Dec. 16, 1930. W. V. McGUINNESS 1,784,967

SINGLE SELECTOR RELAY FOR PNEUMATIC TUBE SYSTEMS

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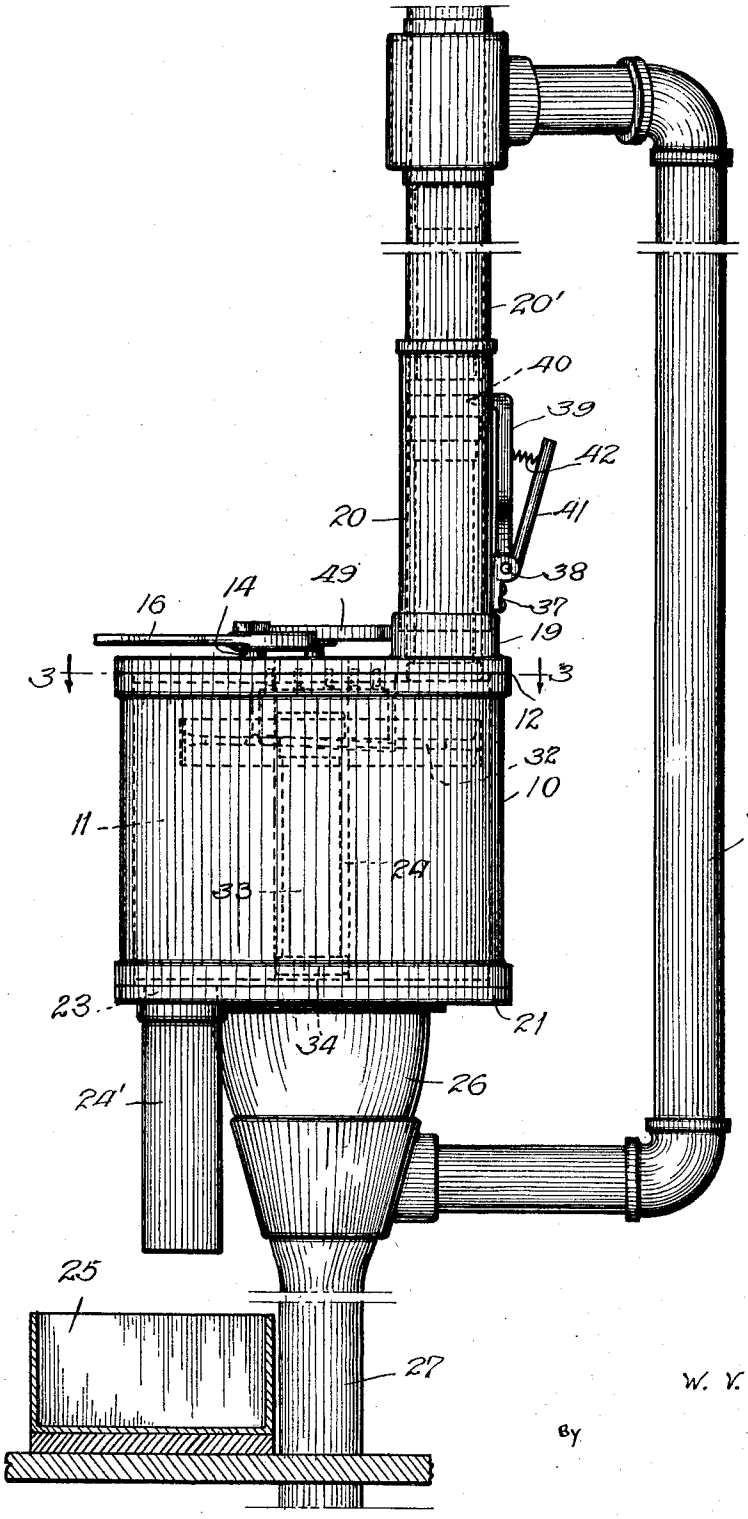


Fig. 1.

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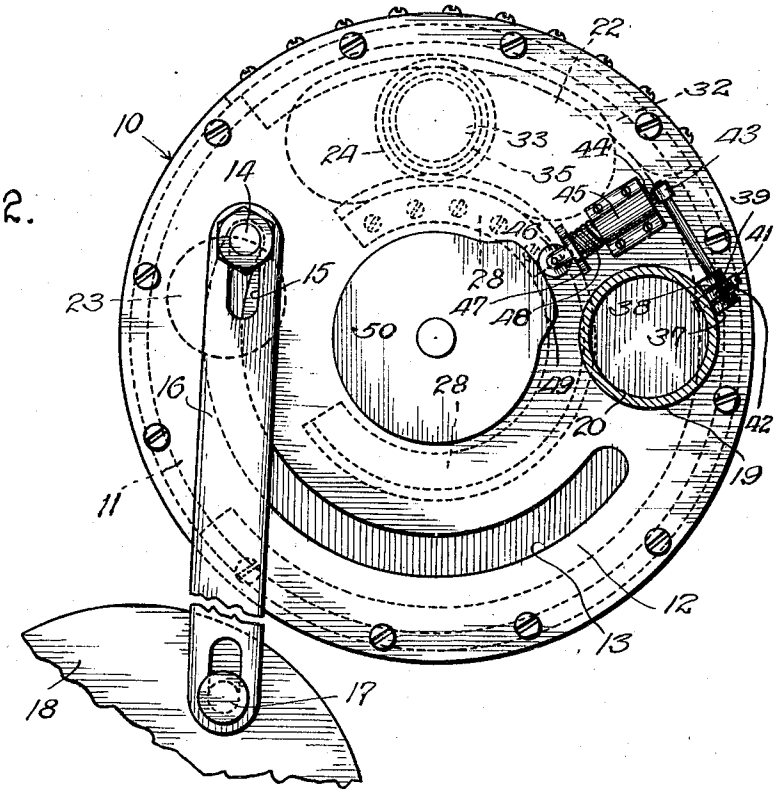
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Fig. 2.



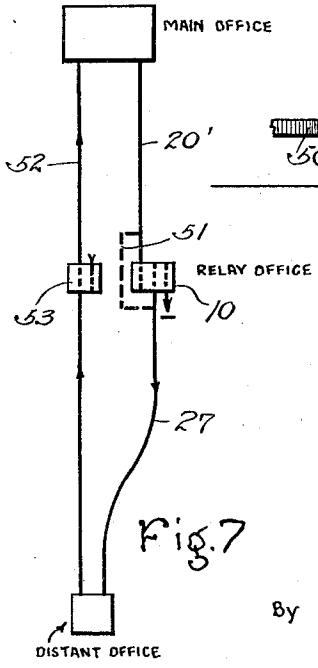


Fig. 7.

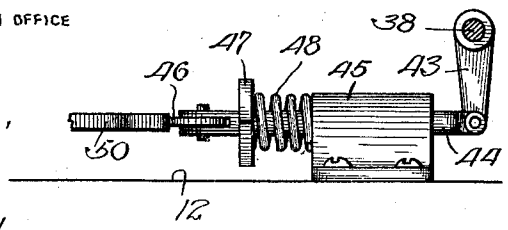


Fig. 6.

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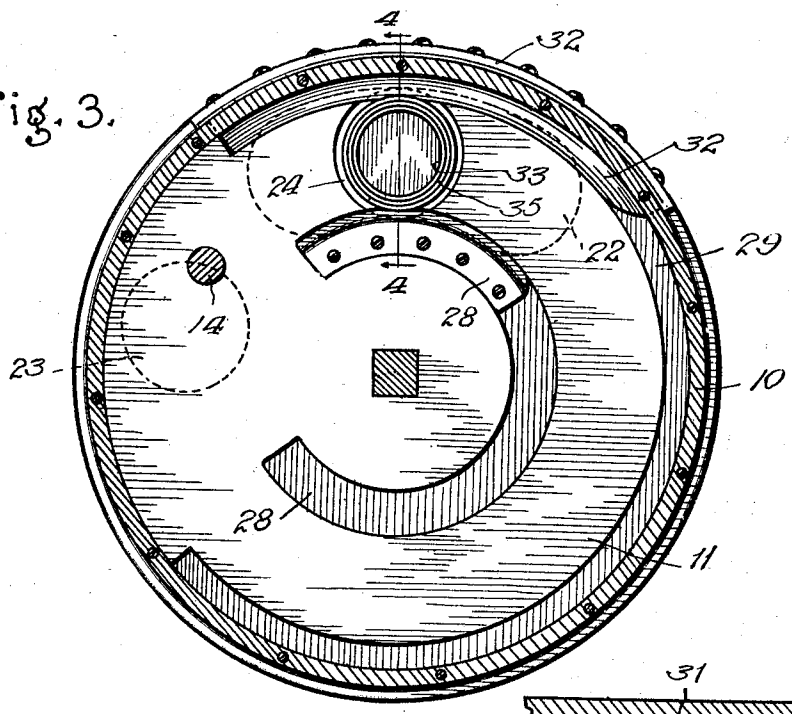
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SINGLE SELECTOR RELAY FOR PNEUMATIC TUBE SYSTEMS

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Fig. 3.



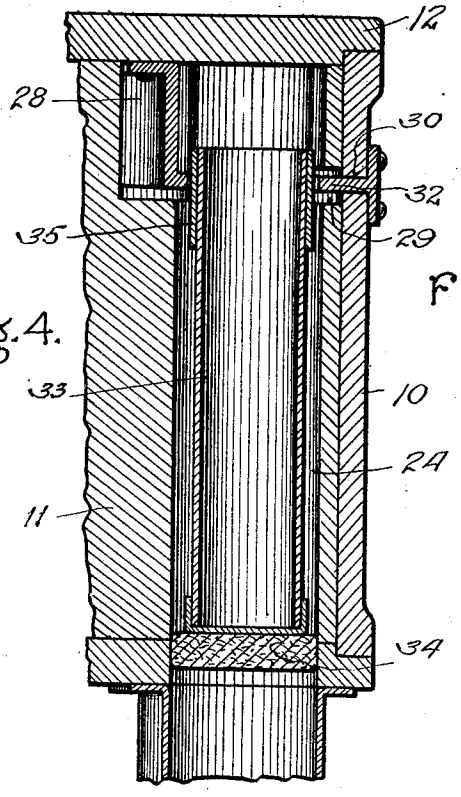


Fig. 4.

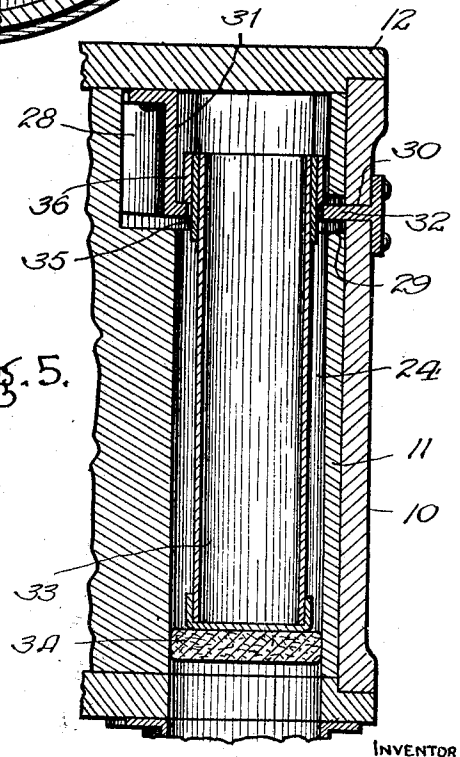


Fig. 5.

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UNITED STATES PATENT OFFICE

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SINGLE SELECTOR RELAY FOR PNEUMATIC-TUBE SYSTEMS

Application filed September 17, 1929. Serial No. 393,244.

This invention relates to pneumatic tube conveyors of the type wherein tubular receptacles are caused to travel from one point or station to another through tubes extending between said stations.

More especially the invention relates to what is preferably termed a single selector relay for such systems.

Pneumatic tubes for this purpose are usually arranged in loops. That is there are two tubes connecting the two points as, for instance, a main office and a distant office and one tube is used for transmission of carriers from the main to the distant office and the other tube is used for the transmission of carriers from the distant to the main office. It frequently happens that, in such a system, there is an intermediate office or offices to which it is desired to deliver carriers from the main office. Heretofore it has been customary, in such a case, to deliver all carriers to this intermediate office, select those intended for the remote office and replace them by hand in the sending side of the loop.

The present invention has for its principal object the provision of a simple and efficient mechanically operated relay interposed in the sending side of such a loop and which will automatically separate the carriers to be delivered at the intermediate office from those intended for the distant office, keeping the latter in the sending side of the loop, provision being made on the carriers to enable this selection to be effected.

With the above and other objects in view the invention will now be described in detail and then specifically claimed, reference being had to the accompanying drawings, wherein:—

Figure 1 is a side elevation of the improved relay.

Figure 2 is an enlarged plan view thereof showing a portion of the oscillator disk.

Figure 3 is an enlarged section on the line 3—3 of Fig. 1.

Figure 4 is an enlarged detail section on the line 4—4 of Fig. 3 and showing the type of carrier used for through transmission to the distant office.

Figure 5 is a view similar to Figure 4 but showing the type of carrier used for delivery at the intermediate station.

Figure 6 is a detail view showing a portion of the mechanism used to actuate the stop or finger which prevents a second carrier from interfering with the operation of the relay at the time the latter is handling a carrier.

Figure 7 is a diagrammatic view disclosing the system employing the present invention.

In the embodiment of the invention as here shown there is provided a casing 10 of cylindrical form and in this casing is fitted a drum 11 which is mounted in the casing for free oscillation. On top of this casing is fitted a head 12, secured in place by suitable screws and in this head is an arcuate slot 13 concentric to the casing. Projecting upwardly through this slot from the drum 11 is a pivot pin 14, which passes through a slot 15 formed in one end of a link 16 having its other end mounted on a crank pin 17, carried by a disk 18. This disk is driven through suitable speed reducing means so that rotation of the disk effects oscillation of the drum 11. Also the head 12 is provided with a tubular boss 19, wherein is fitted the lower end of the tubular body 20 of an automatic carrier spacing mechanism presently to be described. Into the upper end of the body 20 is fitted the end of a pneumatic tube 20′ leading from the main office or sending station.

On the lower end of the casing 10 is secured a bottom 21 wherein is a large arcuate slot 22 and spaced from this slot circumferentially is a circular opening 23. In the drum 11 is a cylindrical pocket 24 which, as the drum oscillates, moves from position of registry with the tubular boss 19 to registry with the slot 22 and opening 23 successively, and then moves back over the slot to again register with the boss 19. Depending from the opening 23 is a tube 24′ which leads to any suitable receptacle, such as the tray 25. Extending below the arcuate slot 22 is a funnel 26, which leads to the entry end of a pneumatic tube section 27, which extends from the relay to the distant station.

Cut into the top of the drum 11 is an arcuate channel 28, which lies within the cir-

cle of the inner side of the slot 22. There is also cut into the periphery of the drum opposite this channel, a slot 29, the casing 10 being provided with a slot 30. Secured to the head 12 and lying in the channel 28 is an arcuate guide rail 31 paralleling the slot 22. A corresponding guide rail 32 projects through the slots 29 and 30 and extends parallel to the first rail. These rails incline upwardly from the ends adjacent the boss 19 to their further extremities for purposes presently to be explained.

The carriers used herewith are of two forms alike in most details but differing in one feature. In each carrier as here shown, there is provided a tubular body 33 having a closed end provided with a felt disk 34, acting as a piston and fitting quite closely in the pneumatic tubing. Preferably the mouth end of the carrier is reinforced as at 35, but such reinforcement is of sufficiently small diameter to pass between the guide rails, as can be seen by reference to Figs. 4 and 5. All of the carriers are alike to this point in the construction but those carriers which are intended for delivery at the intermediate or relay station are provided with a selector collar 36, at the upper end, this collar being of such diameter as to be incapable of passing through the space between the guide rails as can be seen in Figure 5.

In the operation of the device as thus far described, carriers are fed into the tube 20′ at the main office, the carriers of course containing messages or the like intended for delivery at the intermediate or distant offices. The carriers are selected so that those to be delivered at the intermediate office will be the ones having the selector collar at their upper or mouth ends. As a carrier arrives at the relay it will drop into the pocket 24, when the drum oscillates to bring such pocket into registry with the boss 19. As the drum continues to oscillate it will move the pocket 24 first into registry with the slot 22 and, unless the carrier is provided with a selector collar, the carrier will drop out of this pocket through the slot into the funnel 26 and thus into the tube 27 for delivery to the distant office. If, however, the carrier is provided with a selector collar, the guide rails will, as the drum oscillates, engage beneath the collar and prevent the carrier from dropping through the slot. These guide rails are inclined as before described so that they may pass beneath the collar irrespective of any slight differences which may exist in the thicknesses of the felt pistons 34. Also this upward inclination of the guide rails serves to ensure that the carriers will be lifted, during their travel over the slot, and will not drag over the bottom plate of the relay. The guide rails terminate in circumferentially spaced relation to the opening 23 so that the collar-provided carrier drops free upon reaching the ends of these rails and, upon the pocket 24 registering with said opening the carrier drops into the basket or tray 25. It will be noted that the slot 15 affords a dwell of the drum at each end of its oscillation so as to provide time for entry and delivery of the carriers.

In order to feed the carriers into the drum pocket 24 one at a time and to prevent interference in the motion of said drum by a carrier being fed partially into the pocket, if the same be occupied, the automatic spacing mechanism above referred to is used. On the tubular body 20 is mounted a bracket 37 carrying a shaft 38, whereon is loosely pivoted an arm 39, having a finger 40 projecting into the body 20 through a suitable slot. Fixed on the shaft 38 is a rock arm 41 having yielding connection with the arm 39 through the spring 42. Also, this shaft 38 carries a rock arm 43, to which is connected the outer end of a plunger 44, sliding in a guide 45, mounted on the head 12. The inner end of this plunger is bifurcated to hold a roller 46 and on this inner end is a collar 47, between which and the guide 45 is mounted a spring 48, urging the roller inward to engage a cam member 49, fixed upon the shaft 50 of the drum 12. This cam is so arranged that its projection engages the roller 46 at the time when the pocket 24 is about central over the slot 22, so that at all other times the finger 40 will engage the upper of the two carriers in position for delivery to the pocket 24, at the time said pocket is alined to receive the lower of the two carriers. Thus the upper carrier will be held back and cannot interfere with the operation of the drum.

A by-pass tube 51 extends around the relay between the tubes 20′ and 27 so as to enable pressure to be maintained in both said tubes.

Inasmuch as no deliveries are ordinarily made at the intermediate office from the distant or remote office there is usually no need of the relay just described in the return tube 52 but its place may be taken by any suitable form of manually operated sending unit as indicated at 53, which does not interfere with the carrier in transit from the distant office to the main office.

It will be evident to engineers and to those familiar with pneumatic tube systems that various changes in the construction of the apparatus and also in the use of the relays may be made within the purview of my invention and without departing from it. Thus the parts may be so arranged that the carriers intended for the home station may drop through the slot 22 into a basket or tray while those intended for the distant office may be moved over this position and then dropped through the opening 23 and into the tube 27.

Instead of employing a rotary drum to

carry the pocket 24 through an arcuate path from one opening to another, I may provide a pocket-carrying member which is reciprocated over discharge openings arranged longitudinally in the line of travel of said reciprocating member.

For purposes of illustration I have shown only one intermediate station but I may employ a plurality of such stations, the discharge tube from one relay extending to the inlet of the relay at the succeeding intermediate station, and the last relay delivering into the tube leading to the distant station. For each additional relay station it will be necessary to add an extra selector collar of larger diameter and raise the guide members 31 and 32 accordingly in each successive relay. It will also be necessary to discharge the home station carrier through slot 22 in this case, the carriers which are destined for the succeeding station or stations being discharged through the second opening 23.

What is claimed, is:—

1. A single selector relay for pneumatic tube systems including a casing, a drum in said casing mounted for oscillatory movement therein, said drum being provided with a carrier receiving pocket, an inlet tube leading to said casing and positioned for alinement with the pocket in one position of the latter, said casing having a pair of outlets arcuately spaced from said inlet tube and with which said pocket is alined successively, a carrier having a selector collar at one end, means fixed to the casing for engaging said collar upon the pocket being alined with the first of said outlets, said means terminating short of the second outlet, and means to effect oscillation of the drum in the casing.

2. A single selector relay for pneumatic tube systems including a casing, a drum in said casing mounted for oscillatory movement therein, said drum being provided with a carrier receiving pocket, an inlet tube leading to said casing and positioned for alinement with the pocket in one position of the latter, said casing having a pair of outlets arcuately spaced from said inlet tube and with which said pocket is alined successively, a carrier having a selector collar at one end, means fixed to the casing for engaging said collar upon the pocket being alined with the first of said outlets, said means terminating short of the second outlet, and means to effect oscillation of the drum in the casing and arranged to cause temporary pauses in the movement of the drum upon the pocket being alined respectively with the inlet tube and with the second outlet.

3. A single selector relay for pneumatic tube systems including a casing, a drum in said casing mounted for oscillatory movement therein, said drum being provided with a carrier receiving pocket, an inlet tube leading to said casing and positioned for alinement with the pocket in one position of the latter, said casing having a pair of outlets arcuately spaced from said inlet tube and with which said pocket is alined successively, a carrier having a selector collar at one end, means fixed to the casing for engaging said collar upon the pocket being alined with the first of said outlets, said means terminating short of the second outlet, and means to effect oscillation of the drum in the casing and arranged to cause temporary pauses in the movement of the drum upon the pocket being alined respectively with the inlet tube and with the second outlet, said first outlet being elongated arcuately to permit dropping of a carrier therethrough during movement of the drum.

4. A single selector relay for pneumatic tube systems including a casing, a drum in said casing mounted for oscillatory movement therein, said drum being provided with a carrier receiving pocket, an inlet tube leading to said casing and positioned for alinement with the pocket in one position of the latter, said casing having a pair of outlets arcuately spaced from said inlet tube and with which said pocket is alined successively, a carrier having a selector collar at one end, a second carrier not provided with a selector collar, guide rails fixed to the casing above and on opposite sides of the first outlet and engaging beneath the selector collar of said first carrier when the pocket is alined with said first outlet, said guide rails being spaced to permit free passage of the second carrier through said outlet, said guide rails terminating short of the second outlet, and means to effect oscillation of the drum.

5. In a single selector relay as set forth in claim 4, said first outlet being elongated arcuately to permit dropping of said second carrier therethrough during movement of the drum.

6. A single selector relay for pneumatic tube systems, comprising a casing, a member provided with a carrier receiving pocket and mounted for oscillatory movement, an inlet tube leading to said casing and positioned for alinement with the pocket in one position of said member, said casing having a pair of outlets spaced from each other and from said inlet tube in the direction of travel of said member so that said pocket is alined therewith successively, a carrier having a selector collar thereon, means fixed to the casing for engaging said collar when the pocket is alined with one of said outlets, and means to effect oscillation of said member and arranged to cause temporary pauses in the movement thereof when the pocket is alined respectively with the inlet tube and with the further outlet therefrom.

7. In a single selector relay as set forth in claim 4, said guide rails being inclined upwardly from the ends adjacent the inlet

tube to the ends adjacent the second outlet.

8. A single selector relay as set forth in claim 4, and a carrier spacing mechanism associated with said inlet tube, means associated with said drum for operatively actuating said spacing mechanism at predetermined positions of said drum.

9. A pneumatic tube system including a main office, a distant office and a plurality of intermediate stations, each of said intermediate stations being provided with a single selector relay as set forth in claim 6, the carriers being provided with graduated selector collars, one for each intermediate station through which the carrier must pass to reach its destination.

In testimony whereof I affix my signature.

WILLIAM V. McGUINNESS.