(No Model.) 3 Sheets—Sheet 1.

N. C. BASSETT.

AUTOMATIC REGULATING VALVE FOR HYDRAULIC ELEVATORS.

No. 348,610. Patented Sept. 7, 1886.

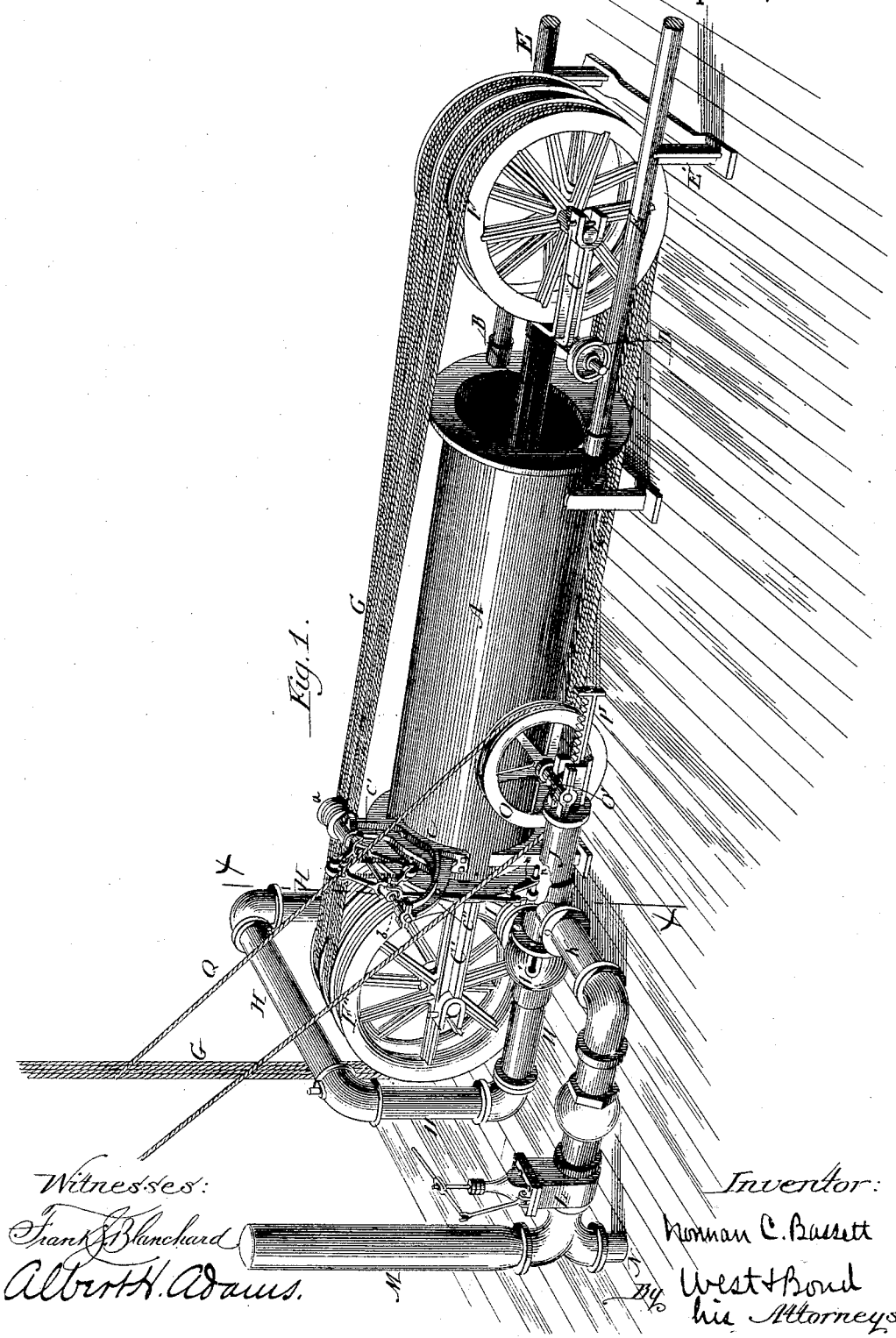

Fig. 1.

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(No Model.) 3 Sheets—Sheet 2.

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Fig. 2.

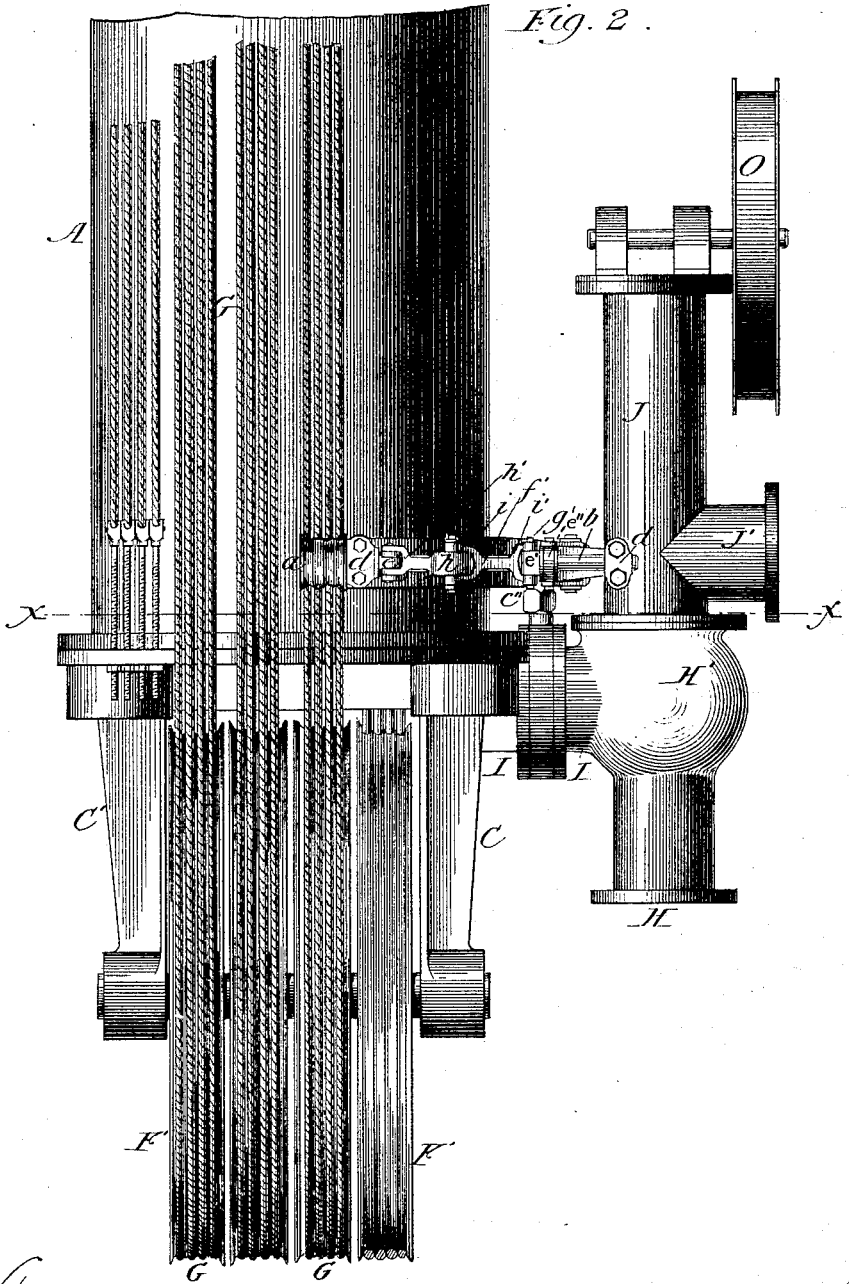

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Fig. 3.

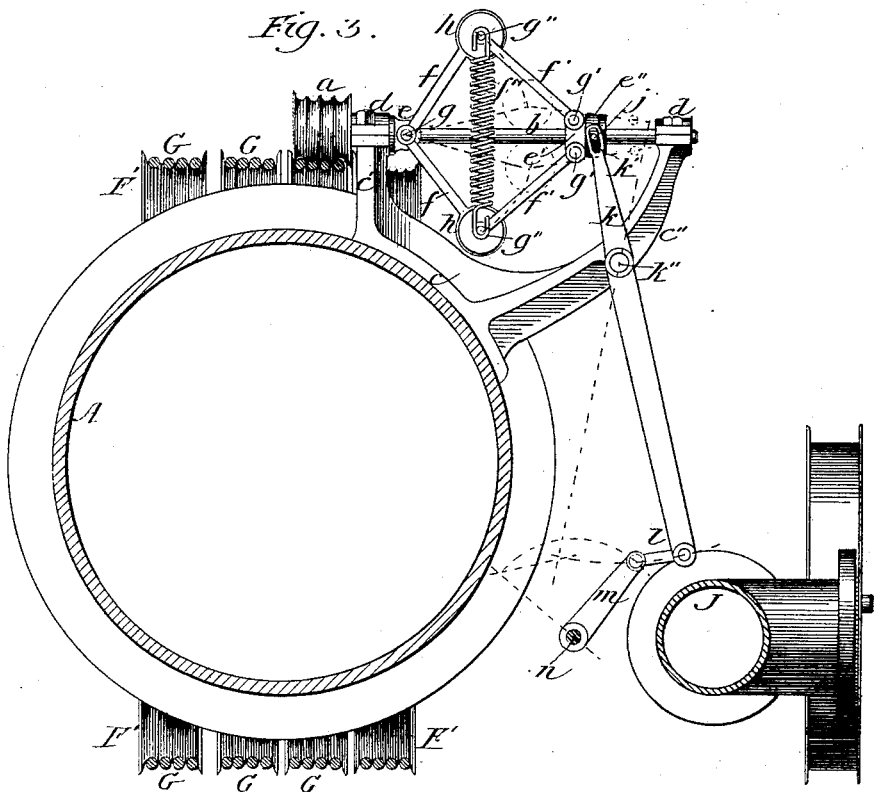


Fig. 4.

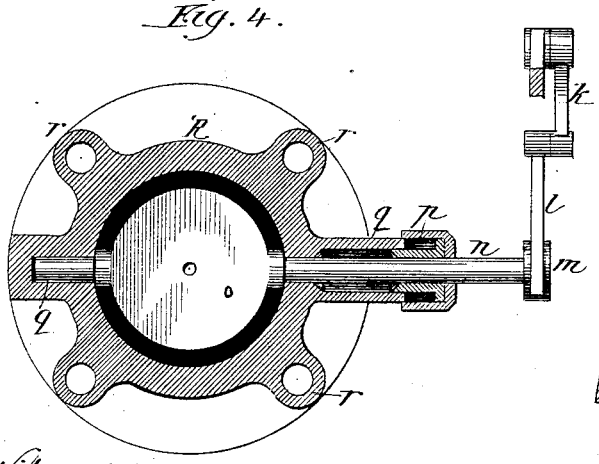
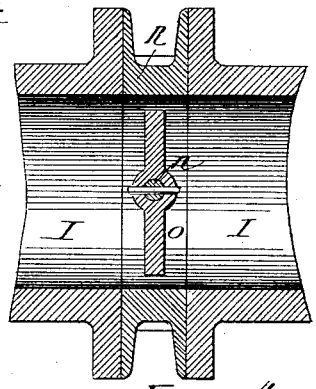


Fig. 5.



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UNITED STATES PATENT OFFICE.

NORMAN C. BASSETT, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE CRANE BROTHERS MANUFACTURING COMPANY, OF SAME PLACE.

AUTOMATIC REGULATING-VALVE FOR HYDRAULIC ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 348,610, dated September 7, 1886.

Application filed June 16, 1884. Serial No. 135,070. (No model.)

To all whom it may concern:

Be it known that I, NORMAN C. BASSETT, residing at Chicago, in the county of Cook and State of Illinois, and a citizen of the United States, have invented new and useful Improvements in Automatic Regulating-Valves for Hydraulic Elevators, of which the following is a full description, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view showing the device applied to a water-elevator cylinder; Fig. 2, an enlarged detail, being a plan of the receiving end of the cylinder with the regulating-valve and its guiding devices applied thereto; Fig. 3, a cross-section on line *x x* of Fig. 1; Figs. 4 and 5, details, being respectively a cross-section and a longitudinal section of the supply and discharge pipe with the regulating-valve therein.

This invention is primarily designed to be used with that class of water-elevators in which a horizontal cylinder is used to supply the power; but it can be used with other styles of cylinders than that shown, and has for its object to automatically control the speed at which the elevator-cage runs from the speed of the traveling cables which operate the cage.

The invention consists in the novel combination of devices, hereinafter described and claimed, for raising and lowering an elevator-car and automatically controlling the speed of the hoisting-cables and the elevator-car.

In the drawings, A represents the cylinder.

B is the piston-rod, attached at its inner end to a piston-head working in the cylinder A.

C is a yoke attached to the outer end of the piston-rod.

D represents wheels carried by the yoke C.

E represents rods forming a track or guide-way on which the supporting and guiding wheels D travel, which rods are supported on suitable standards or posts, E′, as shown.

F is a cable-wheel, formed, as shown, of a series of grooved wheels mounted on a shaft which has its bearings in the ends of the yoke C. The other cable-wheel, F′, is likewise formed and its shaft is mounted and has its bearings in the end of the yoke C′ on the receiving and discharge end of the cylinder A.

G represents the hoisting-cables, running over the cable-wheels F F′, as usual, and attached to the cage (not shown) in the usual manner.

H is the supply-pipe for supplying water to the cylinder from a street-main or other source of supply, which pipe is connected to a section, H′, in which is located the supply and discharge valve.

I is the pipe leading to the receiving end of the cylinder.

J is the pipe in which is located the stem for operating the valve in H′, and to which is attached the discharge-pipe.

K is the discharge-pipe.

L is the chest located in the discharge-pipe, and in which is a Peet or other quick-moving valve.

M is an ordinary siphon relief-valve, located at the end of the discharge-pipe.

N is a branch of the discharge-pipe leading to a sewer or other outlet.

O is a pulley-wheel, operated by the shifting cable, and having on its shaft a cog-wheel, O′.

P is a rack attached to the stem of the supply and discharge valve, and operated by the wheel O′.

Q is the shifting cable, running into the cage in the usual manner and over the wheel O.

R is an interposed ring, located between the end of the pipe I and its attachment to the valve-chamber H′.

These parts may be of the form of construction and arrangement shown, or of any other well-known form of construction and arrangement, and with the exception of the interposed ring R they are old and well-known devices for use in connection with water-elevators using a horizontal cylinder.

The practice heretofore has been to leave the pipe I with its full opening, and the result has been that any increase in the pressure of the water producing a corresponding increase in the pressure on the piston-head in the cylinder would cause an increase in the travel or speed of the cage, and in case of the descent of the cage increasing the outflow would be correspondingly increased, as no means have been provided to check either the inflow or outflow, and thereby prevent an increase of speed in the running of the cage beyond the maximum, except through the reversing-rope, and to automatically control the supply and

discharge and keep the cage at or below a maximum running speed constitutes the feature of this invention, and this object is accomplished by the following devices. A small grooved wheel, *a*, is secured to the end of a shaft, *b*, in such position as to lie in contact with the cables between the wheels F F', as shown in Fig. 1. The shaft *b* is supported on a frame formed of a base, *c*, and arms *c' c''*, the base having a curved face to fit the exterior of the cylinder A, to which cylinder it is secured by bolts or otherwise. The upper end of the arms *c' c''* are in the form of half-boxes, to receive other half-boxes and form the boxes *d*, in which the shaft *b* is mounted, so as to rotate freely. The shaft *b* has affixed thereto, inside of the arm *c'*, a collar or support, *e*, and has mounted thereon a second collar or support, *e'*, which is free to slide back and forth on the shaft, but is secured so as to rotate with the shaft, and this collar or support *e'* is connected to a ring, *e''*, in such manner as that the ring *e''* will move back and forth with the collar *e'*, but is non-rotating. The head or collar *e* has pivoted thereto the inner ends of two bars, *f*, by a suitable pin or pivot, *g*, the ends of each bar having a fork, *h'*, so formed that an arm of each fork lies adjacent to the face of the collar, while the other arm of each fork comes outside of the arm of the other fork lying adjacent to the collar, as shown in Fig. 2, by which means the center of the bars *f* with the collar *e* and shaft *b*, is properly maintained. The outer end of each bar *f* has an enlarged portion or head, *h*, which comes between a fork, *i*, of a bar, *f'*, the fork being pivoted to the head by a suitable pin or pivot, *g''*, as shown in Figs. 2 and 3. The inner ends of the bars *f'* are each formed with a fork, *i*, which straddles the collar or head *e'*, and is secured thereto by a suitable pin or pivot, *g'*, as shown in Figs. 2 and 3, and, as shown, a spring, *f''*, is provided, running from pivot *g'* to pivot *g''*, which spring is of sufficient tension to keep the outer ends of the bars *f f'* from being projected beyond a certain limit, and also furnishes the means for drawing the ends of the bars in as the rapidity of the rotation which throws them out decreases.

The collars or heads *e e' e''*, in connection with the bars *f f'*, pivoted thereto and to the head, form a governor, by means of which, from the rotation of the shaft *b*, the collar or head *e' e''* will be moved back and forth on the shaft, the collar being attached to the head by a spline or otherwise to allow of rotation.

The stationary collar *e''* has projecting out therefrom a pin or stud, *j*, which enters a slot, *k'*, in the end of an arm or lever, *k*, which lever is pivotally supported on the arm *c''* by a suitable pin or pivot, *k''*, as shown in Fig. 3, and the other end of this arm or lever *k* has pivoted thereto one end of a link, *l*, the other end of which is pivoted to an arm or crank, *m*, which arm or crank is securely fastened to the end of a shaft, *n*, on which shaft is mounted a disk-valve, *o*, which valve is of less diameter than the diameter of the ring R, which corresponds to the diameter of the pipe I, so that when the disk *o* is standing vertical, as shown in Figs. 4 and 5, there will be a space between its circumference and the interior of the ring R, as shown in Figs. 4 and 5. The shaft *n* has its bearings in suitable sockets, *q*, on the ring R, and, as shown, the open socket *q* is closed by a stuffing-box, *p*, through which the shaft *n* passes. The ring R is provided with ears *r*, through which and flanges on the pipe-sections I bolts can be passed, securing the ring between the pipe-sections, as shown in Fig. 5. The diameter of the disk *o* in relation to the diameter of the pipe I is one that when the disk is vertical or across the opening in the pipe the water, passing under a rapid inflow or outflow, will only be sufficient to produce a maximum speed for the cage, and as the inflow or outflow decreases in rapidity the disk will turn to increase the opening as required for the flow to produce a maximum running speed, or a speed less than the maximum, the result being that in no event can the speed of the elevator be increased beyond the maximum at which it is designed to be run.

The disk *o* is automatically operated to increase or decrease the opening in the pipe I, for the passage of water to regulate the speed at which the cage travels, as follows: The wheel *a* being in contact with the traveling cables, which run to the cage, its speed will be governed by the speed of the cable, and the speed of the cables on the ascent of the cage will depend on the travel of the piston-head in the cylinder, which travel depends on the pressure of the water from the street-main or other source of supply, the stronger the pressure the more rapid the inflow, and consequently the more rapid movement of the piston-head. The travel of the elevator-cage should not be beyond a certain maximum, and if the pressure of the water and consequent inflow were a regular one at all times the speed would be the same; but as the pressure of the water varies the speed will also vary, and this variation in the speed will be communicated to the wheel *a* and thence to the shaft *b*, and this shaft by its rotation will operate the governor formed by the collars *e e'* and bars *f f'*, which parts, as the speed increases beyond a certain point, will be acted on to draw the collar *e e''* inward, and this movement of the collar operates the lever *k*, and through the link *l* and crank or arm *m* turns the shaft *n* and the valve-disk *o* from a horizontal position, which position is the one it occupies under ordinary circumstances for the maximum speed for the cage to a vertical position, the degree of turning depending upon the movement of the governor, which in turn depends upon the rapidity at which the shaft is rotated from the wheel *a* and the cables. It follows from this that any increase in speed is at once communicated by the cables through the

wheel *a* to the shaft *b*, and through the connecting devices to the valve *o*, turning the valve to the point required to regulate the inflow to the cylinder and pressure on the piston-head to the extent required to make the speed the maximum or below the maximum. The descent of the cage in case it becomes too rapid, or beyond the maximum, produces a corresponding rapid travel of the cables to act on the wheel *a* and increase the rotation of the shaft *b*, which rotation, through the governor and connecting devices, will turn the disk or valve *o* and check the outflow, and cause the running speed of the cage to be reduced to or below the maximum speed.

As shown, the wheel *a* is operated from the cage-cables over the cylinder; but it is evident that this wheel could be located to be operated from such cables at some other point, or independent cables, running over wheels on the shaft of the wheels for the cage-cables, could be provided for operating this wheel *a*, and in place of the wheel *a* a system of gearing operated from one of the cable-wheels, or from the shaft of one of the cable-wheels, could be made to impart rotation to the shaft *b*, and in place of the governor shown other forms of governors or devices, which would act to automatically turn the valve, could be provided without departing from the spirit of this invention, which consists in locating a valve in the inlet and outlet pipe leading to the cylinder, and operating such valve automatically from the speed of the cage, by which means the cage controls itself as to the rate of speed at which it travels.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination of the hoisting-cylinder A, main pipe H, inflow and outflow pipes, a main valve for cutting off the sppply, and a supplemental valve, *o*, of less diameter than the pipe, operated by a governor for regulating without cutting off the supply, substantially as described.

2. The combination of the hoisting-cables G, the wheel *a*, in frictional contact therewith, the rotating shaft *b*, the governor turning with said shaft, and a turning disk or valve, *o*, arranged in the fluid inlet and outlet pipe to the hoisting-cylinder, and connected with the governor for controlling the position of the valve by the speed of the hoisting-cables, substantially as described.

3. The combination of the hoisting-cables G, the wheel *a*, in frictional contact therewith, the rotating shaft *b*, carrying said wheel, a governor turning with the shaft, a pivoted lever, *k*, connected with the governor, and a turning valve or disk, *o*, arranged in the fluid-supply pipe to the hoisting-cylinder and connected with said pivoted lever for controlling the position of the said valve or disk by the speed of the hoisting-cables, substantially as described.

4. The combination of the hoisting-cables G, the wheel *a*, in frictional contact therewith, the rotating shaft *b*, carrying the friction-wheel, the governor turning with said shaft, the pivoted lever *k*, connected with the governor, the turning valve or disk *o*, arranged in the fluid-supply pipe to the hoisting-cylinder, the crank *m*, rigidly secured to the shaft of the valve or disk, and the link *l*, connecting the crank with the pivoted lever for controlling the position of the valve or disk by the speed of the hoisting-cylinder, substantially as described.

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