

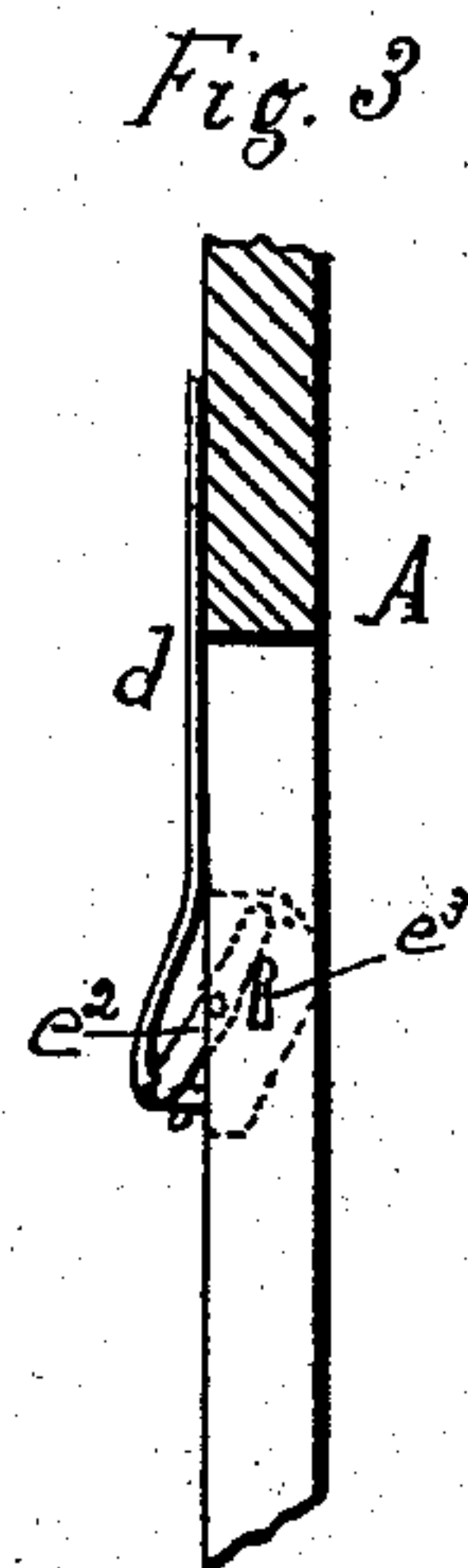
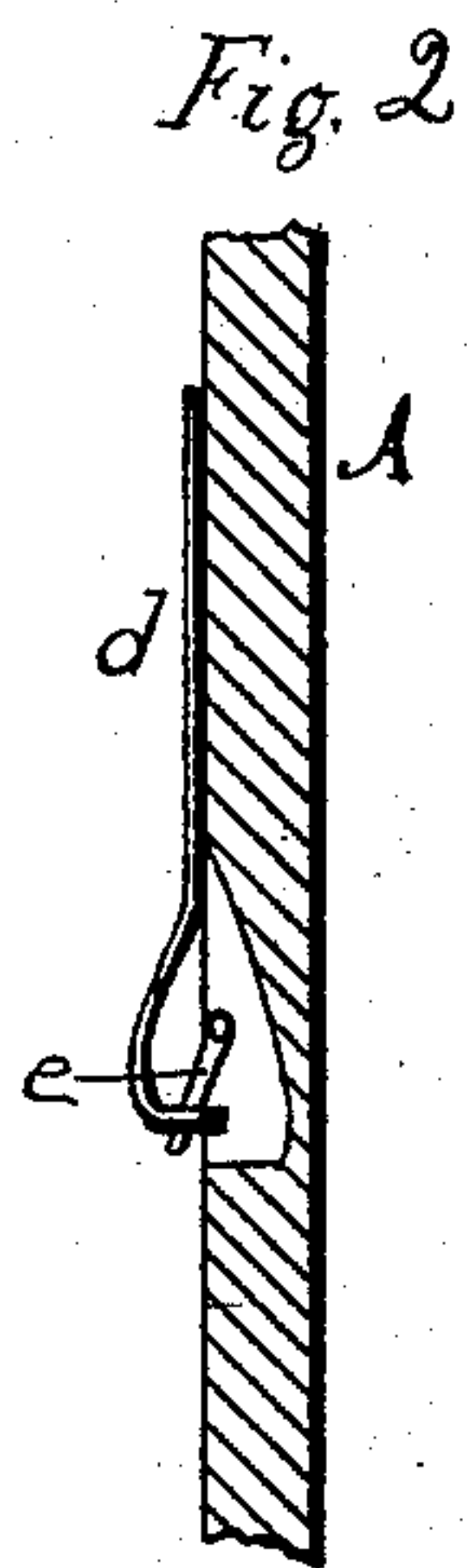
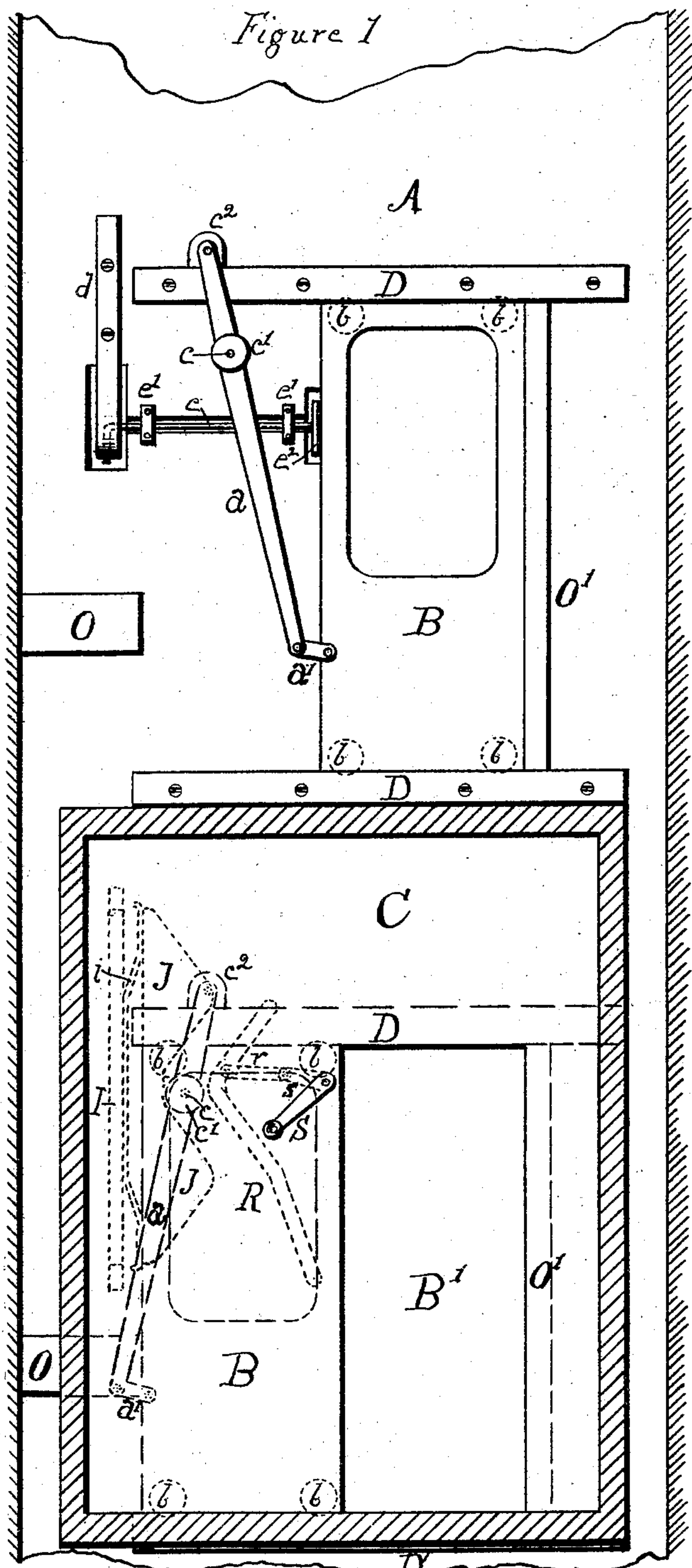
(No Model.)

A. MILLER.

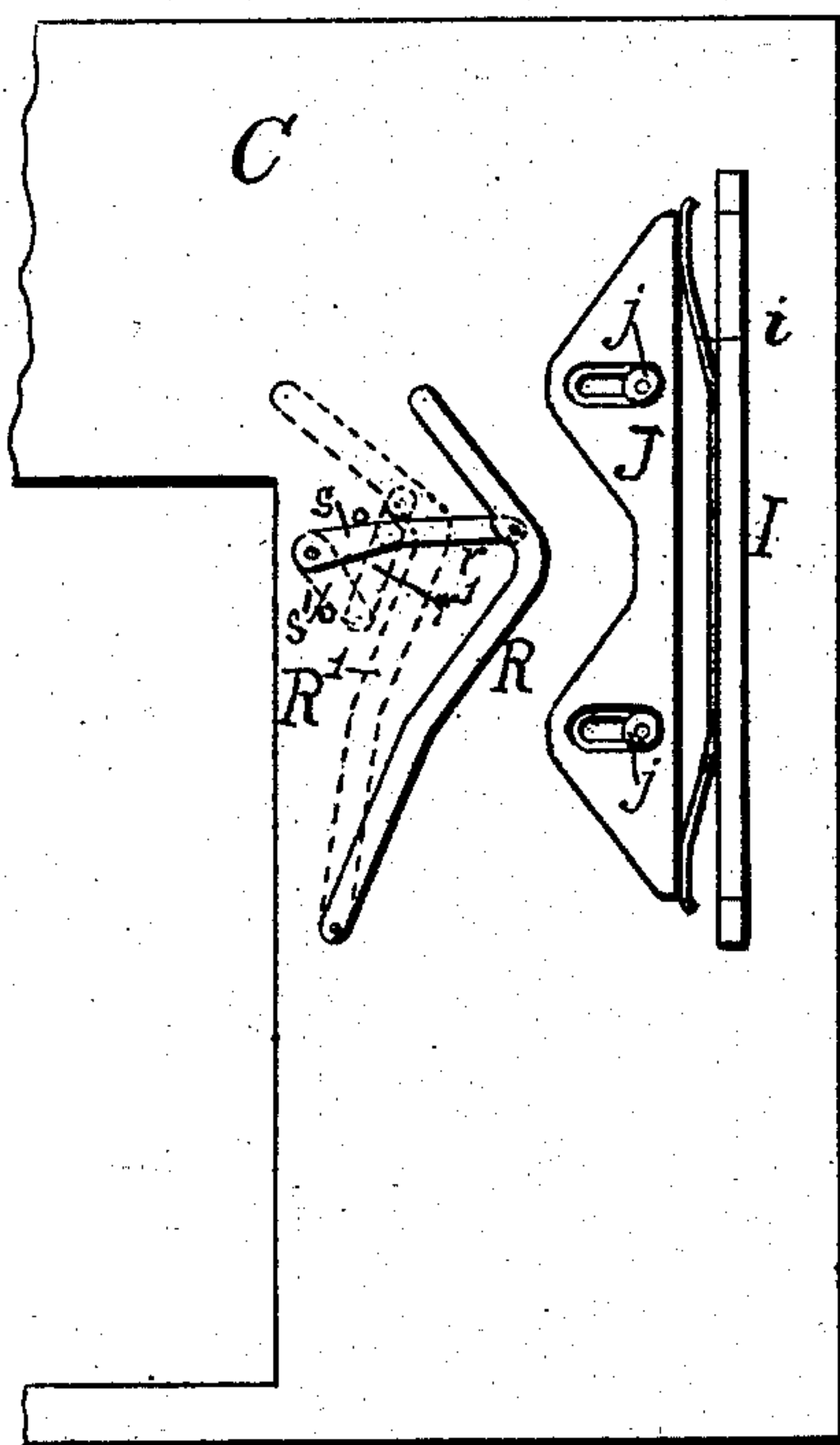
AUTOMATIC ELEVATOR GATE.

No. 388,431.

Patented Aug. 28, 1888.



*Fig. 4*



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B. Frank Cooley

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per H. H. Cooley, Atty.



# UNITED STATES PATENT OFFICE.

AARON MILLER, OF BROCKPORT, NEW YORK.

## AUTOMATIC ELEVATOR-GATE.

SPECIFICATION forming part of Letters Patent No. 388,431, dated August 28, 1888.

Application filed December 9, 1887. Serial No. 257,377. (No model.)

*To all whom it may concern:*

Be it known that I, AARON MILLER, a citizen of the United States, residing at Brockport, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Automatic Elevator-Gates, of which the following is a specification.

My invention relates to means for opening and closing and for locking and unlocking the doors or gates opening into the shaft or well automatically from the elevator cab or car.

The accompanying drawings, illustrating my invention, are as follows:

Figure 1 shows in interior elevation two stories of the side walls or casing of an elevator shaft or well having the doors or gates therein operated in accordance with my invention, and with the cab or car shown in vertical section and opposite to the lower door, which, with its tracks and operating-levers and its connections, is shown in broken lines in an opened position, while the upper door is shown closed. In this figure the cams and other devices attached to the outside of the cab or car for operating the doors are shown in dotted lines. Fig. 2 shows in vertical section a portion of the well-casing, taken just to the right of spring *d* of Fig. 1, while Fig. 3 shows a similar section of a portion of the well-casing, taken in a line with the left-hand side of the opening for a door or gate in the well-casing. Fig. 4 shows in outside elevation a portion of the cab C turned around, so as to expose to view the cams and other devices attached to the cab for operating the doors or gates.

Similar letters refer to similar parts throughout the several figures.

Referring to Fig. 1, the doors or gates B work upon tracks D by means of rollers *b*. (Shown in dotted lines.) The levers *a* swing, as seen, upon bolts passing through their upper ends and secured in the blocks *c*<sup>2</sup>, attached to the inside of the elevator-case. These levers *a* articulate at their lower ends with the links *a'*, and these links *a'* articulate at their other ends upon pins or screws located at the left-hand side of and near the bottom of the inner face of the doors B. Projecting from the face of each one of these levers *a* and toward their upper ends are seen the studs *c*, upon which the rollers *c'* are revolvably secured.

Referring to Figs. 1 and 4, cab or car C is

shown opposite the lower floor in the drawings and with the opening B' in the side thereof opposite the lower door-opening in the well-casing. Secured on the outside of the cab C, and by means of the bolts passing through the guide-rollers *j*, is seen the cam J, capable of lateral motion, as indicated, upon these guide-rollers *j*, but held in the position indicated in the drawings by means of the leaf-spring *i*, secured at or near its center to the cam-piece I by means of screws. (Not seen.) This cam J is so formed and positioned upon the outer face of the cab C as to engage the rollers *c'* on levers *a* only when the doors B, which such levers *a* operate, happen to be in any position other than closed, whereby the cab C, it will be seen, cannot pass any door B without leaving it closed. The conformation and position of this cam J are also such, as will readily be seen, as to admit of the opening of each door B when the cab C has its floor on a level with the bottom or lower end of such door. Pivottally secured at its lower end, and also on the outer side of this cab C, is seen the cam-bar R, so formed and positioned, as seen in full lines in Fig. 4 and in dotted lines in Fig. 1, as to engage the rollers *c'* on levers *a*, and thereby open each door B in succession just as the cab C approaches the level of the floor onto which each of such doors B opens, and that, too, it will be noticed, no matter in which direction the cab C happens to be going, whether upward or downward, in its course. Cams R and J, it will thus be seen, form such a course or channel between them as to engage successively each one of the rollers *c'*, and thus successively, by means of each one of the levers *a* and link *a'* thereto attached, open and close each of the doors B, opening each one full width and against the stop-blocks O just as the cab C reaches the level of the floor onto which each door opens, and closing each door very soon after leaving the level of the floor onto which each opens.

Referring to Figs. 1 and 4, lever S and crank *s* are each rigidly connected to a common bolt or rod passing through the side of cab C, lever S being on the inside and crank *s* on the outside of such cab or car. Connecting-link *r* articulates, as seen, at one end with the outer end of crank *s* and at its other end with the cam-bar R, and toward the upper



end of such cam-bar R, whereby it will be seen that by pulling the lever S downward and toward the opening B' in the side of cab C the cam-bar R, link r, and crank s may be caused to assume the positions indicated in dotted lines in Fig. 4, at R', r', and s', respectively. The extreme movement or throw of the centrally-operative point of cam-bar R (that is that point opposite the center of cam J) is a little more than the extreme movement or throw of each one of the rollers c' on levers a in fully opening and closing doors B, whereby, when such cam-bar R is caused to take the position shown in dotted lines at R' in Fig. 4, being at a point beyond where it can engage any one of the rollers c' on levers a when doors B, operated thereby, are fully closed, such doors B will not be opened when passed by cab C. Thus it will be seen that the conductor or operator, by operating lever S in the manner just described, may cause any one of the doors B to be opened or not, at pleasure, as the cab C passes it. Crank s may be arrested at either extreme of its course or throw by striking against any suitable stop pins, screws, or bolts, as indicated in Fig. 4. As indicated in Fig. 1, doors B, when closed, strike against stop-pieces O'. Spring i should be so proportioned in strength as to yield somewhat under the pressure of rollers c' on levers a in closing doors B, but not strong enough to cause serious accident to life or limb of any one that might happen to be caught by any door as it was being closed.

Referring to Figs. 1, 2 and 3, to the inside of the well-casing A and considerably to the left of the upper end of each door B is screwed a curved spring d, with its lower end working in a cavity therefor formed in casing A. Passing downward through a hole in the lower end of spring d is seen the curved left-hand end of rod e, located in a channel therefor formed in casing A and working in suitable bearings, e', let into such casing A, and secured therein so as to be flush with the inner face thereof, or nearly so. To the right-hand end of this rod e is secured the swinging bolt e<sup>2</sup>, so formed and arranged on rod e that when spring d is in its normal position the lower end of this swinging bolt e<sup>2</sup> will project outward from the inner face of casing A and just to the left of each door B, and thus securely lock the same when closed. In Fig. 3 the cavity in casing A for swinging bolt e<sup>2</sup>, and also that portion of such bolt contained therein, is shown in dotted lines.

Referring to Figs. 1 and 4, cam-piece I, it will be seen, it is so formed and positioned on the outer face of cab C as to engage and depress spring d, and so operate bolt e<sup>2</sup> as to unlock door B before cam-bar R reaches and engages rollers c' on levers a, and this cam-piece I, consisting of a plain strip of uniform width and thickness, except that at each end it is beveled down in thickness, as indicated, it will be seen also, is of such a length that any one door is kept unlocked only a little longer

than during the whole time when it may be actuated by either of cams J or R, and locked at all other times; but when it is desired for any reason to unlock any door from the outside of the well-casing it may be done by means of any suitable key inserted in a key-hole, e<sup>3</sup>, formed in the left-hand jamb of each door-opening. Each of the doors B is locked by an exactly similar device; but, for the sake of perspicuity, none of these locking devices are shown in either broken or dotted lines at the lower door in Fig. 1; but their construction and operation are sufficiently explained in the specification and shown in other places in the drawings.

The operation is as follows: Cab C, by means of cam-piece I thereon, unlocks in the manner already described each door as it passes it, while cams J and R (when such cam R occupies the position shown in full lines in Fig. 4 and in dotted lines in Fig. 1) open and close each door, in the manner already described, as such cab C passes each; but when he so desires the conductor or operator can pass any door without opening it by pressing lever S downward and to the right, and causing cam-bar R to assume the position indicated in dotted lines at R' in Fig. 4. If, however, the cab C should at any time approach any door B that has in anywise been left open, whether opened from without or not, it will be seen that from the formation of cam J such door must of necessity be first closed by either the upper or lower end of cam J, (and that, too, even if it is intended to open that door in passing it,) and then it will again be opened by cam-bar R; but no door can, under any circumstances, be left open by cab C in passing, whether it be opened or closed before the passage of such cab C. As each door is operated and locked in a similar manner, it matters not how many stories there be opened to the elevator-well, although only two are shown in the drawings.

I am aware that elevator doors or gates have been operated by means of cams on the cab or car engaging rollers directly on the doors or gates; but such an arrangement produces a great deal of friction and jarring of the doors and cab, and tends to produce a heavy vertical thrust upon the doors, thus increasing the power required to operate them, and making it necessary to pass the whole or nearly the whole height of the cab to open and close a door. All this is avoided by the devices shown and described, and the doors are operated during the passage of a small portion of the height of the cab, greatly decreasing the liability to accidents.

I claim—

1. In combination, the door, the cab, two separate and distinct cams located thereon, a lever articulating upon a fixed pin in or attached to the side of the elevator-casing and arranged to be actuated by such cams and to operate the door, such cams so formed and positioned on such cab and in relation to such lever that one of them shall serve only to



open the doors and the other to close the doors, and means for causing either one of such cams to assume an operative position or not, as desired, and that, too, from the inside of the cab  
5 and without disturbing the other cam.

2. In combination, the door, the cab, two separate and distinct cams located thereon, a lever articulating upon a fixed pin in or attached to the side of the elevator casing and  
10 arranged to be actuated by such cams and to operate the door, one of such cams consisting in a yielding or spring cam so formed and positioned on such cab and also in relation to the lever engaged thereby that such door shall be  
15 closed only thereby as the cab leaves the floor on which such door is located, such cam yielding so as to cushion the force with which such door is closed, the other one of such cams consisting in a pivotal cam located on the outside  
20 of the cab, and means for swinging or operating such pivotal cam from the inside of the car or cab, so that such pivotal cam may be caused to engage such lever or not, as may be desired, and such pivotal cam so formed and  
25 arranged, as shown and described, on such cab, and also in relation to such lever, that each door may be opened only by such cam or not, as may be desired.

3. In combination, the door, the cab, a yielding or spring cam, and a lever, such cam located on such cab and arranged to operate such lever and to yield or give somewhat under the pressure produced by such lever thereon, such lever articulating upon a fixed point in or attached to the side of the elevator-casing, such  
35 lever arranged to operate such door and to receive at its fulcrum the vertical thrust of such cam.

4. In combination, the door, the cab, a pivotal cam, and a lever, such cam located on such cab and arranged to operate such lever, such lever articulating upon a fixed stud in or attached to the side of the elevator-casing, such lever arranged to operate such door and to receive at its fulcrum the vertical thrust of such cam, and means for swinging or operating such pivotal cam from the inside of the car or cab, so that such pivotal cam may be caused to engage such lever or not, as may be desired. 40 45

5. In combination, the door, the cab, a yielding or spring cam, and a lever, such cam located on such cab and arranged to operate such lever and to yield or give somewhat under the pressure produced by such lever thereon, such lever articulating upon a fixed stud in or attached to the side of the elevator-casing, such lever arranged to operate such door and to receive at its fulcrum the vertical thrust of such cam, such yielding or spring cam provided with bearing-surfaces extending over the entire course traversed by the stud on such lever engaged thereby, so that such lever shall be engaged by such cam in any position that such door may occupy, whereby the level of the floor onto which such door opens can neither be approached nor left without closing such door. 50 55 60 65

6. In combination, the door, the cab, a cam thereon, and a spring-actuated swinging latch passing by and bearing against the edge of such door in locking the same.

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Witnesses:

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B. F. COOLEY.