

(No Model.)

A. J. McADAM.
HYDRAULIC ELEVATOR.

No. 469,585.

Patented Feb. 23, 1892.

Fig. 1.

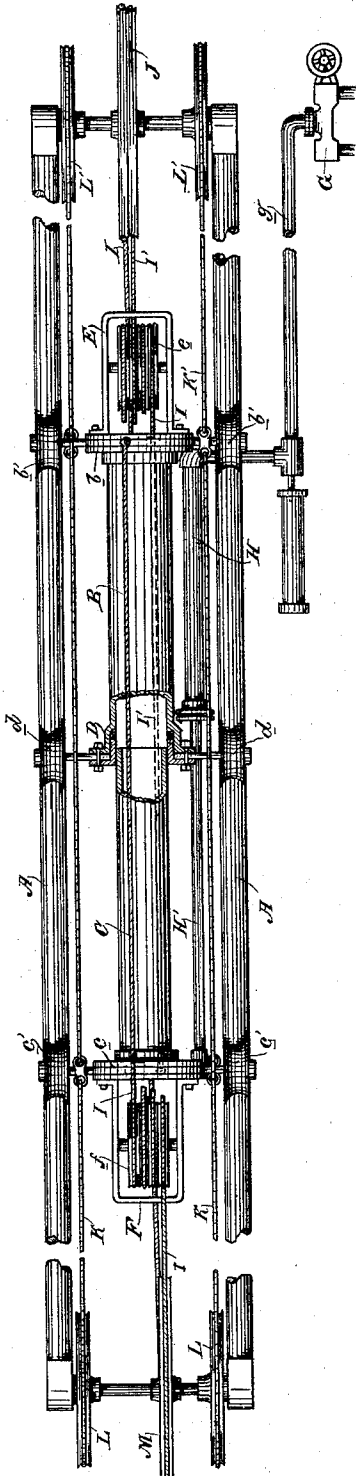
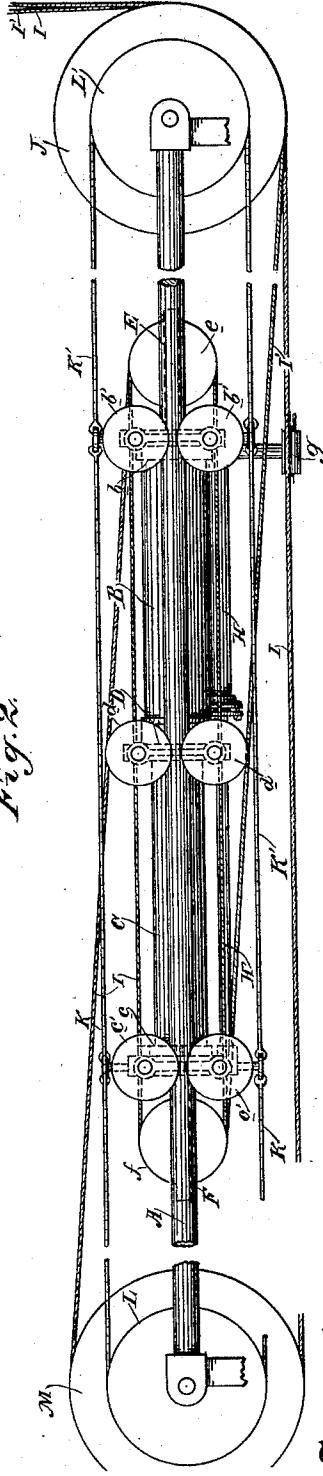


Fig. 2.



Witnesses,
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UNITED STATES PATENT OFFICE.

ALEXANDER J. McADAM, OF SAN FRANCISCO, CALIFORNIA.

HYDRAULIC ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 469,585, dated February 23, 1892.

Application filed November 9, 1891. Serial No. 411,404. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER J. McADAM, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented an Improvement in Hydraulic Elevators; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to that class of hydraulic elevators in which the pressure of the water is directed upon oppositely-moving parts, which are connected together, whereby they move in unison, and are also connected with the cage or car to effect its travel.

My invention consists in telescopic cylinders moving in opposite directions, said cylinders having sheaves over which the hoisting-ropes pass.

It also consists, in connection with said cylinders, of the telescopic or extensible water-pipes by which water under pressure is supplied to the cylinders and exhausted therefrom; and it finally consists in the combination of said cylinders and the connecting-chains by which they are enabled to move in unison.

The object of my invention is to provide a simple and effective hydraulic elevator.

Referring to the accompanying drawings for a more complete explanation of my invention, Figure 1 is a plan of my elevator mechanism. Fig. 2 is a side elevation of same.

Though my invention is applicable to both horizontally and vertically arranged cylinders, I have here shown the horizontal arrangement.

A is the stationary frame-work of the apparatus.

B is the outside or larger cylinder, and C is the inner or smaller cylinder. The cylinder C moves within the cylinder B, and the two are united by a suitable joint, stuffing-box, and connection, as is shown at D. This connection D has joined to its ends the carrying-wheels *d*, which move and travel upon the side rails of the frame-work A. There are four of these wheels *d*, two bearing under and two bearing over the side rails A. The end of cylinder B has a cap or head *b*, which is provided at its ends with carrying-wheels *b'*, there being four of these, two being under and two above the side rails A. The cylinder

C carries a head or cap *c*, the ends of which are provided with carrying-wheels *c'*, four in number, two being under and two above the side rails A. The head or cap *c* is hollow and communicates with the cylinder C. The head or cap *b* carries a frame E, in which are the sheaves *e*. A corresponding frame F is carried by the head or cap *c*, and said frame has the sheaves *f*.

G indicates the main operating-valve, from which the pipe *g* extends, said pipe being connected with a pipe H, located opposite the cylinder B. Into this pipe H telescopes the pipe H', the end of said pipe being connected with the hollow head or cap *c* of cylinder C.

I is one of the hoisting-ropes. This is connected at one end suitably with the head or cap *b* of cylinder B. It thence passes back and forth between the sheaves *f* and *e*, and extends upwardly, and its other end is to be connected suitably with the cage or car. In its course it also passes around end sheaves M and J.

I' is another hoisting-rope, the end of which is connected with the head or cap *c* of cylinder C, and passes back and forth over the sheaves *e* and *f* and under the fixed sheave J at one end of the frame A, and thence connected at its other end to the cage or car.

K and K' are the connecting chains, ropes, or cables by which the cylinders B and C are caused to operate in unison. One pair K of these chains is secured at one end to the head or cap *c*, and thence passes around the fixed end pulleys L, and is connected at the other end to the head or cap *b*. The second pair K' is connected with the head or cap *b* and thence passes around end pulleys L' and back again to the head or cap *c*, to which they are connected. These chains thus connected are practically endless ones, and they cause the cylinders to move in unison.

The telescopic cylinders are simple and practical in construction, avoiding the large amount of packing and number of stuffing-boxes necessary where pistons are used.

The operation is as follows: Water is admitted through pipes G *g* H and H' to cylinder C and effects the opposite movement of the two cylinders. As they withdraw from each other the hoisting-ropes are spread and the cage or car is elevated. As the water is ex-

hausted the weight of the car draws the cylinders together again. In their movements they are equally controlled by the connecting-chains $K K'$. The water-pipes, being telescopic, conform to the movements and positions of the cylinders.

In case it be desired to strengthen and make more powerful the apparatus, I could have two or more sets of telescopic cylinders mounted in the same general frame-work and having the same connections.

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

1. In a hydraulic elevator, the combination of telescopic cylinders, a water connection thereto, whereby they are moved in opposite directions, sheaves carried by each of said cylinders, and hoisting-ropes passing back and forth between said sheaves and connected with the cage or car, substantially as herein described.

2. In a hydraulic elevator, the combination of telescopic cylinders, a water connection thereto, whereby they are moved in opposite directions, sheaves carried by each of said cylinders, hoisting-ropes passing back and forth between said sheaves and connected with the cage or car, and endless chains, ropes, or cables connecting said cylinders, whereby they move in unison, substantially as herein described.

3. In a hydraulic elevator, the combination of oppositely-moving telescopic cylinders, sheaves carried by each of said cylinders, hoisting-ropes passing between said sheaves and connected with the cage or car, and an extensible water-pipe connected and communicating with the end of one of said cylinders, substantially as herein described.

4. In a hydraulic elevator, the combination of oppositely-moving telescopic cylinders, sheaves carried by each of said cylinders, hoisting-ropes passing between said sheaves and connected with the cage or car, an extensible water-pipe connected and communicating with the end of one of said cylinders, and endless chains, ropes, or cables connecting said cylinders to cause them to move in unison, substantially as herein described.

5. In a hydraulic elevator, the combination of the oppositely-moving telescopic cylinders having end heads or caps, sheaves carried by each of said cylinders, hoisting-ropes carried by and between the sheaves, the fixed water-pipe H , and the water-pipe H' , telescoping in said pipe H and communicating through the head or cap of one of said cylinders with said cylinders, substantially as herein described.

6. In a hydraulic elevator, the combination of the oppositely-moving telescopic cylinders having end heads or caps, sheaves carried by each of said cylinders, hoisting-ropes carried by and between the sheaves, the fixed water-pipe H , and the water-pipe H' , telescoping in pipe H and communicating through the head or cap of one of said cylinders with said cylinders, and endless chains, ropes, or cables connecting the cylinders for causing them to move in unison, substantially as herein described.

7. In a hydraulic elevator, the combination of the oppositely-moving telescopic cylinders $B C$, having the end heads or caps b and c , and the carrying-wheels of said cylinders traveling on a fixed frame, the sheaves of said heads or caps, the hoisting-ropes carried by the sheaves, and the extensible water-pipes H and H' , communicating through cap c with the end of cylinder C , substantially as herein described.

8. In a hydraulic elevator, the combination of the oppositely-moving telescopic cylinders $B C$, having the end heads or caps b and c , and the carrying-wheels of said cylinders traveling on a fixed frame, the sheaves of said heads or caps, the hoisting-ropes carried by the sheaves, the extensible water-pipes H and H' , communicating through cap c with the end of cylinder C , the end pulleys $L L'$, and the chains, ropes, or cables connected with the end heads of the cylinders and passing around said pulleys, substantially as herein described.

In witness whereof I have hereunto set my hand.

ALEXANDER J. McADAM.

Witnesses:

S. H. NOURSE,
H. F. ASCHECK.