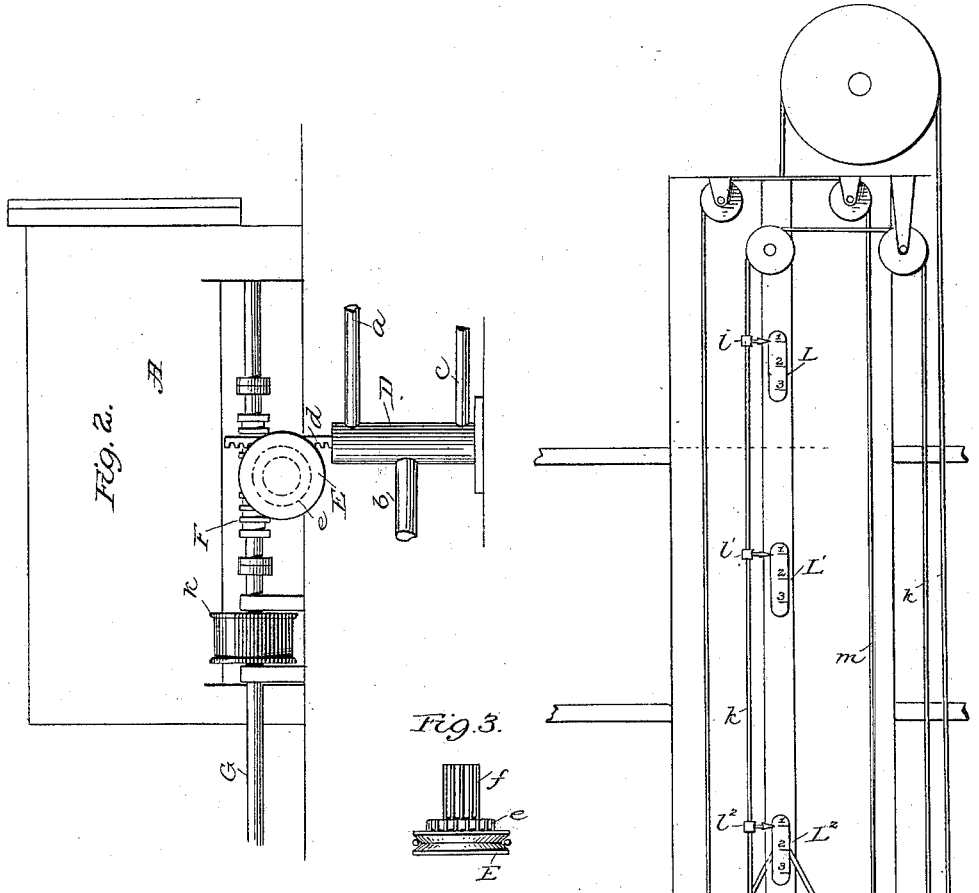
(No Model.)

F. M. REYNOLDS & G. C. TEWKSBURY.

ELEVATOR.

No. 302,589. Patented July 29, 1884.



Attest:

F. L. Middleton

Inventor

Frank M. Reynolds

George C. Tewksbury

by Joyce & Spear

Attys.

UNITED STATES PATENT OFFICE.

FRANK M. REYNOLDS AND GEORGE C. TEWKSBURY, OF NEWARK, N. J.

ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 302,589, dated July 29, 1884.

Application filed December 5, 1883. (No model.)

To all whom it may concern:

Be it known that we, FRANK M. REYNOLDS and GEORGE C. TEWKSBURY, of Newark, in the county of Essex and State of New Jersey, have invented a new and useful Improvement in Elevators; and we do hereby declare that the following is a full, clear, and exact description of the same.

Our invention relates to elevators. Our object is to adapt the automatic system shown in Reissued Letters Patent heretofore granted George C. Tewksbury, and numbered, respectively, 10,191 and 10,192, to a hydraulic elevator, and to combine the automatic with the hand operating system.

Our invention consists, essentially, in the combination of the automatic stop mechanism with the hydraulic elevator, whereby any one of the series of stops or projections may be set to come into contact with the moving parts of the apparatus connected more or less directly with the car, for the purpose of operating the valves which control the flow of the fluid.

It consists, further, in combining the automatic with the hand operating system.

It consists, also, of an adaptation of our self-adjusting mechanism shown in an application filed by us in the United States Patent Office of even date herewith, said self-adjusting mechanism consisting of means whereby the moving stud upon the apparatus, which strikes the projection upon the valve-shifting mechanism, is made to operate the valve gradually, whether coming in contact with the said projection upon one side or the other.

Our invention also includes details of construction subordinate to the leading features of the invention, all as hereinafter fully explained.

In the accompanying drawings, Figure 1 shows a side elevation of the essential parts of our improved elevator. Fig. 2 shows the mechanism for operating the valves on an enlarged scale. Fig. 3 is a detail view hereinafter explained.

In Figs. 1 and 2, A represents the cylinder of the hydraulic elevator, shown in a horizontal position, but which may be placed in a perpendicular position, if desired. The pulley B is supported upon a bracket, and the pulley B′ is carried on the piston at the opposite end of the cylinder, these pulleys operating with the hoisting-rope C in the ordinary manner. The apparatus is single-acting, the cylinder being open on the left-hand end, and the water is admitted through the pipe *a* through a three-way valve of ordinary construction in the cylinder D. A pipe, *b*, admits the water to the cylinder D, which is discharged through the pipe *c*. The water, when discharged, returns through the pipe *a* and the valve to the cylinder D. At the stem of the valve *d* is a rack-bar, which meshes into a pinion, *e*, fixed to the pulley E. Concentric with and attached to the pinion *e* is another pinion, *f*, which meshes into the circular rack F on the shaft G. This shaft is adapted to rock in suitable bearings in which it has some sliding movement. This shaft carries fixed collars *g g* and projections or studs *h h*, which in construction and operation are like those shown in Letters Patent No. 280,670, granted to us July 3, 1883. A stud, H, fixed to a cross-head of the pulley B′, and sliding in ways or guides as the pulley advances or recedes, strikes the collars at both limits of its movement, and between these limits, at proper times, determined by the position of the car in respect to the various floors, it strikes the projections *h h*. The general construction and operation is the same as that in the aforesaid patents of Geo. C. Tewksbury, where the projection on the car strikes projections on vertical rods in order to ship the belt to arrest the movement of the car.

In our Patent No. 280,670, referred, to the shaft (corresponding to the shaft G in the present application) acts in the same general manner through intermediate devices to ship the belt. In the present invention shaft G is made to operate the valve by the same kind of movement as that described in the aforesaid patents, and more particularly in Patent No. 280,670. Movement of the pulley B′ with its cross-head carrying the stud H against the described projection upon the shaft G will impart to that shaft longitudinal movement carrying with it the rack F, which rotates the pinions *f e*, thus moving the stem *d* of the valve.

The arrangement and adjustment of the parts are such that, supposing the pulley B′ to start from the position shown in Fig. 1—that is, with the elevator down—its motion to the left will bring it in contact with that particular one of the studs *h* which happens to be in line with it. In this case it will be understood that water passing in the cylinder behind the piston, and the elevator coming up, when the stud H reaches this stud *h* it carries it along with itself, thereby shifting the valve until it closes the water-passage, shutting off the supply from the cylinder. As soon as this is done, the pulley stops and the apparatus remains in that position. It will be understood that all this impelling mechanism heretofore described is to be located at some distance from the elevator. In the present embodiment, as shown, it is in the basement beneath the elevator. In order, therefore, that means may be provided for turning the shaft G at the will of the attendant, whether in the car or upon any floor, we have provided a rope *k k*, which is wound in opposite directions upon the drum K, splined upon the shaft G. This rope passes over pulleys, as shown in Fig. 1, and carries indexes *l l′ l²*, and the rope may be arranged either in the car or in the elevator-well, within reach of an attendant upon the floor of any story. The drum K, held between the shaft-bearings, causes longitudinal movement on the shaft, and when the rope is drawn the shaft G is turned. The index-fingers *l l′ l²* on the rope point to index-plates L L′ L² in suitable positions on the wall of the elevator-well, and sufficiently near to the path of the index-finger to insure certain indication of the position.

The index-plate L is marked, as at 1 2 3, to indicate the different floors, and the arrangement and marking are made to correspond to the position of the studs *h* on the shaft G, so that when the rope *k* is drawn to bring the index-finger *l* to any given number on the plate it will turn the shaft G to bring the stud *h* adapted to arrest the elevator at that floor into line with the stud H, and this, as before explained, will shift the valve to arrest the motion of the piston at that point. In order to give the valve further movement to cause the piston to recede and the car to descend, we use the ordinary hand-rope, *m*, which passes over suitable pulleys, as shown in Fig. 1, and around pulley E, whereby the rope *m* may be used to shift the valve to any required position by moving the valve farther than the position indicated in the above description, and water is thus allowed to escape, the piston returns, and the car descends. The rope *k* may then be used to set the shaft G to any one of its studs *h* in position for arresting the car at any desired floor, and then, by the rope *m*, the car may be started. By this means the apparatus is adapted to be operated either from the car or from any given floor, and can be caused by the attendant upon one floor to move from another and return from that other in the same manner as shown in the aforesaid patent of Tewksbury; or it may be operated in the ordinary manner from the car. The motion of the shaft G gradually moving the valve causes the apparatus to stop with a gentle motion, and relieves it from any shock or jar. The rack F is not rigidly connected to the shaft G, but is formed upon the sleeve adapted to slide within certain limits upon said shaft. These limits are determined by fixed collars *o*. The shaft G, when moved by the stud H, has, therefore, some movement before one of the collars *o* comes into contact with the sleeve. The purpose of this is that the valve may be moved gradually, whether the car be going up or down, for it will be observed that when the stud H moves to the left and strikes upon the right-hand side of the stud *h* it will start the valve from its open position, and should move it sufficiently to close it; but supposing the valve to be opened for the discharge of the water, and the car to be descending by its own weight, it will move the stud H to the right, and if it be desired to arrest the car in its downward movement at any given floor the stud *h* will be struck upon the left-hand side by the right-hand side of the stud H. This will bring the parts out of adjustment to an extent equal to the two studs, and will cause the car to go by the floor instead of stopping gradually at it, and to compensate for this we give the rack-sleeve F sufficient movement upon the collars *o*.

We do not claim this, broadly, as we have shown it in another application of even date herewith, and in this application claim it only as a hydraulic elevator.

We neither claim nor limit ourselves to the special construction and arrangement of the cylinder, pulleys, and valves. As to the hydraulic apparatus, what is shown is a well-known form, and any other equivalent form may be used in its place.

We claim as our invention—

1. In combination with the valve of a hydraulic elevator, mechanisms provided with a series of studs adapted to be brought into line with the moving stud upon or carried by the elevator-piston, whereby the valve is automatically moved, substantially as described.

2. In combination with the valve, the shaft G, adapted to be rocked by the rope *k*, and carrying studs adapted to be brought into line with and moving by the stud carried by the elevator-piston, substantially as described.

3. The combination of the shaft with means for rocking it, and with its studs, and means for causing the piston to move the shaft by contact with the studs, and a rack having limited movement upon the shaft, and connected to the stem of the valve, substantially as described.

4. In an elevator, and in combination, an automatic device for arresting the impelling mechanism, capable of being set at any given

floor to arrest at any given floor, and means, substantially as described, within reach of the attendant upon the car, whereby the impelling mechanism may be operated to stop or start by the attendant, substantially as described.

5. The combination, with the described automatic arresting mechanism, of a rope adapted to set the studs for arresting the car at any given floor, and the index finger and plate *l* L, substantially as described.

6. The combination of the cylinder A, pulleys B B′, stud H, shaft G, studs *h*, rack F, and connections, with the valve-stem, and means for rotating the shaft G, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

FRANK M. REYNOLDS.
GEO. C. TEWKSBURY.

Witnesses:
S. R. NORRIS,
M. E. CYPHERS.