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N. C. BASSETT.

OPERATING MECHANISM FOR HYDRAULIC ELEVATOR VALVES.

No. 476,861. Patented June 14, 1892.

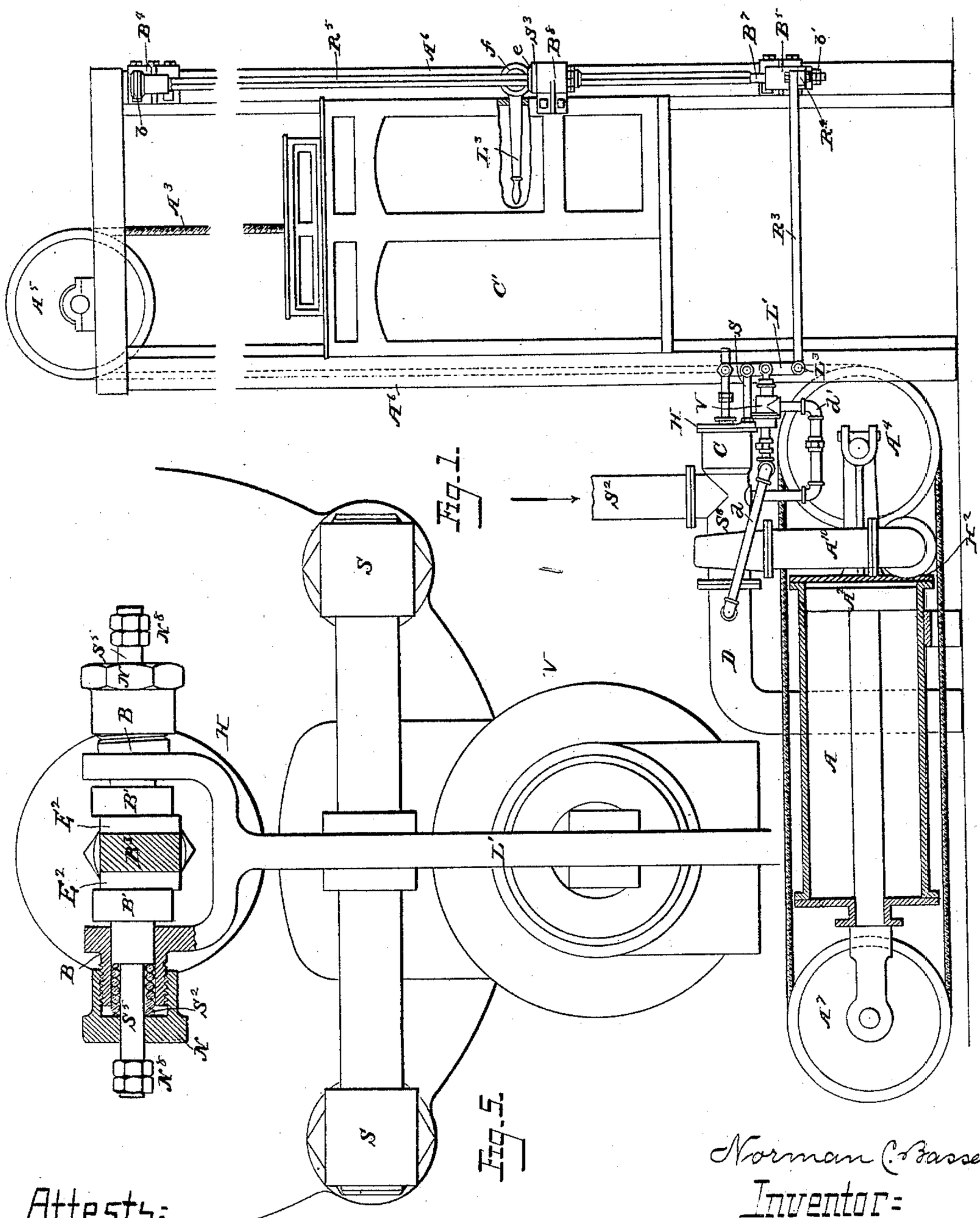

Fig. 1.

Fig. 5.

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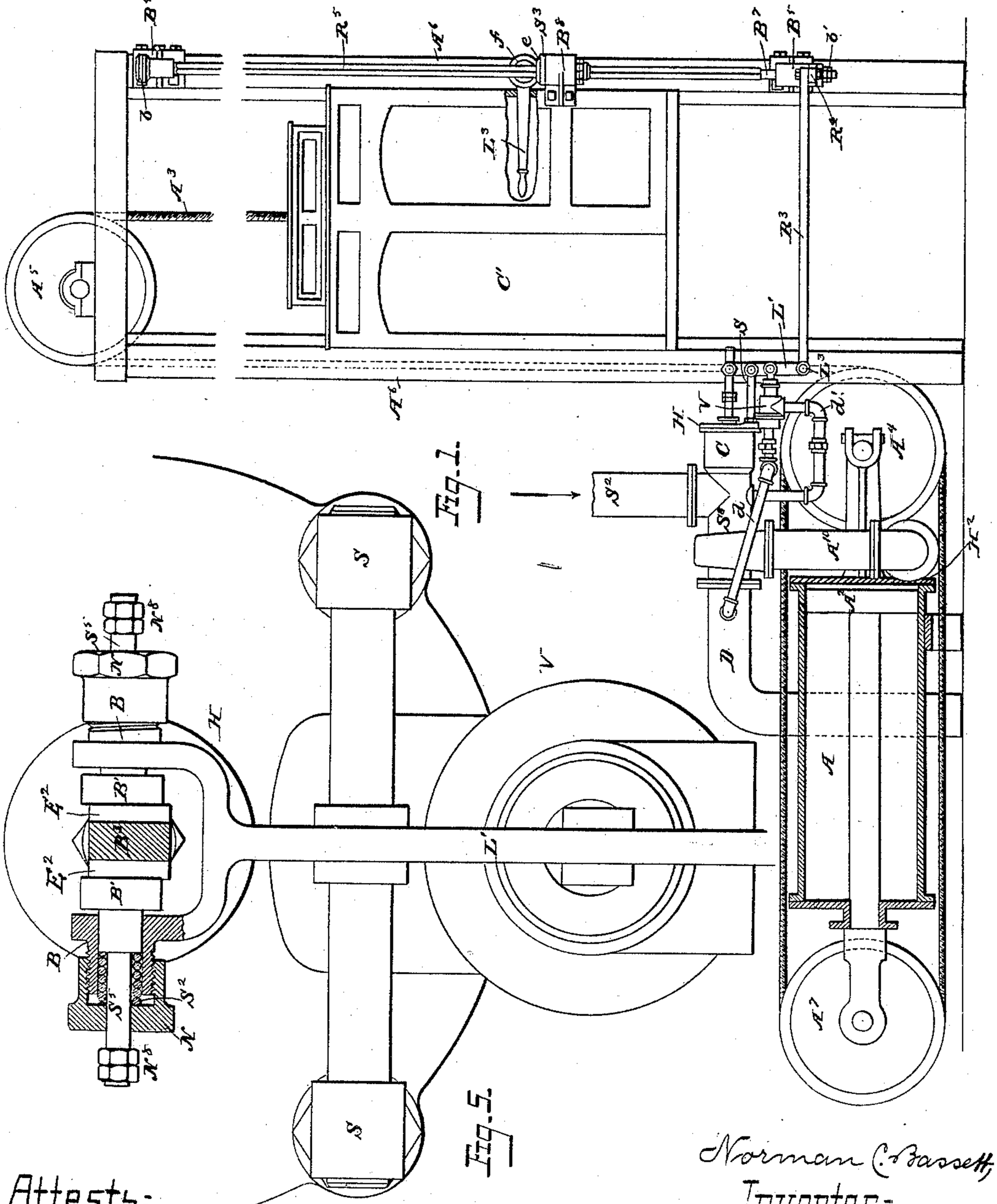

Fig. 1.

Fig. 2.

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Fig. 6.

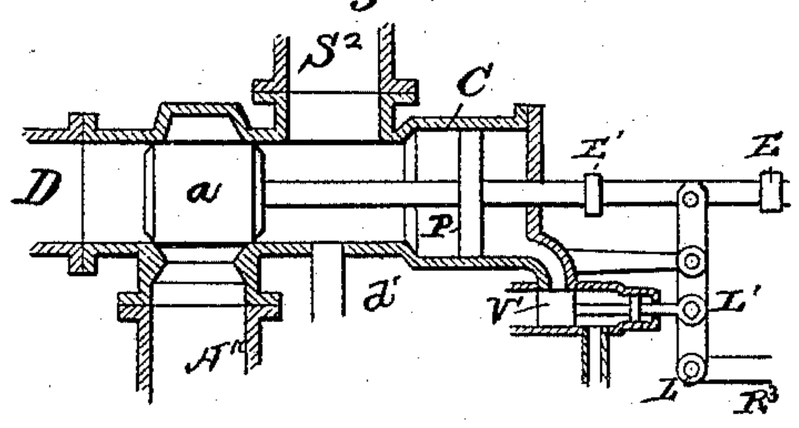


Fig. 2.

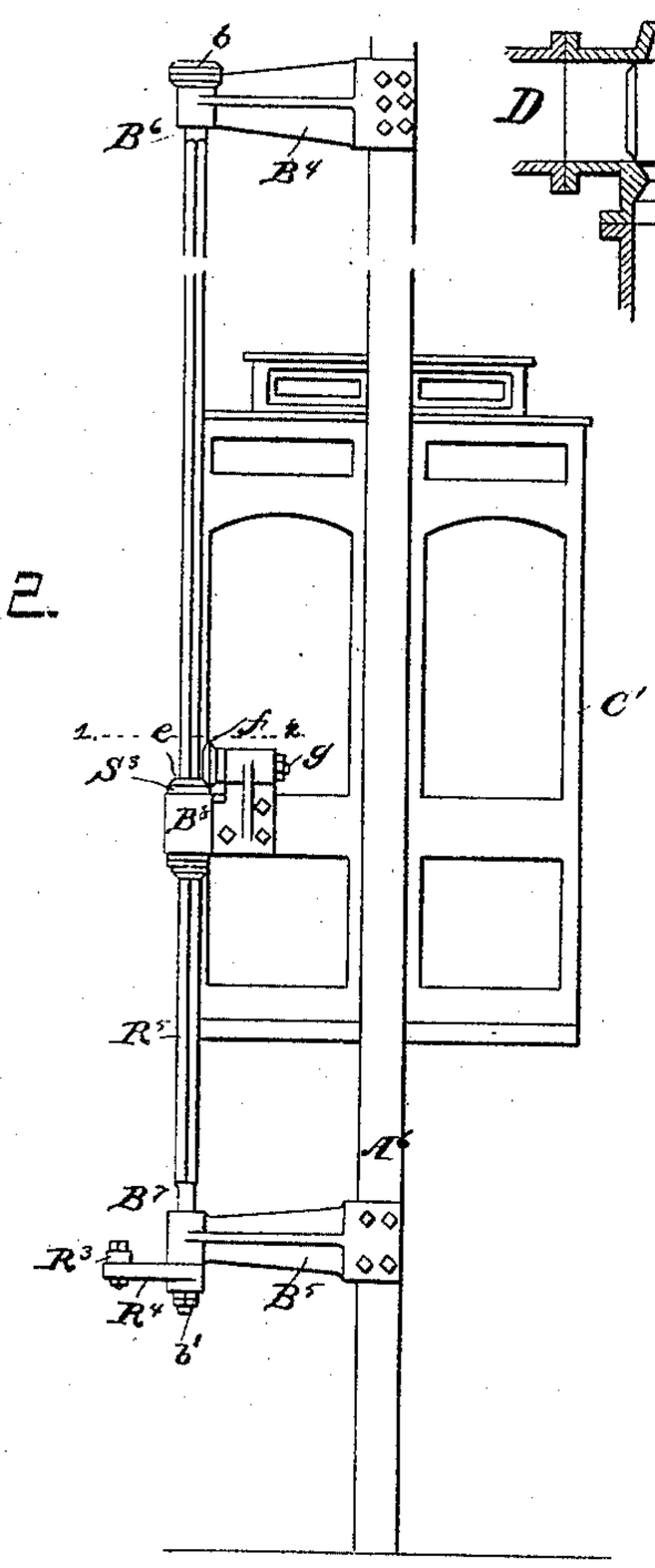
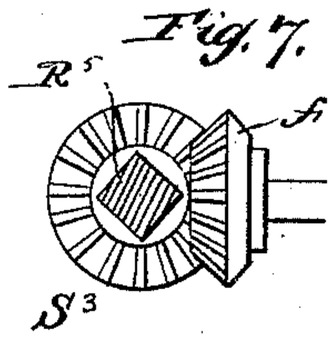


Fig. 7.



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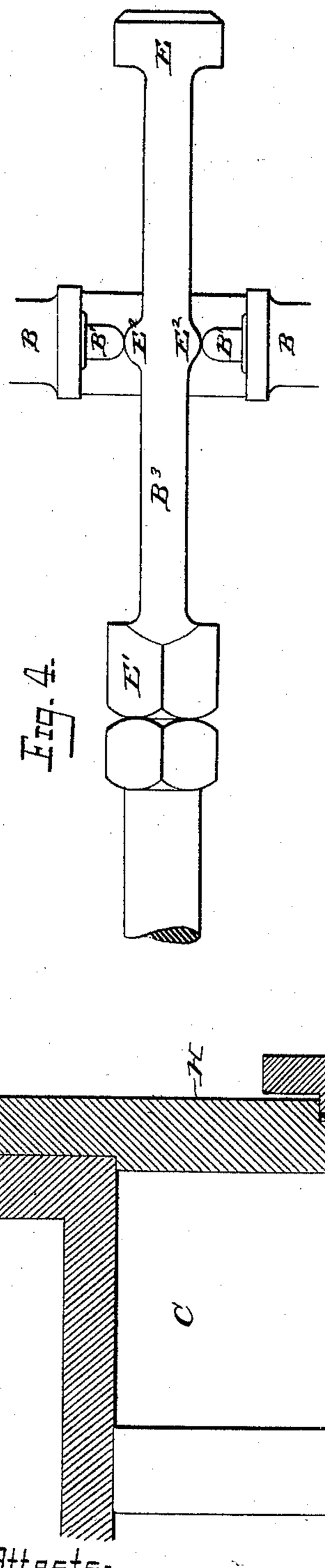

Fig. 4.

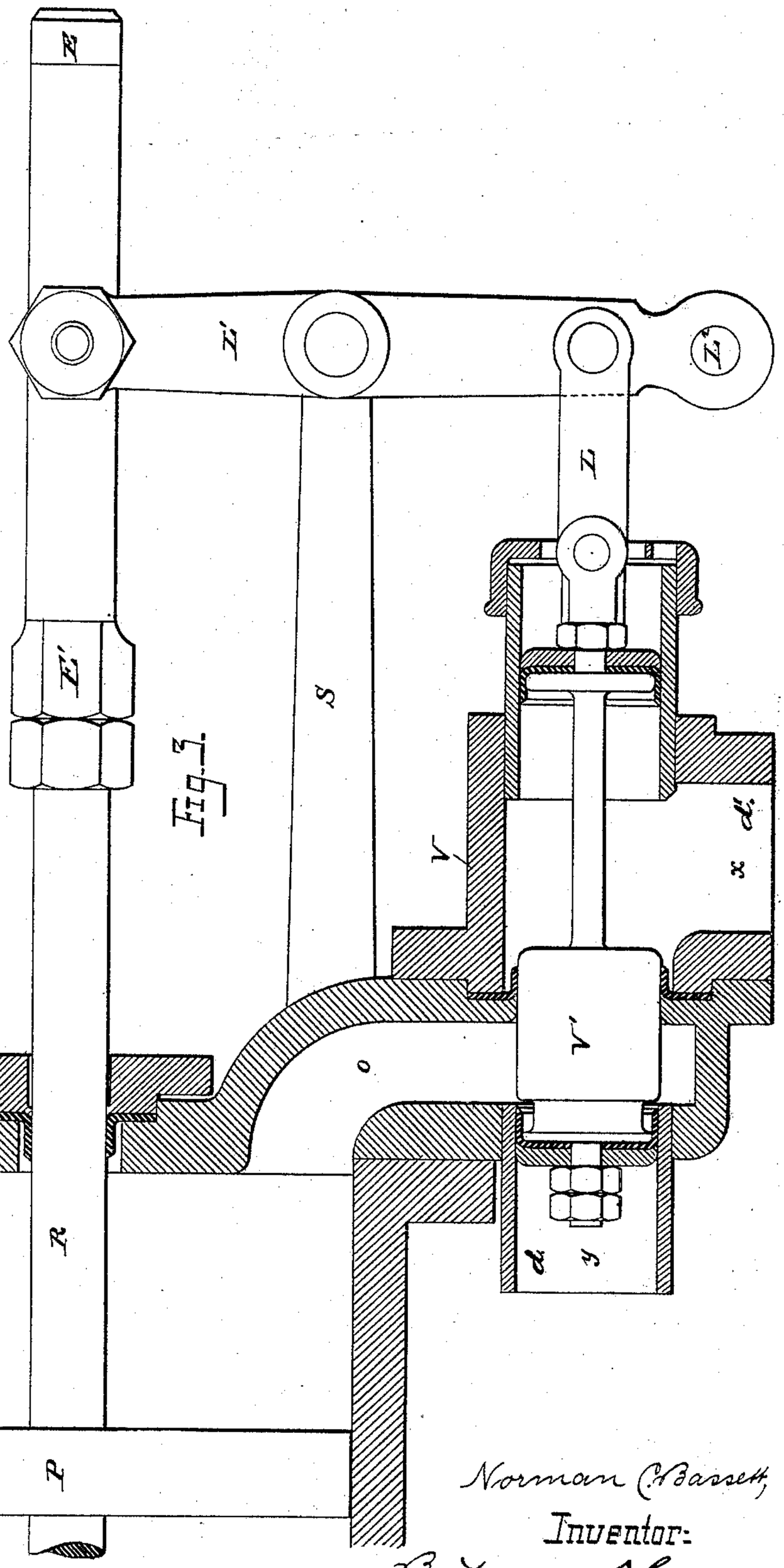

Fig. 3.

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UNITED STATES PATENT OFFICE.

NORMAN C. BASSETT, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE OTIS BROTHERS & COMPANY, OF NEW YORK, N. Y.

OPERATING MECHANISM FOR HYDRAULIC-ELEVATOR VALVES.

SPECIFICATION forming part of Letters Patent No. 476,861, dated June 14, 1892.

Application filed February 11, 1885. Serial No. 155,625. (No model.)

To all whom it may concern:

Be it known that I, NORMAN C. BASSETT, a citizen of the United States, and a resident of the city of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Operating Mechanism for Hydraulic-Elevator Valves, of which the following is a specification.

My invention consists in certain improvements in elevating apparatus whereby the manipulation of the large or main valve from the cage is effected with but little exertion on the part of the operator and without the use of the ordinary hand-ropes for conveying motion from the cage to the valve, the said improvements being fully set forth hereinafter, and illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation in part section of an elevator, illustrating my improvements; Fig. 2, an elevation showing the cage, one of the guides, and appliances for conveying motion from the cage to the valve devices. Fig. 3 is an enlarged section of part of the auxiliary-valve-operating engine. Fig. 4 is a plan of the piston-rod and connections shown in Fig. 3; Fig. 5, an end view of the parts shown in Fig. 3; Fig. 6, a section of the main valve-casing, valve, and auxiliary engine; Fig. 7, a section on the line 1 2, Fig. 2, enlarged.

In the drawings the elevating-engine is shown as consisting of a horizontal cylinder A, provided with a piston A^2 and piston-rod carrying a traveling sheave A^7, round which and round sheaves A^4 A^5 passes the cable or flexible suspensory A^3, the end of which is connected to the cage C′, traveling between guides upon vertical supports A^6 A^6. The motor fluid is conducted by a supply-pipe S^2 to a valve-casing S^8 and flows to and from the end of the working cylinder A through a pipe A^{10} and is discharged from the valve-casing S^8 through a discharge-pipe D. The valve-casing S^8 is enlarged at one end to form a cylinder C of a valve-actuating engine, the piston P of which is connected by a stem R with the main valve *a*, and the piston-rod R extends through a packed opening in the head H of the cylinder. The pressure of the motor fluid is made to operate through the auxiliary engine upon the valve *a*, so as to throw the latter by the adjustment of an auxiliary or engine valve V′, which slides in a chest V, communicating through a port *o* with the engine-cylinder at a point adjacent to the head H, and the auxiliary valve is connected by any suitable appliances with the cage C′, so that the attendant therein can, by adjusting such valve, control the engine, and thereby move the main valve *a* without the exertion which would be requisite if the same were moved by connections extending directly to the cage. To standards or stationary supports S is pivoted a lever L′, connected by a link L with the valve V′, and the casing of the latter is provided with a port *x*, communicating through a pipe *d′* with the water-supply—for instance, with the chest or casing S^8—and also with the discharge-port *y*, communicating with a pipe *d*, leading to the main discharge-pipe D. The shifting-rope or other appliance or device leading to the cage is connected to the end L^2 of the lever L′, so that by vibrating said lever the auxiliary valve V′ may be carried to either of the positions necessary to close the port *o* or open it to the discharge or to the supply. If the valve V′ is thrown to the right, the water between the piston P and the head of the cylinder C will pass to the discharge-port Y under the action of the pressure upon the left face of the piston P, and the latter will move to the right and open the pipe A^{10} into the discharge D, so that the main piston A^2 will be carried toward the head H^2 of the working cylinder by the weight of the cage in descending. If the valve V′ is moved to the left, the pressure from the supply upon the right-hand face of the piston will carry the said piston and valve *a* to the left and will admit the water under pressure against the right-hand face of the working piston A^2 and will carry the latter and the sheave A^7 to the left, thereby raising the cage. In order that the adjustment of the auxiliary valve may effect a corresponding and proportionate adjustment of the main valve *a*, a partial connection is made between the piston-rod R and the auxiliary valve through the medium of the lever L′, which is forked and provided at each end with a barrel B, a clamp composed of two sliding jaws B′, the stem S^5 of each of which extends through the said barrel and against which bears a spiral spring S^2, tending to thrust the jaw inward. The piston-rod R is

provided with shoulders E E′, midway between which on the sides of the piston-rod are rounded lugs or enlargements E^2, for a purpose described hereinafter. To limit the movement of the clamp-jaws B′ B′, check-nuts N^8 are screwed upon the threaded ends of the stems S^5. When the parts are in the position shown in Fig. 3, the elevator is at rest and the jaws B′ B′ are in contact with the enlarged lugs E^2 and are forced back into the barrels. If now the lever L′ is forced to the left, so as to carry the engine-valve V′ to the left and admit the pressure upon the right-hand side of the piston P, the jaws B′ will be carried to the right from the lugs E^2 and the piston P and main valve *a* will be carried to the left, thereby opening the pipe A^{10} and permitting the water to flow against the right-hand face of the working piston A^2 and move the latter to raise the cage. As the valve *a* nears its position at the left the lug E by contact with the upper end of the lever L′ will carry the latter to the left until it is in a vertical position and the valve V′ closes the port *o*, when the further movement of the valve *a* will be arrested, leaving the port leading to the pipe A^{10} wholly open. Should it now be desired to arrest the upward movement of the cage, the lower end of the lever L′ is carried to the right, when the pressure upon the left face of the piston P will carry the same toward the right until the lugs E^2 are brought against the jaws B′, when the lever L′ will be moved until it is in an upright position and the valve V′ has closed the port *o*, when the further movement of the parts will stop, at which time the valve *a* will close the end of the pipe A^{10} and the further movement of the main piston will cease. If it should now be necessary to lower the cage, the lower end of the lever L′ is moved to the right, permitting the water to discharge from the right of the piston P, when the latter will move to the right and the valve *a* will uncover the end of the pipe A^{10} and the cage will descend. The piston P will continue its motion to the right until the end of the pipe A^{10} is wholly uncovered, when the contact of the lug E′ with the upper end of the lever L′ will carry the latter to a vertical position, when the valve V′ will close the port *o* and the valve *a* will be arrested at the right of the end of the pipe A^{10}.

By the parts above described pressure is brought to shift the valve *a* to one side or the other of the pipe A^{10} to discharge the water from the main cylinder or admit it under pressure thereto, and the movement of the piston P in either direction causes the lever L′ and the valve V′ to be brought to a central position and arrests the valve *a* as it reaches the termination of its movement in either direction, or when it arrives in a position to close the pipe A^{10} upon moving toward the latter from either terminal position. While the frictional contact of the lugs E^2 with the lever L′ of the clamps thereof is sufficient to insure the movement of the lever with the piston-rod to close the port *o* and arrest the valve *a* in its mid-position, it is not so great but that the operator may readily carry the jaws past the lugs whenever it is necessary to move the lever L′ in either direction to shift the valve V′ and open the port *o* to start the cage in either direction. The port *o* is thus automatically closed by the action of the piston as soon as the valve *a* closes the pipe A^{10}, and also as soon as the said valve *a* reaches either of its terminal positions, and the lever L′ is capable of being adjusted independently of the piston-rod, but is always moved automatically by the latter at the termination of its proper movement, so as to close the port *o*.

It will be obvious that other means than those described for creating a frictional resistance to the movement of the lever L′ past a point midway between the stops E E′ may be employed.

The strength or grip with which the jaws act upon the lugs may be readily adjusted by using caps N, screwing upon the external threaded portions of the barrels B and capable of being set to compress the springs S^2 to any desired extent.

The engine-valve, as well as the main valve *a*, may be of different forms, according to the character of the hydraulic engine and of the valve-operating engine, and different connections between the piston-rod and the engine-valve may be employed for operating the said engine-valve positively and directly from the movement of the piston-rod. I am aware that various arrangements of auxiliary valves in connection with engines for operating the main valves of hydraulic elevators have been used; but my invention differs from those heretofore employed in securing the automatic closing of the auxiliary valve by connections between the piston-rod and the said valve, as set forth.

While the engine-valve may be operated from the cage through the medium of the ordinary shifting-rope attached to the lever L′, I prefer to operate the same through the medium of a vertical rod or shaft arranged in proximity to the path of the cage, connected to the engine-valve, and capable of being turned or locked from within the cage, whatever may be the position of the latter. One arrangement for carrying out this mode of operating the valve is illustrated in Figs. 1 and 2 of the drawings, in which R^5 is the rod or shaft, provided at the top and bottom with bearing-pieces B^6 B^7, adapted to sockets in brackets B^4 B^5. To prevent undue friction at the lower bearing end of the shaft R^5, the latter is provided at the upper end with a cap *b*, which bears upon the top of the bracket B^4 and supports the entire weight of the tube, this mode of support having the further advantage of preventing any springing or buckling of the shaft and maintaining it perfectly straight throughout. An arm R^4 is secured by nuts *b′* to the lower bearing-piece of the

shaft below the bracket B^5 and is connected by a rod R^3 to the end L^2 of the lever L′. Upon the shaft R^5 is fitted a tube or sleeve S^3 so as to slide easily upon the shaft without turning independently of the latter, and the said sleeve S^3, which is cylindrical externally, is fitted to a bearing in a bracket B^8, connected to the car, so as to be carried with the latter in its vertical movements. A bevel-pinion *e* is secured to or forms part of the upper end of the sleeve S^3 and gears with a beveled pinion *f* upon a shaft *g*, turning in a horizontal bearing in the bracket B^8 and carrying a lever L^3, which extends through a slot into the cage in a position convenient to be operated by the attendant. By raising or lowering the lever L^3 the attendant can rock the pinion *f*, and thereby turn the pinion *c*, and with it the sleeve S^3 and the shaft R^5, so as to swing the arm R^4 and vibrate the lever L′, this operation being effected at any point in the well in which the cage may be placed, and when the latter is moving or at rest.

The vertical shaft may, without departing from the principle of my invention, be supported in a different manner from that described, may be differently connected to the valve or valve-operating appliances, and different means may be used for turning the shaft from within the cage, as will be obvious to any skilled mechanic, and this mode of operating valves from a vertical shaft may be employed in those cases where the main valve is operated directly without the use of an auxiliary engine.

Although I have shown the auxiliary engine provided with a cylinder forming part of the main valve-casing, it will be apparent that the two may be wholly separated and independent of each other.

Without limiting myself to the precise construction and arrangement of parts shown and described, I claim—

1. The combination of the cage, the main operating-engine, an auxiliary engine connected to the valve of the main engine, a lever connected to the rod of the auxiliary engine by a clamp frictionally engaging the valve-rod and to the valve-rod, and having its fulcrum between the connections to impart a movement less in extent and opposite in direction from the piston to the valve, and connections, substantially as described, between the lever and cage, whereby the auxiliary valve may be moved from the cage independently of the main valve, while the movement of the latter is transferred to the auxiliary valve, substantially as and for the purpose described.

2. In a hydraulic elevator, the combination of the car, lifting-cylinder, controlling-valve, auxiliary cylinder C, piston P, rod R, having a continuation, as a bar B^3, and heads E E′, lever L′, link L, auxiliary valve V′, passage *o*, and a fulcrum on which the lever L′ vibrates, by means of which the piston P closes the valve V′ as the former approaches either end of its stroke, substantially as described.

3. The combination of the car, lifting-cylinder, main valve and valve-rod having projections E E′ E^2, auxiliary valve, and a connecting-lever between the two provided with a clamp, whereby the auxiliary valve while carried with the main valve may be moved independently thereof at all times, substantially as and for the purpose set forth.

4. The combination of the piston connected to the main valve of a hydraulic elevator, the piston-rod provided with the rounded lugs E^2, an auxiliary valve, and a lever pivoted to the stem of the auxiliary valve and having a movable connection with the rod of the piston through the medium of a clamp frictionally engaging the rod, substantially as described, whereby the friction is increased at one point when it engages with the said lugs E^2 of the connection without interfering with the positive independent adjustment of the lever, for the purpose set forth.

5. The combination of the cage, the operating engine and its valve, an auxiliary engine provided with a piston, piston-rod, valve, and valve-rod, and a lever connected with the cage and with the piston-rod by a clamp and with the valve-rod of the auxiliary engine and adjustable independently of the said piston-rod, whereby the auxiliary valve is moved by the movement of the auxiliary piston, but can be moved from the cage without the movement of said piston, substantially as and for the purpose set forth.

6. The combination of the main valve of an elevator apparatus and auxiliary engine provided with a piston and piston-rod and auxiliary valve provided with a stem, a lever connected with the auxiliary valve and provided with frictional connections between it and the piston-rod of the auxiliary engine, the cage of the elevator, and connections between the latter and the auxiliary valve, substantially as set forth.

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

NORMAN C. BASSETT.

Witnesses:
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