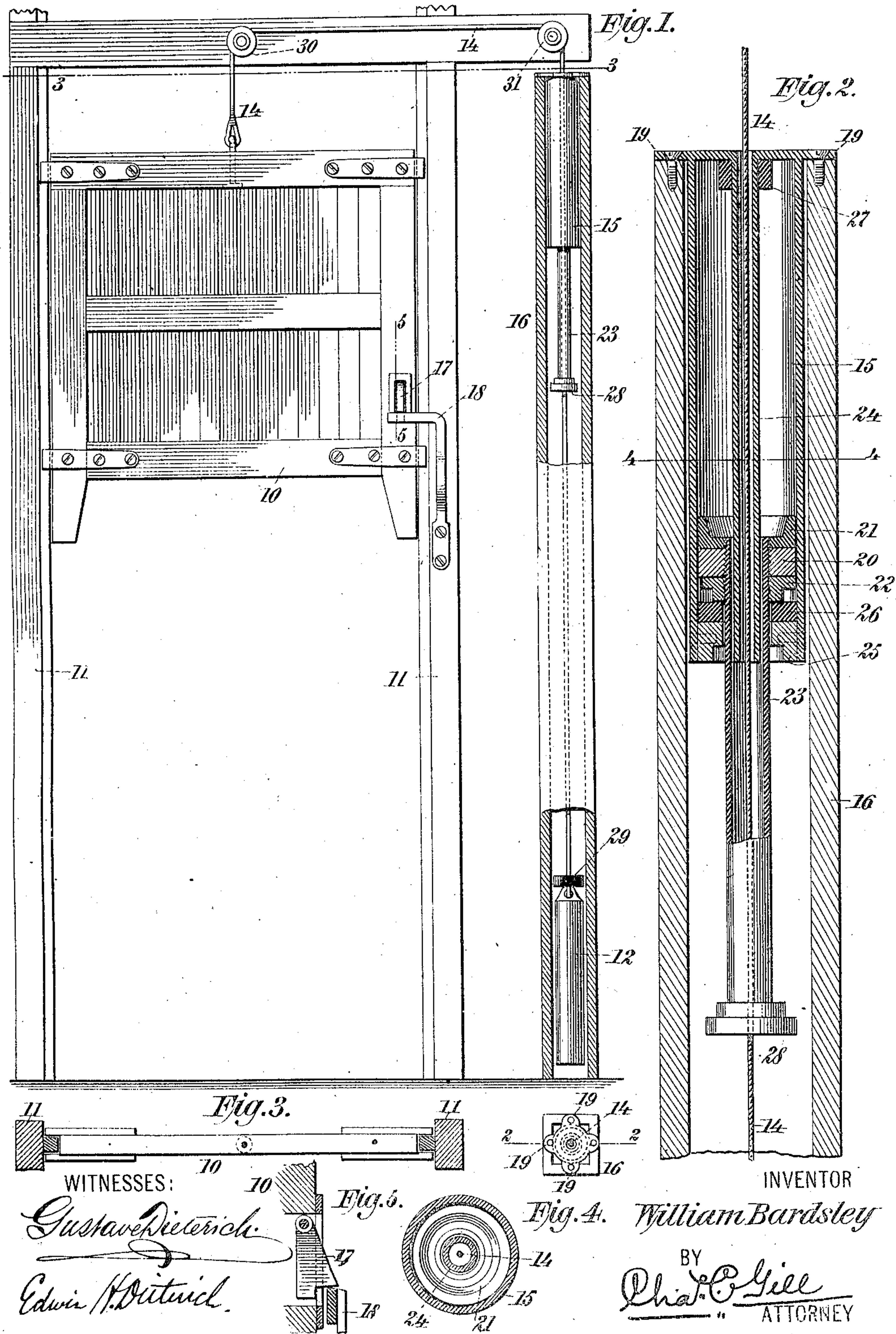


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W. BARDSLEY.
CUSHIONING APPARATUS FOR ELEVATOR SHAFT GATES.

APPLICATION FILED MAR. 28, 1905.



UNITED STATES PATENT OFFICE.

WILLIAM BARDSLEY, OF KEARNEY, NEW JERSEY.

CUSHIONING APPARATUS FOR ELEVATOR-SHAFT GATES.

No. 812,392.

Specification of Letters Patent.

Patented Feb. 13, 1906.

Application filed March 28, 1905. Serial No. 252,471.

To all whom it may concern:

Be it known that I, WILLIAM BARDSLEY, a citizen of the United States, and a resident of Kearney, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Cushioning Apparatus for Elevator-Shaft Gates, of which the following is a specification.

The invention relates to improvements in cushioning apparatus for elevator-shaft gates and the like; and it consists in the novel features and combinations of parts hereinafter described, and particularly pointed out in the claims.

In many buildings used for business purposes the elevators or hoists are employed for carrying freight and the elevator-shafts are guarded at each floor of the building by a vertically-operated gate, which when the elevator reaches the floor is moved upwardly until caught by an automatic device, whereupon the freight is either loaded upon or removed from the elevator, after which the gate is released and permitted to descend to its initial position. The descent of the gates to their lower position has usually resulted in considerable annoyance, due to the fact that the gates strike the floors with violence and not only become impaired thereby, but create a great deal of noise.

The object of my invention is to provide simple, efficient, and comparatively inexpensive cushioning apparatus for retarding the final part of the descending or closing movement of elevator-gates, and thereby preventing the gates from striking the floors with violence.

In carrying out my invention I provide the gate with a counterbalance-weight connected by a rope thereto and extend this rope at one side of the shaft through a vertically-arranged cushioning apparatus, comprising, preferably, a stationary air-cylinder and a piston and hollow piston-rod, the said piston being at the lower end of said cylinder, with the piston-rod extending downwardly below the same when the gate is in its elevated or open position. When the gate descends toward its lower or closed position, it draws the counterbalance-weight upwardly without obstruction until the gate is reaching its lower position, when said weight will meet the depending end of the said piston-rod and drive the piston upwardly within said cylinder, thereby trapping the air within the upper portion of the cylinder and forming a cushion, which

will retard the ascent of said weight, and consequently the descent of said gate, the latter finally regaining its initial lower position without violence or noise. The weight of the gate when in its lower position will, through the pressure of the counterbalance-weight, keep the piston-rod and piston in their upper position. When the gate is raised overhead, the counterbalance, which is about three-fourths the weight of the gate, and the piston and piston-rod will all move downwardly, the counterbalance descending the requisite number of feet, while the piston and piston-rod travel about one foot.

The invention will be fully understood from the detailed description hereinafter presented, reference being had to the accompanying drawings, in which—

Figure 1 is a front elevation of an elevator-gate with its coacting parts equipped with cushioning apparatus constructed in accordance with and embodying the invention, the gate being shown in its elevated or open position and the box inclosing the cushioning apparatus being shown as partly in section. Fig. 2 is an enlarged central vertical section, partly broken away, through the cushioning apparatus and its inclosing box. Fig. 3 is a horizontal section through Fig. 1 on the dotted line 3 3 thereof. Fig. 4 is a horizontal section through the cushioning apparatus on the dotted line 4 4 of Fig. 2, and Fig. 5 is a detached enlarged vertical section of the gate-latching mechanism on the dotted line 5 5 of Fig. 1.

In the drawings, 10 designates an elevator-gate of usual construction; 11, the customary guides therefor; 12, the counterbalance-weight, connected with the gate 10 by means of a rope or flexible connection 14, and 15 the air-cushioning cylinder, mounted vertically within the box or frame 16, the latter being located to one side of the gate 10, as shown in Fig. 1. The gate 10 is provided with a pivoted latch 17, which when the gate is in its upper or open position engages a spring-arm 18 and supports the gate, as usual. When it is desired that the gate shall descend to its closed position, the latch 17 and arm 18 are disengaged and the gate permitted to travel downwardly.

The cylinder 15 is of metal and fastened at its upper end by means of ears 19 upon the upper edges of the box or frame 16, within which said cylinder is suspended. Within the cylinder 15 is provided a piston compris-

ing by preference a wooden disk 20, a leather cup 21, and a metal disk-nut 22, said parts being secured upon the upper end of the hollow piston-rod 23. The leather cup 21 may be directly secured to the wooden block 20. The piston and the hollow piston-rod 23 encompass and are guided upon the central tube 24, which hangs downwardly from the upper end of the cylinder 15 and is open at both ends, so as to permit the movement of a rope or flexible connection 14 through it, and the hollow piston-rod 23 in its vertical movement guides upon said tube 24 and being open at both ends permits the connection 14 to also move through it. Within the lower end of the cylinder 15 is provided a closing head or block 25, upon which is located a rubber or cushion disk 26 to receive the impact of the piston when the latter descends to its lower position. (Shown in Fig. 2.) Upon the central tube 24 is provided a rubber or other suitable cushioning-disk 27 to prevent the piston on its ascent from striking the head at the upper end of the cylinder 15, and the said disk 27 may be disposed at the upper end of the tube 24 or may be located upon the upper central portion of the cup 21, the result in either arrangement being the same, the purpose being that the said disk 27 shall prevent the upper edges of the cup 21 from striking the upper end of the cylinder. The lower end of the piston-rod 23 is provided with a head 28, and intermediate the weight 12 and said head 28 there is provided upon the rope 14 a rubber cushioning contact-disk 29, which when the gate 10 descends toward its lower position will strike the head 28 and move the piston-rod 23, with its piston, upwardly within the cylinder 15. The disk 29 is located at the upper end of the weight 12, and the said disk is provided to prevent the direct physical contact of said weight with the piston-rod, the purpose of the disk being to cushion the weight as the latter reaches said piston-rod and prevent injury to the latter or the making of a noise.

In Fig. 1 the gate 10 is shown in its elevated or open position, and in this location of the gate the weight 12 will be at the lower portion of the box or frame 16 and the piston-rod 23 will be in its lower position projecting downwardly below the cylinder 15. When the gate 10 is released to descend, its movement in a downwardly direction results in the weight 12 being caused to ascend within the box 16, and the said gate and weight will move rather rapidly until the weight strikes the lower end or head 28 of the rod 23, when the further movement of said gate and weight is retarded from the fact that the movement of the weight must drive the piston-rod 23 and its piston upwardly within the cushioning-cylinder 15, the air imprisoned within said cylinder above the piston affording a cushion retarding the final downward movement of

the gate 10 and preventing said gate from striking the floor with violence. The piston should rather snugly fit the cylinder 15, so as to properly imprison the air; but it is not necessary that said piston should with extreme nicety fit the cylinder, because there should be an opportunity for the leakage of air around the piston or around the tube 24. While the gate 10 remains at its lower or closed position the piston will remain within the upper portion of the cylinder 15, being there held by the pressure of the weight 12 against the lower end of the piston-rod 23. When the gate 10 is again moved to its upper position, the weight 12 and piston-rod 23, carrying the piston, will both descend to the respective positions in which they are shown in Fig. 1, the weight 12 descending the requisite number of feet and the piston-rod 23 under average conditions about one foot.

The cushioning apparatus hereinbefore described is comparatively simple and inexpensive, but highly efficient, in that it does prevent the gate from striking the floor with violence and does not occupy any room required for other purposes, since it is in the direct path of the weight 12 and within the runway-box 16 for said weight and does not project beyond the same. The rope or flexible connection 14 passes over suitable pulley-wheels 30, 31, whereby a portion of the rope is compelled to travel on a vertical path and in the present instance passes directly through the cylinder, piston, and piston-rod. The guiding-tube 24, carried by the cylinder, is of considerable advantage in that it forms a guide for the rope 14 and also for the piston-rod 23, the latter by means of said tube 24 being compelled to travel in a direct path.

I prefer to suspend the cylinder 15 and have the piston-rod 23 projecting downwardly below the same, so that said rod and its piston may be moved with relation to said cylinder; but it is obvious that my invention would be included in a reverse arrangement of the cushioning apparatus, whereby the piston-rod at its head 28 might be secured at the upper end of the box 16 and the cylinder hung downwardly from said rod, so that the cylinder would be the movable part of the cushioning apparatus to be struck by the weight 12 and moved with relation to the rod 23, this arrangement being merely turning the cushioning apparatus upside down and having the cylinder for the movable member or part thereof and the rod 23 as the fixed member or part.

I am also aware of other modified arrangements of the parts of my invention.

Among the features characterizing my invention it may be mentioned that the counterbalance-weight 12 is always exerting its force in a direction tending to elevate the gate, that the cushioning apparatus does not operate to cushion the gate except during the

latter part of the closing movement of the same, that the counterbalance-weight 12 and rope 14 perform a portion of their movements or travel during both the opening and closing of the gate without influencing or being influenced by the cushioning apparatus, and that the movement of the gate is greater in extent than the travel of the piston of the cushioning apparatus, said piston only moving during a portion of the opening and closing movements of the gate and performing its checking function only during the latter portion of the closing movement of the gate.

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

1. A vertically-movable gate, and a counterbalance-weight therefor, said weight being connected with the gate by a flexible connection and arranged to move vertically, combined with a cushioning apparatus for cooperation with said flexible connection and comprising a vertically - arranged cylinder and checking-piston therein and one of which constitutes a movable member, said gate and flexible connection being adapted to have a greater extent of movement than said movable member and to move independently of the same during a part of the closing movement of said gate and to effect the movement of said movable member to create the cushion during another portion of such closing movement; substantially as set forth.

2. A vertically-movable gate; and a counterbalance-weight therefor, said weight being connected with the gate by a flexible connection and arranged to move vertically, combined with a cushioning apparatus for cooperation with said flexible connection and comprising a vertically - arranged cylinder and checking - piston therein through both of which said flexible connection freely passes and one of which is movable upon the other to create the cushion, and means carried by said flexible connection for engaging said movable member only during a portion of

the closing movement of the gate and moving the same to create the cushion; substantially as set forth.

3. A gate and a counterbalance-weight therefor, said weight being connected with the gate by a flexible connection and arranged to move vertically, combined with a cushioning apparatus through which said flexible connection passes and which comprises the fixed cylinder having the central guiding-tube open at both ends, and hollow piston-rod carrying the piston and encompassing said tube, said piston-rod normally extending from said cylinder in position to be struck, upon the closing of the gate, by a part carried by said flexible connection, for moving said piston-rod and piston within said cylinder and creating the cushion; substantially as set forth.

4. A vertically-movable gate, and a counterbalance-weight therefor, said weight being connected with the gate by a flexible connection and arranged to move vertically, combined with a cushioning apparatus for cooperation with said flexible connection and comprising the vertically-arranged cylinder having the central guiding-tube open at both ends, and the hollow piston-rod carrying the piston and encompassing said tube, one of said parts being movable and the other fixed and said flexible connection being freely extended downwardly through said cylinder, piston and rod and provided with means for engaging said movable part only during a portion of the closing movement of the gate and moving the same to create the cushion; substantially as set forth.

Signed at New York city, in the county of New York and State of New York, this 27th day of March, A. D. 1905.

WILLIAM BARDSLEY.

Witnesses:

CHAS. C. GILL,
ARTHUR MARION.