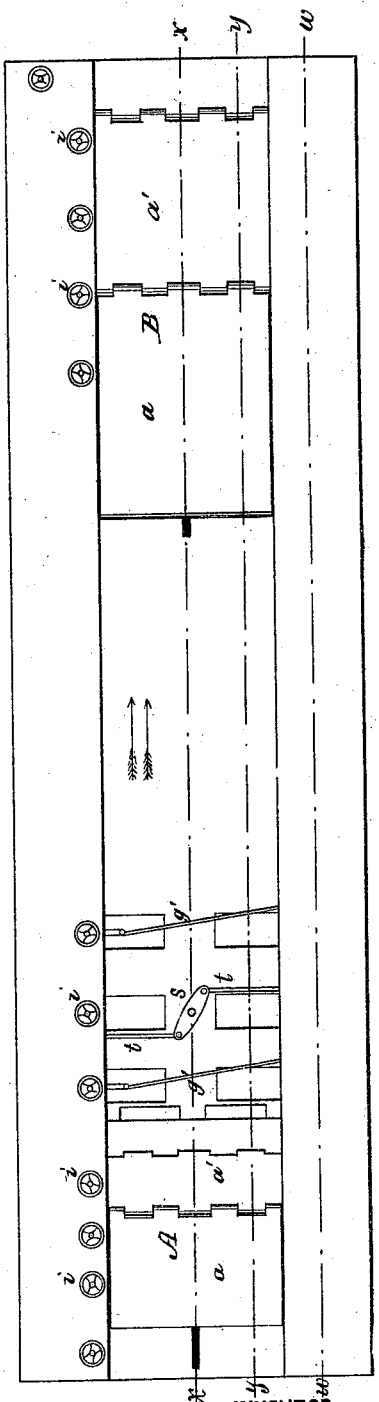

Fig. 5.

WITNESSES:

A. W. Hart.

Solon C. Kemon

INVENTOR:

Geo. W. Parsons

BY Munn & Co

ATTORNEYS.

UNITED STATES PATENT OFFICE.

GEORGE W. PARSONS, OF CEREDO, WEST VIRGINIA.

IMPROVEMENT IN CANAL LOCKS AND DAMS.

Specification forming part of Letters Patent No. **189,056**, dated July 18, 1876; application filed April 29, 1876.

To all whom it may concern:

Be it known that I, GEORGE W. PARSONS, of Ceredo, in the county of Wayne and State of West Virginia, have invented a new and Improved Adjustable Dam Lock and Chute; and I do hereby declare that the following is a full, clear, and exact description of the same.

The object of my invention is to enable boats to be passed from one level to another, either in canals or rivers, more quickly and with less labor than by means of the locks heretofore used. To this end the invention is twofold. It relates, first, to a lock proper; and, secondly, to the bulk-head of the lock or dam. For locking purposes I employ vertically-acting gates, operated by sliding hydraulic pistons, the water being allowed to act on one or the other side of the pistons, according as it is desired to raise or lower the gates. The admission of the water is controlled by adjustable valves or wickets. It is hence obvious the labor and time involved in the operation are reduced almost to a minimum.

In respect to the chute, I break up the ridge or column of water which forms at the bottom of every fall, by allowing a portion of the water, which would otherwise pass over the fall, to pass beneath or around it, in one or more separate streams, and enter or rejoin the main body at the bottom of the fall. A body of comparatively smooth water will thus be formed to float the boat safely over the brink of the fall.

In the accompanying drawing, forming part of this specification, Figure 1 is a sectional elevation of my improved dam and chute, on line *w w* of Fig. 5; Fig. 2, a like section on line *y y*, Fig. 5; Fig. 3, a sectional elevation on line *x x*, Fig. 5; Fig. 4, a horizontal section on line *z z*, Fig. 3. Fig. 5 is a plan view of the dam and chute.

The lock is designed for use mainly for the purposes of slack-water navigation, but is applicable also for canals proper. In some cases the bulk-head, which forms part of the lock proper, will form part of a dam extended completely across a stream or river.

In the drawing, the double arrows indicate the direction of the natural flow of water in the canal or river. I show in Figs. 1, 2, 3, the gates by which the lock is formed. The smaller gate A is located upon the upper level, and the larger gate B upon the lower level—in other words, the smaller gate is hinged to the bulk-head, and the larger to the bottom of the lock proper. Each of them is composed of two plates, *a a'*, hinged together transversely of the lock. The part *a'* is hinged at the bottom of the lock, and the end of the other part *a* is hinged to the rods *b* of pistons C, which work horizontally in cylinders arranged immediately beneath the gate. The piston-rods are curved or bent at one end, to adapt them to work in a lengthwise slot in the lock-bed, as shown. It is evident that if the water be admitted to press on one side of the pistons, they will be moved to the opposite end of the cylinders, and thereby raise the gates, the respective parts *a a'* in such case assuming the position indicated in full lines in Figs. 2 and 3, to wit, at an angle of about forty-five degrees to each other. The water is admitted to the piston-cylinders by means of valves or wickets *e*, on the upper (or upstream) side of the pistons, through passages *f* on the lower side thereof, through passages *g* having wickets *e'*, Fig. 4. Both passages *f g* communicate with the main passage E in the side of the lock and opening on the upper level. This main passage extends the whole length of the lock, and is closed at its lower end by a wicket, which may be opened to clear the passage of sand or other accumulation. To buoy up the gates, and thus assist in raising them, or holding them raised, I admit water beneath them, through passages *h* in the side of the lock, Figs. 2 and 4. These passages are provided with wickets in like manner with those by which water is admitted to the pistons. All the wickets above mentioned are operated by rods *i*, which extend above the lock, and are provided with hand-wheels for convenience of adjusting them. The water thus admitted to the piston-cylinders and space beneath the gates is allowed to escape through passages *k*, Fig. 4, on the opposite side of the lock from which it enters. Similar wickets or valves *e''* control these eduction-passages as the induction-passages, and the two sets of wickets are connected by rods, (not shown,) so that as those on either side open, the others close. All the eduction

passages *k* communicate with the main passage F on the right-hand side of the lock, Figs. 1 and 4. This passage is open at its lower end, and closed at its upper end. The wickets *f'* on the left-hand side of the lock, immediately below the bulk-head, are employed to aid in admitting water to the lock, and the wickets *f''* on the opposite side of the lock aid in discharging the water. The wickets *f' f''* are connected in pairs by rods *g'*, so that when those *f'* on one side of the lock are open, the others *f''* are closed.

It is apparent that when a boat is to be conveyed from the upper to the lower level, the larger gate B is raised in the manner above described, aad the lock having become filled, the boat draws in in the usual way. The small gate A is then raised, and the larger immediately lowered. The water in the lock will then at once fall quickly to a level with the water in the canal or river below, but in place of passing through said passages or wickets in hinged gates, as in the common lock, it passes over the gate, and, as it falls, assists by its impetus to carry the boat out of the lock. By the above-described plan of constructing locks, and operating the gates, I am enabled to pass a boat from one level to another in about one-third the time required in the common lock, and with very little labor on the part of the lock-tenders.

In forming the chute and adjustable dam, to which I referred at the outset, the lower gate and its connections and attachments may be dispensed with. The object is to pass a boat safely over the fall or bank G, Fig. 2, without submerging the prow or allowing the keel to strike the angle of the bulk-head. In other words, the prow must be buoyed up as it passes the edge. To this end the water which passes over the fall must be prevented from forming a breaker at the point directly below the bulk-head G. I effect this result by allowing water to pass beneath the bulk-head through passages *n*, and around the bulk-head through passages *o*, Fig. 1. These passages open, respectively, at *p* and *q*, Figs. 1 and 2, and the currents passing through them are caused to tend upward, and thus meet the column passing over the bulk-head, and break up and destroy the breaker it tends to form. The water below the fall is thus rendered comparatively smooth, and even heavily-laden boats may pass safely over the fall. These passages beneath the bulk-head are opened and closed by pivoted valves or wickets *r*, Fig. 2, operated by rods or other suitable devices, and the side passages by valves *m*, operated by rods. The valves *m* are connected by rods *t*, and pivoted equalizing-lever *s*, Fig. 5. Thus both valves *m* are simultaneously opened and closed. The several passages *n o* are also available in the locking operation, serving to admit the water to the lock, and enabling it to be filled very rapidly.

What I claim is—

1. In a lock, the combination, with the hinged two-part gates, of induction and eduction passages and sliding pistons connected with said gates, and acted on by the water, to raise and lower them in the manner described.

2. In a lock, the combination, with the gates and pistons, of the wickets or valves located in the induction and eduction passages, and the rods connecting the same, whereby the wickets are alternately opened and closed, as set forth, for the purpose specified.

3. The combination, with the bulk-head, of passages *n* beneath it, and the lateral passages *o* opening immediately below it, and the wickets for controlling admission of water, as shown and described.

G. W. PARSONS.

Witnesses:
AMOS W. HART,
AUG. M. TANNER.