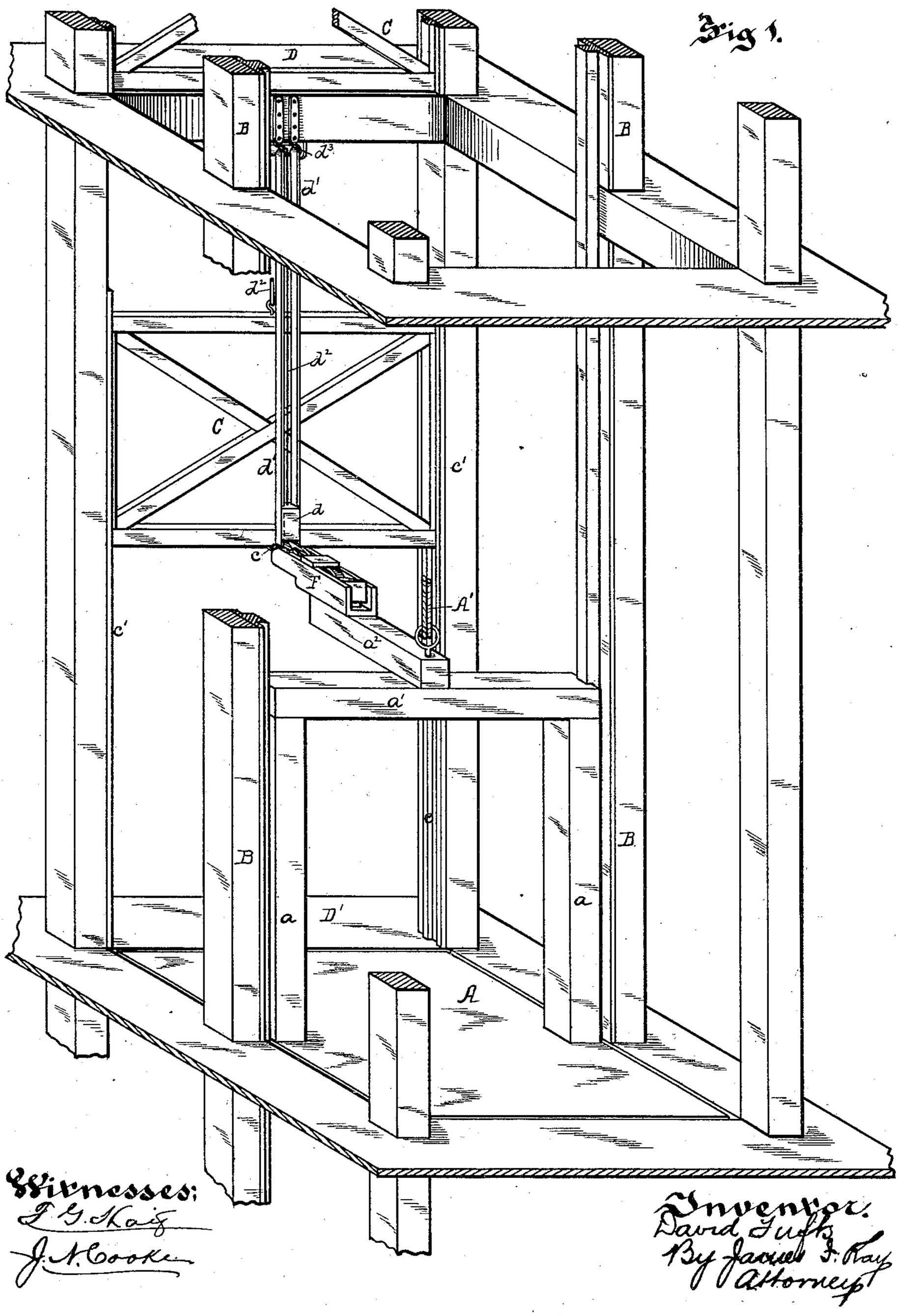
(No Model.) 4 Sheets—Sheet 1.

D. TUFTS.

OPERATING ELEVATOR GATES.

No. 343,681. Patented June 15, 1886.

Fig 1.



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By Jared F. Kay
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D. TUFTS.

OPERATING ELEVATOR GATES.

No. 343,681. Patented June 15, 1886.

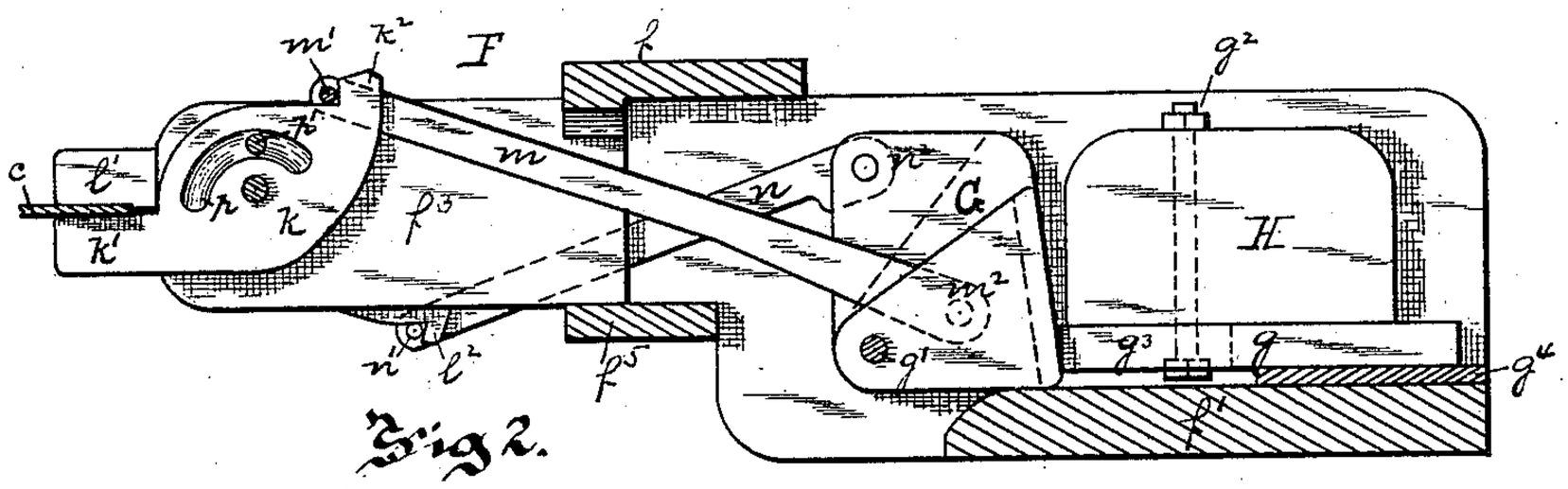
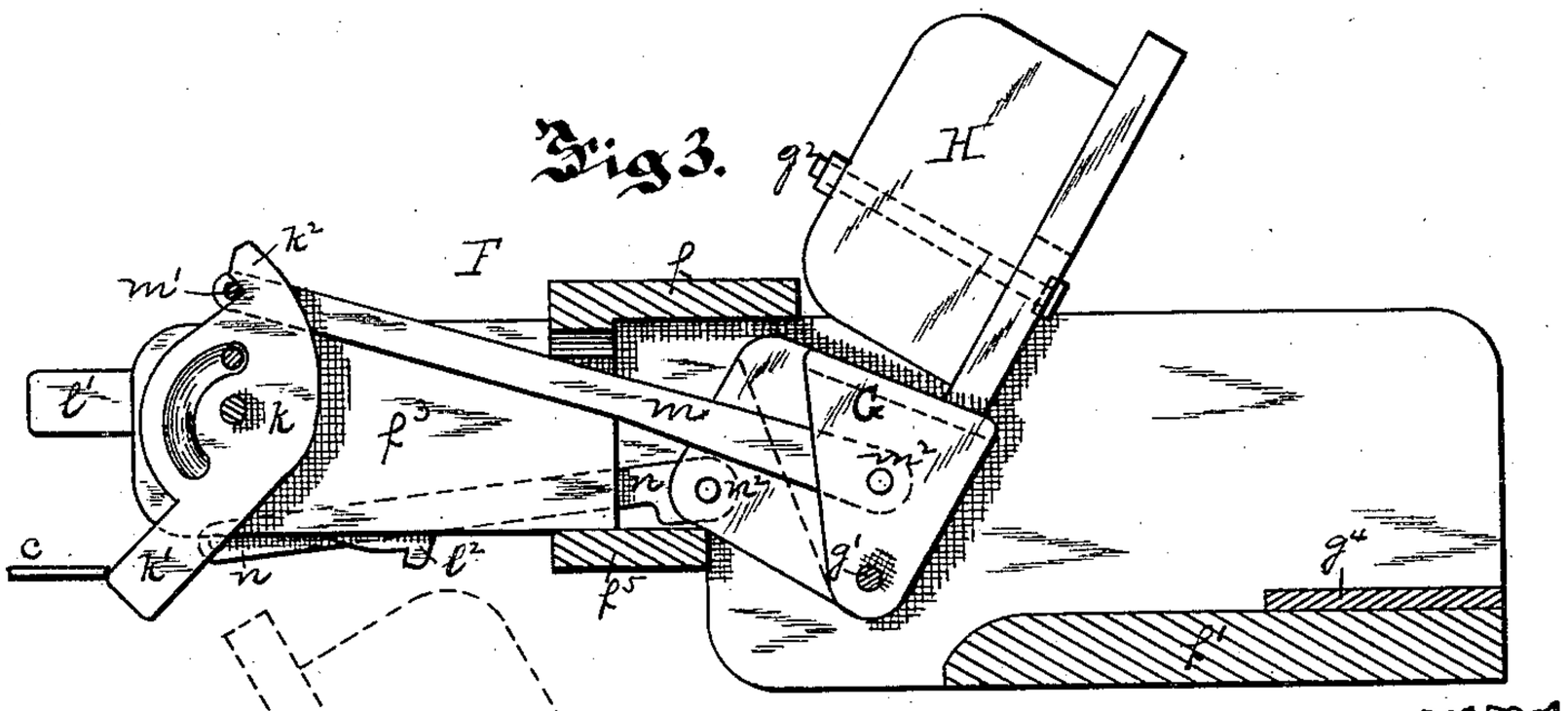


Fig 2.

Fig 3.



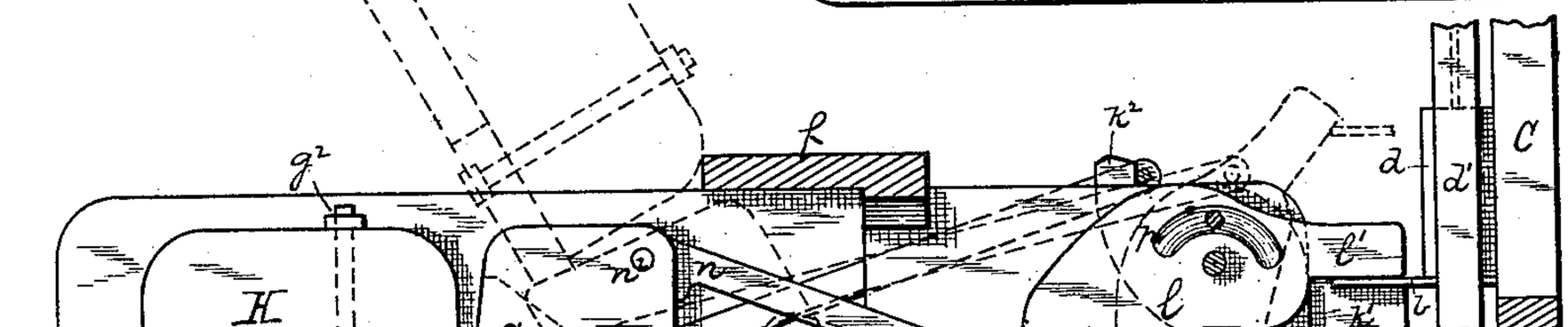


Fig 4.

Fig 5.

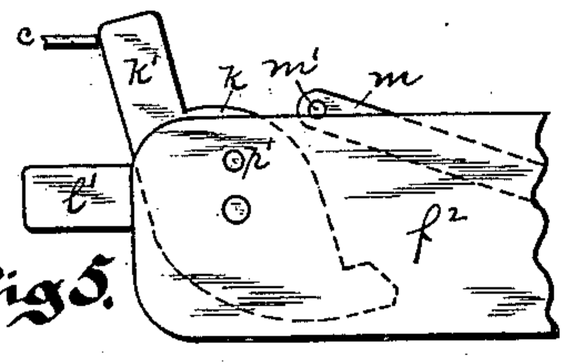
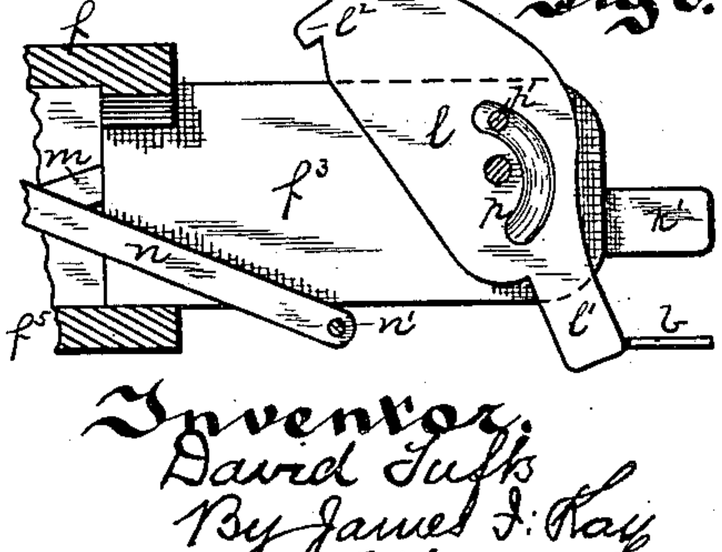


Fig 6.



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(No Model.) 4 Sheets—Sheet 3.

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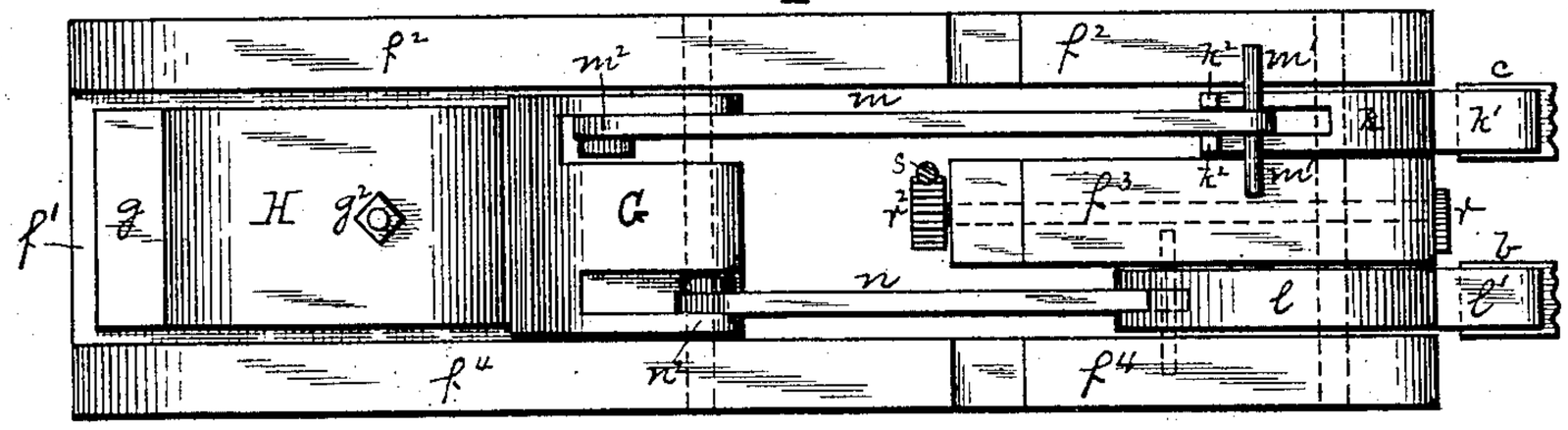
OPERATING ELEVATOR GATES.

No. 343,681. Patented June 15, 1886.

Fig 7.



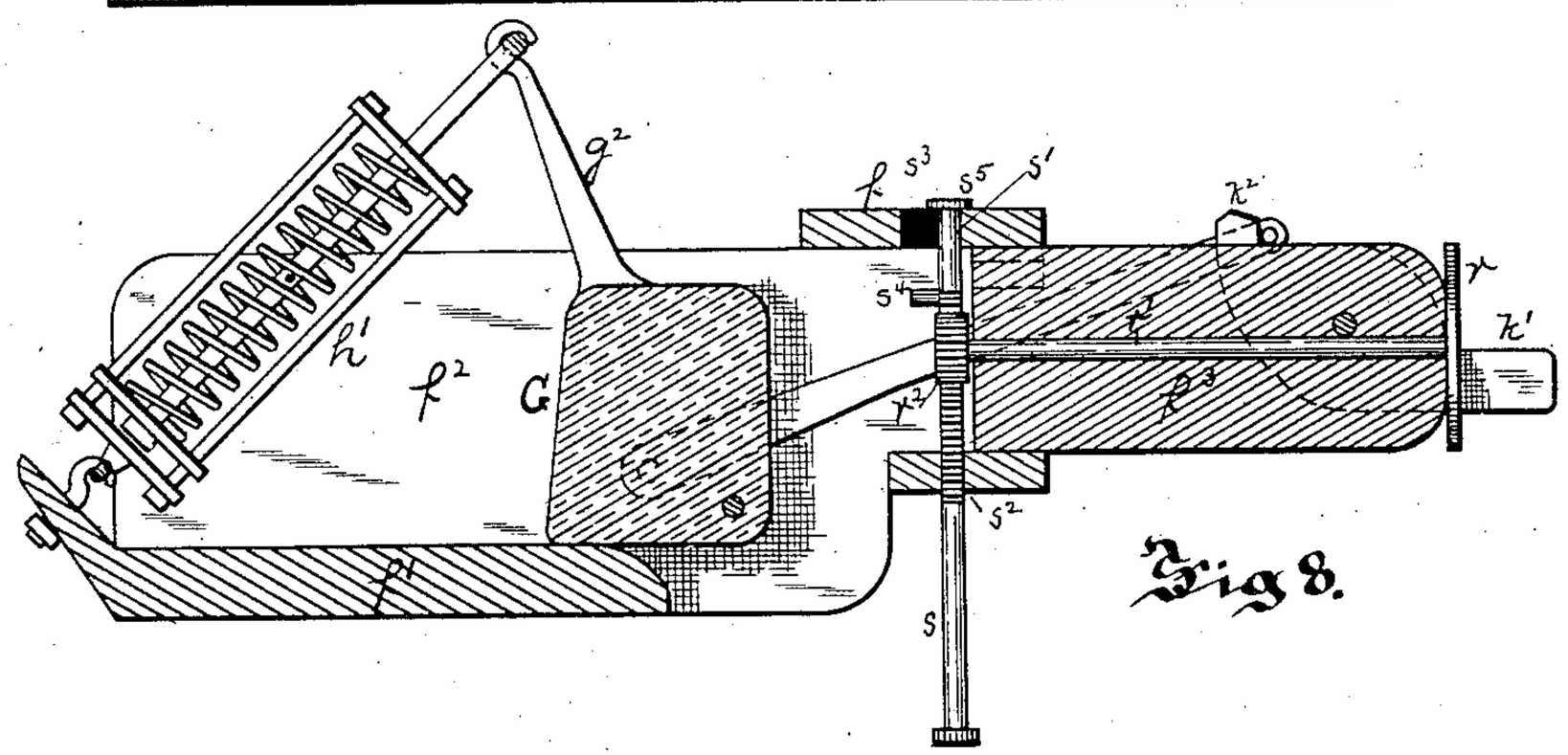


Fig 8.

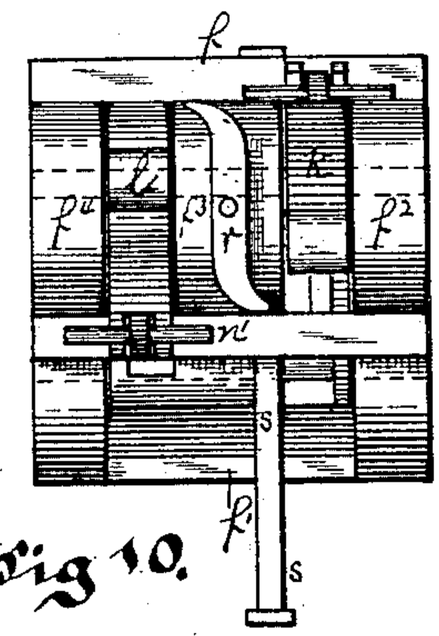


Fig 10.

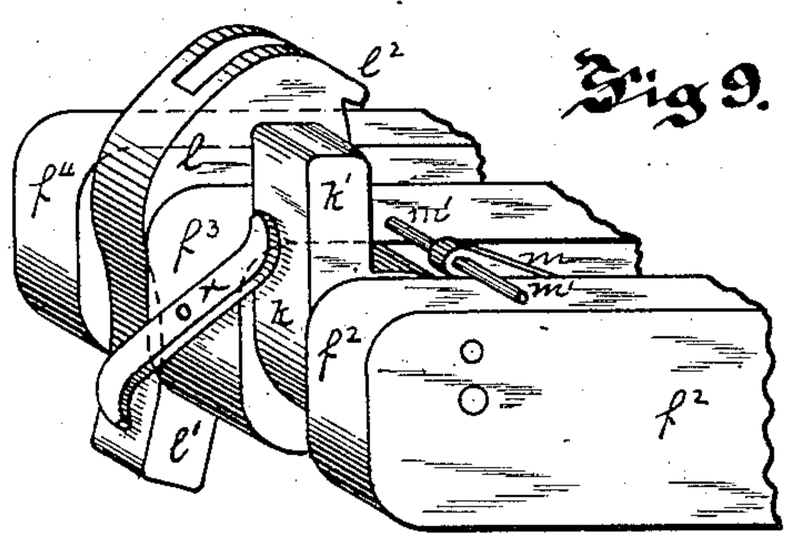


Fig 9.

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(No Model.) 4 Sheets—Sheet 4.

D. TUFTS.

OPERATING ELEVATOR GATES.

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Fig 12.

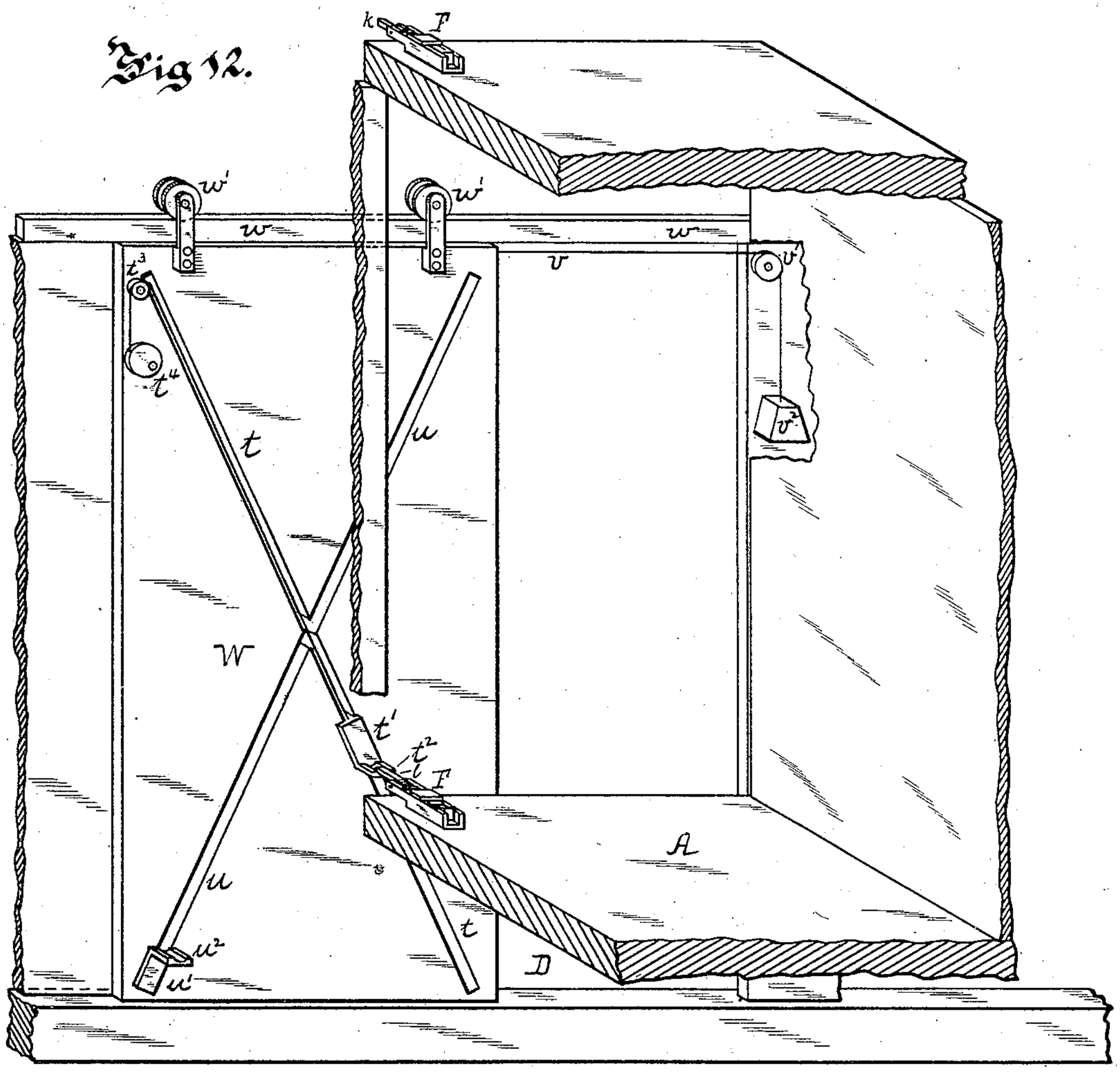
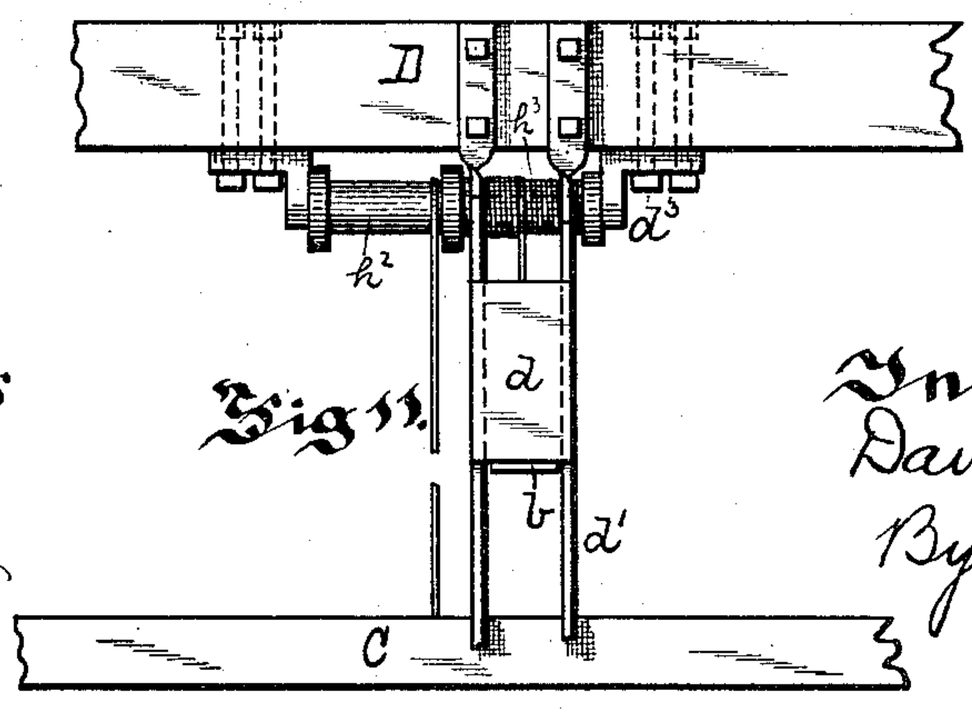


Fig 11.



Witnesses:
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UNITED STATES PATENT OFFICE.

DAVID TUFTS, OF PITTSBURG, PENNSYLVANIA.

OPERATING ELEVATOR-GATES.

SPECIFICATION forming part of Letters Patent No. 343,681, dated June 15, 1886.

Application filed February 9, 1886. Serial No. 191,325. (No model.)

To all whom it may concern:

Be it known that I, DAVID TUFTS, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Operating Elevator-Gates; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to the operation of elevator gates or doors, its object being to provide simple and compact means for opening, retaining in that position, and closing the gates as the elevator, either in its upward or downward course, approaches, stops at, and leaves the floor or landing at which the gate or door is located. It is a well-known fact that in all large wholesale business-houses these elevators are employed for raising and lowering the goods handled therein, and that unless care is taken the gates around the elevator-shaft are often left open in such manner as to endanger the lives of those within the building, or the destruction of goods, the danger being that the shaft will be unprotected, and any person may inadvertently step down it or the goods fall down the same.

Heretofore means have been provided for operating these elevator-gates, but they have been found so objectionable that they have been used in but few cases, as great difficulty was found in operating the gate unless it was both opened and closed by a positive movement, and in case the closing or opening of the gate was prevented by any goods resting against the gate or falling in its course when the gate was open either the gate or the mechanism for operating the same was broken, and thus rendered inoperative.

In these elevator-gates the points which are found desirable in order to make a practically perfectly-working apparatus are, that the gates shall be raised or opened whether the elevator is ascending or descending; that the apparatus shall be so arranged that in case a heavy weight is pressing against the gate as the elevator passes and the apparatus engages therewith the elevator will pass without raising the gate or breaking any of the parts thereof, or, that if any such obstacle occurs in the course of the gate in closing there will be no liability of breaking the gate or in the operating apparatus, the gate simply remaining open until the obstruction is removed; to arrange the apparatus so that the gate can close slowly, thus preventing the injury of any person in its course, to arrange the apparatus so that the gate can be lifted the full height required, even in buildings having but low stories, and to arrange the apparatus so that it can pass any desired landing or floor without operating the gate, and that the automatic apparatus shall be simple, compact, and strong, and shall not be too expensive, so that it can be applied to the ordinary freight-elevator at comparatively small cost.

The object of my invention is to meet these needs in the ordinary elevator-gates, and it is believed that by my improved apparatus I am enabled to overcome all objections heretofore urged to automatically-operated elevator-gates, and at the same time to fully fill all the essentials of a perfectly-operated gate.

It consists, essentially, in tripping the apparatus on the elevator, having sufficient power to move the gate, and engaging with a suitable lug or other device on or connected with the elevator gate or door, and adapted to move the gate or door until the force exerted against the tripping apparatus is greater than the force exerted thereby, when the tripping apparatus will trip and pass, leaving the gate or door free to close by its own weight or other suitable means.

It also consists in certain improvements in the tripping apparatus, whereby the power is applied to the tripping-lever, to cause it to move the gate and to trip and pass when under heavy pressure. The tripping-lever is caused to pass without operating when moving in the opposite direction. The lever mechanism for operating the gate or door both in the upward and downward movement of the elevator are combined in compact form and operated by the same force, and the tripping-levers may be withdrawn in such manner as to pass the engaging devices on the gates without engaging with and operating the same, as well as in certain details of construction both in the elevator-gate and in the apparatus for perfectly operating the same, as will be hereinafter more specifically set forth.

To enable others skilled in the art to make and use my invention, I will describe the same more fully, referring to the accompanying drawings, in which—

Figure 1 is a perspective view of the elevator-shaft, illustrating my improved apparatus. Fig. 2 is an enlarged side view of my improved tripping apparatus, the side plate of the body of the tripping apparatus being removed, and said figure showing in full lines the apparatus for operating the gate when the elevator ascends. Fig. 3 is a like view of the apparatus, showing the position of the parts wherein the tripping apparatus is raised in tripping. Fig. 4 is a like view showing the apparatus for operating the elevator-gate when the elevator descends, the position of the apparatus in tripping being shown in dotted lines. Figs. 5 and 6 are detail views showing the movement of the tripping-levers when they pass the lugs on or connected with the gate without operating the tripping apparatus. Fig. 7 is a top view of my improved apparatus. Fig. 8 is a longitudinal central section thereof, partly in full lines, showing the apparatus for withdrawing the finger-levers and a spring for obtaining the required force. Fig. 9 is a detail perspective view illustrating the manner in which the tripping-levers are withdrawn by the finger-lever. Fig. 10 is a face view of the tripping apparatus. Fig. 11 is a view showing the form of pulleys employed when the apparatus operates to raise the gate within a low story, as hereinafter described; and Fig. 12 is a perspective view of the form of apparatus employed in operating gates or doors which slide to one side of the entrance.

Like letters of reference indicate like parts in each.

My improved apparatus for operating elevator gates or doors may be employed either to raise the gates or doors in opening them, or where doors sliding to the side of the opening are employed to draw these doors aside and cause the opening thereof.

I will first describe the apparatus employed in operating the vertically-moving gates, and subsequently describe the manner in which my invention may be applied to horizontally-sliding gates or doors.

The elevator A is of any desired construction, that shown in Fig. 1 being the ordinary freight-elevator having the elevator-standards *a*, cross-beam *a'*, to which is secured the elevator-rope A', the elevator moving between the guide-posts B.

The landings D D' shown may be any desired distance apart, though in the simplest form of my apparatus it is preferable each room or apartment be over twice the height it is desired to raise the gate, for reasons hereinafter described.

The elevator-gate C moves between suitable guide-bars, *c'*, being counterbalanced by weighted ropes over pulleys, or in any other suitable way, the intention being that the gate shall overbalance the weights secured to the rope sufficiently to gradually descend within its guides as soon as the devices for raising it are disengaged therefrom.

Secured at or about the base of the gate C is the engaging-lug or other suitable device, *c*, with which the tripping-apparatus hereainfter referred to engages in raising the gate when the elevator is ascending.

Extending down in front of the gate C are the guide-bars *d'*, in which is mounted the slide *d*, which slide, where the apartment is of sufficient height, is connected to the gate by a rope, d^2, passing over a pulley, d^3, located at or near the top of the guide-bar. These guide-bars *d'* can be formed of the ordinary rectangular or half-round metal bars, bent to shape, and having their upper ends given a quarter-turn, as shown in the drawings, so as to provide means for bolting to the frame-work of the elevator-shaft, and the slide *d* is provided with flanges extending out on each side of the guide-bars, being thus confined within the same, the slide *d* having an engaging-lug or similar device, *b*, extending out therefrom, which engages with the tripping apparatus, as hereinafter described.

The cross beam *a'* of the elevator is provided with a bar, a^2, which extends out therefrom toward the elevator-gate, and on which is supported the tripping apparatus F, the body of this tripping apparatus being formed of the top plate, *f*, bottom or bed plate, *f'*, and the side plates, f^2 f^4, and center plate, f^3, the center plate, f^3, extending only part of the length of the body, and back of this center plate there being pivoted the block G by means of the pin *g'*, mounted on the side plates, f^2 f^4, of the body, the block G having the arm *g* carrying the weight H, this weight being preferably secured to the arm by means of the bolt g^2, extending through a slot, g^3 in the weight, and by means of this adjustable weight on the lever the exact force to be exerted by the tripping apparatus can be accurately adjusted.

On the bed-plate *f'* of the body, or secured to the arm *g*, is a suitable cushion, g^4, by means of which the sound of the weight in dropping is deadened, so that the tripping apparatus is substantially noiseless.

Instead of the employment of the weight, as shown, other equivalent apparatus may be employed, such as the spring *h'*, acting with the arm *g*, as shown in Fig. 8.

Pivoted at the forward end of the body are the tripping-levers *k l*, the lever *k* being pivoted between the side plate, f^2, and center plate, f^3, and being employed to operate the gate in the upward or ascending course of the elevator, the lever *k* having the trigger *k'* extending out in such position as to engage with the lug *c* at the base of the gate, while the lever *l* is pivoted between the center plate, f^3, and side plate, f^4, and acts to raise the gate in the downward course of the elevator, the lever *l* having the trigger *l'*, which engages with the lug *b* on the slide *d* and acts through the rope d^2 to raise the gate as the elevator descends.

At the opposite end of the lever *k* from the trigger *k'* is formed a suitable slot, at each side of which are the hooks k^2, which engage

with lugs m' on the connecting bar or strap m, this strap being pivoted to the block G at m^2, and it is evident that when the trigger k' engages with the lug c of the elevator-gate it will raise the gate, unless the weight of the gate is sufficient to cause the lever to draw upon the strap m through the block G and raise the weight H, as shown at Fig. 3. As, however, the gate is so counterbalanced as to be easily raised, it is evident that the force of the weight H will be sufficient to cause the tripping-lever to raise the gate until the gate strikes a suitable stop or other obstruction, when the force exerted upon the trigger k' will be sufficient to raise the weight H through the lever mechanism, when in such case the lever k will trip and pass the lug c on the elevator, leaving the gate free to descend by its own weight and close the entrance to the elevator, thus preventing accident by any goods falling down the shaft or persons inadvertently stepping into the same. The lever l is also formed with a slot at the opposite end from the trigger l', and at each side of this slot are hooks l^2, engaging with lugs n' on the bar or strap n, which is pivoted to the block G at n^2 and acts in substantially the manner described, when the elevator in its downward course causes the trigger l' to engage with the lug b on the slide d, the operation being substantially the same as that described in connection with the tripping-lever k, except that the tripping-lever l operates through the slide d' and rope d^2, passing over the pulley d^3 to raise the gate, the apparatus being thus enabled to raise the gate in its downward course. The tripping-lever k is heaviest on the trigger side thereof, so that it will, when tripped by the lug c on the downward course of the elevator, always drop back into engagement with the strap m, and the tripping-lever l is heaviest on its hook side for the same reason. The lugs m' on the strap m extend out over the side and center plates, f^2 f^3, of the body in such position that the hooks on the tripping-lever k will always engage therewith upon pressure being applied to the trigger of the lever, and the strap n is supported in such position that it will always be engaged by the hooks on the tripping-lever l by means of the cross-bar f^5, extending between the center plate, f^3, and side plate, f^4.

It will be noticed that whenever the tripping-lever k comes in contact with the lug c at the base of the gate in the downward course of the elevator as the lever is free to swing on its bearing it will be pressed up by the lug and pass the same without acting thereupon, the lever being thus arranged only to engage with the strap m in the upward course of the elevator, and being free to swing on its bearing in the downward course thereof, so that it performs no function in its downward course, the hooks k^2 being simply drawn away from a connection with the lugs m' of the strap. The same is true of the lever l when operating in the upward course of the elevator, as when the elevator is ascending and the trigger l' of the lever strikes the lug b on the slide d the pressure of the lug simply throws the lever without in any way causing the operation of the apparatus.

In order to limit the movement of these tripping-levers k l, I form in one side thereof the segmental radial slot or groove p, into which the pin or key p' on the side plate of the body fits, and this pin or key thus acts to limit the movement of the levers, so that when they are thrown by the lugs c or b in the course where they do not operate they cannot be thrown out of position, but will immediately fall back into their normal position of engagement with the straps.

In order to arrange the apparatus so that it shall not operate in passing any particular gate, which is often desirable in elevators passing several stories or landings, I pivot the finger-lever r at the outer end of the center plate, f^3, and by means of it, as shown particularly in Fig. 9, by giving it a half-turn I am enabled to turn the tripping-levers k l in such position that they will not engage with the lugs c and b on the gate or its slide. This lever r may be operated by hand or by other suitable device; but I have found the simplest construction for operating it to be as follows: Extending through the center plate, f^3, or journaled in suitable manner thereon is the shaft r', at the outer end of which is attached this finger-lever r, at the inner end of which is a small pinion, r^2, this shaft and finger-lever being operated by any suitable mechanism, that shown being a vertical rack-bar, s, which extends through the cross-bar f^5 of the body, the rack-bar having formed thereon a short rack, which engages with the pinion r^2, and by which, as it is drawn upward or downward, the bar r', carrying the finger-lever, is rotated so as to draw back the tripping-levers, as before described. The portion of the bar s which has not the rack-teeth formed on it and which passes through the top plate, f, and cross-bar f^5 is generally formed cylindrical, as shown, and passes through circular holes or seats s' s^2 in these parts of the body, and the seat s' has at one side thereof a short slot, s^3, through which a lug, s^4, on the rack-bar passes, the rack-teeth on the bar engaging with the pinion when this lug s^4 corresponds in position with the side slot, s^3, and when it is desired to turn the finger-lever so that it will draw the tripping-levers out of their normal position, the rack-bar is pushed up, its head s^5 being raised from the top plate, l, and the bar being supported by the lug s^4, resting on top of the plate p; but when it is desired to release the tripping-levers, the rack-bar is drawn down, this lug s^4 then passing through the slot s^3, the rack-bar being held in the proper position by its head s^5. When the distance between the landings is over twice the height to which it is desired to raise the gate, a simple pulley, d^3, may be employed in connection with the rope d^2, by means of which the gate

is raised in the downward course of the elevator; but when the distance is less than this it is necessary to employ a combined pulley—such as that shown in Fig. 11—this pulley having two separate windlasses, which are of different diameters, and one rope from the gate passes over the windlass h^2, of larger diameter, while the other rope, connecting with the slide, passes over the windlass h^3, of smaller diameter, and by means of this apparatus the gate is raised the full distance required, even though the course of the elevator in raising that is less than that distance.

When my improved apparatus is in use, as the elevator ascends the trigger k' of the tripping-lever k engages with the lug c at or near the base of the gate, and as the force exerted by the weight or spring H through the leverage of the tripping apparatus is greater than the weight of the gate over its counterbalancing-weights as the elevator ascends the tripping-lever raises the gate with it, and if the elevator stops at that landing the tripping-lever holds the gate up until the elevator is raised or lowered. If the elevator then continues to ascend, as the gate has been raised to its highest position and strikes against a suitable stop or shoulder, the force exerted by the gate is greater than that exerted by the weight or spring of the tripping apparatus, and the weight or spring will then be raised through the leverage of the tripping apparatus, the lug c on the gate thus throwing the trigger, so that it passes the lug and leaves the gate free to descend by its own weight. In the meantime the tripping-lever l has come in contact with the lug b of the slide d, and as this lever does not operate in the upward course of the elevator the lug b simply throws this lever, as shown in Fig. 6, and the lever falls back into its normal position. As the elevator continues to ascend it operates each gate in its course, unless the gate is held by some weight sufficient to overcome the force exerted by the weight of the tripping apparatus—such as when a bundle or package of goods has been thrown against the gate, or when a person is leaning on it—in which case, as the weight of the gate is greater than the force exerted by the tripping apparatus the trigger will simply throw itself, and the elevator will pass the gate without raising it. When the elevator descends, as it leaves the landing it permits the gate to descend gradually with it, the lug c of the gate resting on the trigger k' of the tripping apparatus, and the tripping apparatus then passes down below the landing, and to raise the gate at the next landing in the downward course of the elevator the trigger l' of the tripping-lever l engages with the lug b on the slide d in its normal position at or near the top of the guide-bars d', and through the rope passing over the pulley L the tripping apparatus then draws the gate up, and if the elevator is stopped at the landing holds it in that position until the elevator descends, when, as soon as the elevator is raised to its highest position and comes against the stop, the force of the lever is greater than that exerted in the tripping apparatus, and the lever is thrown in the same manner as described in connection with the tripping apparatus k, leaving the gate free to descend by its own weight, the gate in descending drawing the slide up to the top of the guide-bars d' in position to again be engaged by the tripping-lever l when the elevator again passes the gate in its downward course. As the elevator is descending the trigger k' of the tripping-lever k comes in contact with the lug c at or near the base of the gate and is thrown thereby without operating the same. If the gates in descending meet with any obstruction, they are held up thereby until the obstruction is removed, there being no injury to the apparatus from this cause nor liability of injury to any person standing in the course of the descending gate.

Where the operator desires to pass several stories without operating the gate, by means of the rack-bar s through the pinion r^2 and bar r' he turns the finger r, the bent fingers of the lever then drawing the triggers of the lever back in the manner above described so that they will not engage with the gate, and in such case the elevator will pass the gates without operating the same, and as soon as he raises the gate he desires to operate by raising the rack-bar he throws the triggers of the levers out into the normal position, ready to engage with and open the gate.

In Fig. 12 is shown one manner of applying my improved apparatus to operating sliding gates or doors moving to the side of the entrance, the gate or door W being supported on the railing w by means of the rollers w' and the door having the rope v attached thereto and passing over the pulley v', at the end of which is secured the weight v^2, which acts to close the door when it is let free after the passage of the elevator. Extending diagonally across the face of the elevator-door are the slots t u, these guide-slots being closed at the ends, and in the guide-slots there being mounted the slides t' u', the said slides being adapted to move within their guide-slots when engaging with the tripping apparatus upon the elevator, the slides having the lugs t^2 u^2, respectively, thereon, and the slide t' being employed to operate the doors as the elevator is descending, while the slide u' is employed to operate the door when the elevator is ascending. It is evident that to accomplish the desired result the tripping apparatus for ascending and descending must be formed separate, the one being located at or upon the floor or the elevator, so that as the elevator descends the apparatus will engage with the slide t' and draw the door back, holding it back when the elevator rests at the landing and then freeing itself therefrom as the elevator descends farther, while the other tripping apparatus is located at such height on the elevator that it will engage with the slide u' and draw the door back as the elevator ascends,

holding it open while the elevator remains at the landing and freeing itself therefrom as the elevation ascends farther. The tripping apparatus employed in either case is the same as that before described, except that separate weight or spring apparatus is employed with each tripping apparatus, and it is not necessary to again describe its construction. As the slide u' is in its normal condition ready to engage with the tripping apparatus when at the base of its slot u, it is evident that no means are necessary to raise the slide, and that after the tripping apparatus has freed itself therefrom at the top of its guide-slot the weight of the slide will cause it to descend to the lower end of the guide-slot; but as the elevator descends it engages with the slide t' in the guide-slot t and draws it down to the base of the guide-slot, and it is therefore evident that means are necessary to raise the slide t' to the upper end of its guide-slot where it will again engage with the tripping apparatus when the elevator descends. For this purpose any suitable mechanism can be employed, that shown being a rope or cord secured to the slide t', and passing over the pulley t^3 at the upper end, and thence connected with the spring-pulley t^4, upon which the cord is wound, so that as soon as the tripping apparatus is disengaged from the slide t' this spring-pulley will wind up the cord, and thus raise the slide t' to the upper end of its guide-slot. When this form of my improved apparatus is employed, where the elevator is descending, as shown in the drawings, Fig. 12, the gate being closed, the tripping apparatus located on the floor of the elevator will engage with the lug t^2 of the slide t' and carry this slide down with it. As, however, the tripping apparatus is held from side movement, it is evident that, as the slide travels in the guide-slot extending diagonally across the door or gate, the door is caused to move to one side of the entrance, the door traveling on its supporting-pulleys, and being thus gradually drawn back by the tripping apparatus until the elevator reaches the landing, and if the elevator remains there the gate being held open by the tripping apparatus until the elevator either ascends or descends. In case the elevator again ascends the tripping apparatus and slide t' will remain in engagement, and the slide will gradually ascend, and the door close as the tripping apparatus allows the spring-pulley to draw the slide and the weight v^2 to close the door. Where the gate descends as the slide t' is carried to the base of the guide-slot t and can move no farther, the force exerted by the slide is greater than that of the tripping apparatus, and the tripping apparatus will then trip and pass, leaving the gate free to be closed by its weight v^2, and as soon as the tripping apparatus is thus disengaged from the slide t' the cord secured to the slide is wound upon the spring-pulley, and the slide is thus drawn up to the upper end of the diagonal slot in position to engage with the tripping apparatus when the elevator again descends. When the elevator is ascending, the tripping apparatus located in the upper part of the elevator will engage with the slide u' in the guide-slot u, and by the force exerted upon this slide as the tripping apparatus is held from any side movement, will cause the gate to move to one side of the entrance, the operation in opening the door, holding it open, and permitting it to close being the same as that above described. In case any force is exerted against the door which would prevent its opening, as has been previously described in connection with the vertically-moving gate, the tripping apparatus will simply trip and pass either in ascending or descending without operating the door.

It is evident that my improved apparatus may be applied in different ways in operating these elevator-gates, and it has been considered necessary only to illustrate the two forms of apparatus shown, and I do not limit my invention to these forms of apparatus.

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

1. In apparatus for operating elevator gates or doors, the combination, with the gate and a lug on or connected with the gate, of tripping apparatus on the elevator having sufficient power to move the gate, and adapted to engage with said lug and move the gate until the force exerted against the tripping apparatus is greater than the force exerted thereby, when it will trip and pass.

2. In combination, the vertically-sliding elevator-gate, the vertical guide d', extending down into the elevator-entrance, and having mounted therein the slide d, connected by the pulley mechanism with the gate, and the tripping apparatus F on the elevator having sufficient power to raise the gate through said pulley mechanism until the force exerted against the tripping apparatus is greater than that exerted thereby, when it will trip and pass, substantially as and for the purposes set forth.

3. In apparatus for operating elevator gates and doors, the combination of the tripping-lever having a trigger or finger engaging with apparatus upon or connected to the gate, and lever mechanism between said tripping-lever, and a weight or spring having sufficient power to move the gate, substantially as and for the purposes set forth.

4. In apparatus for operating elevator gates or doors, a tripping-lever having a finger or trigger engaging with apparatus on or connected with the gate or door, and provided with hooks or equivalent devices engaging with lever mechanism connected to a weight or spring having sufficient power to move the gate, substantially as and for the purposes set forth.

5. In apparatus for operating elevator gates or doors; the combination, with the tripping-lever, of a pivoted block carrying or connected to a weight or spring, and a rod or strap

connecting said tripping-lever and block, substantially as and for the purposes set forth.

6. In apparatus for operating elevator gates or doors, the tripping-lever having a concentric groove, *p*, formed therein, and a pin in the body of the tripping apparatus fitting within said groove, to limit the motion thereof, substantially as set forth.

7. In apparatus for operating elevator gates or doors, the combination of the block G, connected to a weight or spring, the tripping-levers *k l*, said levers engaging with the elevator-gate in the upward and downward movement, respectively, with the elevator, and connecting-straps from said levers to said block, substantially as and for the purposes set forth.

8. In apparatus for operating elevator gates or doors, the combination of the vertically-moving gate having the lug *c* thereon, the vertical guide *d'*, extending down into the elevator-entrance, and having the slide *d*, connected by pulley mechanism with the gate, and the tripping apparatus provided with the tripping-levers *k l*, engaging with the lug *c* and slide *d*, respectively, and connected to the same weight or spring apparatus, substantially as and for the purposes set forth.

9. In tripping apparatus for operating elevator gates and doors, the combination of the block G, having the arm *g*, and the weight H, adjustably secured thereon, substantially as and for the purposes set forth.

10. In apparatus for operating elevator gates and doors, tripping apparatus provided with a weight, in combination with a cushion for deadening the sound of the weight, substantially as set forth.

11. In apparatus for operating elevator gates and doors, the combination of the strap having lugs at the ends thereof, and the tripping-lever having hooks adapted to engage with the said lugs or swing free therefrom, substantially as and for the purposes set forth.

12. In apparatus for operating elevator gates and doors, the combination, with the tripping-lever adapted to engage with apparatus or connected to the gate or door, and a finger-lever adapted to engage with said tripping-lever and hold it out of the course of the apparatus on or connected to the gate, substantially as and for the purposes set forth.

13. In apparatus for operating elevator gates or doors, the combination, with the tripping-lever engaging with apparatus on or connected with the gate, of the finger-lever *r*, mounted on the shaft *r'*, and apparatus for operating said shaft, substantially as and for the purposes set forth.

14. In apparatus for operating elevator gates and doors, the combination of the tripping-lever, the shaft *r'*, carrying the finger-lever *r* and pinion r^2, and the rack *s*, engaging with said pinion, substantially as and for the purposes set forth.

15. In apparatus for operating elevator gates or doors, the combination, with the tripping-lever, of the shaft *r'*, carrying the finger-lever *r* and pinion r^2, and the rack-bar *s*, having a rack engaging with said pinion and provided with the head s^5, engaging with the top plate of the body of the tripping apparatus, substantially as and for the purposes set forth.

16. In apparatus for operating elevator gates and doors, the combination of the shaft carrying the finger-lever and having the pinion r^2 at the opposite end thereof, and the cylindrical rack-bar engaging with said pinion and having a lug, s^4, passing through the slot s^3 in the top plate of the body of the tripping apparatus, substantially as and for the purposes set forth.

17. In apparatus for operating elevator-gates, the combination, in a slide mounted in a suitable guide and adapted to engage with tripping apparatus on the elevator, a pulley having windlasses of different diameters, a cord connected to the elevator-gate and to one of the windlasses, and a cord connected to the slide and the other windlass, substantially as and for the purposes set forth.

In testimony whereof I, the said DAVID TUFTS, have hereunto set my hand.

DAVID TUFTS.

Witnesses:

JAMES I. KAY,

J. N. COOKE.