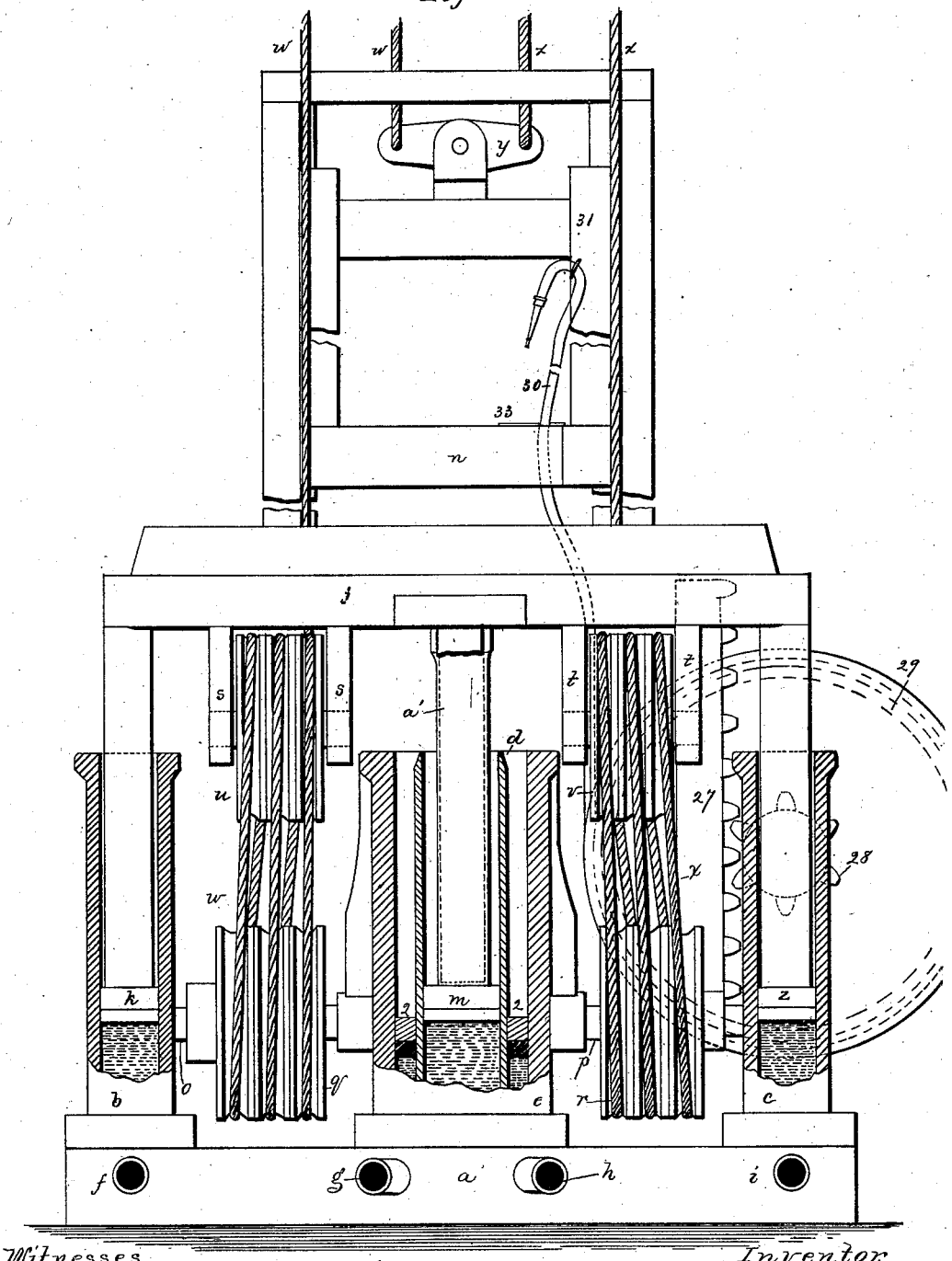
2 Sheets—Sheet 1.

K. FLETCHER.

HYDRAULIC ELEVATOR.

No. 192,116. Patented June 19, 1877.

Fig. 1.



Witnesses.
W. J. Pratt.
B. L. Perkins.

Inventor.
Karl Fletcher
per Crosby & Gregory attys.

2 Sheets—Sheet 2.

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Fig. 2.

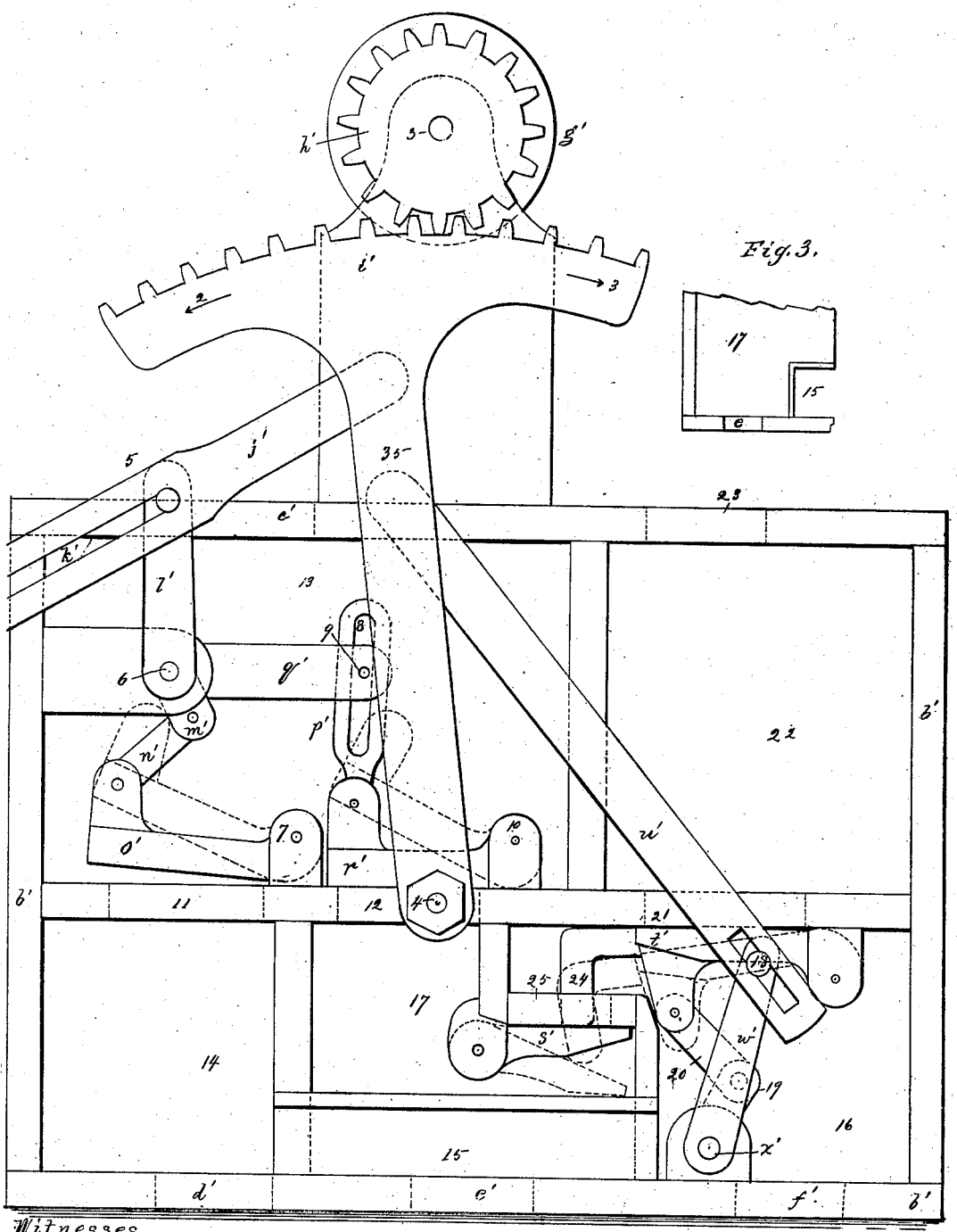

Fig. 3.

Witnesses.
W. J. Pratt.
E. C. Perkins.

Inventor.
Karl Fletcher
per Crosby & Gregory Attys.

UNITED STATES PATENT OFFICE.

KARL FLETCHER, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO HIMSELF AND D. N. PICKERING, OF MARSHALLTOWN, IOWA.

IMPROVEMENT IN HYDRAULIC ELEVATORS.

Specification forming part of Letters Patent No. **192,116**, dated June 19, 1877; application filed May 9, 1877.

To all whom it may concern:

Be it known that I, KARL FLETCHER, of Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Hydraulic Elevators, of which the following is a specification:

This invention relates to improvements in hydraulic elevators, wherein the cross-head is lifted by means of central and end portions, and consists in the combination with a cross-head lifted at each end positively and at its center by means of attached pistons of an auxiliary piston, adapted to be brought into operation when desired to increase the lifting power of the elevator beyond the capacity of the end and central cylinders.

The invention also consists in a combination of valves, substantially as hereinafter described, whereby by means of a single rope or rod the valves may be operated to admit water into all the main cylinders, or into the auxiliary cylinder.

Also, in the combination with an elevator platform or car, of means to permit a hose to be carried up to any story or floor.

Also, in the combination with the elevator and hose, of a reel to wind the hose as the elevator is lowered.

Figure 1 represents in side elevation (the cylinders being in section) sufficient of an elevator to show my improvements in connection with the cylinders, pistons, and cross-head. Fig. 2 represents the system of valves, and Fig. 3 a section across the bottom of the chest.

On the base *a* of the elevator are erected or placed three main cylinders, *b c d*, and an auxiliary cylinder, *e*, the latter being so placed as to surround the central main cylinder *d*; each of these cylinders is connected with water-supplying pipes, *f g h i*. The cross-head *j* has three main pistons, *k l m*. The piston-rods of the pistons *k l* are connected with the ends of the cross-head, and the rod of piston *m* with the central cross-head. These three pistons are of small area, but sufficient for such loads as the elevator will be expected to lift under ordinary circumstances.

Water introduced under such pistons will raise them and the cross-head to which they are positively connected, thereby lifting the cross-head evenly and enabling it to be made lighter than if the cylinder was supported only at the ends or only at the center.

Between the cylinders, on axles *o p*, are series of sheaves, *q r*, and on the cross-head are hangers, *s t*, to support series of sheaves *u v*. Over these sheaves *q r*, they being on stationary axles, and over the movable sheaves *u v*, attached to the cross-head are passed wire or other ropes, *w x*, which, after passing over the usual pulleys at the top of the passage in which the car works, turn down and connect with the top or other part of the car, or with a lever, *y*, thereon.

The auxiliary piston, 2, is made as an annulus, and is connected with the cross-head by links, *a'*, shown in dotted lines, Fig. 1, at opposite sides of the piston-rod of piston *m*. When an extra load, one beyond the capacity of the three main cylinders, is to be lifted, then water is introduced under the auxiliary piston 2, and thereafter it co-operates with the other pistons.

Referring to Fig. 2, *b'* is the valve-chest, its front being removed to show the parts. It receives water from the main through an opening, as at *c'*, dotted lines, and discharges water into the pipes *f i*, under the main pistons through openings *d' f'*, and through opening *e'* into pipe *h*, under the auxiliary piston 2.

The rotating shaft 3 is provided with a pulley, *g'*, over which the usual hand-rope or cord for letting on and cutting off the water-supply is wound. This shaft has also a pinion, *h'*, adapted to engage the teeth of a lever, 35, provided with a sector, *i'*, pivoted at 4. A link, *j'*, jointed with the arm of the sector, receives within a slot, *k'*, a pin, 5, on an arm, *l'*, of a rock-shaft, 6, having an ear, *m'*, connected by link, *n'*, with a main valve, *o'*, pivoted at 7, and adapted to open or close the passage 11, (shown in dotted lines,) it leading from the receiving-chamber 13 to the supplying-chamber 14, from which the water passes out through opening *d'* along the channel-way 15, (see the section Fig. 3,) into the chamber 16, and out through the opening *f* to the pipes *f' i* of the main cylinders.

The pipe *g*, to supply the cylinder *d*, is herein shown as adapted to be connected with the main, and the water let in under the piston *m* is to be crowded back into the main as the car is lowered and is thereby saved. This cylinder might, however, be supplied with water from the chest *b'*. All the water supplied to the main pistons and fed through the chest passes from the receiving-chamber under valve *o'*.

When the sector is in the position shown in Fig. 2, the valve *o'* will be lifted. Now, if it is desired to place into action the auxiliary cylinder, the sector is further moved in the direction of the arrow 2, and then an arm, *q'*, provided with a pin, 9, entering a slot, 8, in a link, *p'*, connected with the auxiliary valve *r'*, pivoted at 10, raises such valve from its seat and uncovers the passage 12, permitting water to be discharged into the auxiliary-chamber 17, from whence it flows through opening *e'* into pipe *h*, under the auxiliary piston 2. In this way one rope or rod may be employed to control the valves to admit water under the main and auxiliary pistons. The pressure of water in chambers 16 17 keeps the exhaust valves *s' t'* closed.

When it is desired to lower the pistons the sector is turned in the direction of arrow 3 until the link *u'* connected therewith meets the pin 18 on arm *w'* of a rock-shaft, *x'*, having an arm, 19, connected by link, 20, with the exhaust-valve *t'*, for the main cylinders, and lowers such valve from the opening or passage 21, permitting the water to exhaust through the exhaust-chamber 22, and out through the opening 23, connected by pipe with the sewer.

As the valve *t'* is opened, its toe 24, extended through the opening or water-passage 25, covered by the exhaust-valve *s'* of the auxiliary cylinder, strikes such valve *s'*, opens it and permits the water from under the auxiliary piston to flow back through chamber 17, through openings 25, 21, to the exhaust-chamber.

The cross-head is supplied with a rack-bar, 27, that engages the teeth of a pinion, 28, on a hollow water-containing drum, 29, the axle of which may be made hollow and be suitably connected with the water-supply, so as to remain full of water. Connected with this water-drum, 29, is a hose, 30, which may be extended up through a passage in the car-platform and be connected with a hook or other suitable support, 31, thereon. This hose may be connected with the car and rise and fall with it. The water-drum, as it is rotated, will wind and unwind the hose.

If desired, the hose connected with a suitable water-supplying pipe may be laid in a coil at the base of the space in which the car rises and falls, and in case of fire the covering 33 of the opening in the platform or car-bottom may be opened and the hose drawn up through such space and be carried up to any floor where it may be desired to use it.

The valves will be packed and otherwise be made to fit their seats water-tight. The valves may be of any usual construction. I do not broadly claim a central and auxiliary piston. The end pistons and cylinders add greatly to the durability, and lessen the wear of the central and auxiliary pistons and cylinders.

I claim—

1. The cross-head, its central and two end pistons, the sheaves *u v* placed between the auxiliary and end pistons, and the auxiliary piston surrounding the central piston, in combination with the central and the two end cylinders, and the auxiliary cylinder, and the two sets of sheaves *q r*, located between the end and auxiliary cylinders, all arranged to operate as and for the purpose described.

2. A rotating water-supplying drum and hose, in combination with and operated by the cross-head as it is raised and lowered, substantially as described.

3. The combination, with the chest, of the main and auxiliary valves connected with a rock-shaft, and adapted to be operated, substantially as described, by means of a single rope, to admit water under the main and auxiliary piston, as set forth.

4. The valve *o'* and its connected rock-shaft and arm *q'*, in combination with the valve *r'* and the slotted link 8, so that movement of the rock-shaft will raise first one and then the other valve, substantially as described.

5. The chest provided with the receiving-chamber 13, passage 11, supplying-chamber 14 and passages leading from it to the main cylinders, auxiliary supplying-chamber 17 and passages 12 *e'* leading into and from it, and exhaust-passages 21 25, in combination with valves *e' r' s' t'*, substantially as described.

6. The combination, with the lever 35, of links *j'*, *u'*, and the rock-shafts operated by them to open and close the main and auxiliary valves and the exhaust-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,

D. N. PICKERING.