

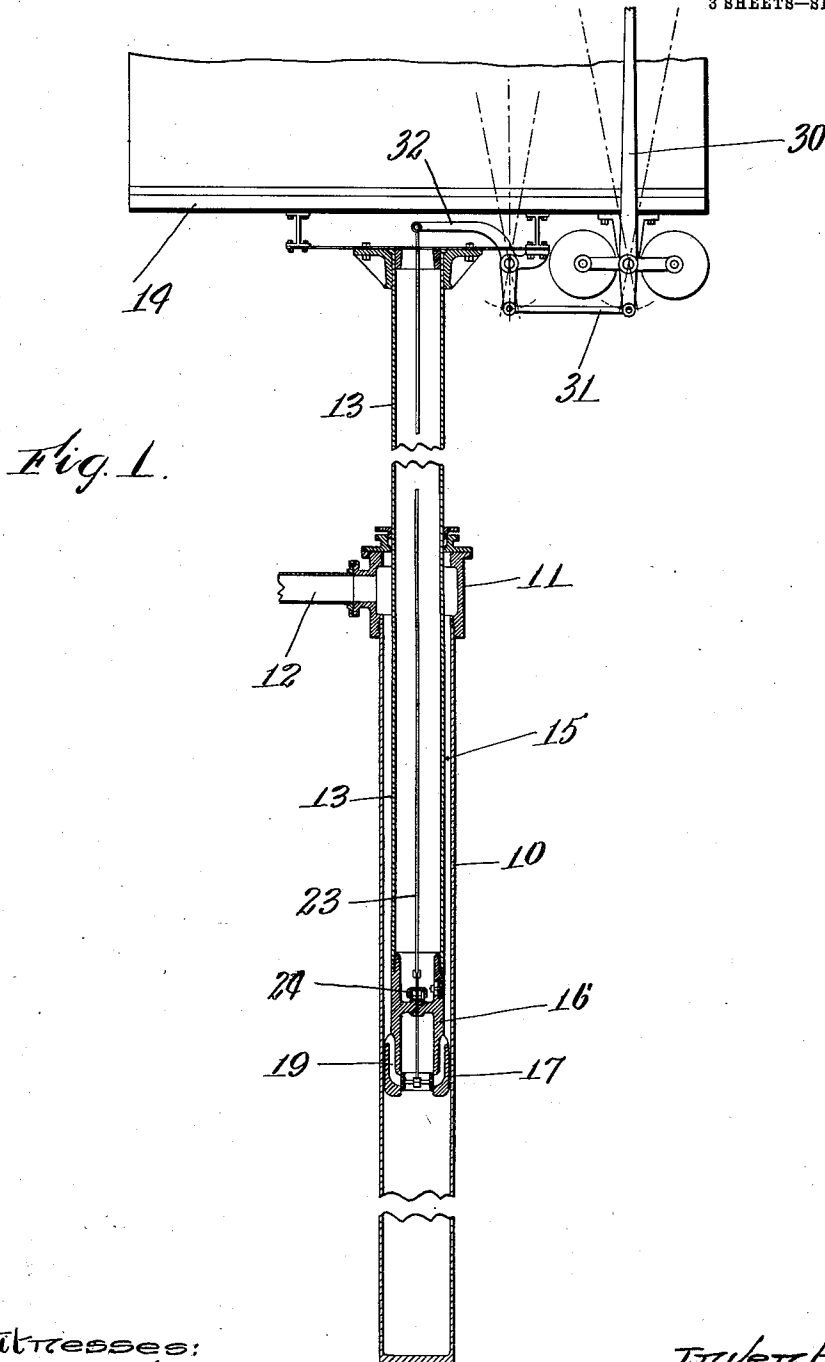
N. P. JULIEN.
HYDRAULIC ELEVATOR.

APPLICATION FILED DEC. 3, 1904. RENEWED JUNE 11, 1909.

946,781.

Patented Jan. 18, 1910.

3 SHEETS—SHEET 1.



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J. E. Laycock

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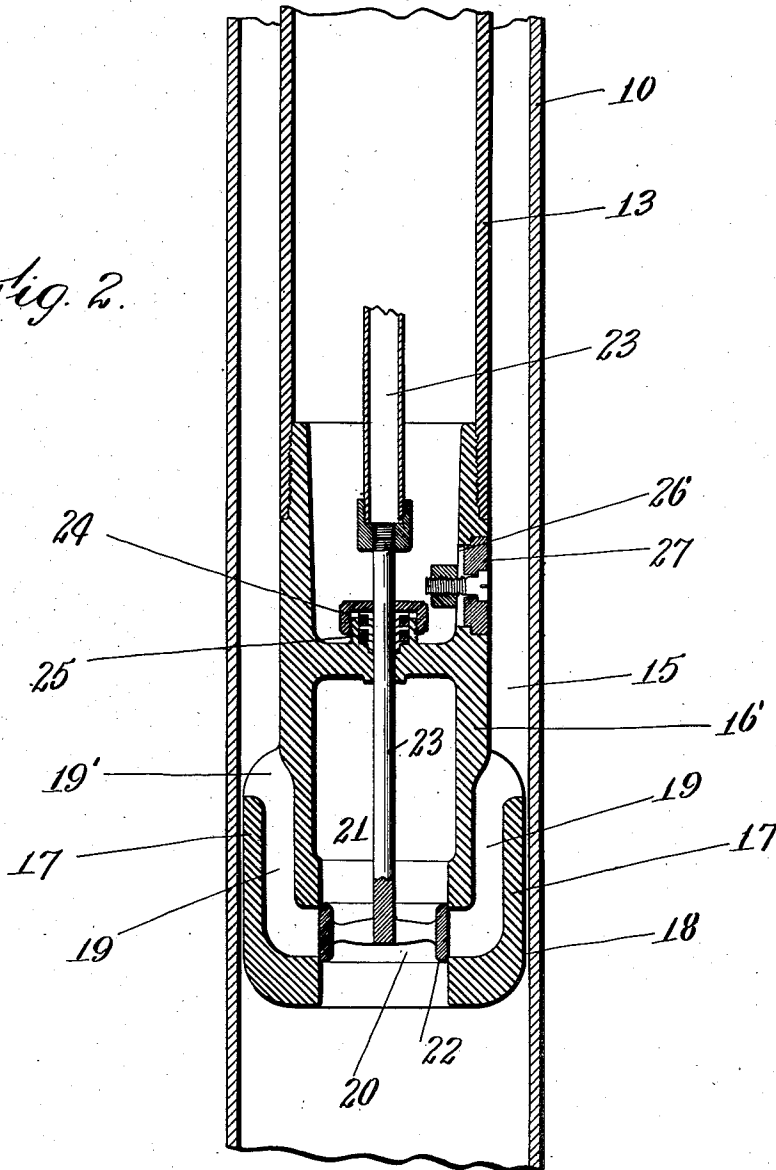
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3 SHEETS—SHEET 2.

Fig. 2.



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Fig. 3.

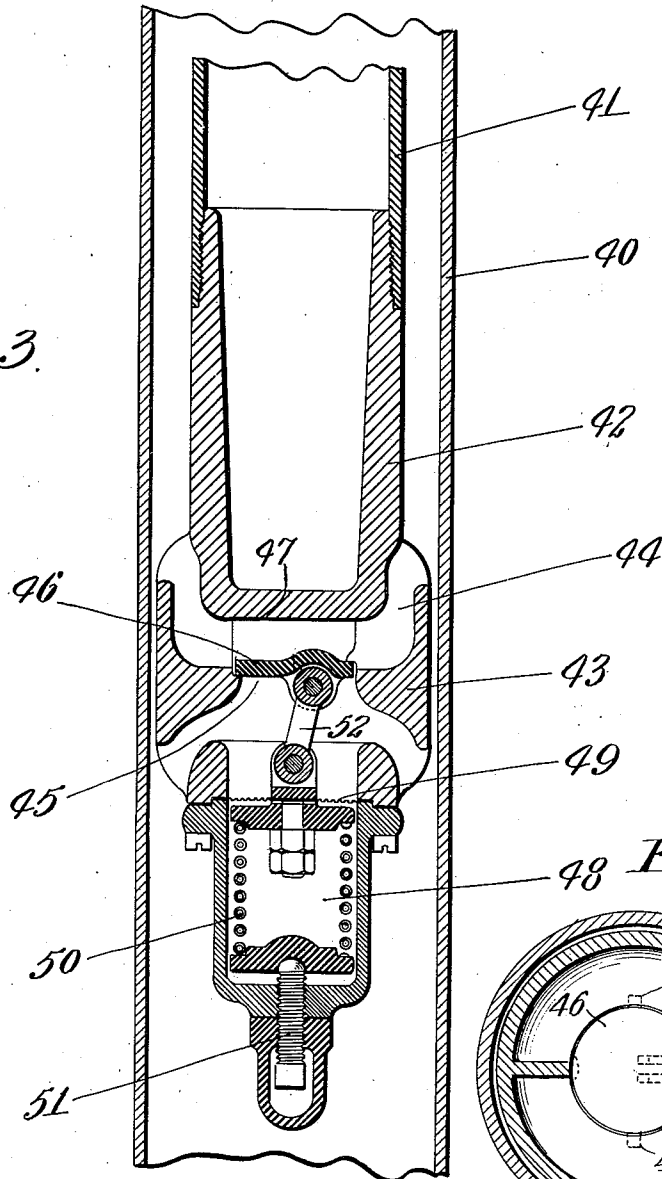
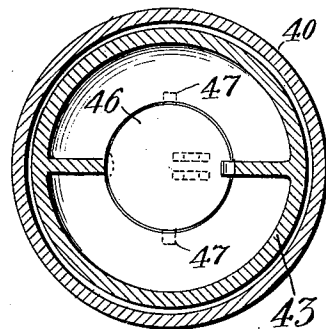


Fig. 4.



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UNITED STATES PATENT OFFICE.

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HYDRAULIC ELEVATOR.

946,781.

Specification of Letters Patent.

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Application filed December 3, 1904, Serial No. 235,279. Renewed June 11, 1909. Serial No. 501,445.

To all whom it may concern:

Be it known that I, NAPOLEON PAUL JULIEN, a citizen of the United States of America, and resident of city and county of Worcester, Commonwealth of Massachusetts, have invented certain new and useful Improvements in Hydraulic Elevators, of which the following is a specification.

10 In the operation of modern hydraulic elevators it is desirable to be able to run the car at a high rate of speed. Certain difficulties, however, are encountered at high speed, among which may be mentioned the
15 difficulty of stopping the car quickly and easily at any desired point, particularly as the heavy moving parts, consisting in many cases of counterweights, cables, etc., gather considerable momentum at high speed which
20 must be overcome within the distance through which it is desired to effect a stopping. For example, in a high speed elevator of the direct plunger type having the usual counterweighted car, it is necessary,
25 in order to bring an ascending car to an easy stop, to shut the water off very gradually; otherwise, the momentum of the moving parts will lift the plunger with attached car off from the water in the cylinder.
30 When the car finally stops in its ascent it will drop back until the plunger strikes the water in the cylinder, with results which are obviously very undesirable. It is, also, undesirable to begin to effect a stop at a
35 considerable distance from the floor at which a landing is to be made. The operator cannot obey signals as promptly, full speed cannot be maintained between stops located a short distance apart, and it is more difficult
40 to bring the car to rest at a position even with the landing floor than would be the case could an easy stop be effected within a short distance.

My invention has for its main object to
45 provide means for interposing a temporary hydraulic retarding effect to the momentum of the car, independent of the motive means; and it consists generally of the parts and combinations to be hereinafter more
50 fully described and definitely pointed out in the claims.

As applied to a hydraulic elevator it consists of means for producing a hydraulic retarding effect, whereby the movement of
55 the car is controlled by a resisting body of water, and in the particular instance shown

it consists of means for throttling the flow of water between the plunger and cylinder.

In the description to follow, an elevator of the direct plunger type is referred to, but
60 it should be understood that the invention applies to any elevator in which it may be desirable to overcome the momentum of the moving parts when the main controlling
65 means are operated to stop the car. The particular form shown is applicable to any fluid pressure elevator having a plunger and cylinder.

The particular means for accomplishing the objects set forth, as applied to the direct
70 plunger elevator, comprise a valve mechanism, hereinafter referred to as the plunger valve, applied to the lower end of the plunger and operating between the spaces above
75 and below the same. When it is open the water has full flow between said spaces and the elevator can be raised. When this plunger valve mechanism is closed, not only is the water prevented from flowing between
80 the cylinder and plunger to act against the bottom of the latter to lift same, but any tendency to continue the run by reason of the momentum of the moving parts is met
85 by the resistance of the body of water between said plunger valve and the stuffing-box, and the suddenness of the stop can be regulated by the amount the plunger valve may be closed. This retarding or brake
90 mechanism while independent of the main valve is preferably arranged to act, ordinarily, only when the main valve has been or is being closed, and particularly on the
95 ascending movement of the car. It can, however, be applied to act independent of the main valve, and in either ascending or descending movement of the car. It may
also be arranged to operate as an emergency brake, as will be more particularly described hereinafter.

In the drawings, Figure 1 is a section of
100 a direct plunger elevator cylinder and plunger fitted with my controlling or retarding means. Fig. 2, is an enlarged sectional view of the lower end of the plunger and mechanism shown in Fig. 1. Fig. 3 illustrates a
105 modification of my invention. Fig. 4 is a detail of the butterfly valve shown in Fig. 3.

The cylinder 10 is fitted at the top with the usual stuffing-box 11, having the pipe 12
110 for the passage of water to and from the cylinder to raise the plunger 13. The admission and discharge of water is controlled

by the usual three-way elevator valve, not shown, which is operated by the usual mechanism from the car.

The car is denoted by 14 and is attached in the usual way to the top of the plunger. This car may be counterweighted or not, as desired. It is, however, usual in long, high-speed runs to counterweight the car. This, however, obviously increases the weight of the moving parts and makes the objections due to the momentum of same, referred to above, very important. Between the plunger and cylinder is shown the usual annular space 15, which is occupied by the water. As the elevator ascends the water flows down through this annular space acting on the bottom of the plunger to raise it, and filling the space occupied by the plunger in the cylinder.

To the bottom of the plunger is attached a plug 16 for constricting the passage of water between the cylinder and plunger. This plug is provided with the enlarged portion 17, which portion nearly fills the cylinder. It may completely fill same, if desired, but preferably a slight space 18 is allowed, thus obviating the necessity of a sliding fit between said plug and cylinder. This enlarged portion thus occupies the annular space 15 for a certain distance at the end of the plunger forming a sort of piston between the plunger and cylinder.

From above the enlarged portion, water passages 19 are formed through the plug, which when open allow for a free flow of water through the plug; thus, forming a free passage between the annular space 15 and the space below the plunger. These water passages are formed so that they can be closed by means of a valve 20. This valve may be of any desired construction to accomplish the control of the flow of water from the annular space to or from the space beneath the plunger, my invention broadly covering any means for the control of the water from the annular space to the space beneath the plunger.

In the form shown in Figs. 1 and 2, the water passages communicate from the top of the plug, as at 19', to the convex cylindrical portion 21. Fitted to this cylindrical portion is provided the plunger valve, having the valve piston 22, which in its intermediate position, as shown, closes said passages. It may, however, be moved in either direction to open the passages. The valve stem 23 passes through the stuffing-box 24 and up through the plunger into the car where it may be operated by any suitable means. The stuffing-box is provided with the packing 25, which can be reached for renewal through the opening 26, having the water-tight door 27.

The operation of the device, above de-

scribed, is as follows. When the elevator is running up, the water is being admitted through the pipe 12 flowing down the annular space 15, and through the passages 19. When the water is shut off quickly there is a tendency for the heavy moving parts to continue their motion, which would result in lifting the plunger off of the water in the cylinder with obviously undesirable results. If, however, the passages 19 be closed, preferably at the approximate time the main valve is closed, the elevator will quickly and easily be brought to rest, it being prevented from ascending farther by the water in the annular space forming a resisting body or column between the stuffing-box and the plug, or plunger valve. The flow of water through the passages 19 may be closed down as rapidly or gradually as desired, or at any point in the run, thus acting as a retarding or brake mechanism on the elevator. The plunger valve may be operated by a mechanism from the car connected with the main valve controlling mechanism. This is shown in Fig. 1 where the main valve controlling lever 30 is connected by means of a connecting rod 31, and a bell crank lever 32, with the valve stem 23. The plunger valve may then be operated at approximately the same time the main elevator valve is operated and at one and the same movement of the main controlling lever, and the adjustment may be so arranged as to bring the elevator to rest as quickly or gradually as desired without the undesirable results referred to.

If desired the device may be used as an emergency control, the connections as shown in Fig. 1 being obviously applicable to a separate lever, and in case the main valve could not be operated the plunger valve could be closed, thus controlling the movement of the car. In the form of elevator shown, this device is more useful in the ascent of the plunger than in its descent, as in its descent it is supported on a column of water in the cylinder between the bottom of the plunger and the main valve, and in case the main valve works properly this forms a resisting column. Nevertheless, the device may be used in either ascent or descent, and in the type of elevator shown, or any other of the hydraulic type, as it controls both the supply and discharge to and from the bottom of the plunger from and to the elevator pipe 12. The plug may be of a size just sufficient to retard the plunger satisfactorily when the valve is completely closed, or it may be larger, and the stopping of the car controlled by the amount the plunger valve is closed, as desired.

Many modifications may be made in my invention one form of which is shown in Fig. 3. Fig. 3 shows a modification in which the

valve is automatically operated, so that when the pressure is relieved in the cylinder the plunger valve closes automatically, thus retarding the movement of the plunger. In the drawings, Fig. 3, 40 is the cylinder, 41 the plunger, and 42 the plug having the enlarged portion 43 and water passage 44. These passages communicate with the central passage 45, adapted to be closed by the butterfly valve 46, centrally pivoted at its edges, as indicated at 47, Figs. 3 and 4, so that its left portion, Fig. 3, may swing upwardly, and its right portion swing downwardly, as will be apparent. On the lower end of the plug is an air pressure chamber 48 provided with a flexible diaphragm 49 which is held in normal position by a spring 50, as indicated in Fig. 3. This spring is adjusted to the proper tension by the adjusting screw 51. The butterfly valve 46 is attached at one side of its center to the diaphragm 49 by means of the link 52. The plug 43 is preferably of a size just sufficient to properly retard the plunger to secure a satisfactory stop when the butterfly valve 46 is closed. When the pressure is applied to raise the elevator, it acts through the contracted space around the plug and on the diaphragm to open the valve 46. When the pressure is removed the valve automatically closes, the flow of water at the passage 44 tending also to hold it to its seat. While the elevator is descending the flow of water will hold the valve open, as will be apparent. This form of device is shown as operating only to retard the plunger on its ascent.

Other modifications will readily occur to those skilled in the art. My invention, however, is not confined in its broad interpretation to the exact forms shown.

What I claim is:—

1. In a hydraulic elevator, the car, means for raising and lowering the car, and devices for interposing a temporary hydraulic retarding effect to the momentum of the car to stop it at any desired point.

2. In an elevator, the car, operating means for raising and lowering the car, and means operative to interpose a temporary hydraulic retarding effect to the momentum of the car at any desired point in its upward movement to enable the car to be stopped quickly without shock.

3. In a hydraulic elevator, the car, operating means for raising and lowering the car, and devices operable to interpose a temporary hydraulic retarding effect to the momentum of the car as it approaches a stopping station so that the car may be brought to rest without shock.

4. In a hydraulic elevator, the car, operating means for raising and lowering the car, and means operable for interposing a temporary hydraulic retarding effect inde-

pendent of said operating means to enable the elevator to be run at high speeds between stations and stopped as desired without shock.

5. In a hydraulic elevator, the combination of the cylinder and plunger, and means for interposing a temporary hydraulic retarding effect to the movement of the plunger to prevent the same rising from the liquid in the cylinder when stopping the plunger movement.

6. In an elevator, the combination of a cylinder and plunger, means for moving the latter in the former, and means for interposing a temporary hydraulic retarding effect to the movement of the plunger in the cylinder due to momentum of the plunger to enable the plunger to be stopped quickly without shock at desired points in its movement.

7. In a hydraulic elevator, the combination with a cylinder and plunger of a stuffing-box through which the plunger runs, a plug on the end of the plunger, and means for controlling the flow of water from one side of the plug to the other in the upward movement of the plunger to interpose a hydraulic retarding effect to the upward momentum of the plunger and enable the same to be stopped quickly without shock.

8. In a hydraulic elevator, the combination with a cylinder and plunger, of a stuffing-box on the cylinder through which the plunger runs, means for constricting the passage of water between the cylinder and plunger, and means for regulating the amount of flow past such constricting means in both directions.

9. In a hydraulic elevator, the combination with a cylinder and plunger, of a stuffing-box through which said plunger runs, a plug on the plunger constricting the space between said cylinder and plunger, passages in said plug providing for the free flow of water through the same, and valve mechanism for throttling said passages more or less to interpose a more or less effective hydraulic retarding action to the momentum of the plunger.

10. In a hydraulic elevator, the combination with a cylinder and plunger, of an enlarged portion on the end of the plunger provided with a passage for the flow of liquid, a valve controlling said passage, and a manual device for operating said valve.

11. In a hydraulic elevator, the combination with a car, of a plunger, a cylinder, valve mechanism carried by the plunger and controlling the supply of operating liquid beneath the plunger, and a valve operating device located within the car and connected to said valve mechanism.

12. In an elevator, the combination with a car, of a plunger and cylinder, means carried by the plunger for controlling the speed

thereof, and a device for operating said means at any desired point in the upward or downward travel of the car.

13. In an elevator, the combination of a
5 car, a plunger, a cylinder, and mechanism
carried by the plunger and operable to effect
a hydraulic braking action at any desired
point in the upward travel of the car.

14. In an elevator, the combination with a
10 car, of a plunger, a cylinder, and valve mech-

anism movable with the plunger and oper-
able to effect a hydraulic braking action at
any desired point in the upward and down-
ward travel of the car.

Signed by me at Worcester, Massachu- 15
setts, this 30th day of November, 1904.

NAPOLEON PAUL JULIEN.

Witnesses:

ALDUS C. HIGGINS,

E. W. DODGE.