

No. 653,044.

Patented July 3, 1900.

F. R. TAISEY.

AUTOMATIC SWITCH FOR PNEUMATIC CARRIERS.

(Application filed July 10, 1899.)

(No Model.)

4 Sheets—Sheet 1.

Fig. 1.

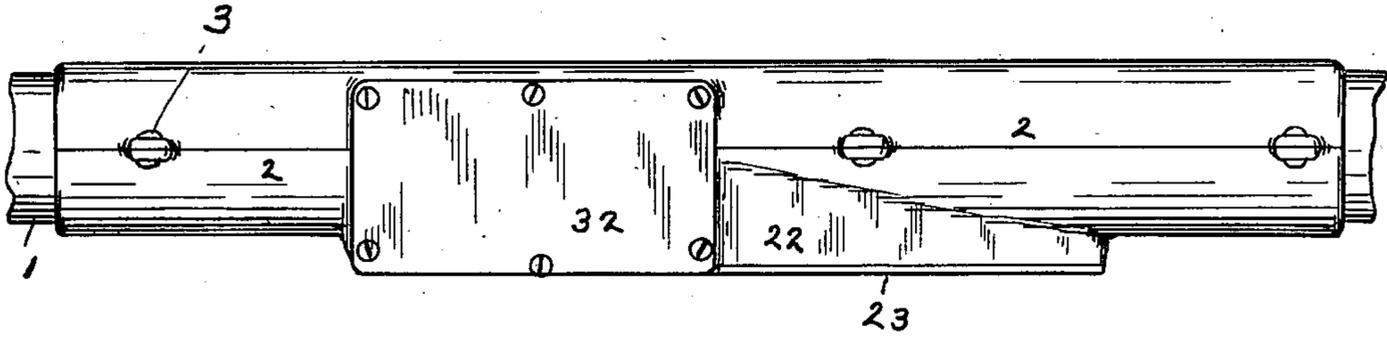


Fig. 2.

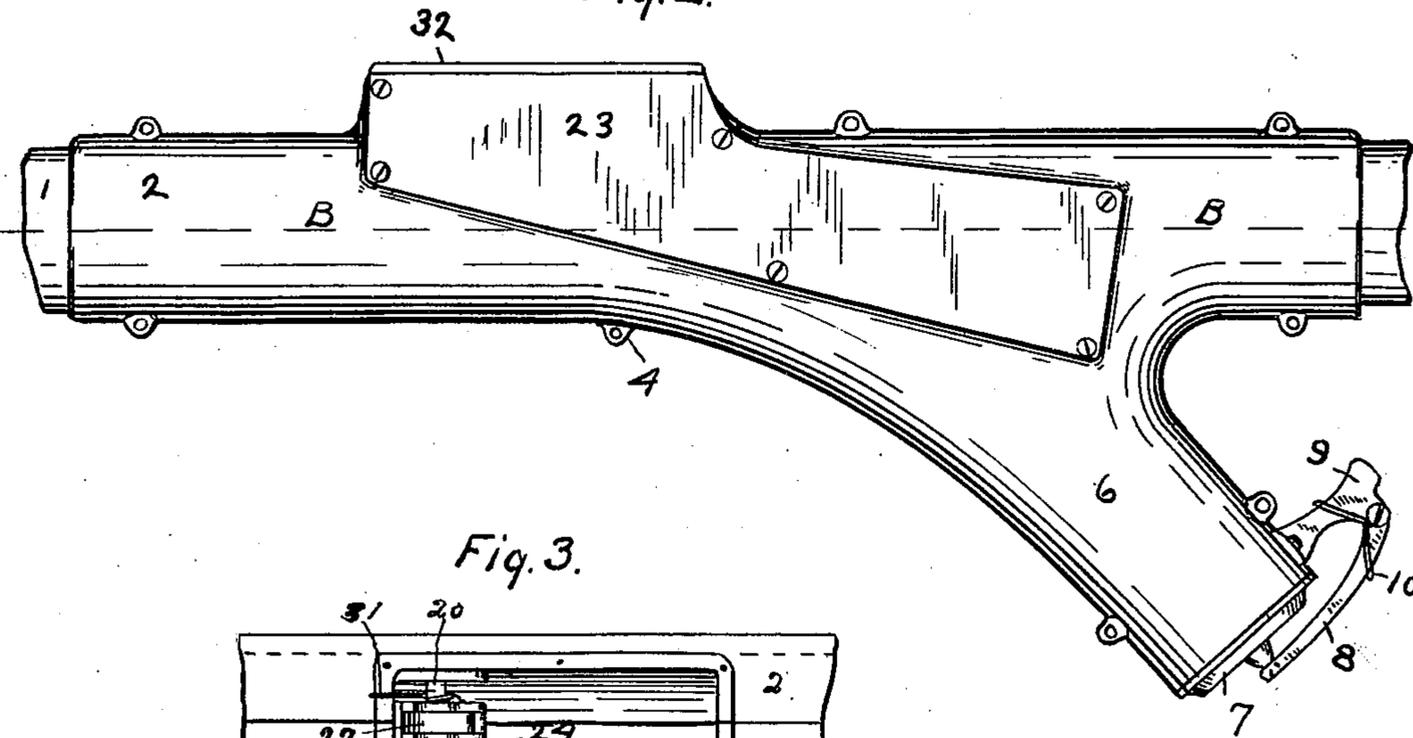


Fig. 3.

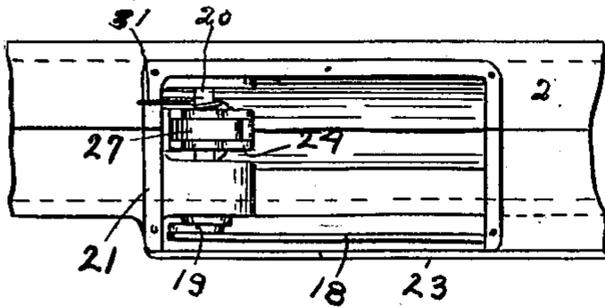
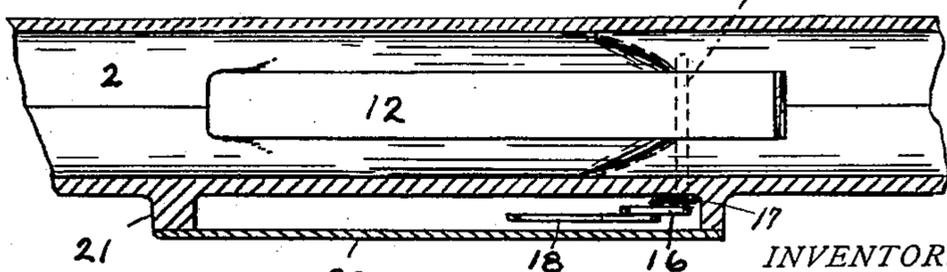


Fig. 4.



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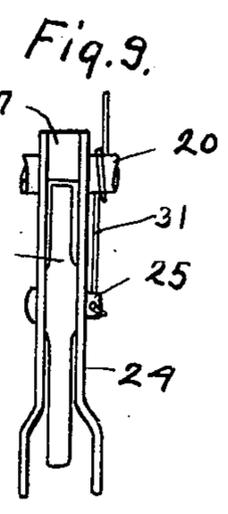
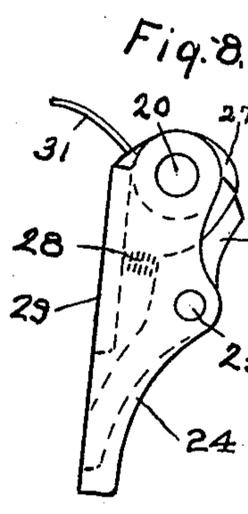
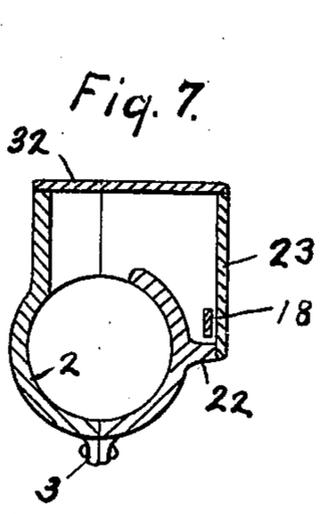
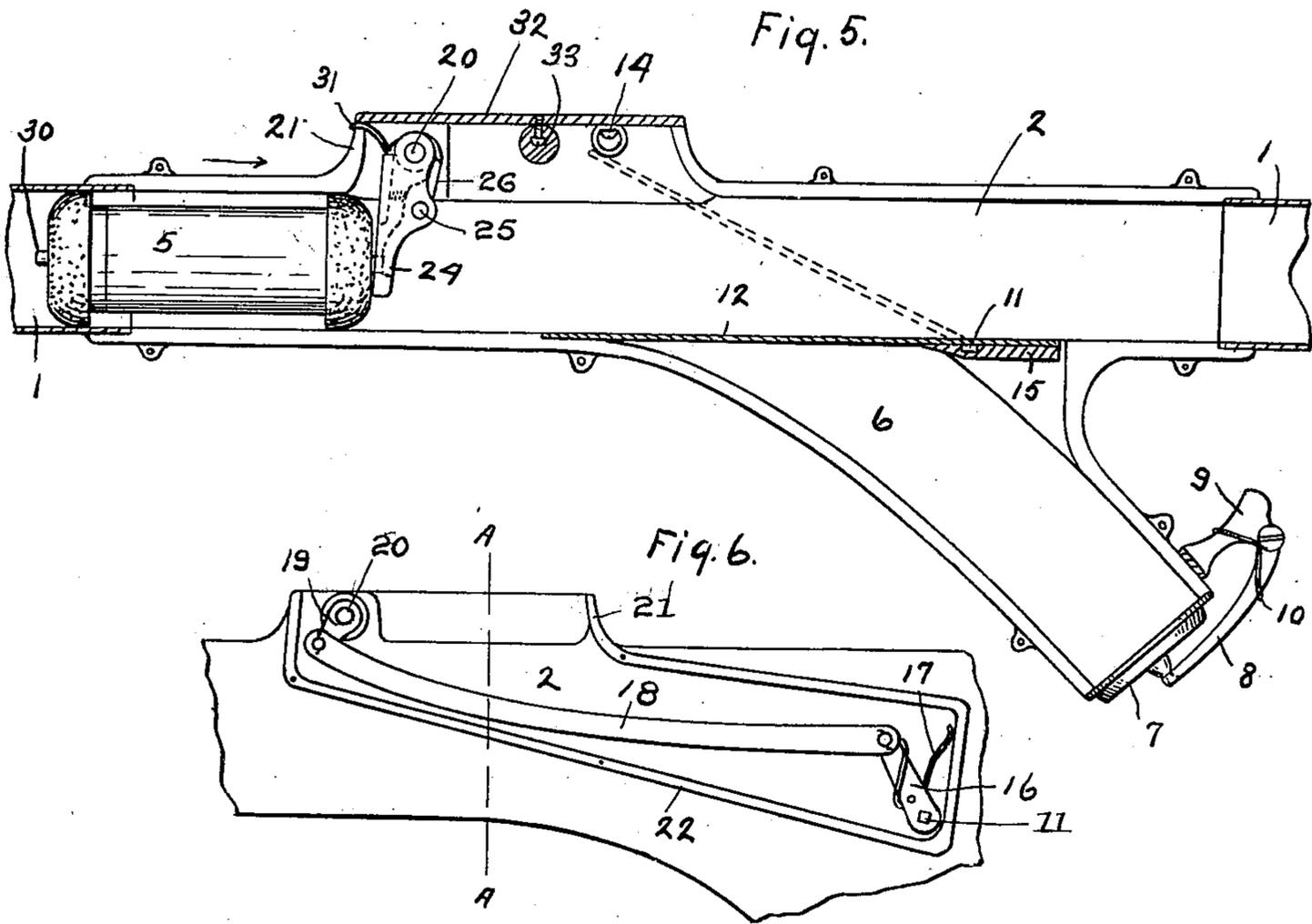
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4 Sheets—Sheet 2.



WITNESSES:

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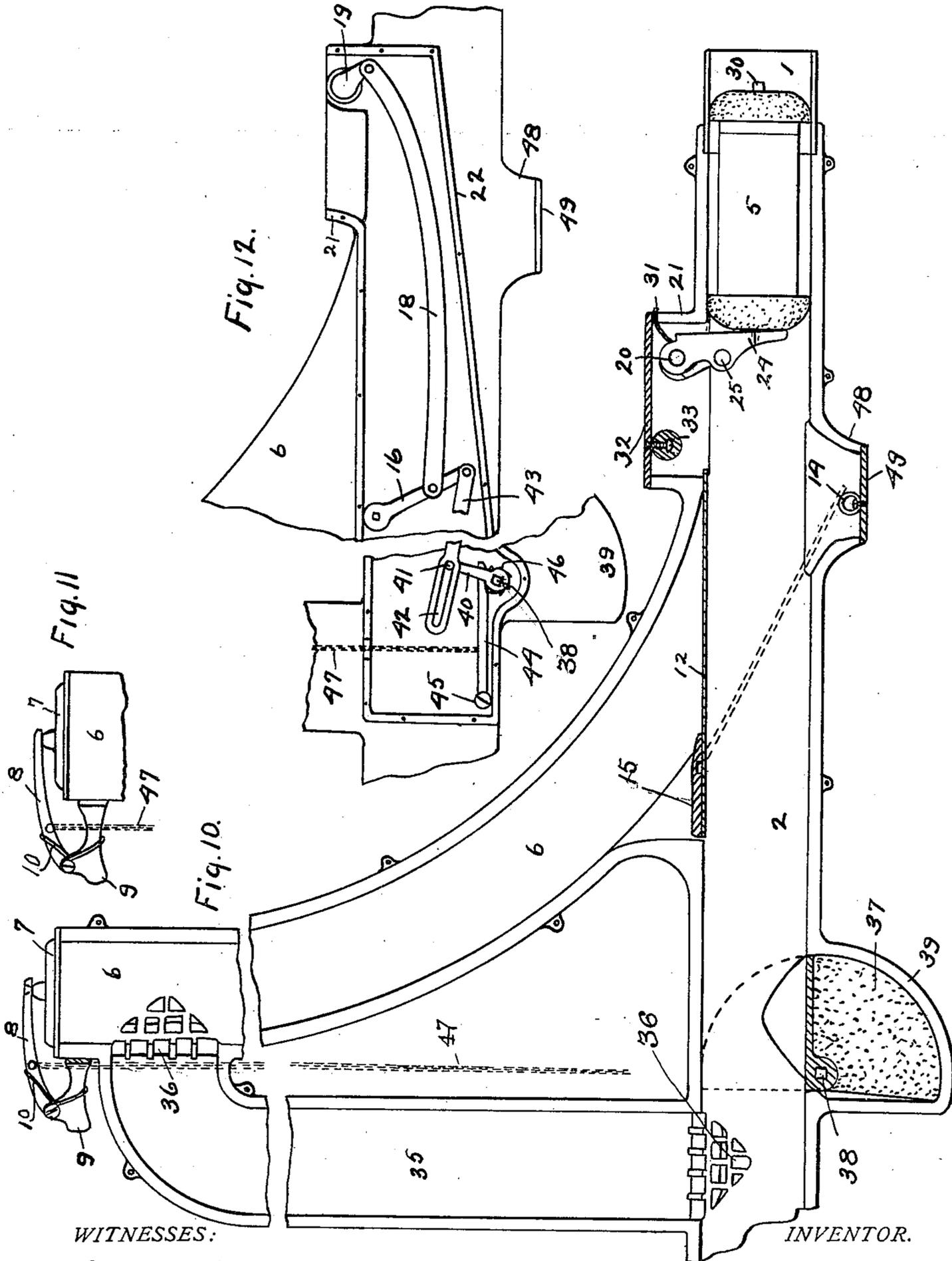
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4 Sheets—Sheet 3.



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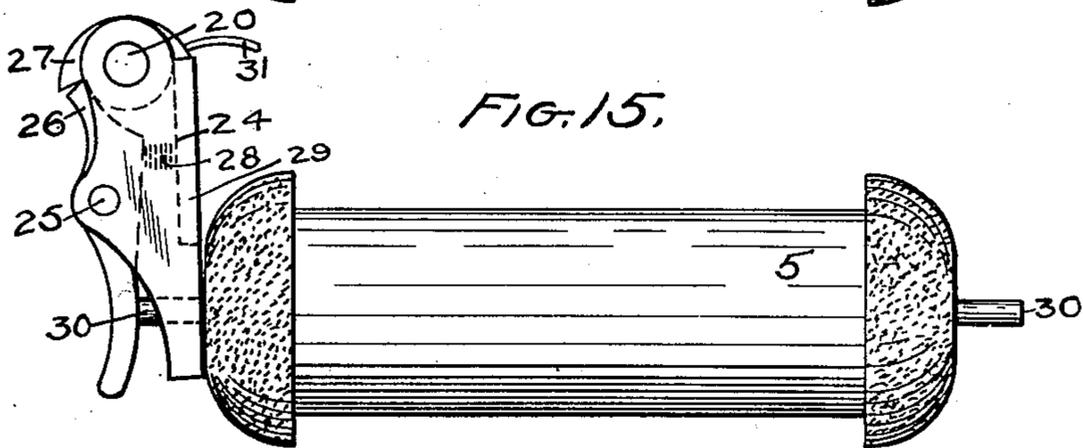
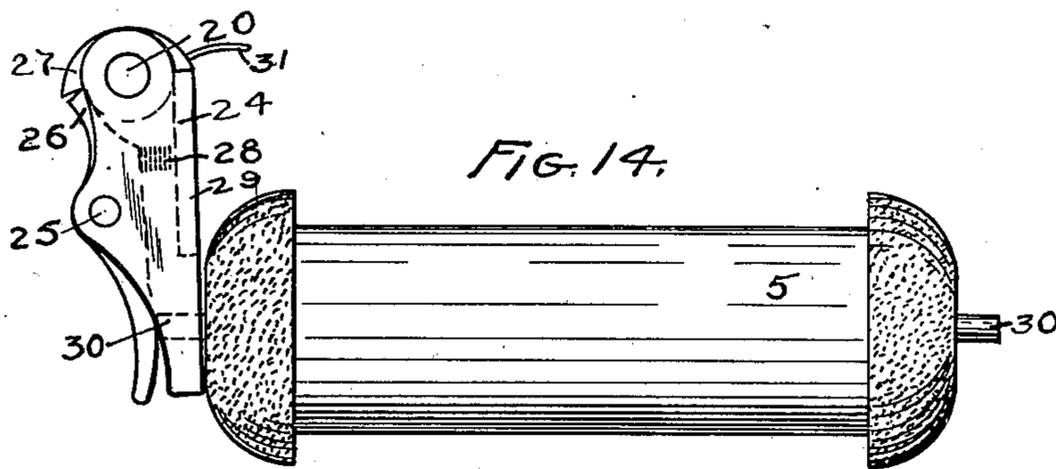
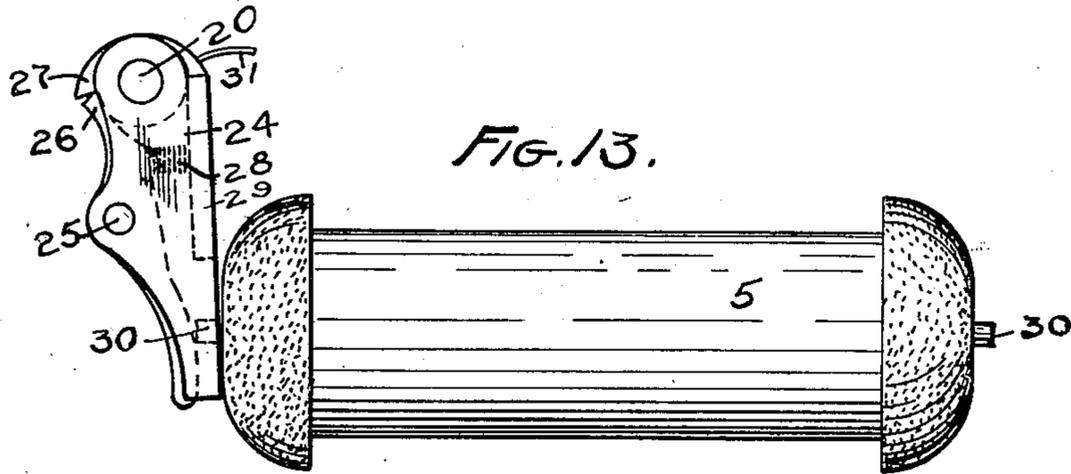
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AUTOMATIC SWITCH FOR PNEUMATIC CARRIERS.

(Application filed July 10, 1899.)

(No Model.)

4 Sheets—Sheet 4.



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UNITED STATES PATENT OFFICE.

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AUTOMATIC SWITCH FOR PNEUMATIC CARRIERS.

SPECIFICATION forming part of Letters Patent No. 653,044, dated July 3, 1900.

Application filed July 10, 1899. Serial No. 723,337. (No model.)

To all whom it may concern:

Be it known that I, FRED R. TAISEY, of Indianapolis, county of Marion, and State of Indiana, have invented a certain new and useful Automatic Switch for Pneumatic Carriers; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which like letters refer to like parts.

This invention relates to an automatic switch for pneumatic carriers, whether adapted for store, newspaper, postal, or other carrier service.

With this invention several carrier-boxes or cartridges may be conveyed through the same tube and each switched automatically to a different place, the switch being actuated by the carrier-box to be switched.

The invention consists in providing a branch tube from the main tube with a switch-tongue mounted so as to close the passage-way through either the main tube or branch tube, as desired, and means for operating such switch-tongue that is controlled or set in motion by a trigger mechanism which is actuated by a pin on the end of the carrier-box. By graduating the length of the pins on the boxes so that each is different from every other and adapting the trigger mechanisms for such various pins each carrier-box will automatically be switched as designed.

Another feature of the invention consists in providing a valve mechanism for closing the main tube that is operated by the carrier-box at the same time it operates the switch-tongue, whereby air from the main tube is deflected into the switch-tube for elevating the carrier-box therein. It is of use where the carrier-box is to be elevated to a higher floor.

The full nature of my invention will be understood from the accompanying drawings and the description and claims following of one form of device embodying said invention.

In the drawings, Figure 1 is a plan view of a section of a pneumatic carrier containing my invention. Fig. 2 is a side elevation thereof. Fig. 3 is a plan of a portion of what

is shown in Fig. 1 with the top plate removed. Fig. 4 is a horizontal longitudinal section of Fig. 2 on the line B B. Fig. 5 is a vertical longitudinal section. Fig. 6 is a side elevation of a part of what is shown in Fig. 2 with the side plate removed. Fig. 7 is a cross-section on the line A A of Fig. 6 with the side plate in place. Fig. 8 is a side elevation of the trigger mechanism. Fig. 9 is a front elevation of the same. Fig. 10 shows the invention modified for discharging the carrier into a floor above, said figure being a central vertical section of the parts with a portion of the upward extension centrally broken away for convenience of illustration. Fig. 11 is a side elevation of the upper portion of said upward extension. Fig. 12 is a side elevation of the device, showing the valve-actuating mechanism with the side plate removed, the same being centrally broken away, as shown. Figs. 13, 14, and 15 show a series of carrier-boxes with graduated pins and trigger mechanisms modified so as to be actuated by the respective pins.

Referring now to the details of construction of this form of device embodying my invention, 1 represents the ends of the main tube. Between the parts of said main tube, at a convenient location, I mount a sectional tube or switch-section 2. It consists of two halves bolted together at 3 and 4, with an external diameter greater than that of the main tube and an internal diameter the same as that of the main tube. Therefore the ends of the main tube fit in annular recesses at the end. The uniformity of the internal diameter of the parts is required for the passage of the cartridge or carrier-box 5. A switch-tube 6 extends from said switch-section 2. For delivery below it is turned downward, as shown in Fig. 5, and for delivery to the floor above it is turned upward, as in Fig. 10. I here show said switch-tube integral with the switch-section. At the outlet of the switch-tube the same is closed by a cap 7, held in place by a lever 8, pivoted to the arm, and pressed into a closed position by the spring 10. So far as possible it is desirable that the discharge end of the switch-tube be closed by this cap air-tight.

At the intersection of the switch-section 2 and the switch-tube 6 I mount a horizontal pin 11, its ends being mounted in the sides of said switch-section. On said pin I secure the switch-tongue 12 for closing the passage-way into the switch-tube or through the switch-section, as desired. Said tongue remains in the position shown in Fig. 5 by plain lines when it is desired that the carrier-box pass on through the main tube and in the position shown there in dotted lines when it is desired that the carrier-box be switched into the switch-tube. Said switch-tongue is so mounted that when it closes the switch-tube 6 it lies flush with the internal surface of the main passage-way. Therefore the front end of the tongue lies in a suitable seat. When the switch-tongue is elevated into the position shown in dotted lines in Fig. 5, its free end engages the stop 14. Said switch-tongue has a weighted shank 15, that is short, to almost counterbalance the long end of said tongue in order to render the tongue easy of actuation. Said switch-tongue is operated primarily by the means shown in Fig. 6. The crank 16 is secured to the outer end of said pin 11, so as to rotate the same, and the spring 17 is so mounted thereon as to tend to return the switch-tongue to the position that closes the switch-tube 6 after the carrier-box has passed through it. A connecting-bar 18 is pivoted to one end of the crank 16, and at the other end it is pivoted to the crank 19 on the horizontal shaft 20, that extends through a box or upward extension 21 in the upper side of the switch-section 2, as appears in Figs. 5 and 6. The said parts 16, 17, 18, and 19 are carried on the outside of the switch-section 2 in a box or seat for the same formed by the rib 22. (Shown in Figs. 6 and 7.) It is closed by the side plate 23, as appears in Fig. 7. This box-like arrangement is brought out also clearly in Figs. 2, 3, and 4. On said shaft 20 I loosely mount a downwardly-extending trigger or fork 24, as appears in Figs. 5 and 9. It extends downward somewhat like a person's two fingers when spread, so that said fingers extend on each side of the radial center of the switch-section or of the carrier-box. Between said bifurcated trigger or fork 24 on the pin 25, centrally mounted therein, I mount a pawl 26, as appears in Figs. 8 and 9. The upper end of said pawl is adapted to engage the ratchet 27 on the shaft 20. The upper end of said pawl, however, is held out of engagement with said ratchet normally by the spring 28. (Shown in dotted lines in Fig. 8.) Said spring is mounted upon a plate 29, that connects the two arms or parts of the bifurcated trigger 24 along the rear and upper part thereof, as appears in dotted lines in Fig. 8. Said spring 28 presses against the pawl 26 above its pivotal point, thus disengaging it from the ratchet. On each end of the cartridge or carrier-box I centrally provide a pin 30. The length

of this pin on the various boxes is graduated. As the carrier-box moves forward in its engagement with the bifurcated trigger or fork 24 said pin 30 engages the lower end of the pawl 26 and throws the upper end of said pawl into engagement with the ratchet 27 before the trigger mechanism is pushed appreciably by said carrier-box. The further movement of the carrier-box pushes the whole trigger mechanism, as shown in Figs. 8 and 9, and since the pawl 26 is in engagement with the ratchet 27 and said ratchet 27 is secured to the shaft 20 the crank 16 and connecting-bar 18 are actuated, and thereby the tongue 12 is moved from the position shown in Fig. 5 by plain lines into the position shown by dotted lines. Then the air passage-way through the main tube or switch-section is obstructed and the box is deflected into the switch-tube, where by reason of its impetus it pushes open the cap 7 and is discharged. After the cartridge or carrier-box is discharged from the switch-tube the spring 10 returns the cap 7 to the closed position, and the trigger mechanism and shaft 20 are returned to their normal position by the spring 31. Said spring has one end fastened in the casing 21, and it is coiled about the shaft 20, as shown in Figs. 3 and 9. The normal position of the trigger mechanism is of course that shown in Fig. 5, whereby it extends into the path of the cartridge or carrier-box. When, however, a carrier-box passes through the tube without any pin 30 on it to actuate the pawl, the box will push the trigger mechanism up out of the way, as in the other case; but the pawl will then not be in engagement with the ratchet 27, as appears in Fig. 8, and therefore will not actuate the mechanism which changes the position of the switch-tongue 12. In such case the cartridge can pass on through the switch-section or main tube without obstruction or deflection. In the upper part of the extension 21, which is closed by the lid 32, as appears in Figs. 1 and 5, I secure to said lid a bumper 33, against which the trigger mechanism is thrown by the rapidly-passing cartridge or box. This, as well as the stop 14, is made of rubber to prevent noise. In this connection it might be stated that the ratchet 27 has on it only one tooth or projection for the upper end of the pawl to engage. When said upper end does not catch said tooth, it merely rides around on the ratchet 27 without engaging anything or actuating anything.

The pawl 26 in the various trigger mechanisms is modified, as shown in Figs. 13, 14, and 15, so as to change the distance of its lower end from the front or engaging face of the trigger or fork 24. In other words, the lower end of the pawl is set up gradually closer and closer to the face of the fork in the series of trigger mechanisms, so that unless the pin 30 on the box is long enough to actuate the pawl before the end of the box comes

in contact with the trigger 24 the pawl will not be operated, but the whole will be turned out of the way in the same manner as if there were no pin on the box. The trigger mechanism requiring the longest pin is placed nearest the office or home station and the trigger mechanism requiring the shortest pin is placed farthest away, and such mechanisms between are graduated accordingly, so that the carrier-boxes with the shorter pins will pass by the trigger mechanisms requiring long pins until each one finds its corresponding trigger mechanism. The springs 28 so hold the pawl 26 as to prevent its lower end from extending in proper normal position so that the shorter pins will not actuate it.

The construction shown in Figs. 10, 11, and 12 contains what has already been described with some added features to enable one main tube to furnish the carrier-box not only for one floor of the store, but for two or three floors. What is shown in Fig. 5 is the form suitable where the carrier-box is to be discharged at a point near the main tube. Where, however, it is desired to discharge said box several feet from the main tube, whether to the floor above that through which the main tube extends or to the floor below, the form shown in the last three figures is used. In such case the switch-tube 6 is extended to such length as will bring the discharge end to the desired place. In such case, however, the mere impetus of the carrier-box may not cause it to reach the desired destination. At least this is true when said switch-tube extends upward, as shown in Fig. 10. When it extends downward, gravity would carry it to its destination. Therefore when said tube extends upward the cartridge or carrier-box must be propelled upward through said switch-tube by air from the main carrier-tube. To effect that result, the main passage-way must be closed by a valve and a long circuit for the passage of air provided leading through the switch-tube and from near its upper end back to the main tube. Therefore a return-tube 35 is provided leading from near the upper end of the switch-tube back to main tube behind the valve mechanism. The passage-way into and out of this return-tube 35 is through perforations 36. To close the main passage-way in this case, a valve 37 is mounted on the shaft 38 in the under side of the switch-section, as appears in Fig. 10. A downward extension 39 is made to provide a seat for said valve when it is in its inoperative position. When the shaft 38 is revolved, it raises said valve into the position shown in dotted lines in Fig. 10. That closes the main passage-way. Said valve and its shaft 38 are operated by the crank 40, (shown in Fig. 12,) that is secured to one end of the shaft 38 and has on its free end a wrist-pin 41, that extends through a slot 42 in the bar 43, that is pivoted to the extended end of the crank 16. There-

fore the trigger mechanism heretofore described, through the connecting-bar 18, the crank 16, and the parts 43 and 40, operates the valve. When said valve is operated and thrown into position to close the passage-way, it is held in that position by the bar 44, pivoted to the pin 45 and having a notch in its free end that engages the ratchet 46 on the end of the shaft 38 adjacent to the crank 40. The discharge of the cartridge or carrier-box from the upper end of the switch-tube 6 causes the elevation of the cap 7 and also of the lever 8. A chain 47 is connected at its upper end with the lever 8 and at its lower end to said bar 44. The bar 44 is elevated from engagement with the ratchet 46 and the valve returned to its inoperative position by gravity. The valve is made out of rubber and therefore has considerable weight and is so mounted that it will be returned to its inoperative position by gravity. Since in this form the switch-tube extends upward instead of downward, it is necessary to mount the trigger mechanism on the side opposite to that in which it is mounted in Fig. 5. Therefore, as appears in Fig. 10, it is necessary to make a downward extension 48, closed by the plate 49, to receive the stop 14 and the free end of the tongue 12.

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

1. In a pneumatic carrier, the combination with the main tube, of switch-tubes leading therefrom, switch-tongues for deflecting the carrier-boxes from the main tube into the switch-tubes, trigger mechanisms for operating said switch-tongues that extend into the passage-way to the main tube, and a series of carrier-boxes having centrally-located pins graduated in length to operate said trigger mechanisms.

2. In a pneumatic carrier, the combination with the main tube, of switch-tubes leading therefrom, switch-tongues for deflecting the carrier-boxes from the main tube into switch-tubes, a series of trigger mechanisms for operating such switch-tongues that extend into the passage-way to the main tube and provided with actuating-pawls graduately arranged in series, and a series of carrier-boxes having centrally-located pins graduated in length to operate such pawls.

3. In a pneumatic carrier having switches, a series of trigger mechanisms for operating said switches including an actuating-pawl and a trigger to which the pawl is pivoted, the distance between the front or engaging faces of the respective triggers and pawls being graduated in the series.

4. In a pneumatic carrier having switches, a series of trigger mechanisms for actuating the switches having an actuating-pawl and a trigger to which the pawl is pivoted, the distance between the front or engaging faces respectively of the triggers and pawls being graduated in the series, and carrier-boxes

with ends to engage said triggers and centrally-located pins graduated in length so as to engage the pawl before the end of the box engages the trigger.

5 5. In a pneumatic carrier having switches, a series of trigger mechanisms for actuating the switches having an actuating-pawl, a trigger to which said pawl is pivoted, and means for holding the pawls in the various trigger
10 mechanisms in such position that the distance between the front or engaging faces of the triggers and the pawls will be graduated in the series.

15 6. In a pneumatic carrier having switches, a series of trigger mechanisms for actuating said switches comprising a shaft, a ratchet secured thereon, a trigger loosely pivoted on the shaft, a pawl pivoted in the trigger to engage the ratchet, and means for so holding
20 the pawl that the distance between the front or engaging faces of the triggers and pawls in the trigger mechanisms will be graduated.

25 7. In a pneumatic carrier, the combination with the main tube, of a switch-tube leading therefrom, means for deflecting said carrier-box into said switch-tube, a return air-tube leading from the switch-tube back to the main tube, and a valve for closing the main tube between the switch-tube and return-tube that
30 is actuated through the same mechanism that actuates the means for deflecting the carrier-box into the switch-tube.

35 8. In a pneumatic carrier, the combination with the main tube, of a switch-tube leading therefrom, a switch-tongue for deflecting the carrier-box from the main tube into the switch-tube mounted on a pin at the junction of said tubes, a crank secured on said pin, a shaft
40 mounted in an extension from the main tube, a trigger mechanism mounted thereon and extending into the passage-way through the main tube, a crank on said shaft, and a rod connecting the crank on the trigger-shaft and the crank on the switch-tongue pin.

45 9. In a pneumatic carrier, the combination with the main tube, of a switch-tube leading therefrom, a switch-tongue for deflecting the carrier-box from the main tube into the switch-tube, a shaft carried in an extension from the
50 main tube, connection between said shaft and the switch-tongue whereby the latter is actuated, a trigger mechanism mounted on said shaft and extending into the passage-way of the main tube whereby said shaft is actuated,
55 and a spring for returning said shaft to its normal position after it has been operated.

60 10. In a pneumatic carrier, the combination with the main tube, of a switch-tube leading therefrom, a tongue for deflecting the carrier-box from the main tube into the switch-tube, a shaft mounted in an extension from the main tube, connection between said shaft and the switch-tongue whereby the latter is operated, a ratchet secured to said shaft, a finger
65 mounted loosely on said shaft and extending into the passage-way of the main tube, a pawl

mounted on said finger and in such position that it will when actuated engage the ratchet, and a spring for holding it normally out of engagement with the ratchet.

70 11. In a pneumatic carrier, the combination with the main tube, of a switch-section interposed between portions of the main tube and secured thereto, a switch-tube leading from said switch-section, a switch-tongue for de-
75 flecting the carrier-box from the switch-section into the switch-tube, an extension on one side of said switch-section, a removable plate for closing said extension, a trigger mechanism mounted in said extension and extend-
80 ing into the passage-way through the switch-section, a rib formed on another side of said switch-section, a removable plate secured to said rib, and a connection between the trigger mechanism and the switch-tongue located
85 in said inclosure.

90 12. In a pneumatic carrier, the combination with the main tube, of a switch-tube leading therefrom, a switch-tongue for deflecting the carrier-box from the main tube into the switch-tube, a valve for closing the passage-way through the main tube, and means actuated by the carrier-box in its passage for simultaneously operating the switch-tongue and valve.

95 13. In a pneumatic carrier, the combination with the main tube, of a switch-tube leading therefrom, a switch-tongue for deflecting the carrier-box from the main tube into the switch-tube, a shaft at the junction of said tubes on
100 which the switch-tongue is mounted, a crank secured to said shaft, means actuated by the carrier-box in its passage for operating said shaft, a valve for closing the main passage-way mounted on a suitable shaft, a crank se-
105 cured to said shaft for its actuation, and a slotted connecting-rod between the crank on the switch-tongue shaft and the crank on the valve-shaft.

110 14. In a pneumatic carrier, the combination with the main tube, of a switch-tube leading therefrom, a spring-pressed cap closing the discharge end of said tube, a valve for closing the passage-way through the main tube, means operated by the carrier-box before it is
115 switched for actuating said valve, means for locking said valve when closed, and a connection between said locking mechanism and the cap-controlling mechanism at the discharge end of the switch-tube, whereby when the car-
120 rier-box in its discharge opens the cap said connection will release the locking mechanism controlling the valve in the passage-way through the main tube.

125 15. In a pneumatic carrier, the combination with the main tube, of a switch-tube leading therefrom, a spring-pressed cap for closing the discharge end of the switch-tube, a return air-tube extending from the switch-tube near its discharge end back to the main tube, a
130 switch-tongue for deflecting the carrier-box from the main tube into the switch-tube, a

valve for closing the passage-way through the
main tube located between the switch-tube
and return-tube and so arranged that gravity
will return it to its normal position after actua-
5 tion, and means actuated by the carrier-box
before it is switched for simultaneously oper-
ating said switch-tube and valve.

In witness whereof I have hereunto affixed
my signature in the presence of the witnesses
herein named.

FRED R. TAISEY.

Witnesses:

V. H. LOCKWOOD,
M. C. BUCK.