

No. 715,330.

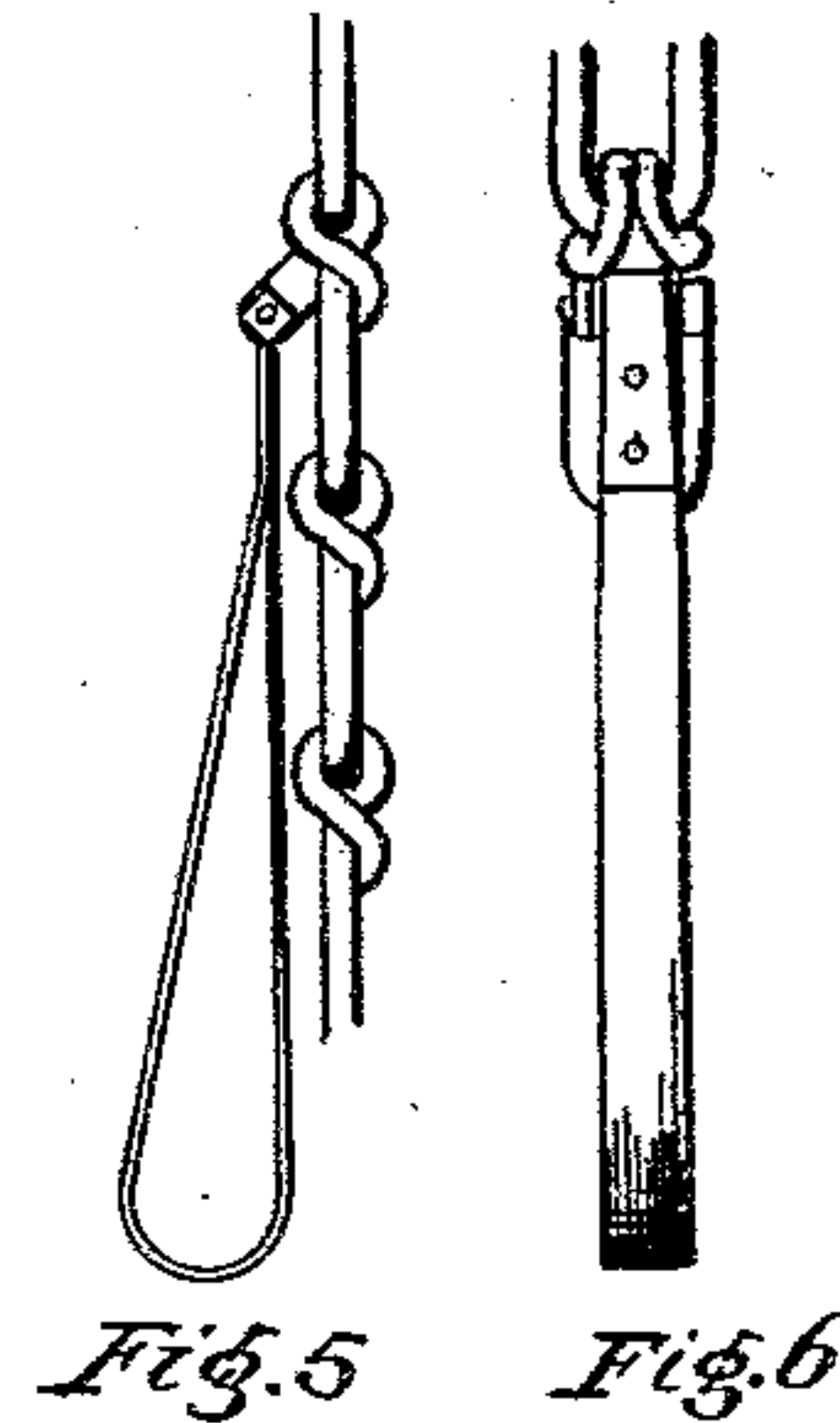
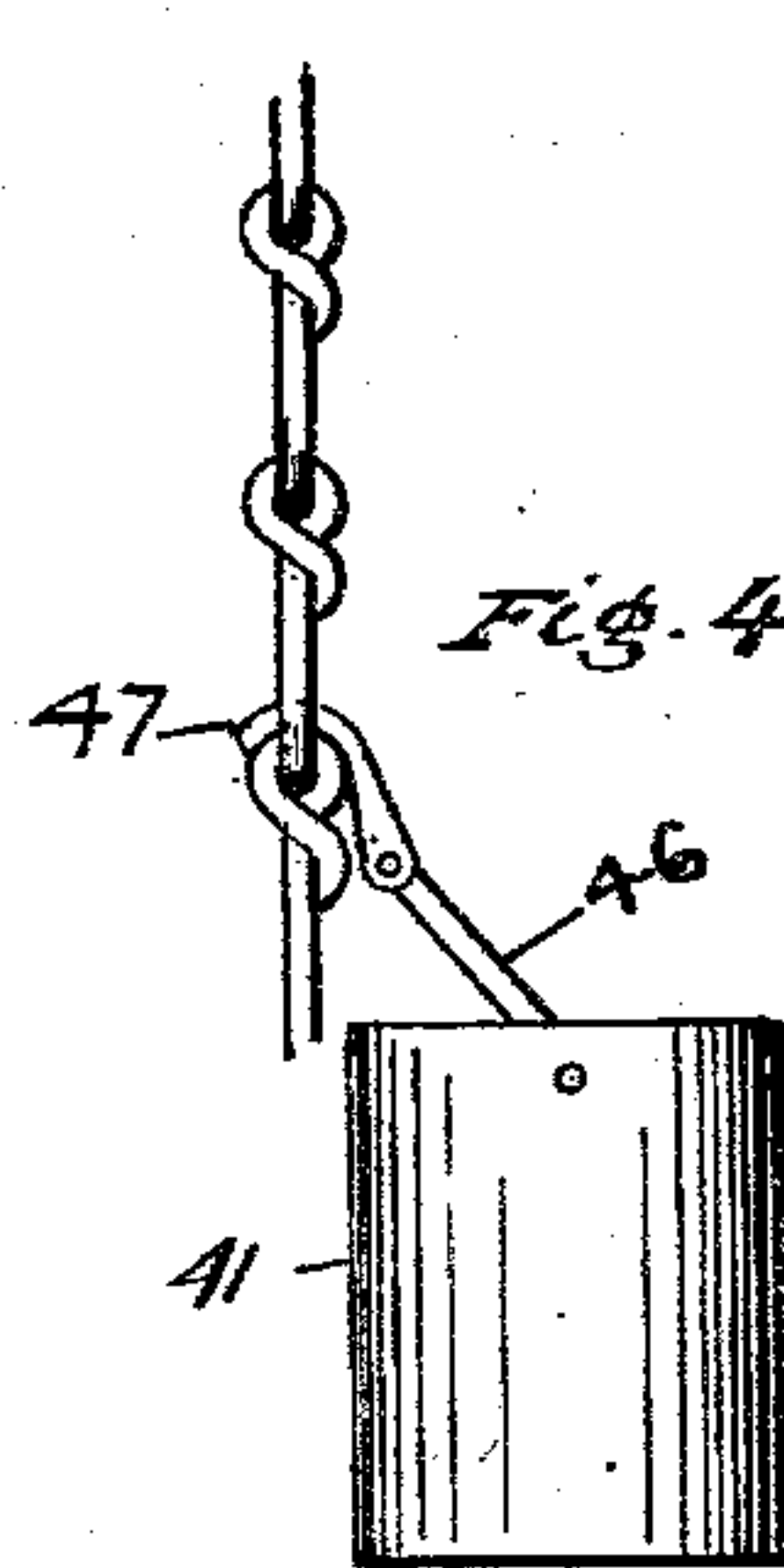
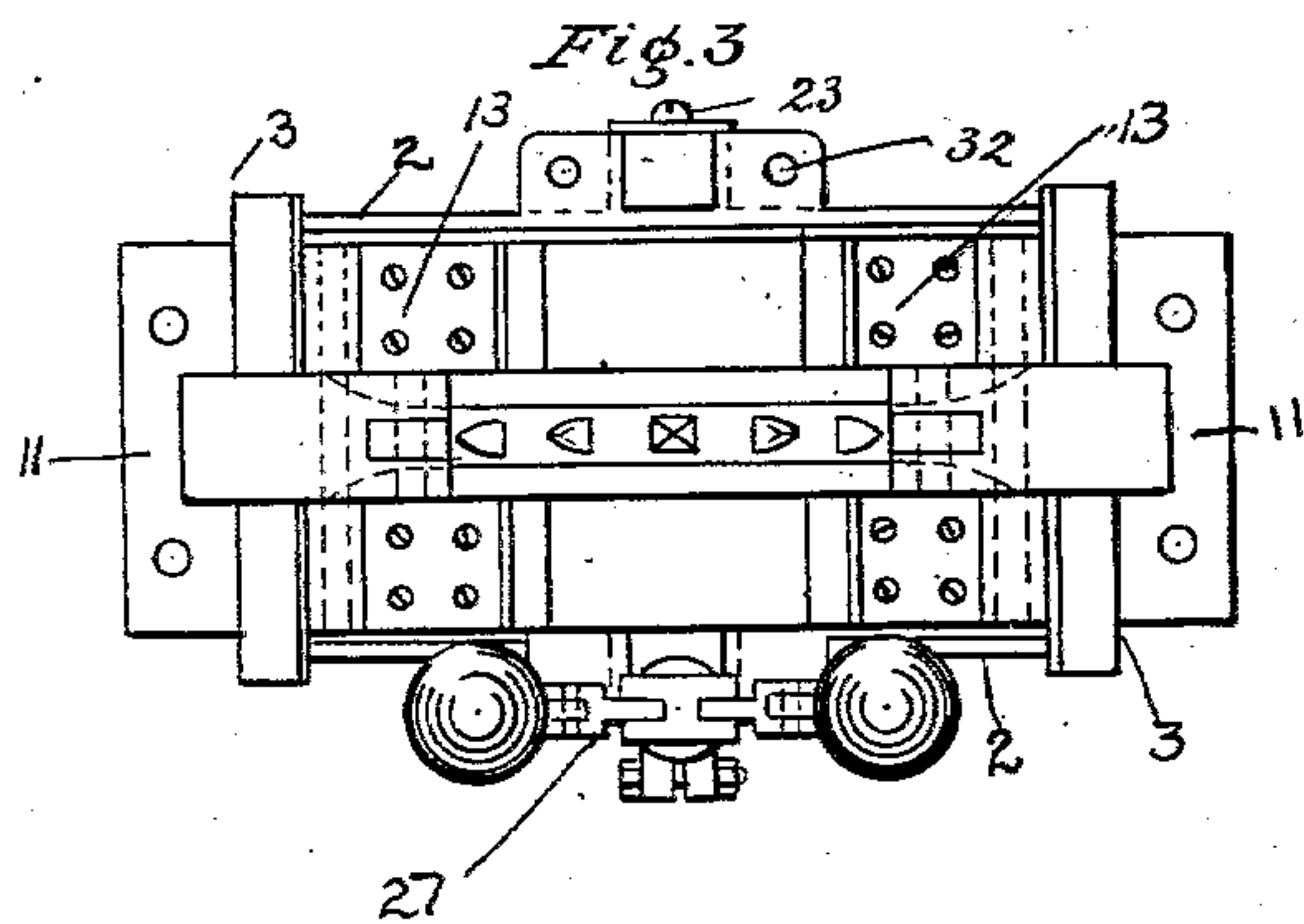
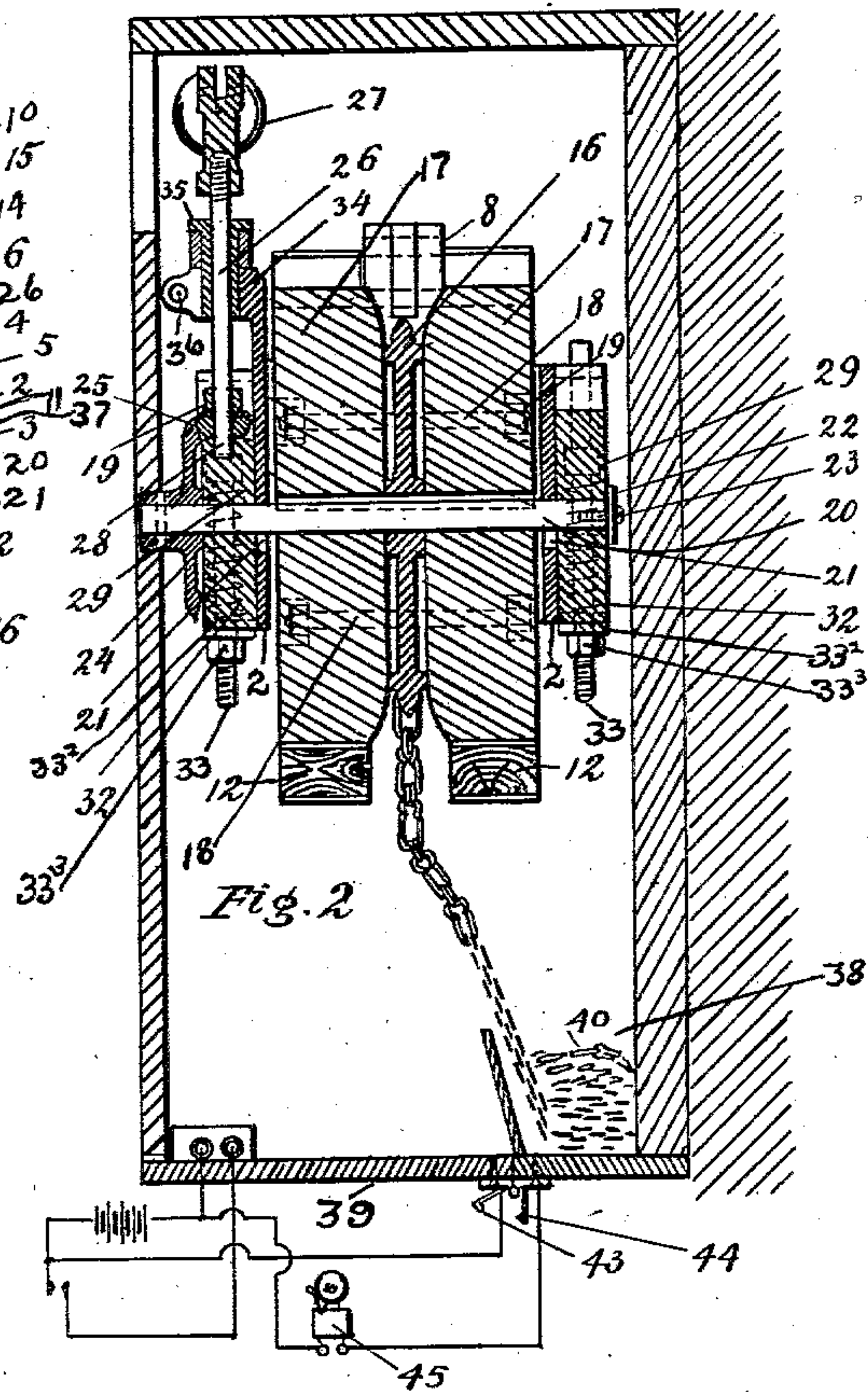
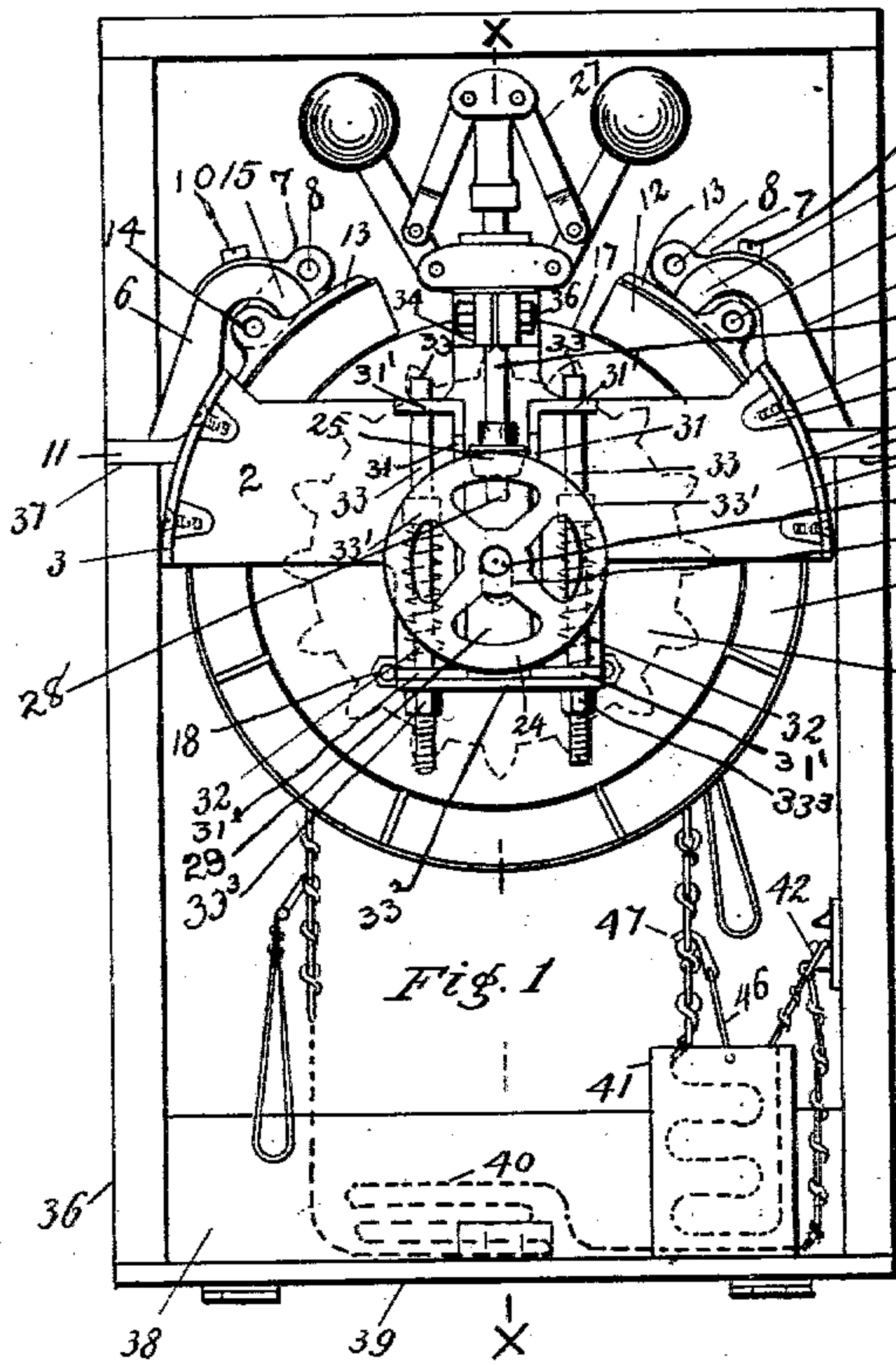
Patented Dec. 9, 1902.

P. ZIMMER.
FIRE ESCAPE.

(Application filed July 10, 1902.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES

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2 Sheets—Sheet 2.

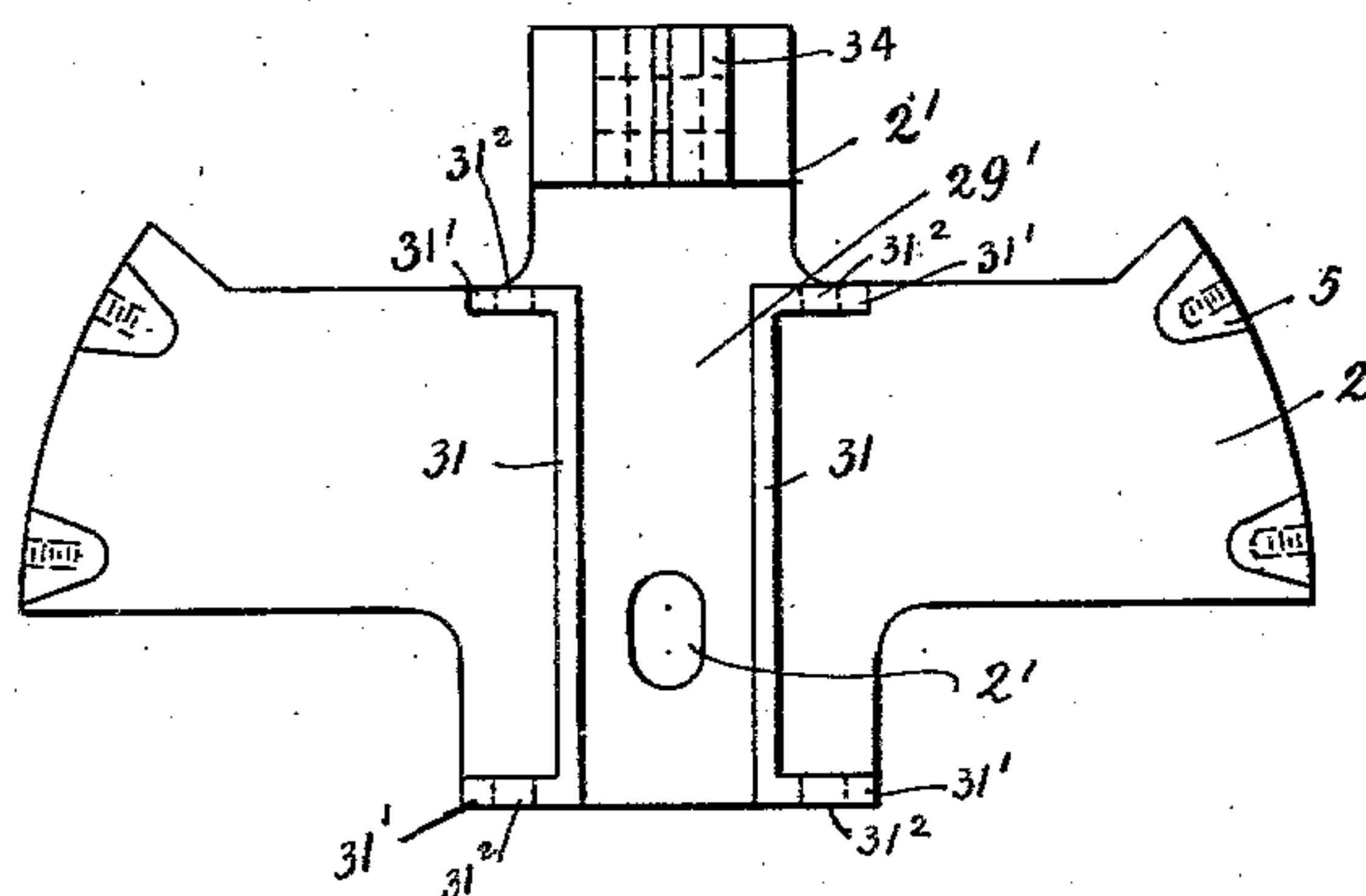


Fig. 7

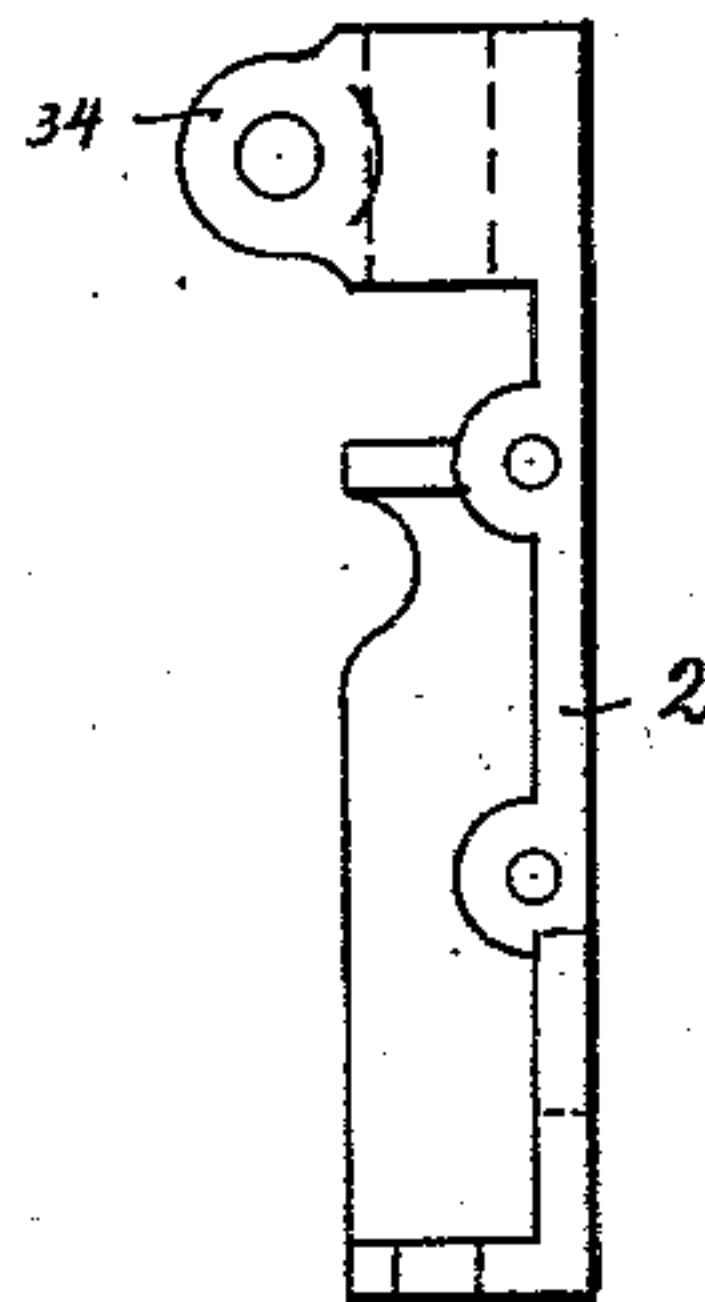


Fig. 8

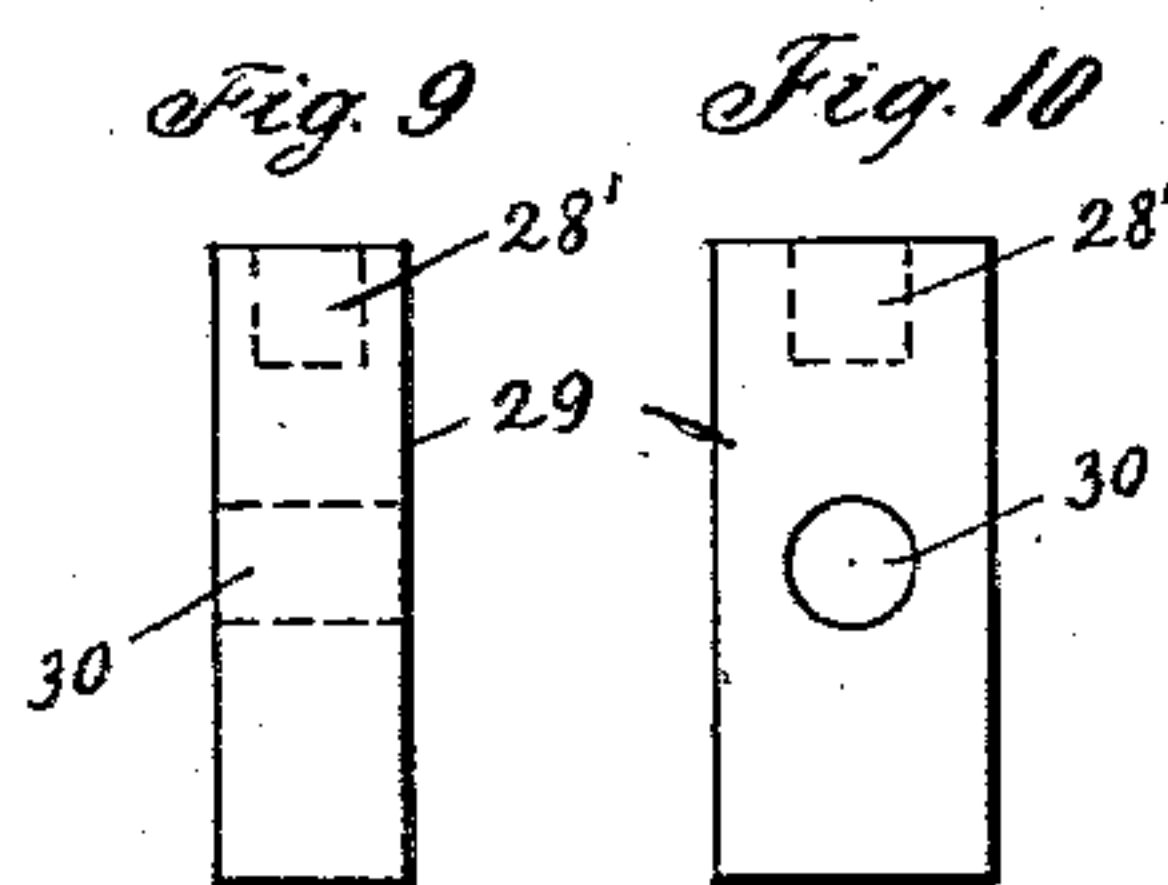


Fig. 9

Fig. 10

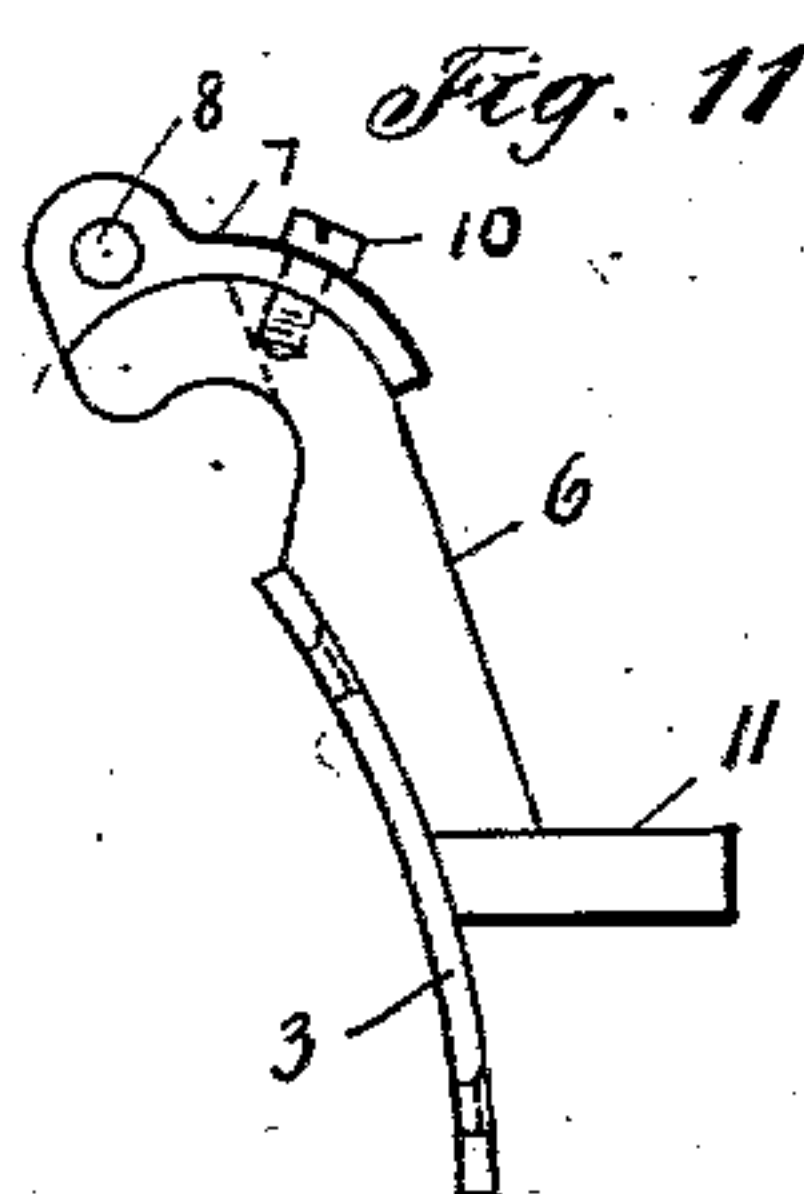


Fig. 11

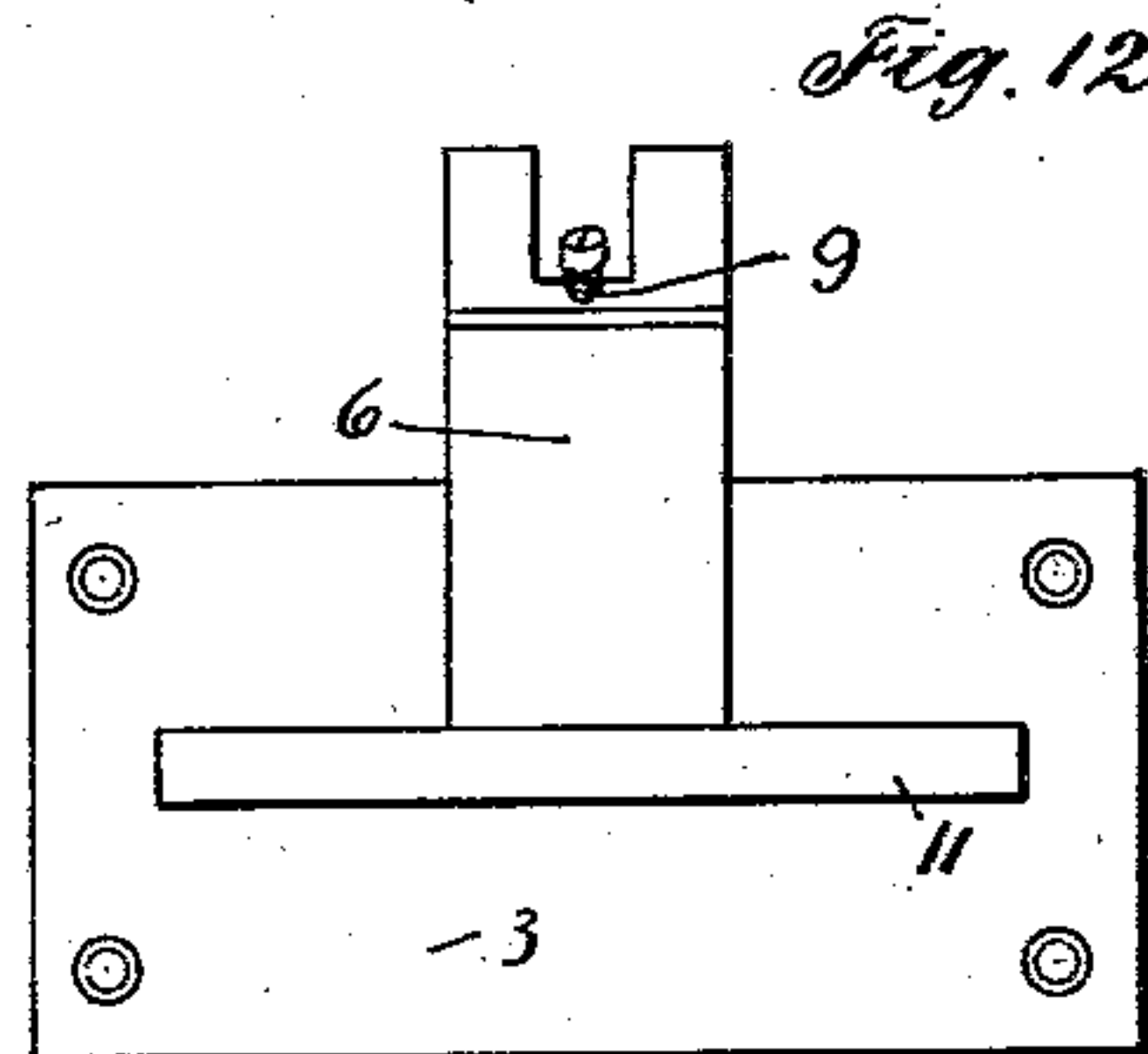


Fig. 12

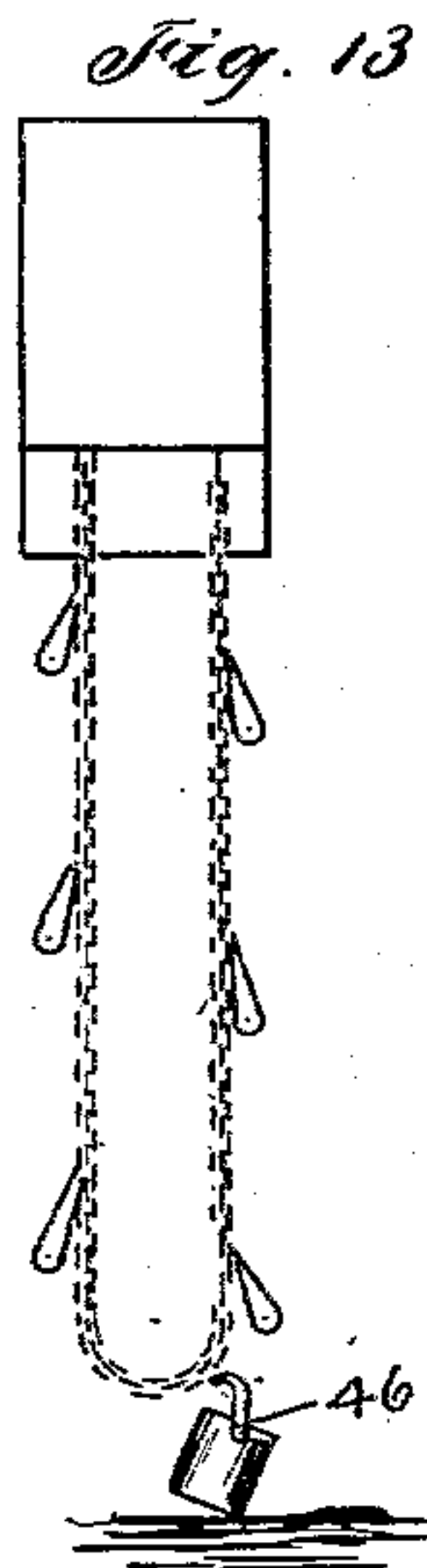


Fig. 13

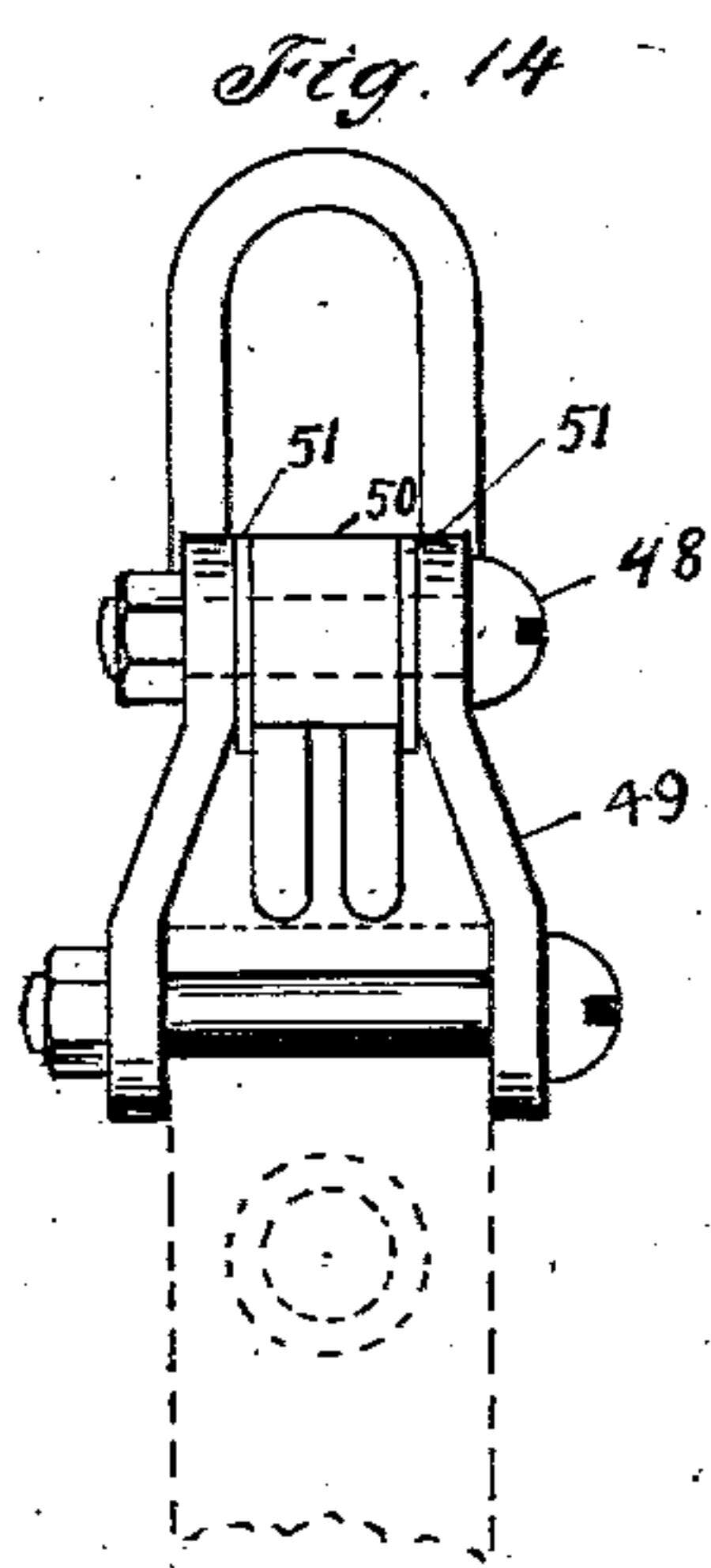


Fig. 14

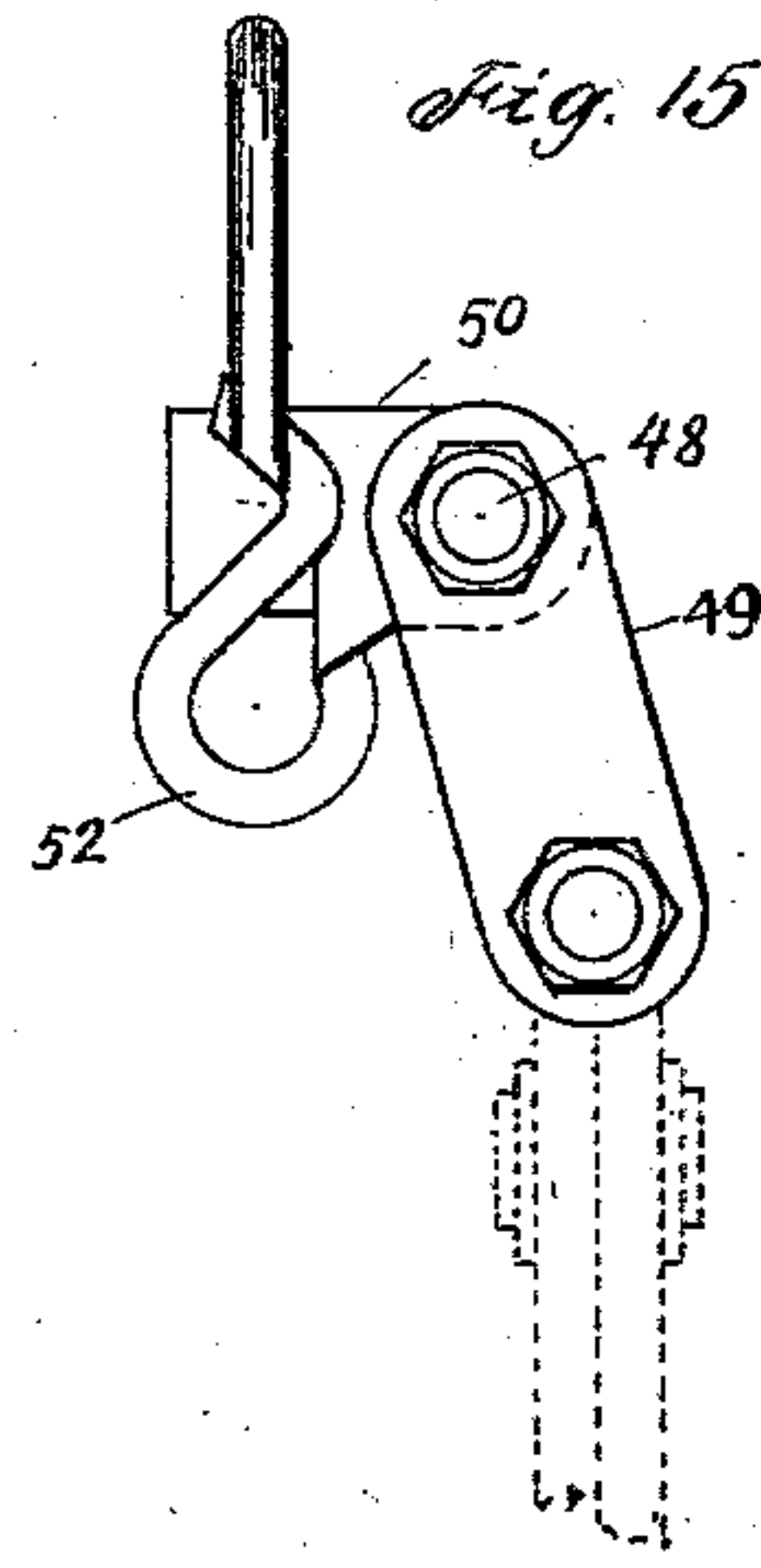


Fig. 15

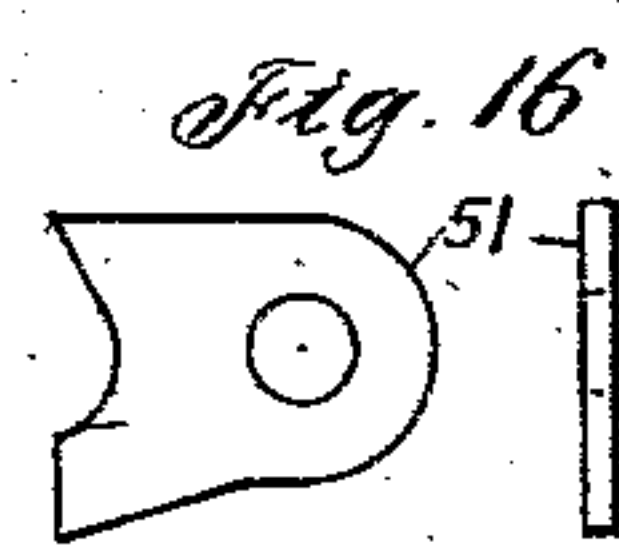


Fig. 16

WITNESSES

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UNITED STATES PATENT OFFICE.

PETER ZIMMER, OF CHICAGO, ILLINOIS.

FIRE-ESCAPE.

SPECIFICATION forming part of Letters Patent No. 715,330, dated December 9, 1902.

Application filed July 10, 1902. Serial No. 115,067. (No model.)

To all whom it may concern:

Be it known that I, PETER ZIMMER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Fire-Escapes; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

This invention relates to fire-escapes; and its objects are to provide strong, compact, neat, and safe means of escape from burning buildings, chiefly suitable as a permanent attachment to private and public buildings, which shall be adapted for use by a number of persons at the same time; which shall be continuous in its operation; that shall in its preferred form dispense with ropes or other combustible material, and which is adapted for carrying a chain strong enough to support a number of persons at the same time.

A still further object of the invention is to provide a fire-escape which shall be equally adapted for the saving of valuable goods and merchandise as well as persons; which is capable of safely carrying cots or beds with patients thereon, and which may, in fact, be employed at all times, if desired, for lowering purposes; which shall operate without initial sudden starts or jerks; which shall instantly apply the braking force with a frictional engagement proportioned to the weight imposed.

Another object of the invention is to provide a fire-escape which may be accurately and permanently adjusted for a given speed of descent and the principle of operation of which shall make possible a wide latitude of selection in the employment of structural materials and coefficients of friction in the brake mechanism—in short, to provide a fire-escape which shall be simple in construction and without delicate parts liable to get out of order at the critical moment, which shall be powerful in its supporting capacity, steady in its movement, prompt, instantaneously and continuously available, and which shall in all respects be adapted to take the place and

be an improvement upon the fixed ladder or stairway type of fire-escapes attached to buildings, which are unsightly in appearance, dangerous, and always slow as a means of egress.

Another object of the invention is to provide a fire-escape or series of fire-escapes which may be set into operation and be made available for instant use from a central point—say a hotel-office.

Generally speaking, my invention consists of a friction-wheel and a coacting clutch member each provided with independent supports in a common frame and normally held out of engagement with each other, but said clutch member being when in operation adapted to support said friction-wheel and retard its movement, said friction-wheel being adapted to carry and support the life-line, and said clutch member being so pivoted to its supports in said frame as to automatically clutch the friction-wheel when forced downward and with a force proportioned to the weight imposed upon said clutch member through said friction-wheel.

Referring specifically to the herein-illustrated form of my invention, its general features are a frame consisting of a pair of side plates and an end plate, the side plates having rounded elongated openings for the reception of the journals or axial spindle of a friction-wheel, each of said plates being provided on its exterior surface with a channel adapted for sliding engagement therein of a journal-supporting block or journal-box, each of said blocks being supported by spiral springs and having also a recess in their upper ends in which a fly-ball-governor shaft or spindle is supported, said side plates, together with the said slidable journal-blocks and their supporting-springs, providing journal-bearings for the revoluble or male member of a friction-clutch and the end plates of said frame being adapted to form pivot or swinging link-supports, said links in turn being pivoted to the respective ends of a non-rotatable or female friction-clutch member partly surrounding said revoluble member, but, as stated, normally held out of engagement therewith, each of the ends of said friction-wheel shaft being adapted to carry a gear-wheel meshing with a governor-rotat-

ing pinion, a governor-shaft arranged at right angles to said friction-wheel shaft and adapted to be rotated by the friction-wheel. Said collar or female friction member is supported at its ends in such a way that when a weight is imposed upon the friction-wheel said wheel is brought into contact with said non-rotatable friction member and causes said member to engage said wheel with a clutch-like engagement proportioned to the weight applied. A chain is provided for said wheel having links that engage teeth or spurs thereon and supporting-straps attached to said chain at short intervals and the whole of my fire-escape being inclosed and supported in a suitable box or cabinet.

My invention also consists in an improved chain-coupling for attaching the body-straps to the chain and a novel method of storing the chain and uncoiling same, all as will be hereinafter more fully described, and particularly pointed out in the claims.

My invention will be more readily understood by reference to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all of the views.

Figure 1 is a side elevation of a fire-escape embodying my invention, the inclosing cabinet being open and showing the manner of storing the life-line or chain when not in use. Fig. 2 is a sectional elevation on the line $x-x$ of Fig. 1 and also illustrates an electric circuit connected with the trap-door latch, by means of which the latter is released, together with the life-line thereon. Fig. 3 is a plan view of Fig. 1. Fig. 4 is a detail view showing the chain-holding bag or receptacle attached to a section of the chain. Figs. 5 and 6 illustrate the body-straps and the manner of attaching same to the chain. Figs. 7, 8, 9, 10, 11, and 12, inclusive, are detail views of the frame supporting the operating members. Fig. 13 is a view of the cabinet, the trap-door thereof being opened, the chain lowered, and bag dropping off. Figs. 14, 15, and 16 are chain-link details.

In the drawings, 2 designates the side plates of the frame; 3, the end plates thereof, secured to said side plates by means of screws 4, having a threaded engagement with the enlarged portions 5 in the ends of said side plates. Said end plates 3 have projecting ribs or supports 6, preferably integral therewith, provided with the adjustable members 7, having pivot-holes 8 and the slots 9. Said adjustable members or pivot-supports 7 are adjustably secured on the ends of the projecting ribs 6 by means of the screws 10, passing through slots 9. Said end plates 3 also have projecting ribs or flanges 11, upon which the device is supported in a suitable frame or cabinet. Within the said frame and supported upon the projecting supports 6 is the non-rotating friction-clutch member consisting of friction-collar or two collars 12, yoked together by the curved bridge-plates 13, pro-

vided with the ears or lugs 14. Said lugs 14 are pivotally connected to links 15, (shown by dotted lines in Fig. 1,) and said links 15 are also pivoted at 8 to the adjustable member 7, secured by screws 10 in supports 6. The members 7 may be dispensed with and links 15 pivoted directly to support 6, which may be provided with a series of holes to permit pivoting of links 15 at any desired angle, or any other suitable method of pivoting the upper ends of links 15 may be provided. The said links 15 constitute the only support for friction member 12 in said frame. Within the friction member 12 is a friction and life-line wheel. This wheel may be made in any suitable manner and may be cast in one piece and its friction periphery shod with hard rubber or the like; but in order to more clearly illustrate its different functions I have illustrated it as consisting of the sprocket-wheel 16 and the friction wheels or blocks 17, clamped together to form a whole by means of four or more bolts 18. (Shown by dotted lines in Fig. 2.) Said bolts 18 have their burs or nuts and heads countersunk in recesses 19, provided in the outer sides of said friction wheels or blocks 17 to prevent them coming in contact with side plates 2. As clearly illustrated in Fig. 2, the diameters of the friction blocks or wheels 17 are greater than the diameter of the sprocket-wheel 16 and project beyond the addendum circle of the latter. The object of this is to provide a channel of ample depth below the friction-surface of the wheel for the chain or life-line in order that it shall not come in contact with or interfere with the friction-surfaces or strike the bridge-plate. Said rotating friction and life-line member, consisting of the sprocket-wheel 16 and friction wheel or wheels 17, bolted together by the bolts or rods 18, is rigidly mounted upon the shaft 20. The ends of said shaft 20 are loosely mounted in slots 21 (see Fig. 7, also dotted lines, Fig. 1) of the side plates 2, so as to be freely revoluble and vertically movable therein. One end of said shaft 20 is provided with a stop washer or disk 22, Fig. 2, secured to one end of the shaft 20 by means of the screw 23, rigidly secured in the end of shaft 20, which prevents the longitudinal movement of said shaft 20 in one direction. Securely attached to the other end of said shaft 20 is an internal bevel gear-wheel 24, which engages the bevel-pinion 25, Fig. 2. (Also shown in dotted lines in Fig. 1.) Said pinion 25 is rigidly mounted upon shaft 26 of an ordinary fly-ball governor 27. The lower end of said governor-shaft projects slightly beyond the pinion 25. Said projection 28, Fig. 2, also dotted lines Fig. 1, is journaled in the recess 28' (see Figs. 9 and 10) in the upper ends of sliding side bars 29, interposed between plates 2 of the frame, the gear-wheel 24, and between side plates 2 and the washer 22. Said side bars 29 are held for longitudinal or vertical movement only with relation to the side 2 of the frame in the channel 29, (see Fig. 7,)

formed by ribs 31 on side plates 2. Said ribs 31 terminate at their ends in the rib portion 31', formed at right angles to the portion 31 of said ribs. (See also Fig. 7.) The friction and life-line wheel 16 17 is normally supported or held from engagement with the friction member 12 by spiral springs 32, encircling rods 33. Said rods 33 are vertically movable in holes or openings 31² in the ribs 31 and are shown by dotted lines in Fig. 7. Said rods 33 are provided with collars 33', (shown by dotted lines, Fig. 1,) rigidly secured thereto, and which rest upon the upper ends of springs 32. The tension against collars 31' by springs 32 is resisted by a plate 33², which connects rods 33 and which has suitable openings provided for said rods. Said plates 33² are supported on the lower ends of rods 33 by burs or nuts 33³, having threaded engagement with said rods 33, as shown. By means of said nuts 33³ on the lower or threaded ends of rods 33 the tension of springs 32 and the normal resistance to frictional contact between friction members 16, 17, and 12 is regulated. Said plates 33² support the slidable blocks or members 29, in which shaft 20 of the revoluble friction member is journaled. Thus when not in operation the revoluble member of the brake is resiliently supported in side plates 2 of the frame, whereas the clutch member or collar 12 is pivotally supported by the end plates 3. When a weight is imposed upon the revoluble member, however, the entire weight, save the resistance of springs 32, resting on the upper sides of ribs 31', is thrown upon the clutch member and its supporting-links pivoted at 8.

I have illustrated my device with but one governor, and for that reason while the side plates 2 are exactly alike in all other respects Fig. 2 herein illustrates the side plate 2 opposite the governor side without the bar or flange projection 2'. It will be evident that both sides may be equipped with separate governors. Said flange or projection 2' is provided with the clamp 34, Figs. 1, 2, and 7, in which a thimble 35 is clamped by means of bolt and nut 36, the thimble and bolt openings being shown by dotted lines in Fig. 7. Said thimble constitutes the upper bearing for the governor-shaft 26.

Referring to the arrangement of the chain in Figs. 1 and 2, my device is mounted in a cabinet having suitable recesses 37, Fig. 1, supporting the lugs 11. In the bottom of this cabinet is a chain or life-line compartment 38, provided with the bottom trap-door 39. Within this compartment 38 one portion of an endless chain or life-line is coiled up, as shown at 40, and the other portion thereof is coiled up within a leather bag or other suitable receptacle 41. A bight of said chain is also attached to the side bracket 42, provided with an open or shallow hook. Said trap-door 39 is normally held closed by the latch, consisting of the swinging catch 43, en-

gaging part 44, rigidly secured to the trap-door. In Fig. 2 I have shown the catch 43 in its released position, which would permit the door to drop. Said catch 43 is controlled by an electric solenoid, magnet, or any suitable device for opening doors by electrical means. An electric bell 45 is connected to the door-opening circuit, so that when said circuit is closed and catch 43 is released from its engaging member 44 and the door permitted to drop said bell will ring and continue to ring so long as the circuit is kept closed. Any suitable electrical arrangement may be employed for opening the trap-door and ringing the bell, and no structural claim is made for this feature of my invention.

The operation of my device is as follows, assuming that a hotel has been equipped with a suitable number of my fire-escapes, all electrically connected on a single circuit passing through the hotel-office and having a suitable circuit-closer therein, (the circuit of course being normally kept open.) The building having caught fire and an alarm sounded, the clerk or any other person conveniently at hand would press the button or whatever device may be employed for that purpose, thus closing the circuit, retracting all of the trap-door catches, and releasing the chains or life-lines, setting the various alarm-bells in action to warn the occupants nearest each of said alarms of the impending danger. As a description of the operation of one fire-escape will suffice for all, let it be assumed that said fire-escape has been placed opposite a window on the top floor of the building. The endless chain being released would extend to or almost to the ground below when uncoiled and would hang in front of all the other windows in the same perpendicular plane as the life-line. All that the occupants of each floor would have to do to reach safety would be to open a window or door opposite the suspended life-line and grasp hold of or step into the first convenient body strap or loop at hand. Having started on the descent, another person would immediately have access to another strap, the chain being liberally supplied with such straps. The body loop or strap herein illustrated may be passed around the body at the waist, used as a stirrup, or in any other convenient way. The chain being in constant motion and endless, there would be no delays, as in many other devices for this purpose, which must be returned for each descent. In practice the predetermined movement of the life-line would be slow and steady, giving ample time for persons on the different floors of the building to attach themselves to the line while in motion. The apparatus will operate either way, and either side or loop of the life-line may be used on which to descend; but in order to avoid confusion and to automatically start the chain in motion I arrange the chain as shown in Figs. 1 and 2, where a portion of the chain is coiled up in the bag or receptacle 41. Said bag or receptacle having

been dropped by opening the trap-door on which it is placed, the portion in receptacle 41 will act as a weight to start the rotary friction member in rotation, which will operate to gradually uncoil the portion 40 of the life-line lying on the bottom of the cabinet, and the portion coiled up in bag 41 will also gradually uncoil as the bag containing it descends, this by reason of the fact that one end of said bag-coil is suspended on hook 42. The endless chain is of just sufficient length to reach almost to the ground, and as the life-line uncoils from the bag, gradually lengthening the descending loop thereof, the opposite or ascending loop becomes shorter and shorter and continues to rise until the bend or lower end of said loop is straightened out and takes an upward incline away from the shallow hook or support 42, from which, owing to its continued upward movement, the chain is then pulled off. At this point both sides of the life-line hang suspended directly from the wheel into the bucket or bag, which still hangs on one side, and the weight of which, together with the free portion of the life-line still remaining coiled up therein, continues the downward movement until all of the life-line coiled up in the bag has been uncoiled. The momentum and the weight of the bag or receptacle itself continues the movement of the chain in the same direction until the bag has reached the lowest point and the link, upon which hook 47 of the bag is hung, turns in its upward movement. This turning movement of the link operates, as will be evident, to turn or pry the shallow hook 47 off from said link, thus disengaging the bag or receptacle from the chain, as illustrated in Fig. 13. The receptacle 41 may be made of any suitable material—such as cloth, leather, metal, or wood—and is provided with the bail 46 and the shallow hook 47, the latter being, for the purpose stated above, but slightly curved. The revoluble friction member or wheel 16 17 being held from contact with the coacting member 12 by the springs 32 will freely and unrestrictedly turn upon its axis, the tension of said spring 32 being adjusted by means of nuts 33³ to barely support the weight of the life-line or chain.

Figs. 14, 15, and 16 illustrate a novel method of securing straps or attachments to the chain, the parts being shown in detail. Fig. 15 is a side elevation of a link to which is clamped, by means of bolt 48 and a clevis 49, the small block 50, in one end of which is drilled a bolt-hole for that purpose. The other end of said block 50 is provided with curved grooves, as shown, conforming with the form of the link. Washers 51 are clamped between the sides of the block 50 and clevis sides to bear against the sides of links 52, which prevents it from spreading away from the block and releasing the hold on the chain. The strap attachment is thus held at right angles to the link and keeps it clear of the sprockets in passing over the sprocket-wheel.

When a body is suspended on the life-line or chain on either loop thereof, the weight thereof tends to press the revoluble friction member and life-line wheel against the friction member 12. Two persons being supported on the chain would double the pressure on said collar 12, three persons would cause three times the pressure, and so on. Said collar 12 being supported on the links 15, pivoted at an angle to the line of force exerted by the weight, the downward pressure on said collar tends to draw the lower ends of links 15 inward, which contracts member 12 around the revoluble member 16 17, which force of contraction, in addition to the direct downward pressure of the weight, is of course in proportion to the amount of weight suspended. The chain leverage or diameter of the chain-wheel having been adjusted in proportion to the frictional resistance or the coefficient of friction of said friction members, the frictional resistance is in direct proportion to the weight. Additional adjustment may be made by changing the angles of the links 15, the upper ends of which are pivoted to the adjustable pivot-supports 7, provided with the slots 9. Ordinarily the weight-leverage and frictional resistance having once been adjusted the device is complete without the governor. The governor, which may be any suitable type of fly-ball governor and the action of which is obvious, is merely an additional precaution. In case the friction-surfaces should become too smooth and the descent consequently too fast the governor or governors would force down the member 16 17 against the member 12 with a force in proportion to the speed. The rotary movement retarding effect of the governor operating to force its spindle or shaft 26 downward and therewith the block 29, in which the rotary member 16 17 is journaled, not being counteracted or nullified by the weight leverage of a body attached to the chain, it is very evident its breaking force is relatively vastly greater in its effect than the same amount of force applied to the life-line.

From the foregoing it will be evident that as a person throws his weight upon the life-line or chain after having secured a suitable hold thereupon there is no rapid initial descent, as where centrifugal force through various forms of governors is depended upon to check the descent, for the heavier the body or the more suddenly it is thrown upon the device the more powerful is the frictional and clutch engagement of its members, and as that engagement is not only instantaneous, but also graduated with the strain imposed, there is neither a sudden start nor a sudden check in the descent. The same principle of operation, further, protects persons already on the line from being shaken off or jarred by others following.

Again, while my device is an improvement upon such as depend upon speed and centrifugal force for the operation of the brakes, it

is also, so far as I am aware, an improvement upon fire-escapes heretofore devised which depend upon the weight of the body for direct brake application, the same being so constructed as to be liable to cause the parts to bind and lock themselves against movement.

As intimated in the fore part of this specification, my device does not depend for its successful operation upon any one material from which to construct the friction or other parts. Hence the cost thereof is not confined to any given figure. The clutch members may be constructed wholly of wood, iron, hard rubber, or any other kindred materials, because the weight leverage or size of wheel and its coacting member is capable of an infinite number of variations, and the clutching power of member 12 is also adjustable within a large range by means of suitably disposing the links 15 and the angle at which they are pivoted with relation to said member 12, and, as also previously stated, the fly-ball governor and the parts immediately associated therewith may be dispensed with entirely. Therefore I have illustrated my invention as equipped with but one governor acting to depress but one side of the revoluble member, as but very little force from that source is required to insure absolute protection against a too sudden descent once the apparatus has been properly adjusted, which adjustment can be determined by experimenting with inanimate weights.

While I have illustrated my device as employing a toothed chain-wheel, it is obvious that a plain rope-wheel may be employed, in which case the rope would be wound around the wheel several times to prevent its slipping and would also be provided with suitable means for keeping the rope taut while passing upward or onto the wheel, as on the principle of a house-mover's capstan. It is evident that numerous other modifications may be made in my invention without departing from the spirit thereof, and I therefore do not confine my invention to the specific construction herein shown and described.

Having described my invention, I claim as new and desire to secure by Letters Patent—

50 1. A fire-escape comprising a friction-wheel and a coacting clutch member, each provided with independent supports in a frame common to both and normally held out of engagement with each other, but said clutch member, being, when the device is operated, adapted to support said friction-wheel and retard its movement, said friction-wheel being adapted to carry the life-line, and said clutch member being so pivoted to its supports in said frame as to automatically clutch the friction-wheel when said wheel is forced downward, with a force proportioned to the weight imposed upon said clutch member, substantially as described.

65 2. A fire-escape comprising a friction-wheel, and a clutch member coacting therewith, each provided with independent supports in a com-

mon frame and normally held out of engagement with each other, but said clutch member, being, when the device is in operation, adapted to support said friction-wheel and retard its movement, said friction-wheel being adapted to carry the life-line, and said clutch member being pivoted to its supports in said frame so as to automatically clutch the friction-wheel, when said wheel is forced downward, with a force in proportion to the weight imposed upon said clutch member, a governor operatively connected with said friction-wheel adapted to force same against the clutch member when operated at a predetermined speed, and a life-line supported upon said friction-wheel adapted to operate same, substantially as described.

3. A fire-escape comprising a wheel or rotating member provided with a sprocket or chain wheel portion and a friction portion, a friction-collar partly encircling said wheel, suitable supports for said collar, said collar being adapted to support said friction-wheel and the weight supported by said wheel, means for normally holding said members from engagement with each other and suitable supporting means for said member and collar, substantially as described.

4. A fire-escape comprising a suitable frame, a circularly-bent friction member supported by and within said frame, a friction-wheel mounted within said collar and provided with journal-bearings revolubly mounted and perpendicularly movable within said frame, means for normally holding said member and wheel out of engagement with each other and means for throwing said member and wheel into engagement with each other, substantially as described.

5. A fire-escape comprising a circularly-arranged friction member or collar, a combined friction and chain wheel revolubly mounted within said collar or friction member, a suitable frame supporting said friction member or collar and wheel, said collar and frame being connected by suitable link-supports, means for normally holding said member or collar and said friction and chain wheel from engagement with each other, and means for placing same into engagement with each other, substantially as described.

6. A fire-escape comprising a suitable frame, a revoluble friction member journaled therein, a clutch friction member partly surrounding said revoluble member and pivotally linked to substantially horizontally movable supports in said frame, said revoluble friction member being adapted for carrying an endless chain or rope and to be rotated thereby, and means upon said chain or rope adapting it for supporting and lowering persons and merchandise, substantially as described.

7. A fire-escape comprising two friction members, one thereof being revoluble and the other being pivoted to substantially horizontally movable supports, a suitable frame for

supporting said members, said frame supporting the revoluble friction member for rotation and supporting the stationary member for contractile movement, said revoluble member
5 being provided with a sprocket or spur wheel and adapted for carrying an endless chain, substantially as described.

8. In a fire-escape, the combination of a rigid frame with a circularly-arranged friction
10 member or collar resiliently mounted in said frame and the ends of said collar being supported for movement toward and from each other, a coacting friction member revolubly mounted and perpendicularly movable in said
15 frame in operative relation to said friction member or collar, a chain running over said coacting friction member to drive the same, said chain being provided with suitable weight supporting or carrying means, a cen-
20 trifugal governor operatively connected with said coacting friction member to force said coacting or revoluble member against said collar and adjustable means for normally holding said friction members out of engagement
25 with each other, substantially as described.

9. In a fire-escape, the combination of a rigid frame with a friction strap or collar having its ends supported in said frame for movement in substantially a horizontal plane, a
30 friction-wheel within said strap or collar mounted in said frame for rotary and radial movements with relation to said friction collar and frame, said friction-wheel being provided with chain-engaging means, a chain
35 running over said friction-wheel to drive the same, said chain being provided with weight carrying or supporting means, a centrifugal governor operated by said friction-wheel and operating to force said wheel downward after
40 a predetermined speed of rotation has been attained, adjustable and yielding means for normally withholding said wheel from engagement with said friction strap or collar, and
45 said friction members being adapted for engagement with each other when said friction-wheel is forced downward, substantially as described.

10. The combination of a box or cabinet, with a fire-escape suitably mounted therein, said
50 fire-escape comprising a rigid frame, a clutch friction-ring supported at its ends for reciprocating movement thereof toward and from each other in said frame, a friction-wheel adapted to carry a life-line also mounted in said
55 frame within said collar, said wheel being journaled in bearings perpendicularly movable in and with relation to said frame, said bearings being mounted on adjustable cushion or spring supports, a life-line running over said friction-wheel to drive the same, said life-line being provided with suitable body-supporting means, said box or cabinet being adapted to contain said life-line when not in operation, a trap-door in the bottom of said box or cabinet,
60 a chain-containing receptacle on the upper side of said trap-door, a shallow hook or chain support fastened to the inner side of

said box or cabinet adjacent to said receptacle, and means for releasing said trap-door and setting the fire-escape mechanism into operation, substantially as described. 70

11. The combination of a box or cabinet, with a fire-escape mounted therein, said fire-escape comprising a frame, a clutch friction ring or member linked to said frame, said
75 links being movably pivoted to said ring and frame, respectively, a friction and life-line wheel mounted in said frame on movable bearings to automatically force the ends of said ring toward each other to increase the extent
80 and force of the grip upon said wheel cushioned in said frame, a life-line to drive said friction-wheel, said life-line being provided with body straps or supports, said box or cabinet being provided with life-line supporting
85 and containing means, a trap-door in the bottom of said box or cabinet supporting one of said containing means, means for opening said trap-door and dropping therethrough the life-line containing means supported on said
90 door and a chain support attached to the inner side of said box or cabinet, substantially as described.

12. In a fire-escape, the combination of a box or cabinet with a fire-escape mounted
95 therein, said fire-escape comprising a frame consisting of a pair of side plates and a pair of end plates, said side plates having rounded elongated openings adapted to receive the journals or axial spindles of a friction-wheel,
100 a journal-bearing channel in the outer side of each of said side plates, the journals and bearings slidably mounted therein, the springs supporting said bearings and the means for compressing or adjusting said springs and
105 supporting said bearings thereon, the friction-wheel journaled in said bearings, said journal-bearings, either or both, being provided with a recess or recesses serving as bearings for a centrifugal governor-shaft, said shaft
110 occupying a position at right angles to said friction-wheel spindle; the end plates of said frame being provided with swinging link-supports, the links pivoted thereto, and said links being also pivoted for horizontal movement
115 with and to the respective ends of the non-rotating friction member, and suitable means for connecting all of said parts in operative relation to each other, substantially as described. 120

13. In a fire-escape, the combination of a frame, male and female clutch-brake members mounted in said frame in operative relation to each other, said male member being
125 mounted for rotation and having bearings movable in said frame, said female member being mounted at its ends for horizontal movement for the purpose of increasing or decreasing the area and force of brake-contact with its coacting member, yielding means for supporting said male member out of engagement
130 with said female member and means upon said male member for throwing it into engagement with said female member, said fe-

male member being adapted to contract when operated upon by said male member, and auxiliary operating means associated with said male member for forcing it into varying degrees of frictional engagement with said female member, substantially as described.

14. In a fire-escape, the combination of a frame, a rotary member adapted to carry a life-line journaled in said frame, a stationary brake member pivoted to swinging or movable supports in said frame in operative relation to said rotary member, the supports for said members, in said frame, being independent of each other and said members being normally out of engagement with each other, said stationary member being adapted to support said rotary member and to automatically vary the surface area and force of brake-contact therewith and to clutch same in frictional engagement when supporting said rotary member, the life-line for rotating said rotary member, and means for forcing said rotary member down upon the stationary member into a frictional and a clutching engagement therewith, substantially as described.

15. In a fire-escape, the combination of a frame, a rotary brake member adapted to carry a life-line journaled in said frame, a stationary brake member pivoted to said frame on adjustable and freely-movable supports in operative relation to said rotary member and adapted for clutch engagement with said rotary member, the pivot-supports for said stationary member being automatically adjustable for varying degrees or forces of engagement thereby, and said stationary member being adapted to support, and to be operated by, said rotary member, adjustable and yielding means for normally keeping said stationary and rotary members out of engagement with each other and the direct and auxiliary operating means for forcing said members into varying degrees of engagement with each other, substantially as described.

16. In a fire-escape and goods-lowering de-

vice, the combination of a suitable frame with the combined block or pulley and rotary friction member journaled in spring-supported and adjustable bearings in said frame, the friction strap or collar partly surrounding said rotating member, said strap or collar being adjustably supported at its ends and movable in a plane substantially perpendicular to the radius of said pulley and rotary friction member, and suitable means for operating the device, substantially as and for the purpose specified.

17. In a fire-escape and goods-lowering device, the combination of a suitable frame, with the combined chain wheel or pulley and rotating friction-wheel journaled in spring-supported and adjustable bearings in said frame, the friction strap or collar partly surrounding said rotating member, said strap or collar having its ends adjustably supported for free movement in a plane substantially at right angles to the radius of said pulley and rotating friction member, and a suitable endless line, cable or chain for rotating said pulley and rotating member in either direction, substantially as described.

18. In a fire-escape and goods-lowering device, the combination of a suitable frame, with the combined chain wheel or pulley and rotating friction-wheel journaled in spring-supported and adjustable bearings in said frame, a fly-ball governor operatively connected with said journal or journals, the encircling friction member partly surrounding the periphery of said wheel, supported at its ends for substantially horizontal movement, and a suitable endless line, cable or chain for rotating said pulley and rotating member in either direction, substantially as described.

In testimony whereof I have hereunto signed my name, in the presence of two witnesses, this 6th day of July, 1902.

PETER ZIMMER.

In presence of—

MAX BAUM,

FRANK BRITSCH.