May 21, 1929. C. W. MEYERS 1,713,672

SELECTIVE DELIVERY PNEUMATIC DISPATCH APPARATUS

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Fig. 1.

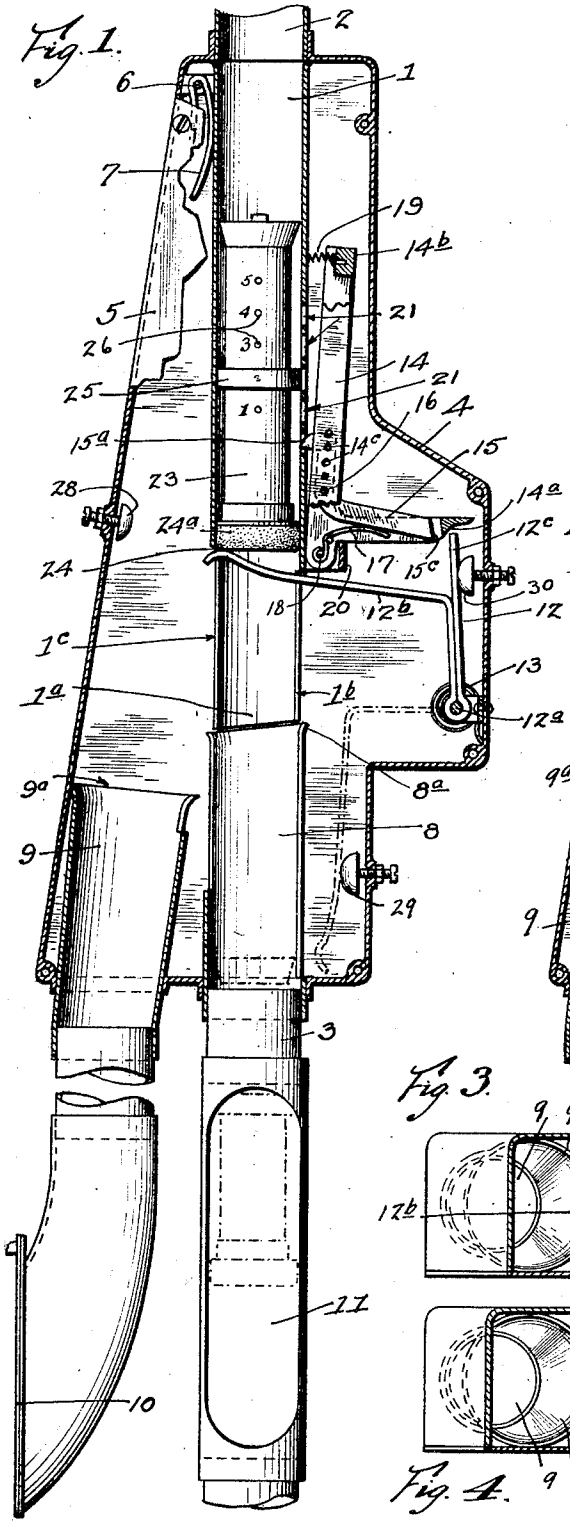


Fig. 2.

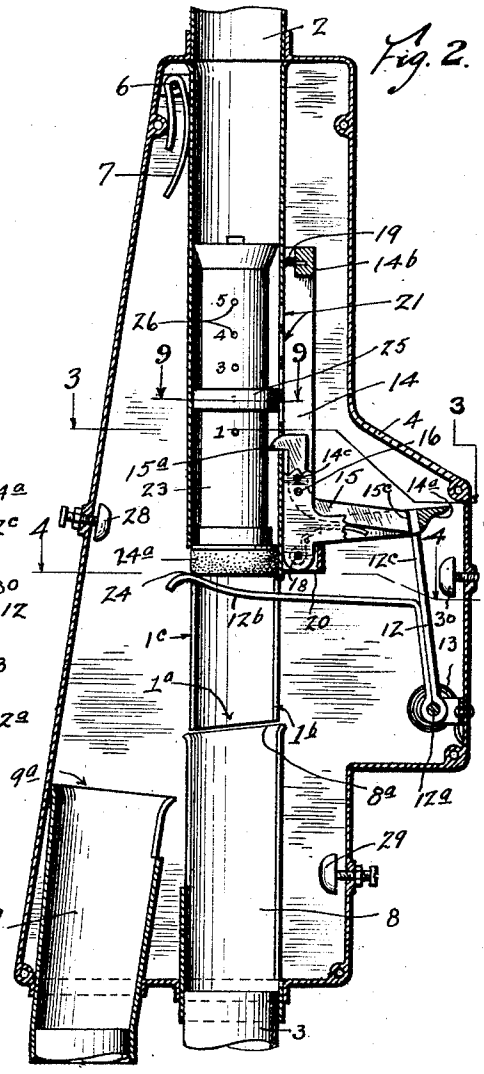


Fig. 3.

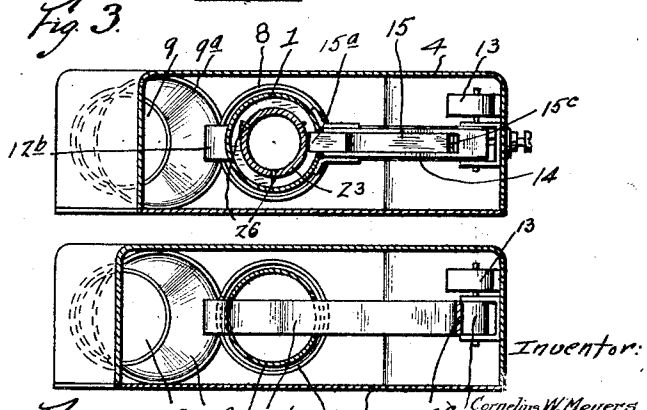
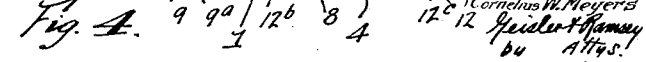


Fig. 4.



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Fig. 5.

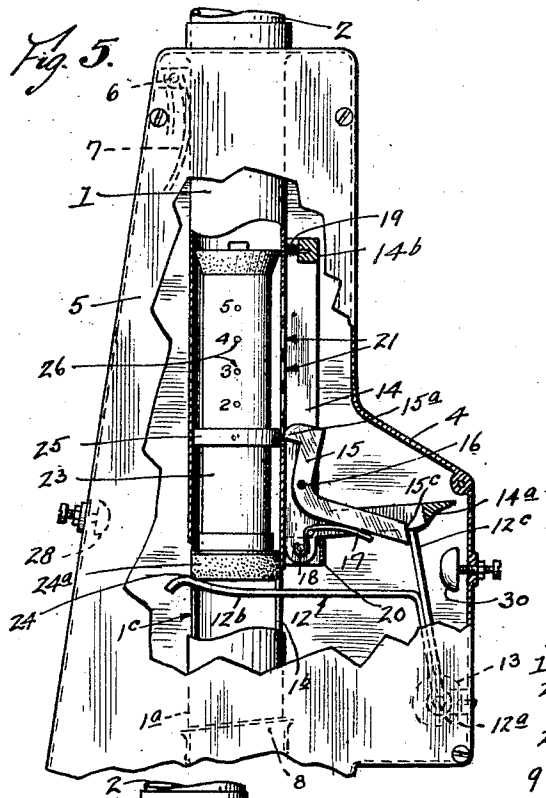


Fig. 6.

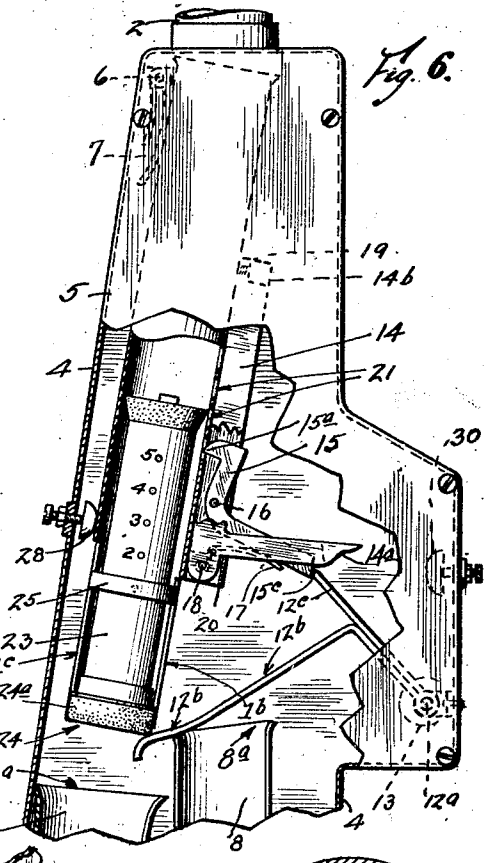


Fig. 7

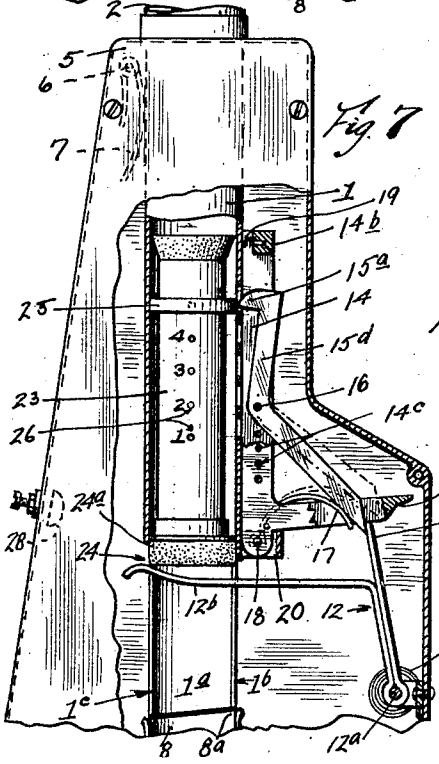


Fig 8.

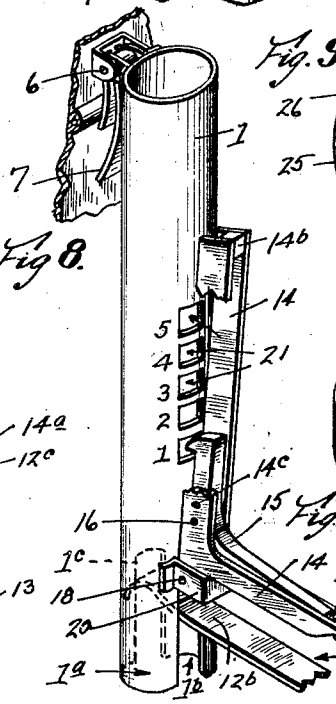
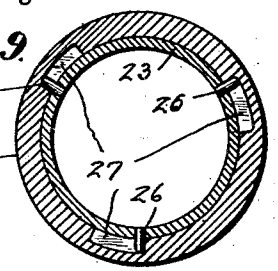


Fig. 9.



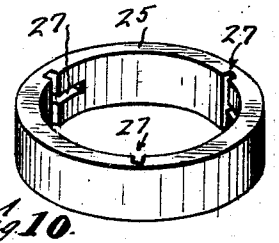


Fig 10.

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Fig. 11.

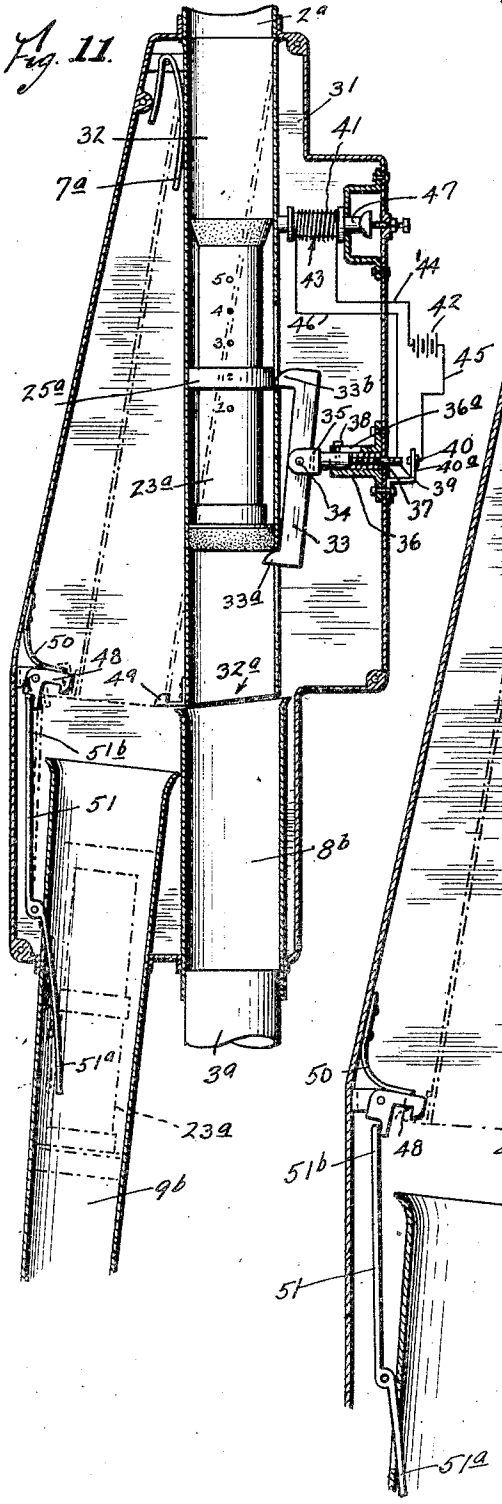
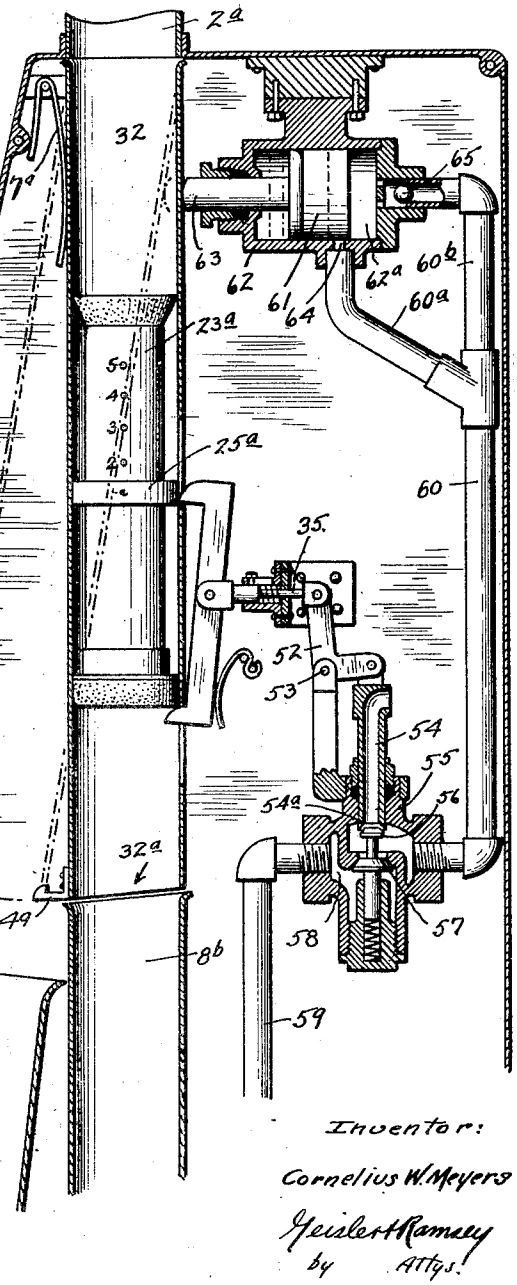


Fig. 12.



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UNITED STATES PATENT OFFICE.

CORNELIUS W. MEYERS, OF PORTLAND, OREGON.

SELECTIVE-DELIVERY PNEUMATIC-DISPATCH APPARATUS.

Application filed July 29, 1925. Serial No. 46,785.

My invention relates to pneumatic dispatch tube apparatus and particularly to selective delivery switches and cooperating carriers therefor. The main object of my invention is to provide a pneumatic dispatch tube with more than two stations each having selective switches, and to arrange said switches so that a selected switch will be automatically actuated by the proper arrangement of adjustable contacts on the carrier.

At present many commercial installations are provided with "separators" similar to the type disclosed in Patent No. 1,102,225, issued to Albert W. Pearsall on June 30th, 1914. Such separators are arranged to direct carriers to either of two stations. These devices are not designed nor are capable of directing carriers to more than two stations. When the range of selectivity from a single dispatch station is more than two stations, it is common practice at the present time to dispatch all of the carriers to a central desk from which an operator manually distributes them to their desired destinations.

My invention is therefore adapted to eliminate the necessity of a central desk and an operator therefor, as well as the necessity of providing parallel dispatching and receiving conduits from said central desk to each one of the intermediate stations. My invention contemplates this result without requiring special equipment, except for the switches and the carriers which co-operate therewith. By the use of my improvement all of the stations can be connected in series by a single continuous conduit of standard construction, each station being provided with a switch for controlling the receiving outlet therefor and with an adjacent inlet. Said switches are selected by an adjustment of the spacing of adjustable contacts on the carriers, each of said switches being arranged to be actuated by a different contact spacing. Thus if a carrier is placed in the conduit it will be diverted therefrom only by the switch at the selected station.

A further and more particular object of my invention is to provide switches which consist of a movable section of conduit, normally alined with the remainder and which may be arranged angularly thereto by the actuation of the selective mechanism, so as to direct the carrier from said conduit to the receiver provided. The selective devices for said movable section of conduit preferably are operated by the weight, or velocity, or both, of the carrier so that auxiliary devices do not have to be timed to operate relatively to the velocity of said carrier in the conduit in diverting said conduit to the intermediate stations.

A further object of my invention is to provide closing devices which co-act with the carrier passing through the conduit so that the selected switch is actuated directly by the carrier and thus said switch will remain open until closed by the carrier passing out of said switch section. That is, I provide means connected with the operating mechanism for said switch which tend to hold the switch section in angular position until the carrier is discharged therefrom so as to prevent the carrier from being returned to a position in alinement with the remainder of said conduit before said carrier has been discharged.

A further object of my invention is to provide devices in said switch actuating mechanism which require the substitution of but a single part to effect the selectivity; said substituted part being relatively small and inexpensive as compared with the cost of the entire switch mechanism. In other words, a further object of my invention is to provide switches that are practically interchangeable, the selectivity being attained by the substitution of a relatively minor part therein.

A further object of my invention is to provide a carrier adapted to co-operate with said selective mechanism, said carrier being provided with two contacts that are adjustable relatively to each other. Said adjustable contact preferably is ring-like and longitudinally slidable upon the body of said carrier. The carrier and the ring-like contact are provided with co-operating devices adapted in one arrangement to engage each other, said co-operating parts on the carrier being spaced longitudinally thereof so that the ring-like contact may be set in its desired position. The connections between said ring and said carrier are preferably three in number, and spaced about the circumference of the carrier and the bore of the ring approximately 120° apart so that the ring will be held securely in set position.

The details of construction and mode of operation are hereinafter described with reference to the accompanying drawings, in which:

Fig. 1 is a longitudinal section through one of the stations in the main conduit with

the switch operating mechanism shown in its normal position when not actuated by a carrier passing through said conduit, the carrier being shown approaching the switch operating lever, however;

Fig. 2 is a similar section with the carrier shown as engaging the switch operating lever and having moved said lever, the arrangement of the switch actuated lever and its co-operating devices being shown as spaced an incorrect distance, relatively to the spacing of the contacts on the carrier, so as not to be actuated by the carrier in passing thereby;

Fig. 3 is a transverse section taken on the line 3—3 of Fig. 2;

Fig. 4 is a transverse section taken on the line 4—4 of Fig. 2;

Fig. 5 is an elevation with parts broken away of a station and a carrier approaching the same with its contacts spaced to actuate the selective mechanism, the positions of the parts of the selective mechanism being similar to those in Fig. 2;

Fig. 6 is a similar elevation with portions broken away of the switch shown in Fig. 5, showing the progressive movement of the selective mechanism in directing the carrier from the main conduit to a suitable receiver therefor;

Fig. 7 is a similar elevation of another station with the contacts on the carrier and in the selective mechanism, set relatively to engage each other;

Fig. 8 is a fragmentary perspective view of a movable switch section which constitutes a portion of the conduit, and shows the location of the contacts thereon relative to said section;

Fig. 9 is a section taken on the line 9—9 through the ring-like contact on the carrier and the side walls of said carrier;

Fig. 10 is a perspective view of the ring-like contact for said carrier;

Fig. 11 is a longitudinal section through a modified type of selective mechanism embodying my invention, in which the actuating agent is electro-magnetic; and

Fig. 12 is a similar longitudinal section through another modified type of mechanism embodying my invention in which the actuating element is a fluid-operated piston and cylinder.

The movable section of the conduit 1 is connected to and normally arranged in alinement with the main tubular conduit, one end 2 of which is shown as discharging into said movable section 1 and the other end 3 receiving carriers which have passed through said movable section. Said movable section 1 is housed within an air-tight casing 4 which is provided with a removable cover 5. The movable section 1 is preferably pivotally connected to said casing by a pin 6 which forms said pivot. A spring 7 also carried by said pin 6 tends to hold said movable section 1 in alinement with the ends 2 and 3 of the main conduit. A fixed section of conduit 8 is arranged within said casing 4 and is preferably provided with a flared mouth 8^a, and is preferably interposed between the end 3 of the main conduit and the discharge end 1^a of the movable section 1. The slight flare of the mouth 8^a is to prevent the carrier from striking the mouth of said section. Disposed angularly to the section 8 is a receiver 9 which also is provided with a flared mouth 9^a. Said receiver is arranged relatively to the mouth 1^a of the movable section 1 so as to be alined therewith when said movable switch section is deflected by the selective mechanism. Said receiver is shown as a section of conduit, the exit of which is closed by a clapper valve 10. This type of receiver is preferably provided if the carrier is to be conducted some distance, but it is understood that any type of receiver can be used, such for example as a basket or transparent receptacle.

The end 3 of said conduit is preferably provided with an inlet 11, shown as one of the side door type, so that carriers can be inserted into said conduit at each station, as well as deflected therefrom.

The selective mechanism shown in Figs. 1 to 9, inclusive, consists of an actuating lever 12 which is moved into its normal position by a coil spring 13 which is mounted about the pivot 12^a for said lever. Said lever is provided with two arms, one 12^b extending transversely through slots 1^b and 1^c formed in the side walls of said movable switch section 1, and another 12^c. Said arm 12^b thus extends across the path of the carriers so as to be rocked about its pivot 13 by each carrier that passes through the conduit. The other shorter arm 12^c is arranged to actuate the L-shaped control lever 14, said control lever carrying a pawl 15 pivotally secured thereto by a pivot pin 16. Said pawl is normally held in one position by a spring 17 also carried by said control lever. One end of said control lever is provided with a cam face 14^a which is adapted to be engaged by the arm 12^c of the actuating lever, as shown in Figs. 1 and 2. That is, the face 14^a is arranged relatively to the path described by the end of the arm 12^c so that when said actuating lever is moved by a carrier passing through the movable section of conduit, the engagement of said arm 12^c with the face 14^a causes the control lever to be rocked counter-clockwise about its pivot 18, as shown in Figs. 1 and 2. Said control lever is normally held in the position shown in Fig. 1, by the spring 19 which tends to space its end 14^b away from the side of the movable section of conduit 1. Said control lever is carried by a bracket 20

formed on said movable section and thus the control lever and its pawl always moves with said switch section 1 while the actuating lever 12 being pivotally carried by the casing, does not. The control lever 14 is preferably made up of two spaced sections so that the pawl 15 can be pivotally mounted between the same. Said pawl 15 is provided with the head 15^a arranged to be in registration with one of a number of apertures 21 formed in the movable section of conduit 1. The different stations are provided with different pawls and thus, as shown in Fig. 7, station "5", for example, would be provided with a pawl 15^d and its head 15^e would register with that aperture 21, marked "5", as shown in Fig. 8. The control lever 14 is the same for all stations, however, and is provided with a number of pivot holes 14^c for the pivots 16 of said pawls. The pivot points for said pawl vary with their lengths, and are arranged so that the pawl provided will be pivoted approximately at its middle each time. Thus a unit throw of said head 15^a in any of its positions will give a corresponding movement to its engaging end 15^c, which is normally concealed with the control lever 14, as shown in Figs. 1 and 2. When, however, a carrier 23 in which the contacts 24 and 25 thereon are spaced the correct distance, passes through the movable switch section, said pawl 15 will be rocked relatively about its pivot 16 so as to move the engaging end 15^c into the path of the arm 12^c, as shown in Figs. 5 and 6. The face of the felt head 24^a preferably constitutes one contact while the adjustable ring 25 constitutes the other. The ring 25 is longitudinally slidable upon the body of the carrier 23 and is held in adjusted position by the pins 26 on said carrier engaging the T-shaped slots 27 on said ring. I preferably provide three of said pins 26 spaced 120° apart about the cylindrical body of said carrier and I space the slots 27 correspondingly about said ring 25. I have discovered that if three pins and three slots are used said pins and slots will always set securely with each other, similar to the legs of a three-legged stool.

The arm 12^b of the actuating lever 12 engages the contact 24 which is the face of the felt head 24^a and if the contacts on the carrier and in the selective mechanism are spaced correctly the head 15^a engages the ring-like contact 25. As is shown in Fig. 1, the head 15^a normally lies outside of the bore of the conduit so as not to be struck by the ring-like contact 25. It is only moved through the wall of said conduit by the action of the actuating arm, shown in Fig. 2 and previously described. If said ring 25 does not coincide with the aperture 21 through which the head projects at the time the control lever is rocked by the actuating lever, the selective devices will not be engaged and the carrier will be permitted to pass directly through said station. If, however, the head 15^a of the pawl, when it passes through the aperture, strikes said ring-like contact, it will move its engaging end 15^c out of concealment by the portions of the control lever 14 so as to be engaged by the arm 12^c of the actuating lever, as shown in Fig. 5. The further rocking of said actuating lever by the carrier will cause said movable section to assume the position shown in Fig. 6 so that the carrier therein will be discharged into the receiver 9 instead of passing directly through the movable switch section 1 to the receiving end 3 of the main conduit. After said carrier has passed into said receiver, said actuating lever is returned to its original position by the action of the coil spring 13 and the movable section is returned to its position in alinement with the remainder of said conduits under the action of the spring 7.

A plurality of adjustable bumpers are provided about the casing to cushion the return movement of said moving parts. An adjustable bumper 28 is provided on the side of the casing to limit the displacement of the movable section 1, as shown in Fig. 6. An adjustable bumper 29 is provided on the casing to limit the movement of said control lever 12, as shown in dotted lines in Fig. 1, and the adjustable bumper 30 is provided to limit the return movement of said control lever, as shown in full lines in said figure.

The selective devices shown in Fig. 11 are a modification of my invention in which electro-magnetism is used as the actuating force. In this modification, the casing 31 houses the movable switch section 32 similar to the arrangement of these parts in the previous figures. Said movable switch section is a part of the main conduit and connects the end 2^a of the conduit with the end 3^a thereof, a short fixed extension section 8^b of the conduit being provided to connect the discharging end 32^a of the movable switch section with said end 3^a. An angularly disposed receiver 9^b is provided similar to the receiver in the previous figures and is arranged to receive the carrier 23^a when the selective mechanism is actuated to move the movable switch section 32 into deflecting position. The selective mechanism in this figure consists of a member 33 which is adapted to rock freely about its pivot 34. Said member is provided with two heads 33^a and 33^b at its opposite ends and at opposite sides of the pivot 34. Said member is carried by a bifurcated member 35 which is slidably held in a bracket 36 carried by the casing 31. A coil spring 37 normally holds said member 35 in extended position, as shown in Fig. 11. A pin 38 is provided on said member which engages the slot 36^a on said bracket to limit the move-

ment outwardly and inwardly of said member. The inner end of said member 35 carries an electrical contact 39 which is normally spaced from its co-operating contact 40 carried by an arm 40^a. Said contacts 39 and 40 serve to make-and-break the electrical circuit through the windings of solenoid 41. This electrical circuit consists of a source of electricity 42, shown symbolically as a battery, which is connected to the solenoid windings 43 through a connection 44. The battery is connected to the contact 40 through a connection 45 and the contact 39 is connected to the windings 43 by a connection 46. When the circuit is closed, electricity flows from the battery 42 through the connection 45 through the contacts 39 and 40, the connection 46, windings 43 and through the return connection 44 to the battery 42. The flow of electricity, through the windings 43 causes the plunger 47 in said solenoid to be moved to the left, as shown in Fig. 11. This causes the switch section to be moved angularly, to the position shown in dotted lines in said figure, against the action of the spring 7^a. I preferably provide a locking pawl 48 pivotally carried by the casing and held in engaging position with the fixed latch 49 carried by the end of the movable switch section, by a spring 50 also carried by the casing 31. I provide a pawl-disengaging lever 51 which is pivotally carried by the casing and has one end 51^a thereof extending into the receiver 9^b. The opposite end 51^b engages the pawl 48 to move it to disengaging position so as to permit the movable switch section 32 to be returned by the spring 7^a to its normal position in alinement with the ends 2^a and 3^a of the main conduit.

As shown in Fig. 11, when the carrier 23^a with its contacts 24^b and 25^a, correctly spaced, passes through said movable switch section, said member 33 will be displaced bodily towards the right, thus moving the member 35 into the bracket 36, compressing the spring 37, and closing the contacts 39 and 40 against each other. If the contacts are incorrectly spaced, however, the heads 33^a and 33^b will be displaced successively instead of simultaneously and the member merely rocks about its pivot 34.

With this type of device I preferably arrange the member 35 so that its position will remain fixed relatively to the casing and the stations may be adjusted by providing members 33 of different lengths. The pivot 34 will remain at approximately the middle and the additional length of said member be thus extended one-half on each side of the pivot. The slight difference in timing therefore of the movable switch section will have no effect upon the relative timing of the carrier therethrough because the section is located in disengaging position by the selective mechanism and is not released until said carrier has passed into the receiver. The position of the selective devices is therefore a sufficient distance above the mouth of the conduit 8^b so as to throw the switch section into deflecting position some distance in advance of the movement of the carrier therethrough at all times.

In Fig. 12 I show a still further modification of my invention in which all of the parts are identical to the similar parts in Fig. 11, except that the actuating mechanism is operated by a fluid, preferably air. These devices are also adapted to be actuated by steam or water, however. For the sake of brevity I will not specify nor describe the parts in Fig. 12 which are identical to the parts in Fig. 11, but will give them the same reference number.

The member 35 is connected to the bell crank lever 52 so that when rocked in a clockwise position around its pivot 53, it will depress the discharge pipe 54 which is longitudinally slidable in the body 55 of the valve. In its normal position, as shown in Fig. 12, the end 54^a of the discharge pipe is spaced from the valve disc 56, and open to the outlet side of the valve. When depressed, however, by the clockwise rotation of the bell crank 54 it engages the valve disc 56 and unseats the valve disc 57 from off the port 58 so as to permit fluid to flow from the intake pipe 59 through the valve body and into the outlet pipe 60. The fluid passes through either of the branches 60^a or 60^b of said outlet pipe and moves the piston 61 in the cylinder 62 towards the left. The piston rod 63 bears against the movable switch section 33 and moves the same angularly into the position shown in dotted lines, where it is held by the pawl 48. After said carrier 23^a has passed into the receiver and tripped said pawl the spring 7^a will move the switch section back into alinement with the two ends 2^a and 8^b of the conduit. The port 64 in said cylinder 62 is preferably spaced a slight distance from the end 62^a of said cylinder so as to entrap a certain portion of said fluid to form a cushion therefor. The fluid is prevented from flowing out through the branch 60^b by the ball-check valve 65 which permits fluid to pass into the cylinder through the branch 60^b but prevents its return flow therethrough.

I claim:

1. In a selective delivery pneumatic dispatch system of the character described, comprising a series of intermediate stations, a transmission tube provided with a series of movable tubular switch sections constituting a part thereof and normally alined with the course of said transmission tube and adapted to divert a carrier to one of said intermediate stations, means for operating said switch sections respectively, such means including and being controlled by two

spaced portions, the spacing of the contact portions of the respective switch operating means being varied so as to differentiate said means from each other and said means being operable only by a carrier also provided with two contact portions so spaced as to have simultaneous contact with those of the selected switch operating means, during the travel of the carrier through the transmission tube, a carrier adapted to be sent through said transmission tube, said carrier provided with two contact portions spaced relatively to those of the switch operating means controlling the selected intermediate station, one of said contact portions of the carrier being adjustable so that the spacing of the contact portions of the carrier may be varied to correspond with those of the switch operating means controlling the selected intermediate station.

2. In a selective-delivery pneumatic-dispatch apparatus of the character described, a tranmission tube provided with selective mechanism, said selective mechanism comprising a movable switch normally alined therewith, control mechanism connected therewith adapted to move said switch out of alinement with said transmission tube and into alinement with said intermediate station, and adjustable means for limiting the throw of said switch section.

3. In a selective delivery pneumatic dispatch apparatus of character described, a transmission tube provided with selective mechanism, said selective mechanism comprising a movable switch section constituting a part of said transmission tube and normally alined therewith, a movable actuating arm extending transversely across said section, control mechanism connected therewith adapted to move said switch section out of alinement with said transmission tube and into alinement with said intermediate station.

4. In a selective delivery pneumatic-dispatch apparatus of the character described, a transmission tube provided with selective mechanism, said selective mechanism comprising a movable switch section constituting a part of said transmission tube and normally alined therewith, a movable actuating arm extending transversely across said section, a control lever pivotally carried by the said switch section, a pawl pivotally carried by said control lever with one end extending through the wall of said switch section and the other normally concealed by said control lever, said pawl being arranged to engage a selected carrier passing through said switch section and to be rocked thereby to move said concealed end into engaging position relatively to said actuating arm.

5. In a selective-delivery pneumatic-dispatch apparatus of the character described, a transmission tube provided with selective mechanism, said selective mechanism comprising a movable switch section constituting a part of said transmission tube and normally alined therewith, a movable actuating arm extending transversely across said section, an L-shaped control lever pivotally carried by the said switch section, a pawl pivotally carried by said control lever with one end extending through the wall of said switch section and the other normally concealed by said control lever, said pawl being arranged to engage a selector carrier passing through said switch section and to be rocked thereby to move said concealed end into engaging position relatively to said actuating arm.

6. In a selective-delivery pneumatic-dispatch apparatus of the character described, a transmission tube provided with selective mechanism, said selective mechanism comprising a movable switch section constituting a part of said transmission tube and normally alined therewith, a movable actuating arm extending transversely across said section, a control lever pivotally carried by the said switch section, yieldable means adapted to move said control lever into one position, a pawl pivotally carried by said control lever with one end extending through the wall of said switch section and the other normally concealed by said control lever, said pawl being arranged to engage a selected carrier passing through said switch section and to be rocked thereby to move said concealed end into engaging position relatively to said actuating arm.

7. In a selective delivery pneumatic-dispatch apparatus of the character described, a transmission tube provided with selective mechanism, said selective mechanism comprising a movable switch normally alined therewith, a movable actuating arm extending transversely across said section, control mechanism connected therewith adapted to move said switch section out of alinement with said transmission tube and into alinement with said intermediate station, and adjustable means for limiting the throw of said actuating arm.

8. In a selective delivery pneumatic dispatch system of the character described, a transmission tube provided with a series of movable switch elements, control means for said switch elements respectively, each means including two spaced portions the relative arrangement of the contact portions of the respective switch control means being varied so as to differentiate said means from each other, and said means being operable only by a carrier also provided with two contact portions so arranged as to have simultaneous contact with those of the selected switch control means during the travel of the carrier through the transmission tube, a carrier adapted to be sent through said transmission

tube, said carrier being provided with two relatively adjustable contact portions, thus adapted to be set so as to be diverted by any predetermined switch element.

9. In a selective delivery pneumatic dispatch system of the character described, a transmission tube provided with a movable switch element, control means for said switch element including two spaced portions, said means being adjustable to vary the spacing of such portions, said means being operable only by a carrier also provided with two contact portions so arranged as to have simultaneous contact with those of the selected switch control means during the travel of the carrier through the transmission tube.

10. In a selective delivery pneumatic dispatch apparatus, a transmission tube the bore of which defines a path for carriers, selective mechanism comprising a movable switch element normally alined with such tube, two spaced control elements adapted to extend into such path, one element being provided with yielding means normally holding such latter element out of such path, the control elements being operatively connected together, whereby the engagement of the extended control element by a carrier passing thru such tube will overcome such yielding means and force the other control element into such path in operative position.

11. In a selective delivery pneumatic dispatch apparatus, a transmission tube the bore of which defines a path for carriers, selective mechanism comprising a movable switch element normally alined with such tube, two spaced control elements adapted to extend into such path, one element being provided with yielding means normally holding such latter element out of such path, the control elements being pivotally connected together, whereby the engagement of the extended control element by a carrier passing thru such tube will overcome such yielding means and force the other control element into such path in operative position.

12. In a selective delivery pneumatic dispatch apparatus, a transmission tube the bore of which defines a path for carriers, selective mechanism comprising a movable switch element normally alined with such tube, and control mechanism including a pivoted bell crank lever, one arm of which extends across such bore, and a movable element adapted to be moved into operative engagement with the other arm of such lever by a predetermined carrier moving thru such switch section.

13. In a selective delivery pneumatic dispatch apparatus, a transmission tube the bore of which defines a path for carriers, selective mechanism comprising a movable switch element normally alined with such tube, and control mechanism including a pivoted lever extending across such bore and a pivoted element adapted to be moved into operative engagement with such lever by a predetermined carrier moving thru such switch section.

14. In a selective delivery pneumatic dispatch apparatus, a transmission tube the bore of which defines a path for carriers, selective mechanism comprising a movable switch element normally alined with such tube, and control mechanism including positively acting switch actuating means extending into such bore, and a movable element adapted to be moved into operative engagement with such means by a predetermined carrier moving thru such switch section.

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