H. A. GILSON & W. B. BEATTIE.

AUTOMATIC LATCH FOR AUTOMATIC ELEVATOR GATES.

APPLICATION FILED NOV. 9, 1907.

931,693.

Patented Aug. 17, 1909.

2 SHEETS—SHEET 1.

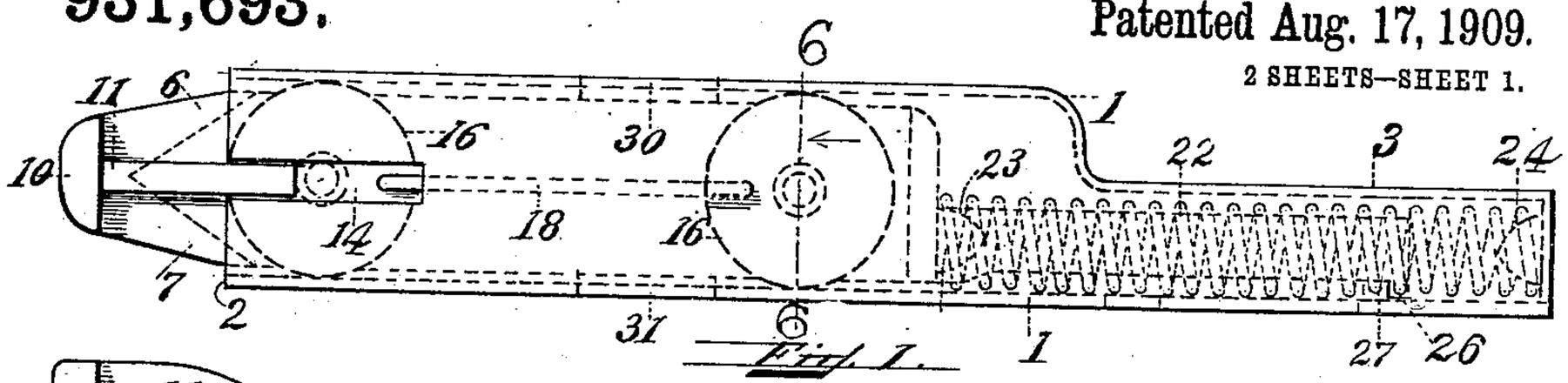

Fig. 1.

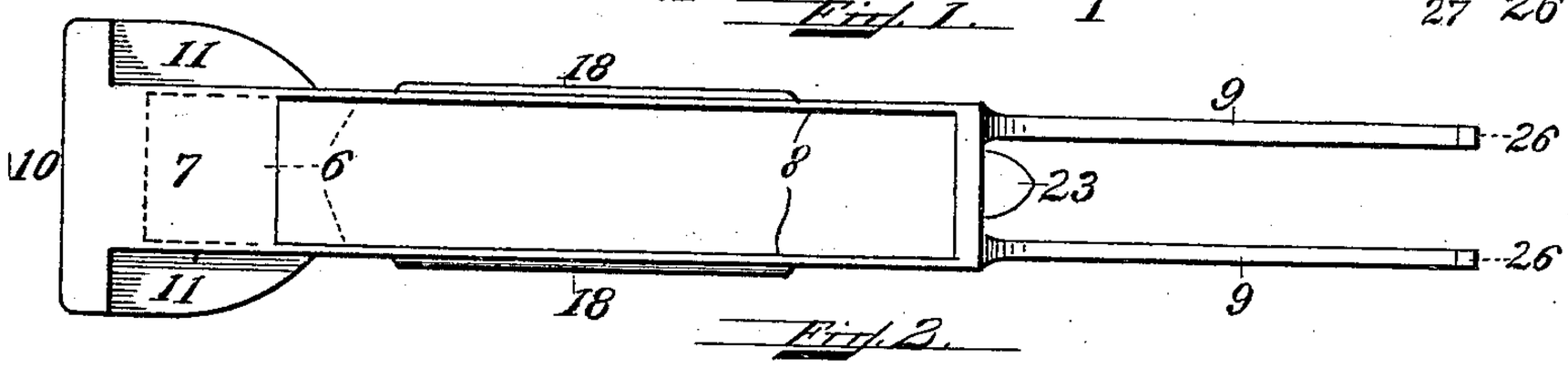

Fig. 2.

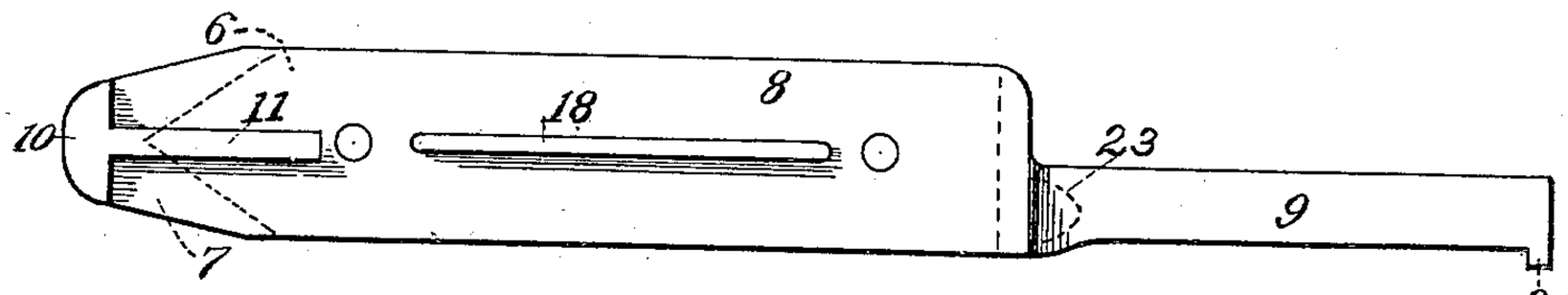

Fig. 3.

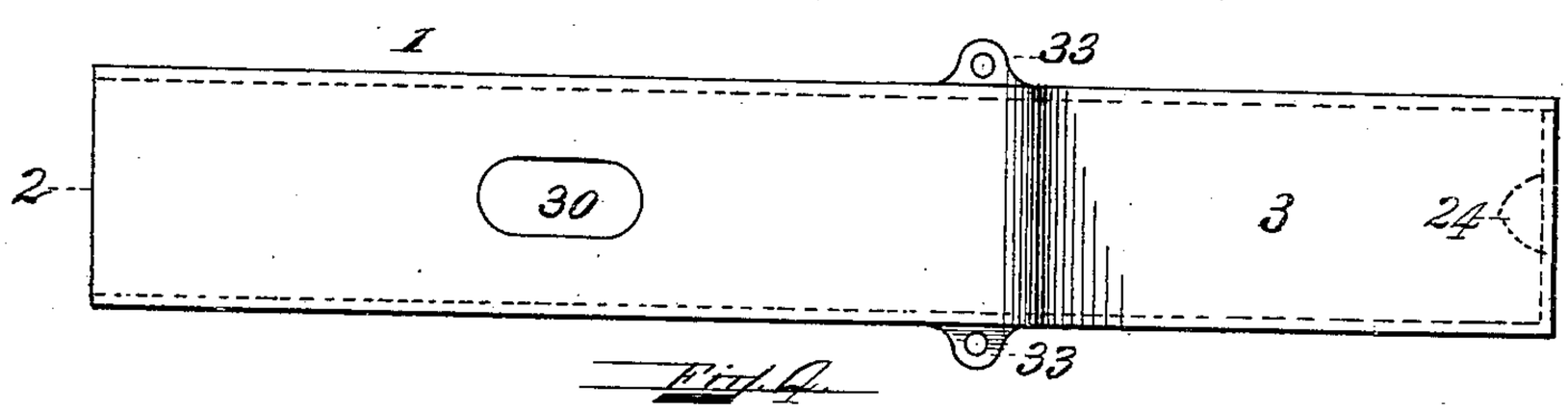

Fig. 4.

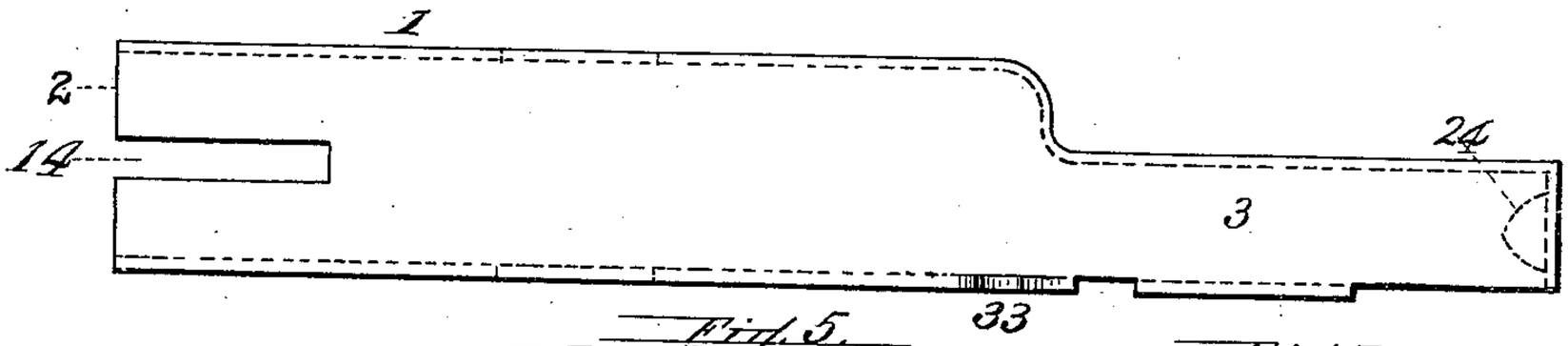

Fig. 5.

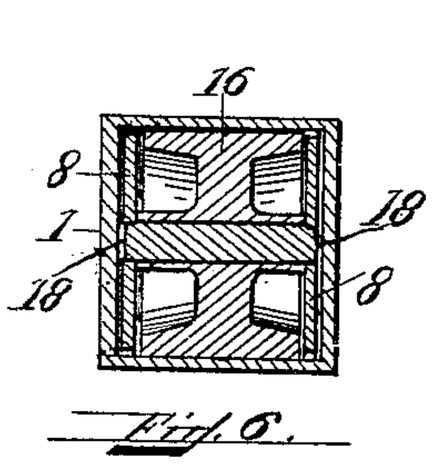

Fig. 6.

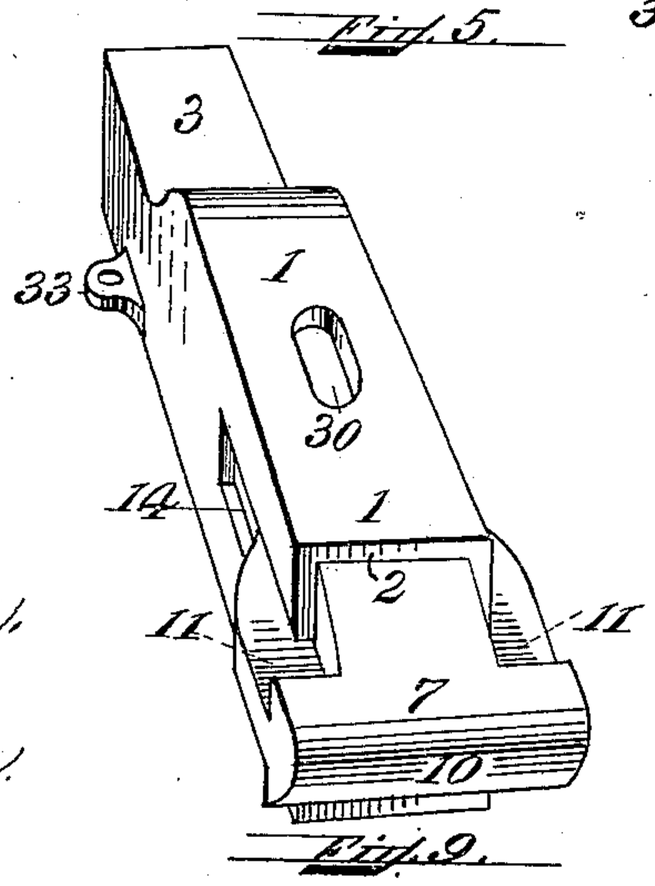

Fig. 9.

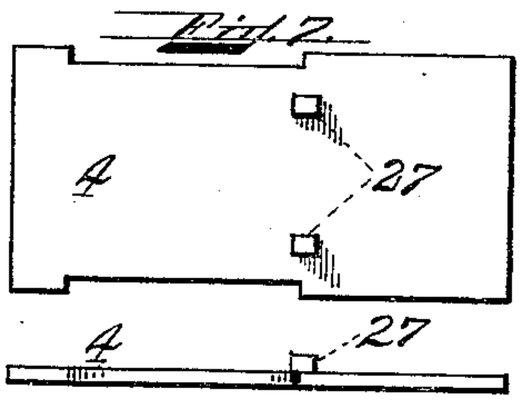

Fig. 8.

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Arthur P. Hardy

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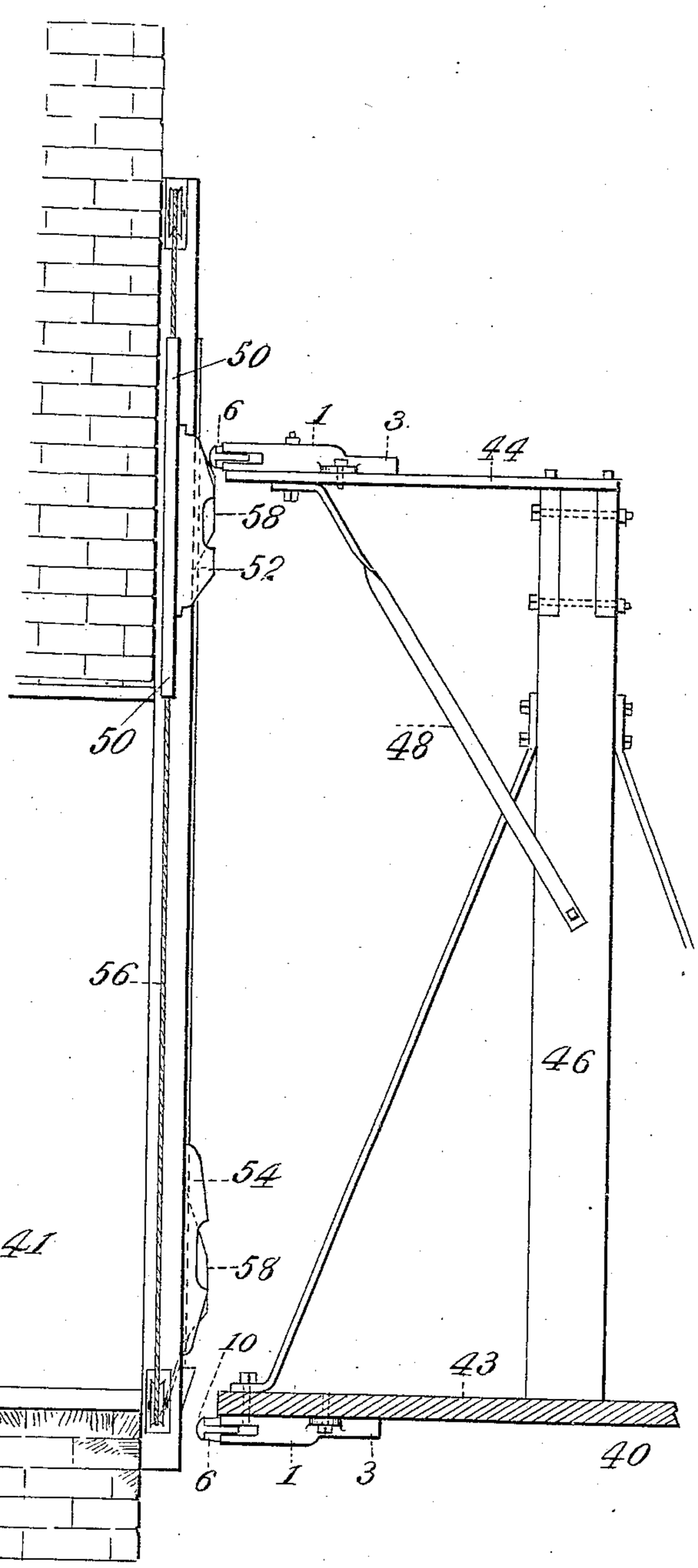

Fig. 10.

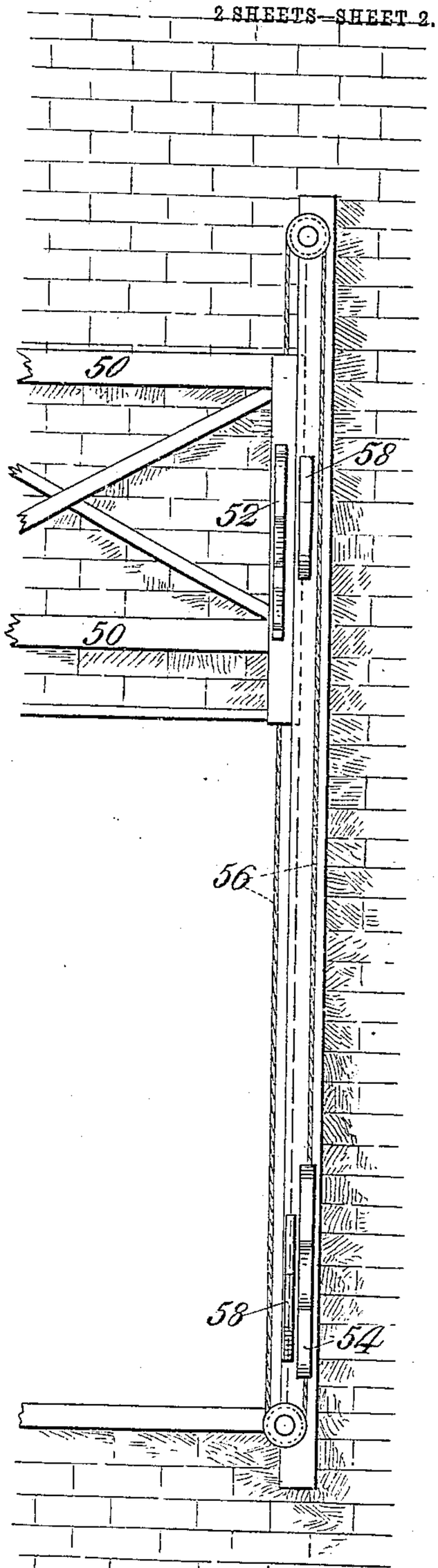

Fig. 11.

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UNITED STATES PATENT OFFICE.

HOWARD A. GILSON AND WILLIAM B. BEATTIE, OF BOSTON, MASSACHUSETTS.

AUTOMATIC LATCH FOR AUTOMATIC ELEVATOR-GATES.

No. 931,693. Specification of Letters Patent. Patented Aug. 17, 1909.

Application filed November 9, 1907. Serial No. 401,470.

To all whom it may concern:

Be it known that we, HOWARD A. GILSON and WILLIAM B. BEATTIE, citizens of the United States, and residents, respectively, of Boston, in the county of Suffolk, and Somerville, in the county of Middlesex, both in the State of Massachusetts, have invented new and useful Improvements in Automatic Latches for Automatic Elevator-Gates.

In an elevator hoistway passing through a series of floors in a building equipped with automatic gates, a common method of construction and operation is to provide the elevator-car with one or more automatic latches which successively engage catch-blocks attached to the various gates to be operated and similar catch-blocks used as counter-weights which are connected with the gates by a flexible connection, with the result that the elevator car, as it approaches a doorway in either direction, will cause the gate at that particular doorway to be raised and when it leaves that doorway in either direction will cause the gate to be lowered.

It frequently happens from the construction of the elevator well and the situation of the various gates on the several floors, that it is impossible to place the catch-blocks on the gates in a vertical line and it therefore becomes necessary that the nose of the latch should be of sufficient width to allow for this difference in the situation of the catch-blocks and the counter-weights. A common form of construction for such a latch has been to provide one with a T shaped nose with the ends of the top of the T extending beyond the sides of the box or casing inclosing the body of the latch. This form of construction, however, has a serious disadvantage in that the cord connecting the gate with the counter-weight frequently catches behind one of the projecting ends of the T-shaped nose and is severed by the movement of the elevator car, thereby rendering the automatic gate system inoperative until the damage has been repaired. Another serious defect in the latches heretofore in use is the tendency to break due to the form of construction and the failure to provide means for supporting the body of the latch within the casing.

Our present invention relates to an automatic latch to be used in connection with automatic gates operated in a manner similar to that just described. Our object is to provide a latch of such construction that the cord connecting the counter-weight and the elevator gate cannot be caught or severed by the latch and that the tendency to breakage will be greatly reduced if not entirely overcome.

In the accompanying drawings, which illustrate our invention and in which similar numbers refer to similar parts throughout the several views:—Figure 1 is a side elevation of our invention; Fig. 2 is a plan view of the latch with the casing removed; Fig. 3 is a side elevation of the same; Fig. 4 is a plan view of the casing; Fig. 5 is a side elevation of the casing; Fig. 6 is a cross-sectional view on line 6—6 in Fig. 1; Fig. 7 is a plan view of the bottom plate of the casing; Fig. 8 is a side elevation of the same plate; Fig. 9 is a view in perspective of the latch and casing as assembled; Fig. 10 is a view partly in section of an elevator equipped with our latches and opposite a landing showing the mode of operation; and Fig. 11 is a front elevation of the same landing showing the elevator gate raised and catch-blocks.

In the drawings illustrating the preferred form of our invention, 1 is a casing, having its forward end 2 open and a rear extension 3 of less height than the body of the casing. In the base of the rear extension 3, is an opening designed to permit the insertion of a spring when the device is being assembled and which is closed by a plate 4. The sides, top and bottom of the casing 1 are preferably cast integral.

Within the casing 1, and having a limited sliding movement therein, is a latch 6, having a head-portion 7 which protrudes from the open end 2 of the casing, a hollow body-portion 8 without top or bottom, lying within the body of the casing and rear-extensions 9, 9, extending into the rear-extension 3 of the casing. The upper and under sides of the head 7 of the latch are preferably beveled to form a nose 10 which is rounded off and made convex in vertical sec-

tion in order to permit the nose to slide readily in or out of engagement with catch-blocks when in use. For the purpose of enabling the latch to engage catch-blocks which are not in perfect vertical alinement, the nose 10 is extended on the sides beyond the body portion 8 and thereby forms a nose which is T-shaped in longitudinal section. With this construction, however, it frequently happens that the cord connecting the elevator gate and the counter-weight is caught behind the side extensions of the nose 10 and severed when the elevator moves, and to remedy this defect we provide flanges 11, 11, on the sides of the head 7 starting flush with the side extensions of the nose 10 and converging rearwardly to the body-portion 8 of the latch. The casing 1 on each side of the open end 2 is provided with a rearwardly extending slot 14, within which slides the flange 11. Since a portion of each flange 11 is at all times within the slot 14, the latch is thereby restrained from any vertical movement.

The body portion 8 of said latch is hollow and has mounted therein two rollers 16, 16 each of said rollers being of a greater diameter than the width of the sides of said body portion so that when the parts are assembled a portion of the periphery of each roller extends above and below the sides of said body portion. A convenient method of fastening these rollers in position is to drill the hub of each roller and the sides of said body portion 8. The hole drilled in the hubs of the rollers being somewhat larger than the holes drilled in the sides of the body of the latch, it is an easy matter to fasten said rollers in position after they have been placed between the parallel sides of said body portion by passing a pin through the holes drilled in the sides of said latch and the corresponding hole in the hub of the roller. The pins when so driven into position may be riveted or headed over. The diameter of the hole in the roller being greater than the diameter of the pin the roller readily revolves thereon. By placing these rollers one at each end of the cavity in body portion 8 the entire latch 6 is provided with a plurality of supports which not only eliminate friction and facilitate the horizontal movement of the latch within the casing but also eliminate any tendency to buckle when the nose of the latch comes into contact with one of the catch blocks.

In the style of latches heretofore in use where but one roller is provided, the latch has frequently broken near its center by reason of a lack of sufficient support. In our invention the rollers being placed as hereinbefore described and having a bearing on both the upper and under surfaces of the inside of the casing prevent any upward or downward movement of the latch when it comes in contact with any of the catch blocks. Also the body-portion 8 of the latch is made slightly narrower than the inside width of the casing and each side of the former is provided on its exterior with a longitudinal rib 18 which contacts the interior of the casing and thereby prevents lateral movement of the latch when in use. This construction facilitates the assembling of our device in that the ribs 18 may be readily ground down to insure a perfect fit without making it necessary to grind the entire side of the latch.

In order to maintain the latch in a forward position where it will engage the catch-blocks, we provide a spring 22 which is held in place by bosses 23 and 24 located respectively on the rear end of the body-portion 8 and on the interior of the rear end of the casing. To limit the forward movement of the latch 6, the rear extensions 9, 9, each have a lug 26 adapted to engage a stop 27 on the bottom plate 4 when the latch is forward.

In order to secure the latch to the floor of the elevator car or to a beam or other support, the casing 1 is provided with an aperture 30 in its top and a similar aperture 31 in its base, through which a bolt or other similar fastening device may pass. These apertures are located between the two rollers 16, 16, just in front of the rear roller when it is in the position shown in Fig. 1. On the outside of the body of the casing 1 are two ears 33, 33, bored to receive bolts or screws, which serve as additional fastening means.

In Fig. 10 of the drawings, for the purpose of illustrating the mode of operation of our device, is shown an elevator car 40 equipped with our latches and in a position opposite a landing 41. One latch is attached to the floor 43 of the elevator car and the other is secured to a cross-piece 44 fastened to the top of the standard 46 of the elevator car and supported by a brace 48.

A gate 50 is shown in a raised position and provided with a catch-block 52. A similar catch-block 54 which also acts as a counter-weight is attached by a flexible connection 56 to the gate 50 in such a manner that when the counter-weight 54 is lowered the gate 50 is raised and vice versa. Two fixed cams 58 are located, as shown in Fig. 10 at the floor of the landing 41 and just above the top of the doorway. Fig. 11 is an elevation, viewed from the elevator well, of the landing shown in Fig. 10 omitting the elevator car. This construction of gates, catch-blocks and cams is old and well known in the art.

The mode of operation of our latch is as follows: Supposing the elevator car to be in the position shown in Fig. 10 and it is moved upwardly, the nose of the lowermost

latch strikes the lower inclined face of the counter-weight 54 and as it slides upwardly on said face, the latch 6 is pressed inwardly in the casing 1 and compresses the spring 22 until the latch reaches the depression in the counter-weight, whereupon the spring 22 forces the latch 6 forward and into the depression and then the nose of the latch carries upwardly the counter-weight 54 and through the flexible connection 56 causes the gate 50 to be lowered. As the counter-weight 54 approaches the limit of its upward journey, it passes by the fixed cam 58 and thereupon the nose 10 of the latch 6 strikes the cam 58 and the latch is pushed thereby out of engagement with the counter-weight 54 and continues upwardly leaving the counter-weight 54 behind in the position shown in Fig. 10 as occupied by the catch-block 52. Meanwhile the latter has descended with the gate and is in the position as shown in Fig. 10 to be occupied by the counter-weight 54. During this operation, the positions of the catch-block 52 and the counter-weight 54 have been reversed. The elevator car having passed above the door upon being reversed will upon its descent operate in a similar manner to raise the gate. The latch fastened to the floor of the elevator car slides into engagement with the counter-weight 54 carries it down thereby raising the gate 50 and when the elevator car has reached the landing, the lowermost latch has passed out of engagement with the counter-weight 54 through the medium of the lower cam 58 and the various parts are in the positions illustrated in Fig. 10. Thus far, the latch secured to the floor of the elevator car is the only latch which has been used in operating the gate. If, however, the elevator car instead of being moved upwardly in the manner just described, is moved downwardly from the position shown in Fig. 10, the latch on the upper part of the elevator car slides into engagement with the catch-block 52 on the gate 50 and as the elevator car moves downwardly, the latch carries the gate 50 downwardly to the floor of the landing and as the gate 50 reaches the floor the upper latch strikes the lower fixed cam 58 and slides out of engagement with the catch-block 52, leaving the landing closed by the gate 50, as the elevator car continues on its downward journey. In case the elevator car is reversed and moved upwardly, as it approaches the landing, the upper latch enters into engagement in the usual manner, with the catch-block 52 on the gate 50 and thereby raises the gate until the floor of the elevator car is almost on a level with the floor of the landing when the upper latch is disengaged from the catch-block 52 by the upper fixed cam 58 and all the parts are in the position shown in Fig. 10.

From the foregoing description, it is apparent that when the elevator car is ascending toward a landing, the upper latch operates to raise the gate and as the elevator car passes by the landing in its upward journey, the lower latch operates to close the gate. When the elevator car approaches a landing in its descent, the lower latch then operates to raise the gate at that landing and as the elevator car passes downwardly by the landing the upper latch operates to lower the gate.

What we claim is:—

1. In an automatic latch for operating automatic elevator gates, a casing, a latch-member having a reciprocating movement therein, a nose to said latch, the outer end of said nose being transversely wider than said casing but diminishing rearwardly to a point within said casing where the body portion of said latch is narrower than said casing, openings in said casing to permit the reciprocating movement of said latch member and means to hold said latch member normally in a forward position.

2. In an automatic latch for operating automatic elevator gates, a casing, a latch-member having a limited reciprocal movement in said casing and having a T-shaped head provided with flanges extending from the end of each side of the nose of said head rearwardly to the body-portion of said latch-member, a plurality of rollers supporting said body portion and means to hold said latch-member normally in a forward position.

3. In an automatic latch for operating automatic elevator gates, a casing, a latch-member having a reciprocating movement therein, a nose to said latch, the outer end of said nose being transversely wider than said casing but diminishing rearwardly to a point within said casing where the body portion of said latch is narrower than said casing, openings in said casing to permit the reciprocating movement of said latch member and a spring to hold said latch member normally in a forward position.

4. In an automatic latch for operating automatic elevator gates, a casing, a latch-member having a limited reciprocal movement in said casing and a spring to hold said latch-member normally in a forward position; said latch-member having a T-shaped head provided with flanges extending from the end of each side of the nose of said head rearwardly to the body-portion of said latch-member, and a plurality of rollers supporting said body portion.

5. In an apparatus of the character described the combination of a casing, a latch member movably held therein, a plurality of rollers supporting the body of said latch member, a nose to said latch member which at its outer end is transversely wider than said casing but diminishes to the transverse

width of the body portion of said latch member at a point within said casing, openings in said casing to permit a reciprocating movement of said latch member, and means for holding said latch member normally in a forward position.

In witness whereof, we have hereunto set our hands, in the presence of two subscribing witnesses, this the twenty eighth day of October, 1907.

HOWARD A. GILSON.
WILLIAM B. BEATTIE.

Witnesses:
ARTHUR P. HARDY,
FRANCIS J. V. DAKIN.