2 Sheets—Sheet 1.

K. FLETCHER.

Hydraulic-Elevator.

No. 211,625. **Patented Jan. 28, 1879.**

Fig: 1.

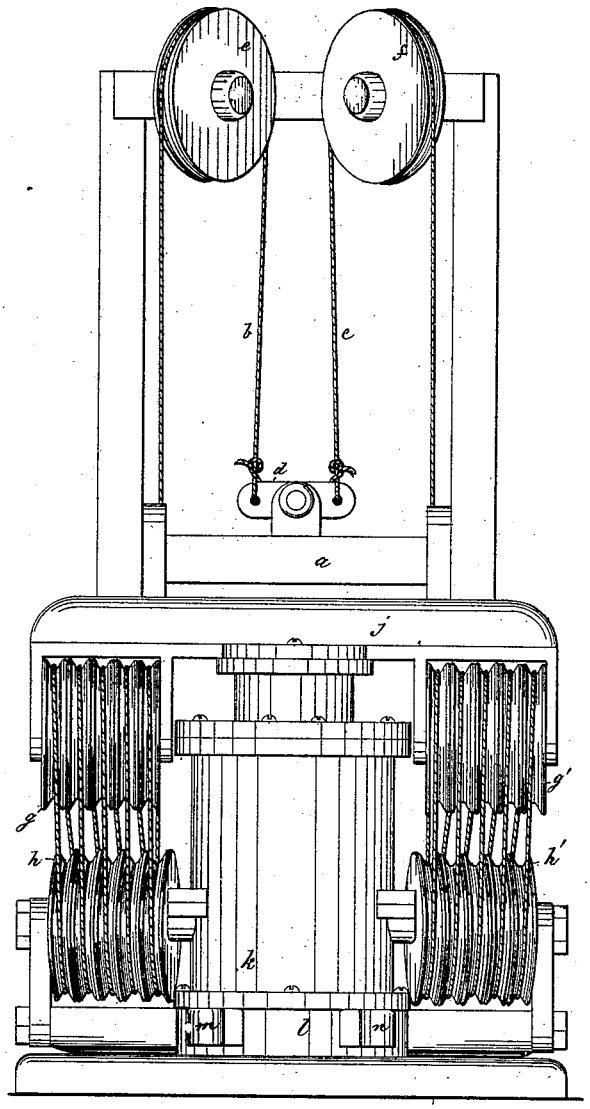


Fig: 3.

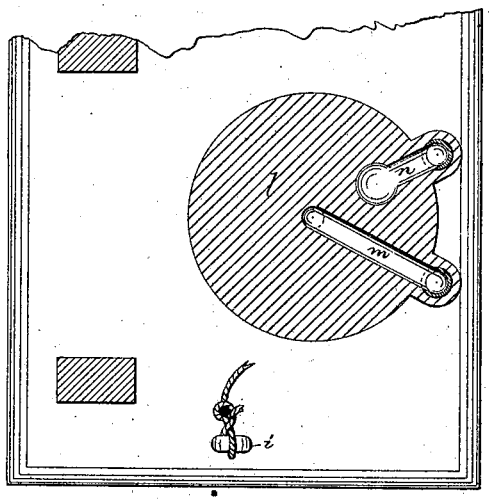
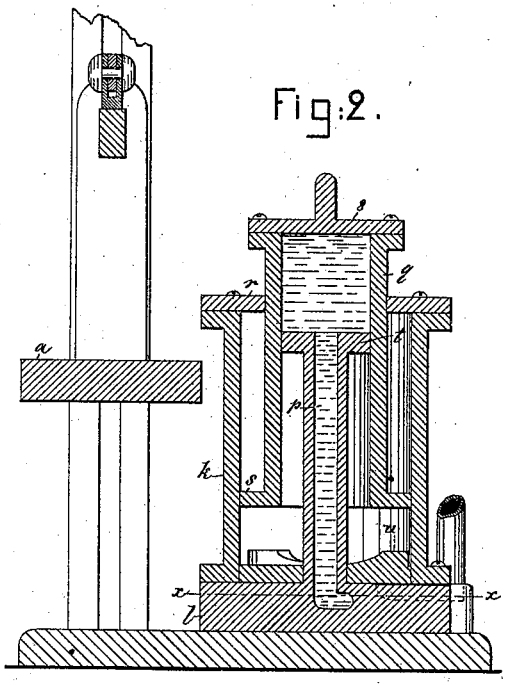


Fig: 2.



Witnesses.

N. E. Whitney.

L. F. Connor.

Inventor.

Karl Fletcher

by Crosby & Gregory Attys

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Fig:4.

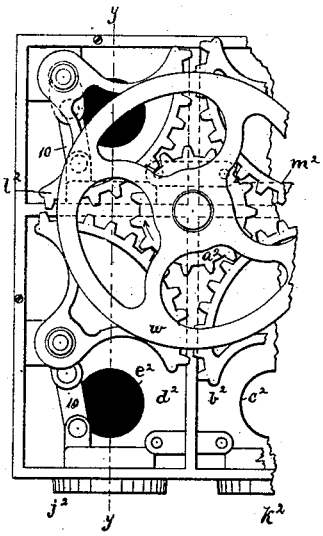


Fig:5.

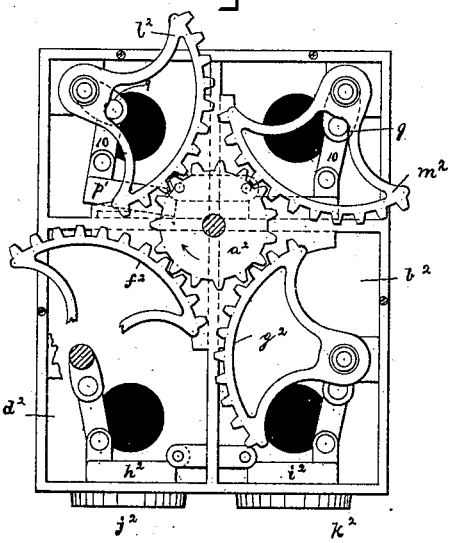


Fig:8.

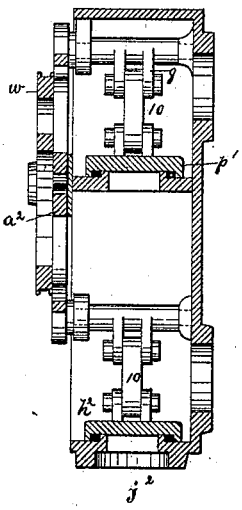


Fig:9.

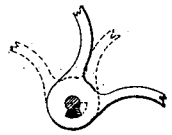


Fig:6.

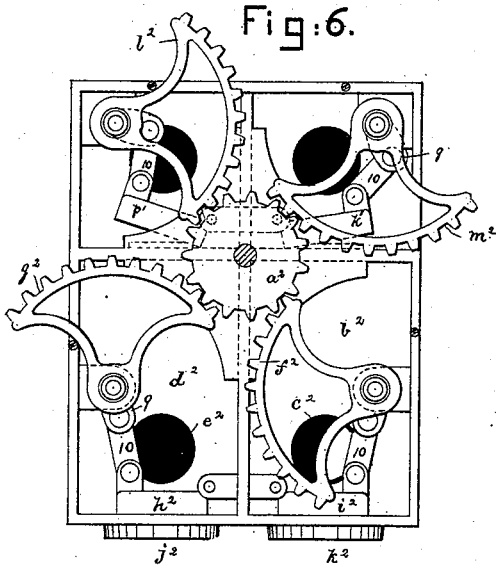
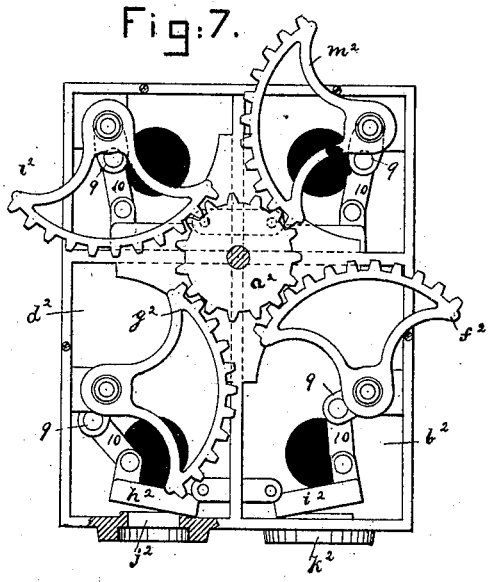


Fig:7.



Witnesses.

N. D. Whitney.

L. F. Connor.

Inventor.

Karl Fletcher

by Crosby & Gregory Attys

UNITED STATES PATENT OFFICE.

KARL FLETCHER, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO BOSTON MACHINE COMPANY.

IMPROVEMENT IN HYDRAULIC ELEVATORS.

Specification forming part of Letters Patent No. **211,625**, dated January 28, 1879; application filed July 29, 1878.

To all whom it may concern:

Be it known that I, KARL FLETCHER, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Hydraulic Elevators, of which the following description, in connection with the drawings forming a part thereof, is a specification:

This invention relates to hydraulic elevators; and consists in the combination, with an outside stationary cylinder and an inside movable cylinder attached to the cross-head, of a stationary pipe placed within the movable cylinder, and provided with a head to fit the interior of the said cylinder, said combination forming an elevator of two capacities, to lift a heavy or light load; also, in mechanism for operating the valves located between the service-pipe and the elevator-cylinders and between the cylinder and waste-pipe, the said mechanism being composed of valves and links located within a valve-box, and of a series of segment-gears operated by one common pinion, to actuate the valves to let water into the cylinders, or from the cylinders to the waste-pipe, as hereinafter described.

Figure 1 represents, in side elevation, a hydraulic elevator constructed in accordance with my invention; Fig. 2, a vertical section taken through the cylinders; Fig. 3, a section on line *x x*, Fig. 2, showing the pipes which supply water to operate the apparatus; Fig. 4, a side elevation of the valve-box, the cover-plate being removed, and the parts being in the position when all the valves are closed. Fig. 5 shows the pinion and sectors changed in position to admit water for the small capacity. Fig. 6 shows both inlet-valves open. Fig. 7 shows both outlet-valves open and the inlet-valves closed; Fig. 8, a section on the line *y y*, Fig. 4; and Fig. 9 is a detail to be referred to.

The elevator platform or car *a* will be constructed and guided in any usual way, it being suspended from the ropes or chains *b c*, connected with the lever *d*, attached to the car, and extended over sheaves *e f* and the sets of sheaves *g g*^{1} *h h*^{1}, the opposite ends of the said ropes or chains being fixed, as at *i*. The sets of sheaves *g* and *g*^{1} are supported by, and rise and fall with, the cross-head *j*, while the sets *h h*^{1} are fixed at the sides of the outer and stationary cylinder, *k*, secured to a base or bottom part, *l*, provided with the primary inlet, *m*, and the secondary inlet, *n*, for the smaller and larger capacities of the elevator, the primary inlet leading water into the stationary pipe *p*, it passing upward therefrom into the movable cylinder *q*, as shown in Fig. 2, the inner face of the upper end of said cylinder, attached firmly to the cross-head, receiving the pressure of the water against it, and lifting the cross-head with it as it rises with the water. This moving cylinder is guided by the annular plate *r*, attached to the top of the outer cylinder, *k*, and at its lower end has a flange, *s*, which fits the interior of the cylinder *k* water-tight. The head or top *t* of the pipe *p* fits the interior of cylinder *q* water-tight.

In Fig. 2 the piston *u* is shown as a separate disk, guided at its outer periphery by the interior of the cylinder *k*, and at its center by the pipe *p*. In Fig. 2 the elevator is shown as having been partially operated for the smaller capacity, water entering only through the valve *p'*, (see Fig. 5,) the inlet *m*, and the pipe *p*. Now, if it is desired to raise a heavier load, the rope which is wound or passed about the sheave *w* (see Fig. 4) is moved so as to rotate it and the pinion *a*^{2} from the position shown in Fig. 5 to that in Fig. 6, opening the inlet-valve *k*^{1}, which permits the water from the service-pipe to enter the chamber *b*^{2} and pass therefrom, through opening *c*^{2} and through a suitable connecting-pipe, into the passage *n* and under the loose piston-head *u*, which will then be lifted up against the end *s* of the interior cylinder, *q*, and will thereafter act with the force of the water under the said head *u* to lift the cylinder *q*, cross-head, and car. Water, which enters from the main and passes through the inlet-valve *p'*, flows into the chamber *d*^{2}, and from it through passage *e*^{2}, and thence through proper connecting-pipes to the passage *m*. When the elevator-car is to descend, the pinion *a*^{2} is moved by the hand-rope in the direction opposite the arrow until the sectors *f*^{2} *g*^{2} are moved as in Fig. 7, when the outlet-valves *h*^{2} *i*^{2} will be lifted, uncovering the passage *j*^{2} *k*^{2}, leading to the sewer.

If desired, the loose head *u* may be bolted directly to the rim *s*, as the head or portion 8

is attached, and may rise and fall with the cylinder q when lifted by water from pipe p.

The shafts which carry the sectors have cranks 9, attached to links 10, connected with ears upon the pivoted valves p' k^1 h^2 i^2. The sectors for moving the inlet-valves p' and k^1 are lettered l^2 and m^2.

The sectors are connected with the shafts, which they operate so as to open and close the valves, by means of a pin or slot connection, as shown in Fig. 9, so as to allow for loss of time in their movements.

I claim—

1. The combination, in an elevator, of an outer stationary cylinder, a movable cylinder, q, attached to the cross-head, it having the rim s of its head fitted to the interior of the said outer cylinder, and a water-supplying pipe, p, projected upward from the bottom of the stationary cylinder, the head t of the said pipe being fitted water-tight to the interior of the moving cylinder, substantially as herein shown and described.

2. The outer cylinder, k, and interior moving cylinder, q, combined with the loose head u, surrounding the pipe p, the said loose head being adapted to be raised against the end of the moving cylinder q, substantially as described.

3. The inlet and discharge valves, and their sectors f^2 g^2 l^2 m^2 and links 10, combined with the pinion a^2, actuated by the hand-rope, the said pinion engaging and operating all the sectors and valves, substantially as described.

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

KARL FLETCHER.

Witnesses:
G. W. GREGORY,
N. E. WHITNEY.