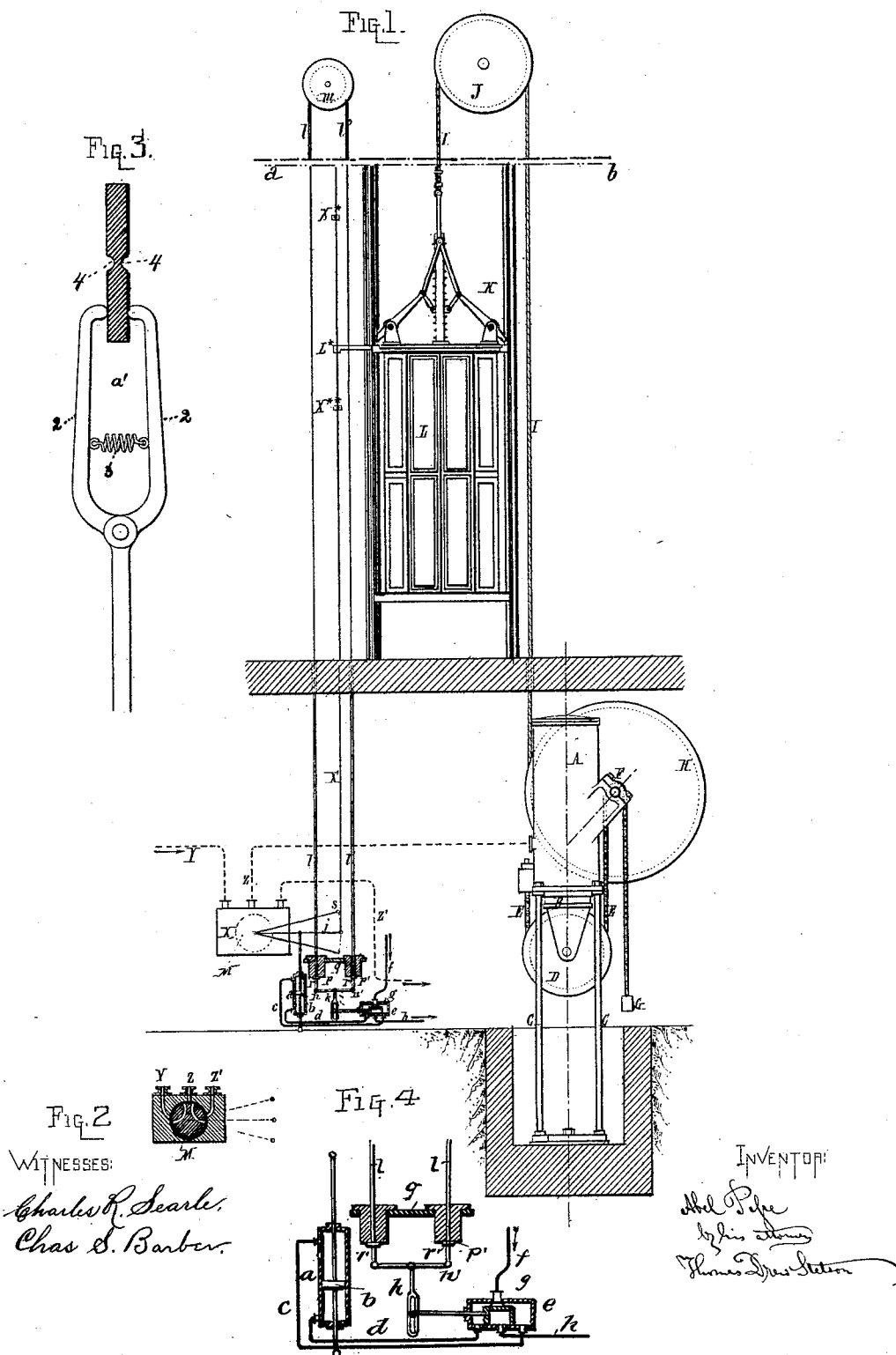


(No Model.)

A. PIFRE.
ELEVATOR.

No. 500,241.

Patented June 27, 1893.



UNITED STATES PATENT OFFICE.

ABEL PIFRE, OF PARIS, FRANCE.

ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 500,241, dated June 27, 1893.

Application filed June 26, 1890. Serial No. 356,916. (No model.)

To all whom it may concern:

Be it known that I, ABEL PIFRE, of Paris, France, have invented a certain new and useful Improvement in Elevators, of which the following is a specification.

The improvement applies to elevators of all kinds, for carrying passengers or freight up and down in buildings, operated by the pressure of water acting on a piston working in a cylinder. I employ a piston and cylinder of large diameter and relatively short stroke, and communicate the motion to the elevator car through multiplying mechanism. The hydraulic force may be obtained by pumping. So far the apparatus is of a well known and long approved character.

The accompanying drawings form a part of this specification, and represent what I consider the best means of carrying out the invention.

Figure 1 is an elevation showing all the novel parts. Fig. 2 is a sectional view of the main valve for controlling the admission of the water to the hydraulic cylinder. Fig. 3 is a detail view of a spring clamp for use between the main valve and the piston for adjusting said valve. Fig. 4 is an enlarged detail of the piston and other parts shown at the lower left hand of Fig. 1.

Similar letters and numerals of reference indicate like parts in all the figures.

The cylinder A incloses a piston B, of which the head is guided by rods C. The piston carries a pulley D, which operates a pitch chain E, of which one extremity is attached to the cylinder A, and the other is carried over a pinion F, keyed upon the axis of the drum H, on which latter is wound the hoisting cable I, which raises and lowers the car L, by the aid of a pulley J. The car carries clamps which on the fracture of the supporting mechanism grasp the guides W. The construction insures that these safety clamps shall take hold with certainty and with force. The weight of the car, and any motion which it may have commenced to attain in the descent, contributes to insure the closing of the clamps on both of the guides.

G is a slight weight carried on the free end of the pitch chain E, which serves to insure its engagement with the pinion F.

The water which operates the piston B is

received through a pipe Z from a large cock or valve mounted in the box X, and which receives its water under pressure through a pipe Y from an elevated reservoir or other source not shown. To lower the car, the water is allowed to escape through the pipe Z'. The large valve M which controls this water may be turned by sufficient force into either the upper position, in which the car will be lowered, the lower position, in which the car will be raised, or the middle position, in which it will be held stationary. I provide for operating this cock with ease, and for holding it with certainty in any position in which the attendant may choose to set it, either in the position to raise or to lower the car at full speed, or to move it slowly, or to hold it.

The cock or valve M is controlled by a lever j, which is connected by a short link to the rod of a small piston a, which is capable of working in a sufficiently long cylinder b, to the ends of which are connected pipes c d, which communicate with a box e, receiving water at full pressure through a pipe f, and discharging it through a pipe h, controlled by a valve g. When this valve g, which is small and easily worked, is moved to the right, the water received through the pipe f flows through the pipe d into the bottom of the cylinder b, and forces the piston a upward, carrying the lever j upward and setting the large cock M in the position to release the water of the cylinder A allowing it to escape through the pipes Z and Z', and the car L to be lowered. When on the contrary the valve g is shifted to the left, the water from the pipe f flows through the pipe c into the top of the cylinder b, and the piston a is urged downward. This carries the lever j down, and conditions the valve M to admit the water from Y through the pipe Z, to depress the plunger B and raise the car L. When the valve g allows the water to enter through the pipe d, and to raise the piston a, it also allows the water to escape from the top of the cylinder b through the pipes c and h, and when the water is admitted through the pipe c to the top of the cylinder b, it is discharged through the pipes d and h from the bottom.

The connection of the small piston a to the lever j, is formed by a spring catch a', one

form of which is shown in Fig. 3, 2 being pivoted jaws drawn together by a spring 3 to engage notches 4. The inclination of the surfaces is such that on bringing the parts 5 into the proper relation they will automatically engage and they will remain engaged under all ordinary conditions. The force of the water acting on the piston *a*, to raise it, will raise the valve and lever *j*, and when the 10 motion is reversed the descent of the piston *a* will lower the lever *j*. But when any sufficient force is applied to the lever *j* by other means, the clamp will release its hold thereof and allow the piston *a* to remain stationary 15 while the lever *j* is raised or lowered by such other force.

Irrespective of the release of clamp *a'*, the main valve *M* can be moved by the rod *X'* when the supplementary valve *g* is in the 20 middle position, the piston *a* moving with the lever *j* and main valve *M*. This movement of the piston *a* takes place because the water from one side of the piston *a* can flow to the other side of the piston through the passages 25 *c* and *d* and the chest of valve *g*, which latter when in its central position puts both of the said passages in communication with the valve chest.

The position of the valve *g* is controlled by 30 a T-shaped lever *k*, turning on a fixed center, and connected by links *n n'* with the ends respectively of a cord or small wire rope *l l'*, which extends the height of the building, running over a pulley *m* at the top. Two 35 considerable weights *r r'* are mounted on this cord in the position shown, each provided with a flange by which it may rest in a fixed support *q*. When one part *l*, and its attached weight *r*, is raised, the other part of the cord 40 *l'* is lowered, and the lever *k* is turned, and the valve *g* is thrown to the left to lower the piston *a*. When the cord is worked in the opposite direction, the part *l'* being raised, with its attached weight *r'*, and the part *l* being 45 lowered, the lever *k* is turned in the other direction, and the valve *g* is set to the right to raise the piston *a*. In each case, one of the weights, *r* or *r'* is raised and the other is not correspondingly lowered, but remains suspended idly in the support *q*. It follows that 50 the gravity of the weights *r r'* exerts a force to throw the lever *k*, and consequently the valve *g* into the middle position. These weights are of sufficient force to overcome 55 the resistance, and automatically throw the parts into this middle position whenever the cord *l l'* is liberated. It will be observed that the throwing of these parts into the middle position does not necessarily or usually throw 60 the piston *a* and its connections into the middle position. On the contrary my mechanism will hold the piston *a* and its attachments in any position in which they may be when the cord *l l'* is liberated. If the attendant wishes 65 the car to stand still, he releases the cord *l l'* when the piston *a* is in its middle position. Then the plunger *B* and the car stand mo-

tionless, and the mechanism may be depend-
ed upon to hold the parts in that condition
for an indefinite period. When on the con- 70
trary the attendant wishes the car to rise,
and to continue rising, he releases the cord
l l' after he has held the valve *g* at either ex-
treme of its motion for so long a time as to
move the piston *a* into its lowest position. 75
When he wishes the car to sink, he releases
it after he has held the valve *g* a sufficient
time in the other extreme position to lower
the piston *a*. Whenever the car has traveled
nearly far enough, and the attendant wishes 80
to stop it, he operates the cord *l l'* to throw
the valve *g* in the proper direction, and the
piston *a* at once responds by moving upward
or downward and turns the lever *j* and its
connections, shifting the valve *M* in the re- 85
quired direction and to the required extent
to stop the car, or to reverse its motion.

X' is a rod connected to the extremity of
the lever *j*, and extending the height of the
building. Its upper end may terminate in a 90
weighted cord running over a pulley, or by
other convenient means of supporting it which
it is not necessary to indicate. When the car
attempts to rise above the upper floor of the
building, a stop *L** on the car strikes the stop 95
*X** on the rod *X* and raises it, thus elevating
the lever *j* and immediately arresting the as-
cent of the elevator. When at the other ex-
treme of its motion the car *L* commences to
descend below the lower floor, the same stop 100
*L** or another, strikes the lower stop *X***, and
depresses the lever *j* and operates to arrest the
descent.

Modifications may be made without de-
parting from the principle or sacrificing the 105
advantages of the invention.

I have shown the cords *l l'* as extending up
and down outside of the car. They might be
worked in such a position by an attendant who
should reach out from the car to operate them. 110
But it may be preferable in ordinary cases to
lead the cord up and down through the car.

I claim as my invention—

1. The combination in an elevator with a
hydraulic hoisting cylinder, of a main valve, 115
a cylinder and piston for operating said main
valve, a supplementary valve for regulating
the position of said piston, a rod provided
with stops thereon and connected with said
main valve, and a cord connected with said 120
supplementary valve, substantially as de-
scribed.

2. In combination with the hydraulic cylin-
der of an elevator, a controlling device having
the following elements—first a main valve, 125
adapted to remain in the position to which it
may be adjusted, and having a port for com-
munication with a source of motor fluid an
exhaust port, and a port for communicating
with said hydraulic cylinder, second a cylin- 130
der and piston for adjusting said main valve,
third a supplementary valve connected by
passages with said cylinder and movable to
two extreme and a middle position, and fourth

weights for automatically bringing said supplementary valve to said middle position, substantially as described.

3. The combination with the hydraulic cylinder of an elevator, of a main valve, a cylinder and piston for operating said valve, a supplementary valve for controlling said piston, and means for operating said supplementary valve comprising a lever in the form of
to a T, ropes attached to two ends of the T, a

weight for each of said ropes arranged to be lifted thereby and a suspending rest for said weights, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribers
ing witnesses.

ABEL PIFRE.

Witnesses:

JOSEPH TOUNIER,
R. G. PRESTON.