Feb. 7, 1928. 1,658,480

W. H. DINSPEL

CARRIER DISTRIBUTING APPARATUS FOR PNEUMATIC DISPATCH SYSTEMS

Filed Sept. 8. 1925 11 Sheets-Sheet 1

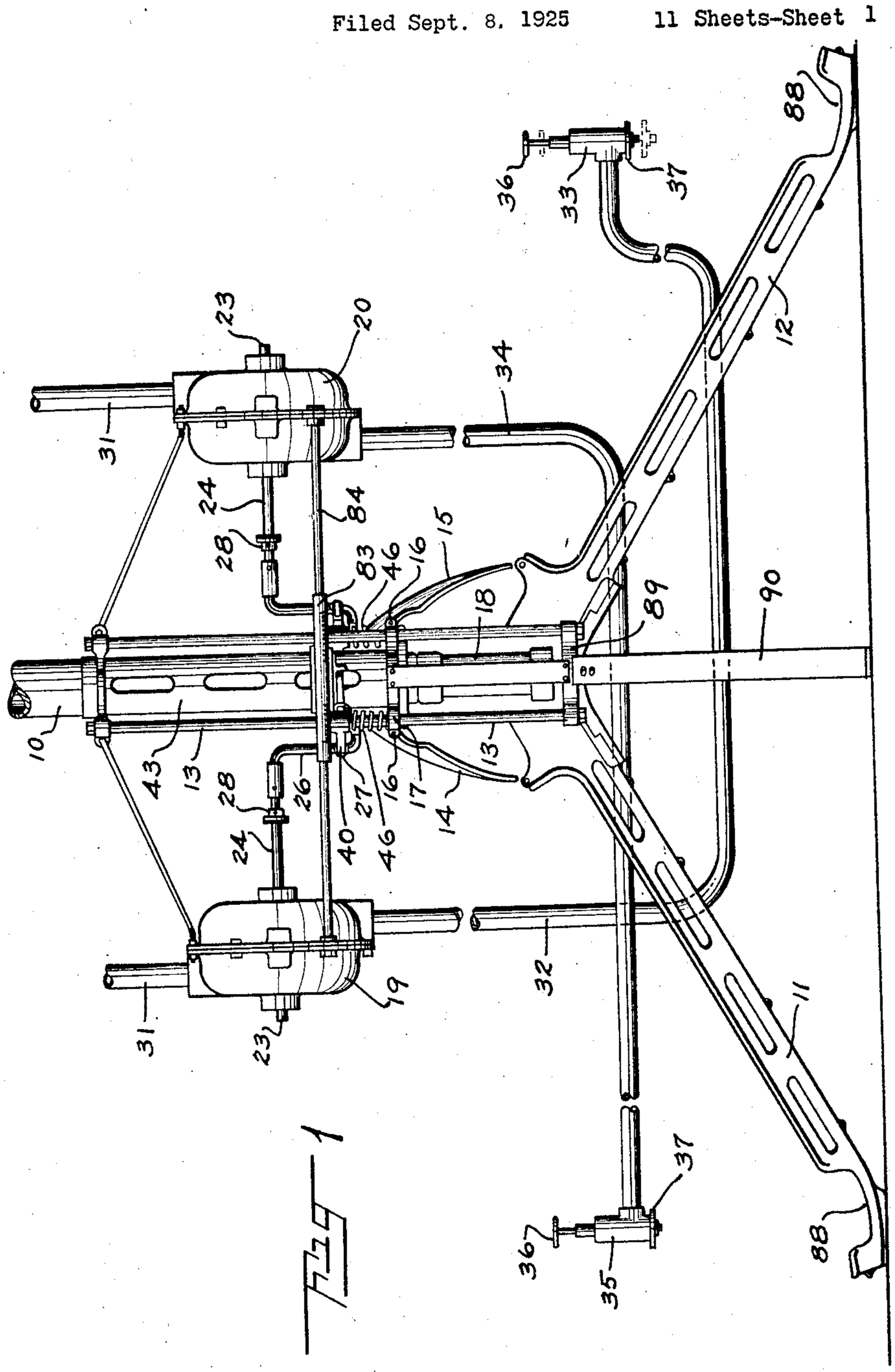

FIG. 1

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CARRIER DISTRIBUTING APPARATUS FOR PNEUMATIC DISPATCH SYSTEMS

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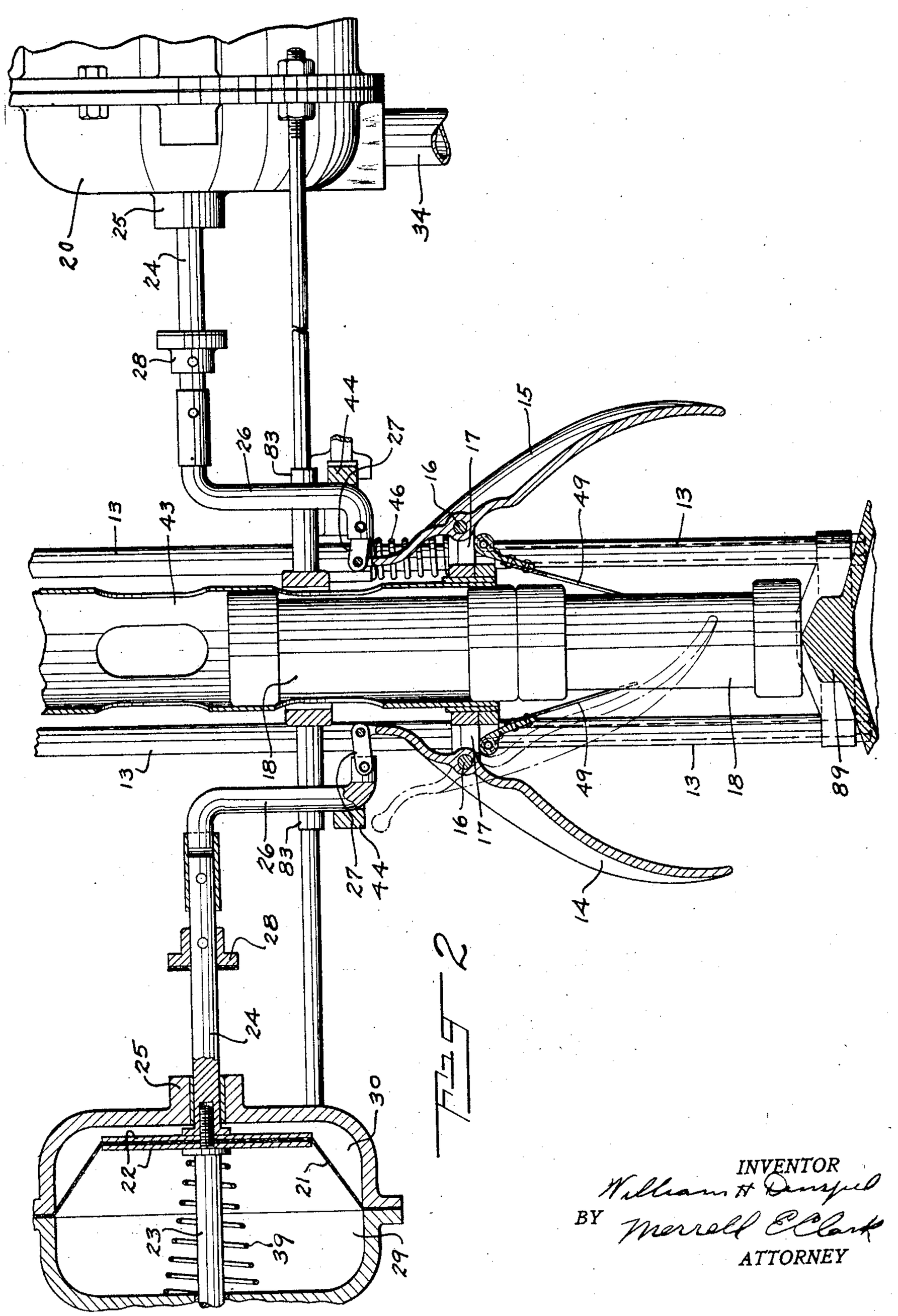

FIG. 2

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CARRIER DISTRIBUTING APPARATUS FOR PNEUMATIC DISPATCH SYSTEMS

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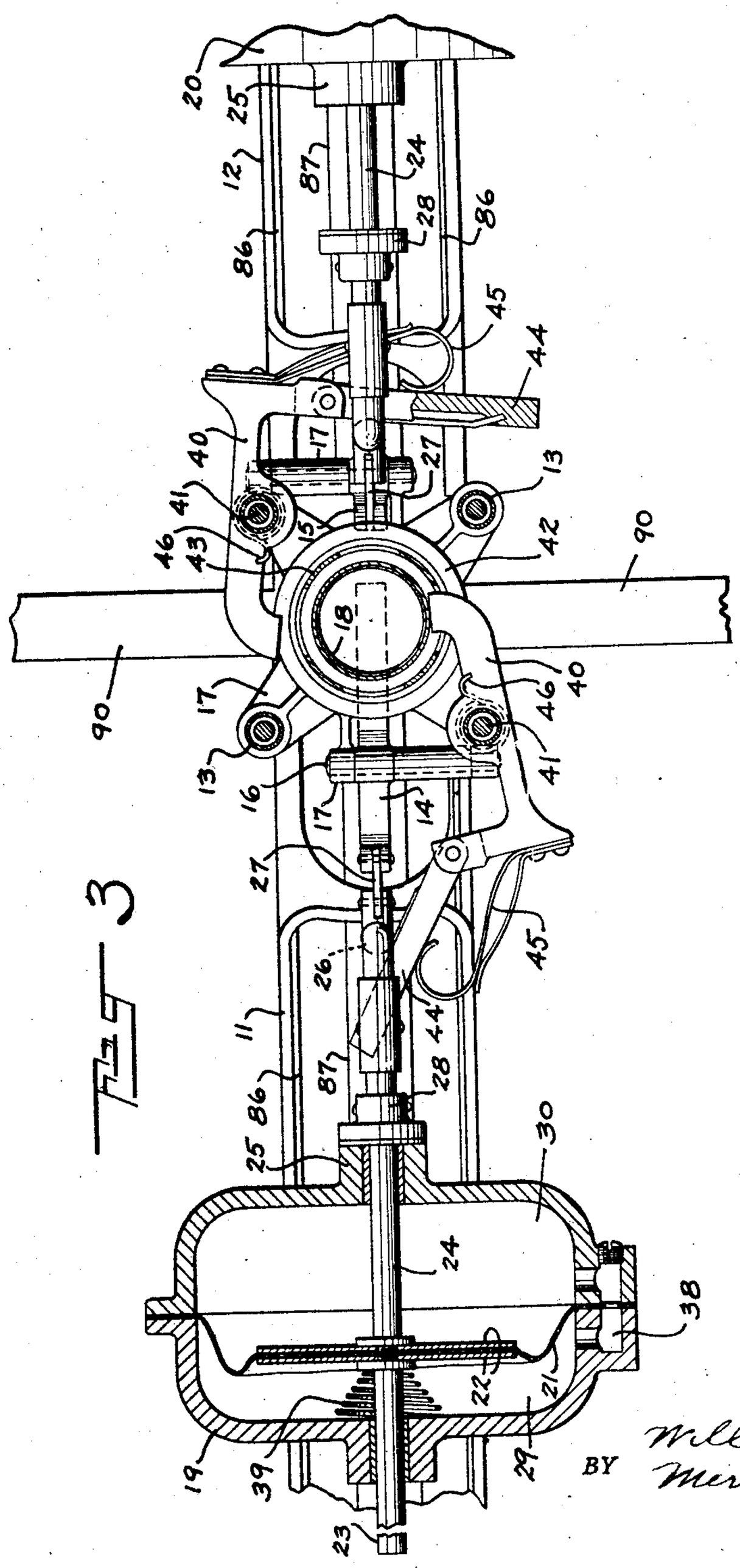

Fig 3

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CARRIER DISTRIBUTING APPARATUS FOR PNEUMATIC DISPATCH SYSTEMS

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Fig 4

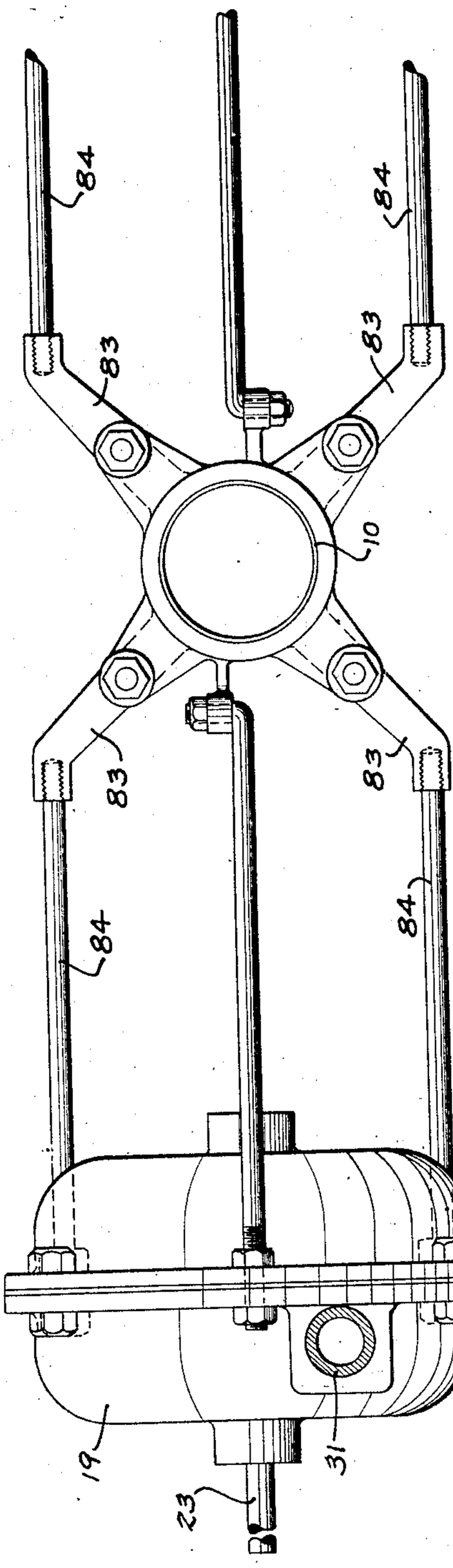


Fig 6

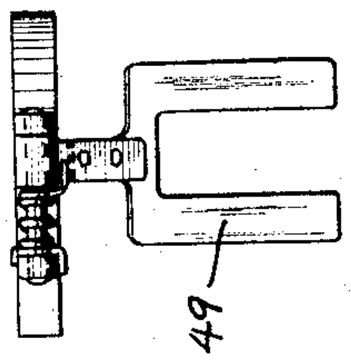
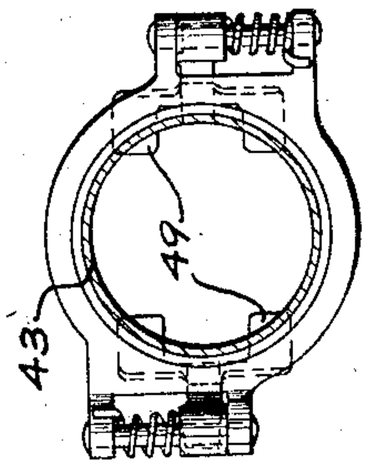


Fig 5



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CARRIER DISTRIBUTING APPARATUS FOR PNEUMATIC DISPATCH SYSTEMS

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Fig. 8

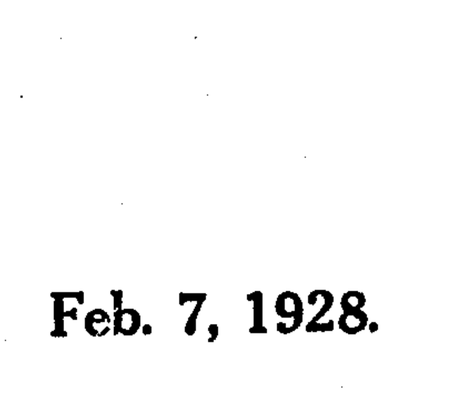


Fig. 7

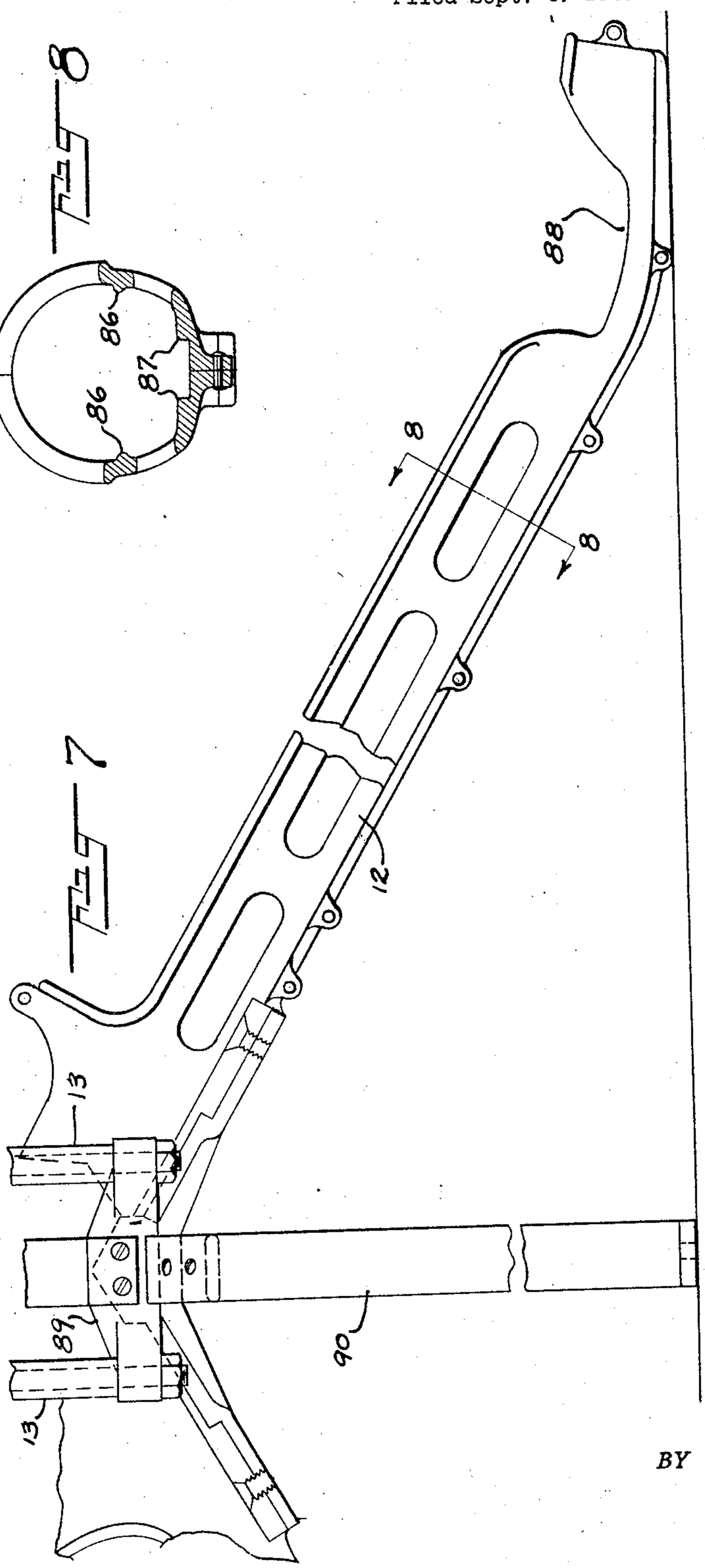
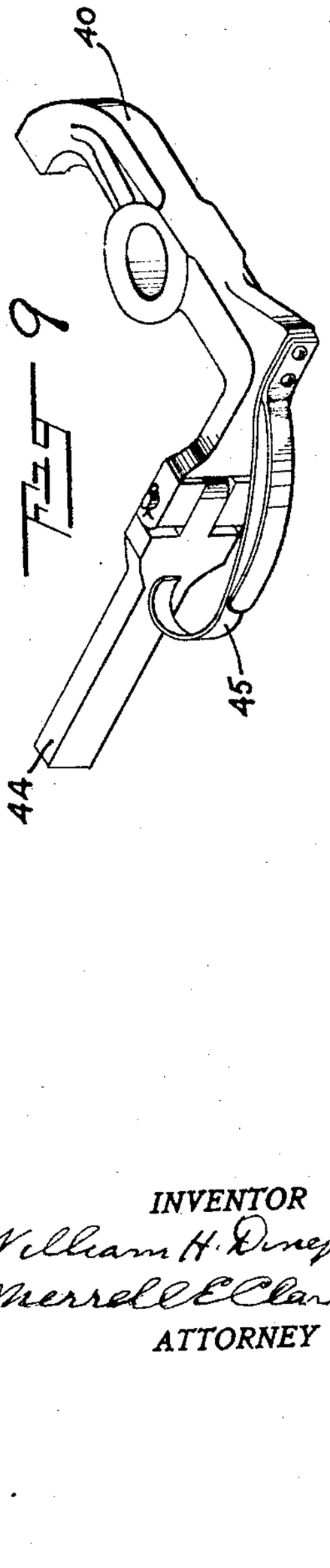


Fig. 9



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CARRIER DISTRIBUTING APPARATUS FOR PNEUMATIC DISPATCH SYSTEMS

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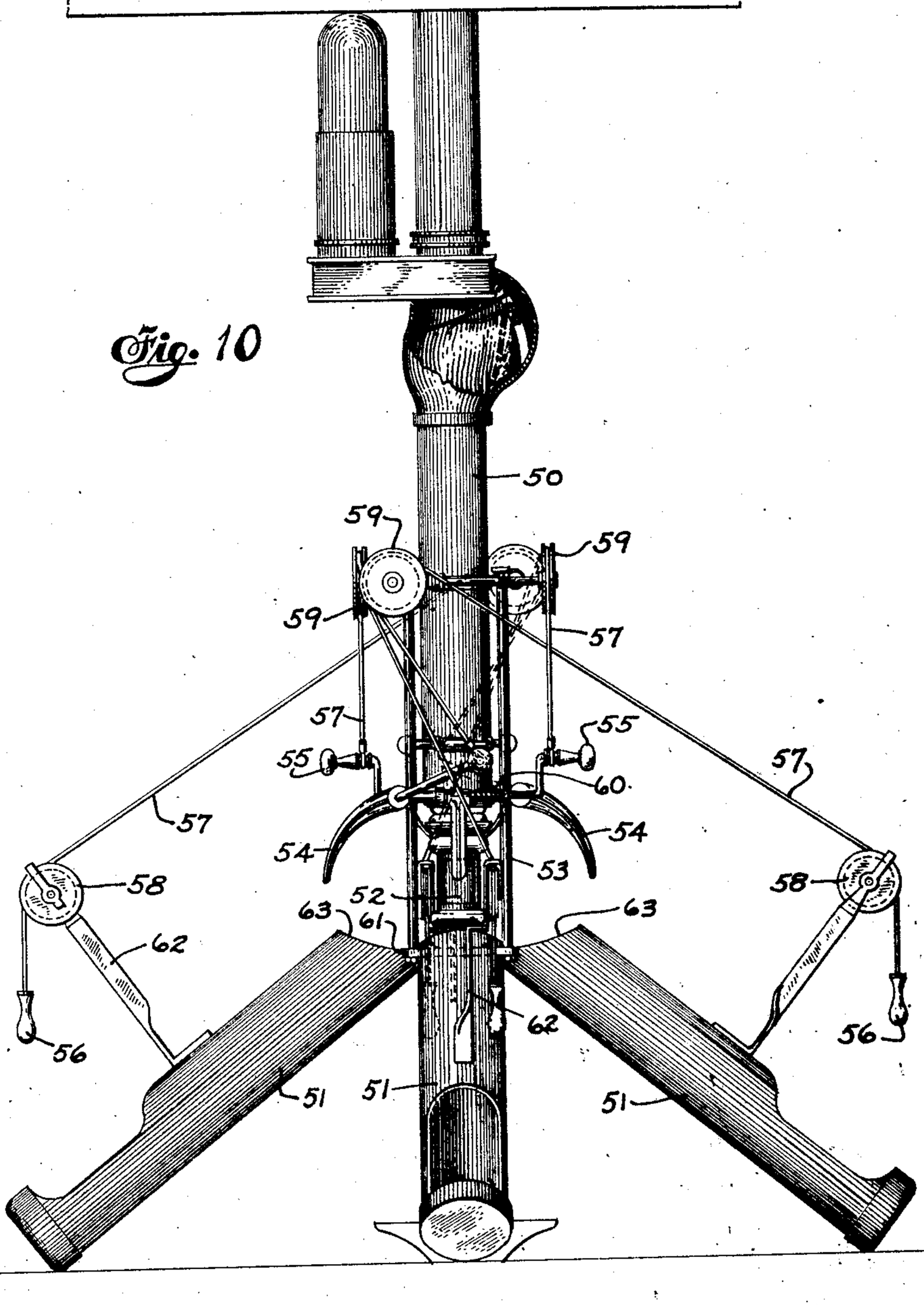
Fig. 10



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CARRIER DISTRIBUTING APPARATUS FOR PNEUMATIC DISPATCH SYSTEMS

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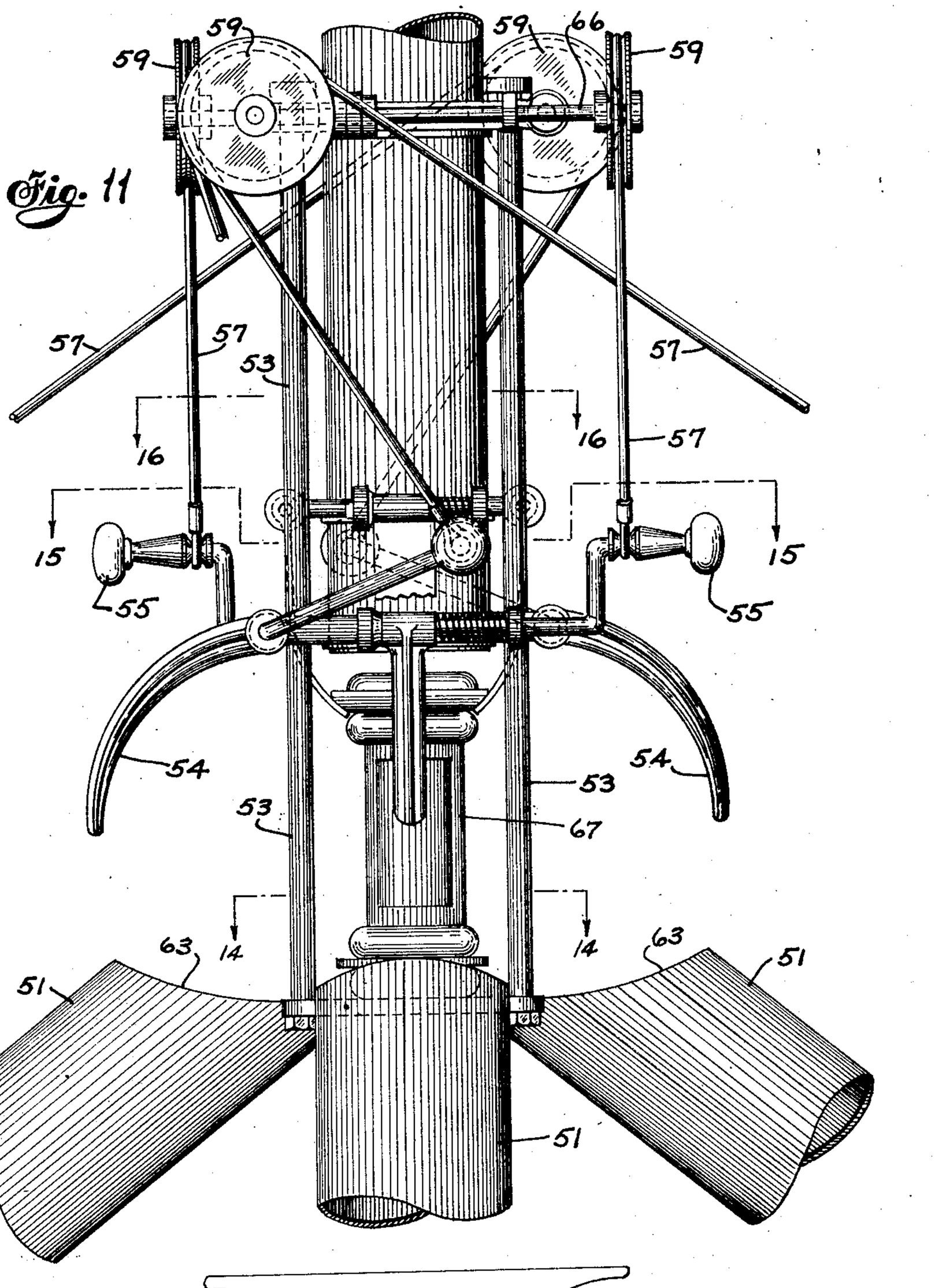
Fig. 11



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CARRIER DISTRIBUTING APPARATUS FOR PNEUMATIC DISPATCH SYSTEMS

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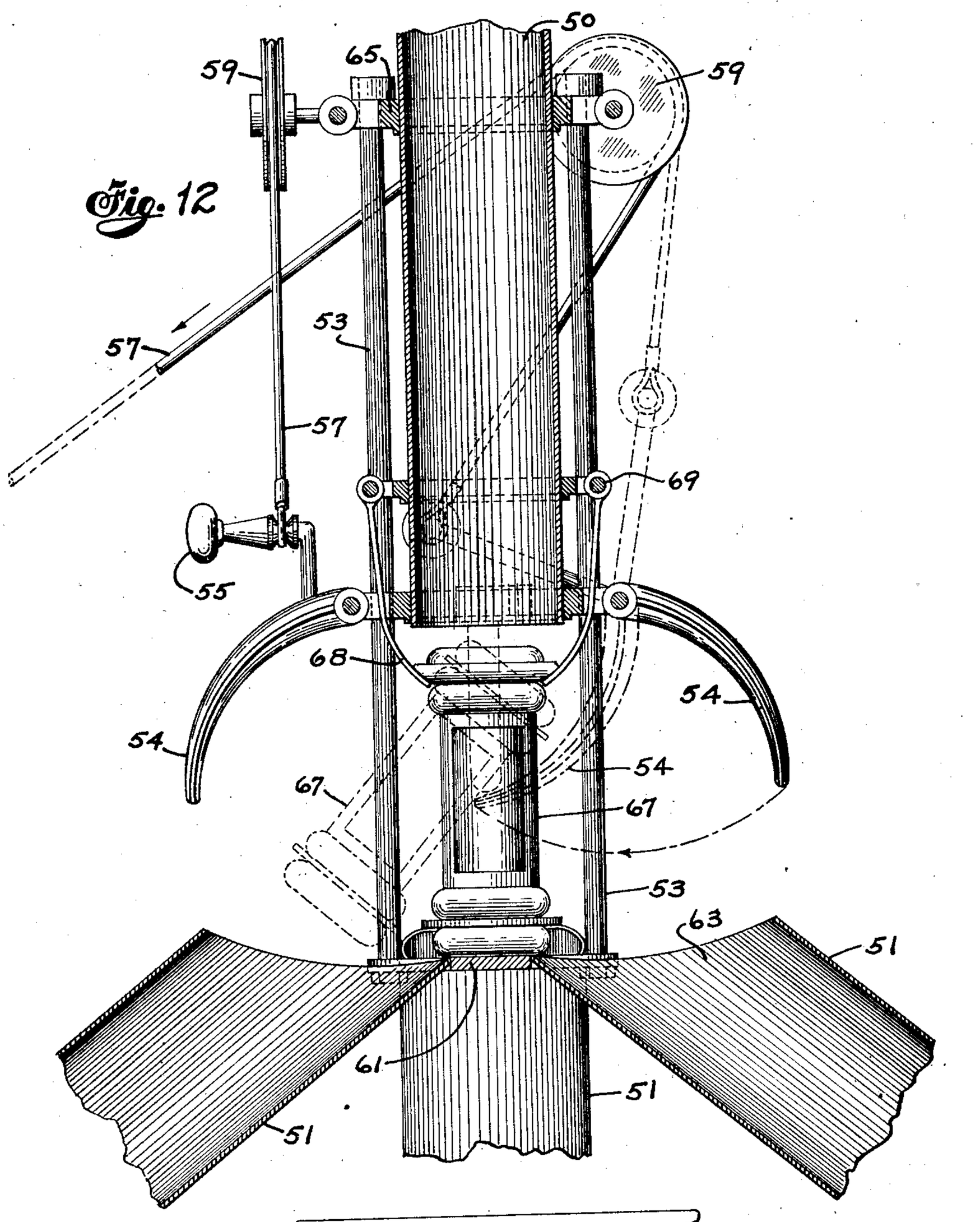
Fig. 12



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CARRIER DISTRIBUTING APPARATUS FOR PNEUMATIC DISPATCH SYSTEMS

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Fig. 13

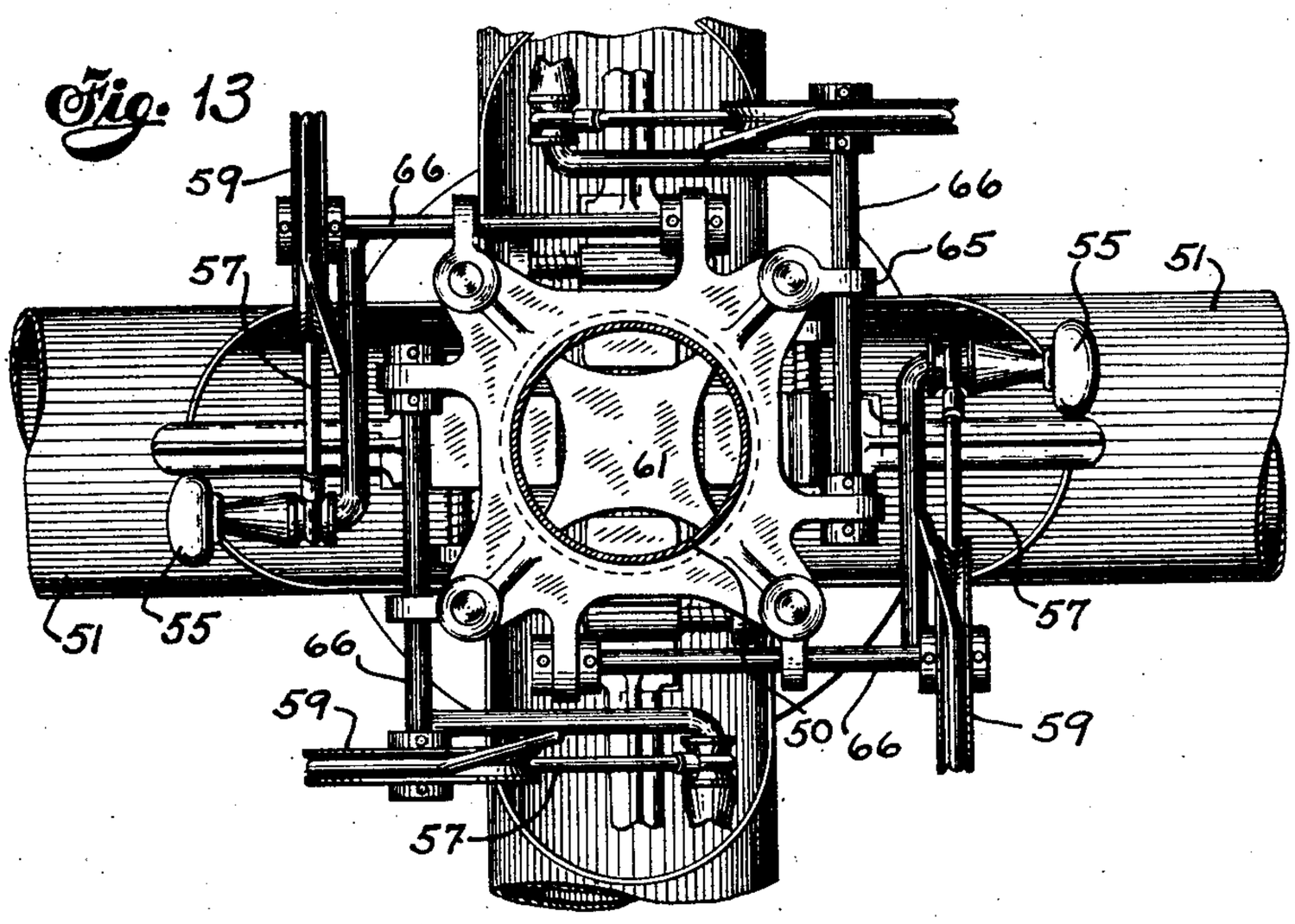
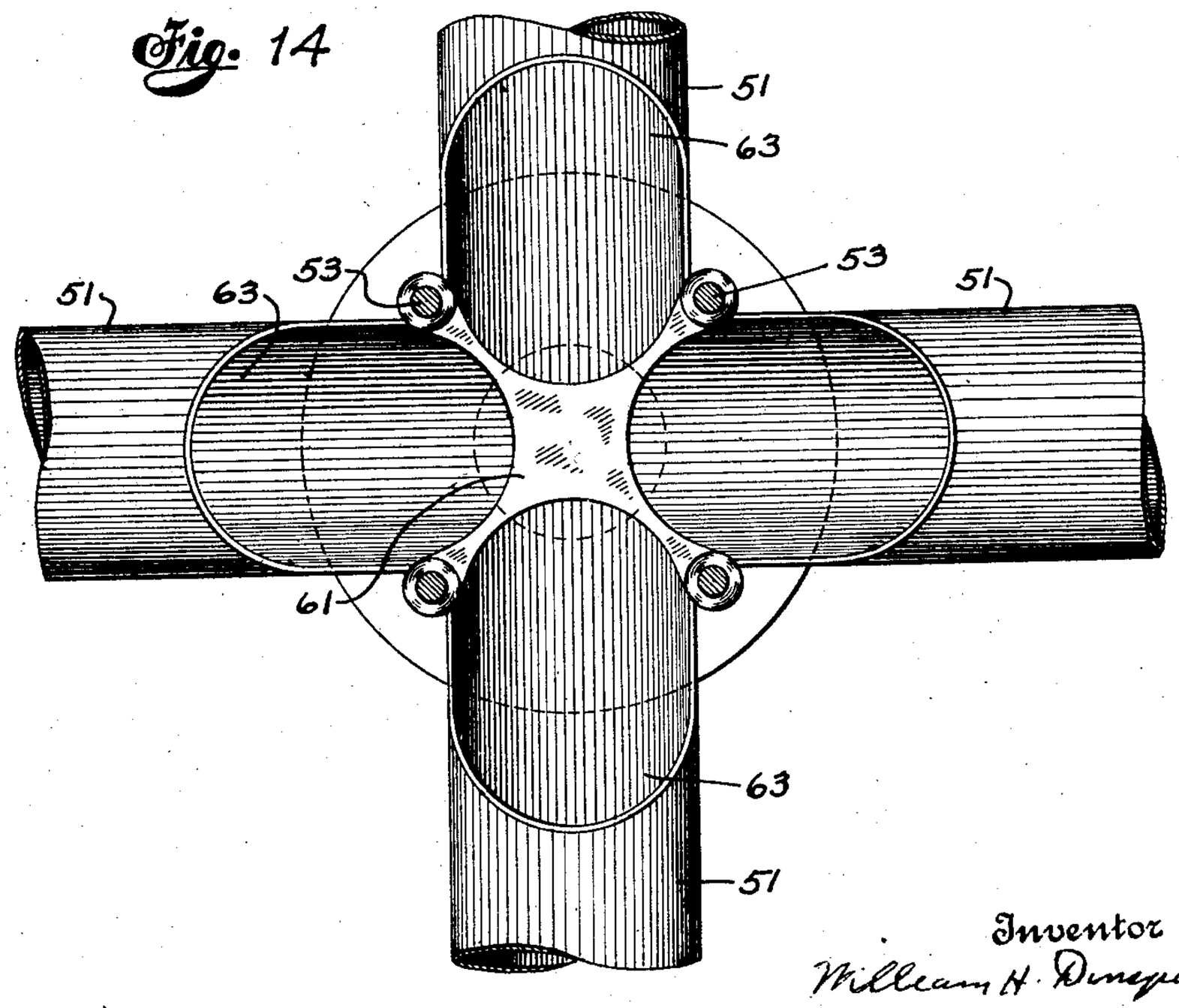


Fig. 14



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CARRIER DISTRIBUTING APPARATUS FOR PNEUMATIC DISPATCH SYSTEMS

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Fig. 15

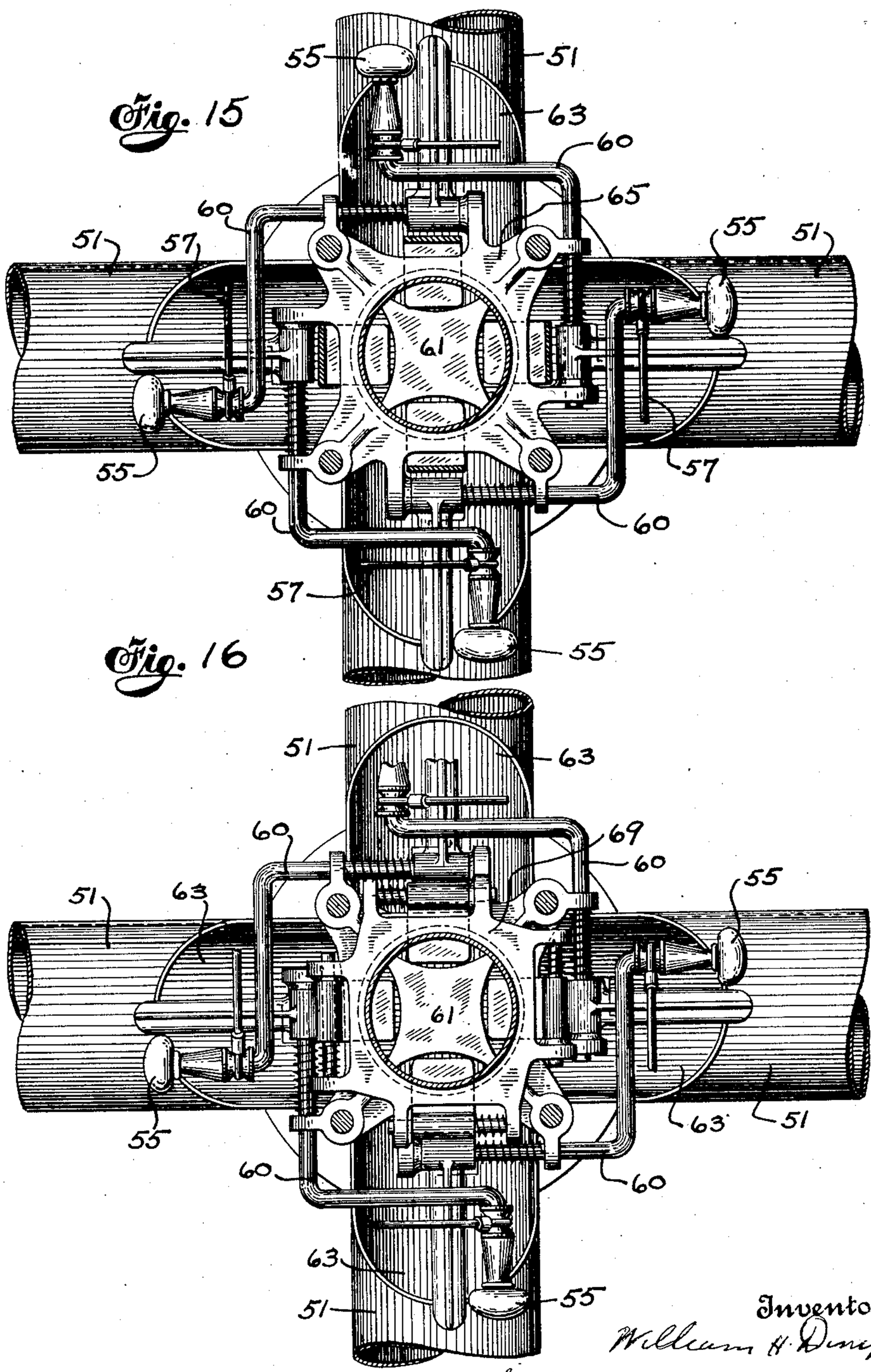

Fig. 16

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CARRIER DISTRIBUTING APPARATUS FOR PNEUMATIC DISPATCH SYSTEMS

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Fig. 17

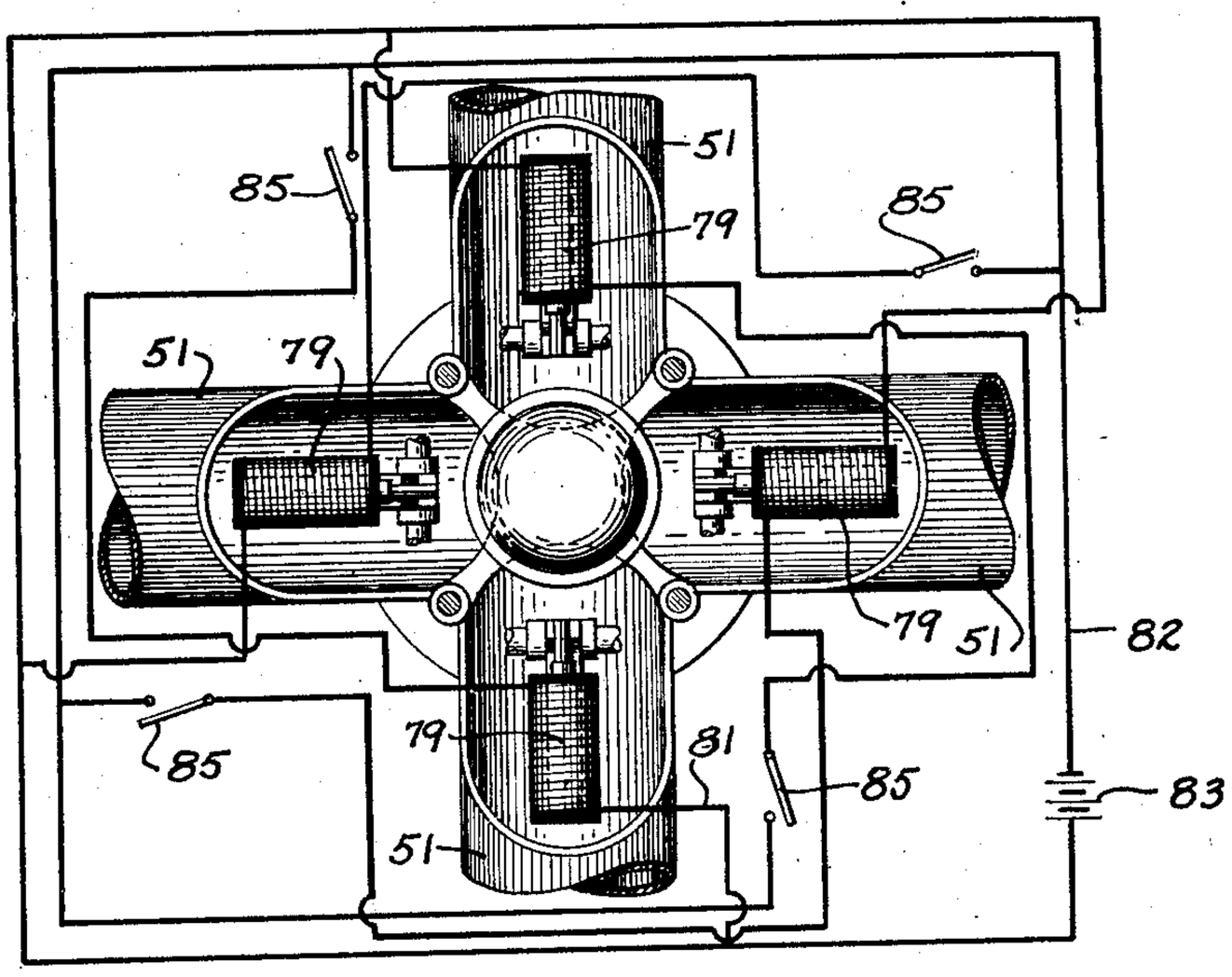
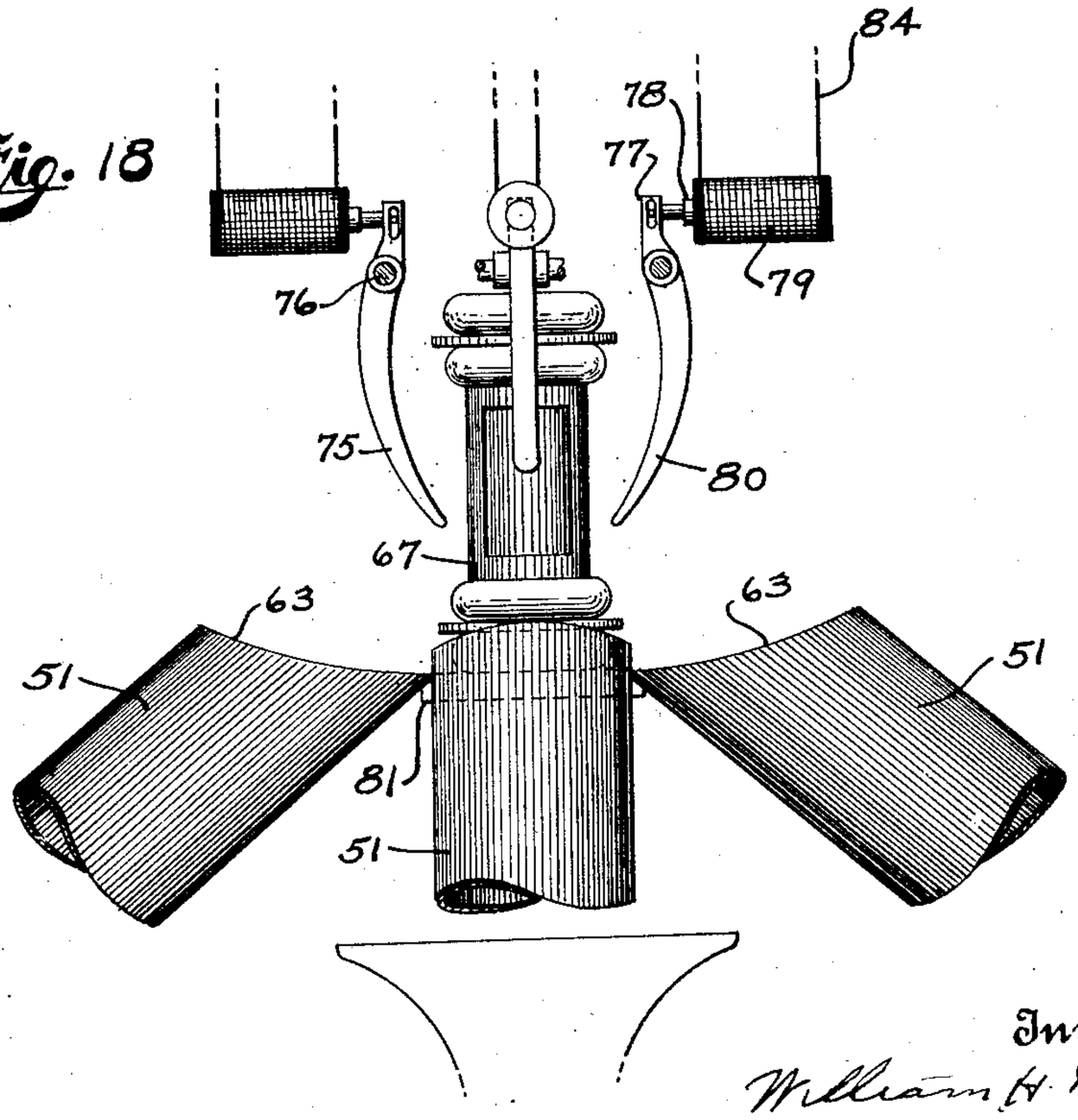


Fig. 18



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UNITED STATES PATENT OFFICE.

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CARRIER-DISTRIBUTING APPARATUS FOR PNEUMATIC-DISPATCH SYSTEMS.

Application filed September 8, 1925. Serial No. 54,943.

This invention relates in general to the construction of delivery terminals or carrier ejecting devices for the conveyor tubes of pneumatic dispatch systems.

In the operation of pneumatic dispatch apparatus installations in connection with which a large volume of business is transacted considerable difficulty has been experienced in effectively disposing of the carriers as fast as they are delivered by the tubes. The capacity of each individual tube for delivering carriers to the operators' station is greater than the capacity of an individual operator to treat the contents of the carriers delivered by the tube. It is, therefore, necessary to provide a plurality of operators to treat the carriers delivered by each tube and a general object of the present invention is to provide means for distributing carriers from a pneumatic dispatch tube to a plurality of operators in accordance with the requirements of the work.

The invention includes the use of a carrier directing device movably mounted at the delivery end of a dispatch tube and operable by means under the control of an operator to direct a carrier delivered by the tube to the operator's station. In a preferred embodiment of the invention two such directing devices are employed and are mounted for the purpose on opposite sides of the discharge end of the dispatch tube. The directing devices are pivotally mounted and are operated through a pneumatic device actuated by changes in pressure conditions obtained through the use of the partial vacuum employed in the dispatch system as a whole. Controlling means for the pneumatic devices take the form of valve devices accessible to the individual operators at their stations so that the actuation of a valve device will cause a carrier to be discharged from the delivery end of the dispatch tube and to move along a chute device to the desired operator's station.

The invention may also be carried out in the form of mechanically operable devices by which the individual operators may manually actuate the appropriate carrier directing device to bring about a like effect, that is, to divert the carrier to the desired station. A feature of this form of the invention resides in the use of four actuating members rather than merely a pair of actuating members so that four operators may be served from the same tube.

Still another embodiment of the invention contemplates the use of electrical means for controlling the actuation of carrier diverting members of the same general type of construction already described.

Other features of the invention will be hereinafter referred to.

In the drawings,

Figure 1 is a view in side elevation of a carrier delivery terminal for pneumatic dispatch tubes which embodies the invention.

Figure 2 is a view in vertical section of the parts shown in Figure 1 and taken on an enlarged scale.

Figure 3 is a view in horizontal section of the parts shown in Figure 2.

Figure 4 is a plan view of a portion of the device shown in Figure 1 and taken on an enlarged scale.

Figure 5 is a plan view of a detail of the mechanism shown in Figure 1.

Figure 6 is a view in side elevation of the parts shown in Figure 5.

Figure 7 is a view in side elevation of a delivery chute member used in connection with the device shown in Figure 1 and taken on an enlarged scale.

Figure 8 is a sectional view taken on the line 8—8 of Figure 1 and on an enlarged scale.

Figure 9 is a view in perspective showing a carrier checking device forming part of the invention.

Figure 10 is a view in side elevation of a modified form of carrier discharging terminal.

Figure 11 is a view in side elevation taken on an enlarged scale of a portion of the apparatus shown in Figure 10.

Figure 12 is a view in vertical section of the device shown in Figure 11.

Figure 13 is a plan view of the parts shown in Figure 11.

Figure 14 is a horizontal sectional view taken on the line 14—14 of Figure 11.

Figure 15 is a view in horizontal section taken on the line 15—15 of Figure 11.

Figure 16 is a view in horizontal section taken on the line 16—16 of Figure 11.

Figure 17 is a plan view of a modified form of the invention.

Figure 18 is a view in side elevation of the parts shown in Figure 17.

Referring to the drawings for a more detailed description of the invention, in Figure 1 is shown at 10 the lower extremity of a discharging end of a pneumatic dispatch tube through which carriers are adapted to be transmitted to an operator's station at which the contents of the carriers are treated and the carriers returned to the points from which they were sent. In the operation of pneumatic dispatch systems, the number of carriers transmitted through a given dispatch tube is relatively high so that it is impracticable for a single operator to take care of the carriers delivered by the tube. This necessitates the employment of a plurality of operators to each tube in the system and presents the problem of serving carriers to a plurality of operators without interference of the operators with each other in the conduct of the work.

The distribution of carriers from a single tube to a plurality of operators is achieved by means of the apparatus shown in Figure 1 and the means by which this useful result is brought about includes a pair of delivery chute members 11 and 12 having a sloping or inclined disposition by which carriers may be delivered from the discharge end of the tube 10 to opposite sides of a table or desk into the immediate reach of the operators stationed at these points.

The upper ends of the chute members 11 and 12 cooperate with a hollow cage or framework 13 which is in effect an extension of the dispatch tube 10, carriers being delivered from the cage 13 into one or the other of the delivery chutes 11 and 12 as desired by the operators. The floor or base of the cage 13 includes a seat 14 on which the end of a carrier emerging from the tube 10 is adapted to rest pending the discharge of the carrier into one or the other of the chutes 11 and 12 through the action of an ejecting member 14 or 15 which cooperate respectively with the delivery chutes 11 and 12.

The ejecting members 14 and 15 consist of arms or levers pivoted at points 16 carried by a spider member 17 located just above the upper end of the cage member 13 already referred to. The ejecting members 14 and 15 are located on opposite sides of the cage member 13 and are adapted to be swung into the cage structure to thereby engage a carrier 18 contained therein and to discharge the carrier into the appropriate chute member 11 or 12. The discharging position of the ejecting member 14 is shown in dotted lines in Figure 2 of the drawing.

In order to operate the ejecting members, pneumatic devices 19 and 20 are provided which take the form of hollow casings provided with internal diaphragms 21 adapted to divide the interior of the casings into compartments whereby differences in pressure may be applied to either side of the diaphragm as desired in order to bring about the operation or release of the ejecting members 14 and 15.

The diaphragm 21 is flexible and is clamped at its mid portion between plates 22 carried by a stem 23 projecting through the outer face of the casing and adapted to slide in the bearing thus provided in the wall of the casing or housing 19 or 20. A continuation 24 of the stem 23 projects through the opposite wall of the casing in a bearing 25 formed for the purpose and through an arm 26 and a line 27 is connected with the upper extremity of the corresponding ejecting member 14 or 15. A stop member 28 carried by the rod 24 is adapted to engage the outer face of the bearing member 25 in the operating movement of the diaphragm 21 to thereby control the extent of operating movement of the corresponding ejecting member 14 or 15.

With this construction it will be seen that the connection of the chamber 29 on one side of the diaphragm 21 in the casing 19 or 20 with the partial vacuum provided in the tube system for the dispatch of carriers therethrough, and the simultaneous connection of the chamber 30 on the other side of the diaphragm with atmosphere will bring about a movement of the diaphragm 21 from the position shown in Figure 2 of the drawing to the position shown in Figure 3. It will be seen that this movement will result in the swinging of the ejecting member 14 from the position shown in full lines in Figure 2 to the position shown in dotted lines in that figure thereby bringing about the discharge of the carrier 18 from its position in the cage 13 into the delivery chute 12.

In order to provide the necessary connection between the chamber 29 in the casing 19 and the partial vacuum, a tube connection 31 is provided. In order to connect the other side of the diaphragm 21 with atmosphere a tube connection 32 is provided between the chamber 30 and the casing 19 and a manually operable valve device 33 located in a position accessible to the operator stationed at the delivery chute 12. In like manner a tube connection 34 is provided between the casing 20 appropriate to the discharge element 15 and a valve device 35 accessible to the operator located at the delivery chute 11.

With this construction it will be seen that

when an operator desires to have a carrier delivered at her station it is merely necessary to depress the head 36 of the appropriate valve device 33 or 35 to thereby move the valve member 37 downwardly and away from the valve casing to thereby permit air to enter through the valve casing 33 or 35 and the corresponding tube connection 32 or 34 with the chamber 30 in the casing 19 or 20. It will be seen that when this has been done air rushes into the chamber 30 thereby moving the diaphragm 21 toward the outer side of the casing 19 or 20 because of the partial vacuum existing in the chamber 29. This movement brings about the operation of the corresponding carrier discharge member 14 or 15 as will be seen.

In order to automatically restore the carrier discharge element to normal position following an operation and to bring about the return movement immediately following the discharge movement of the member, a by-pass or passage 38 is provided between the chambers 29 and 30 in the casings 19 and 20. By this arrangement the pressure conditions on opposite sides of the diaphragm 21 are quickly restored regardless of whether the operator continues to hold the control valve open or whether she immediately allows the valve to close. This restoration of substantially equal pressure conditions on opposite sides of the diaphragm 21 brings about a condition wherein a spring 39 acts to force the diaphragm 21 to its normal inoperative position as shown in Figure 2 of the drawing. This movement of the diaphragm, as will be clear, will restore the connected carrier discharge element 14 or 15 to its normal or inoperative position.

In order to prevent the movement of a following carrier into the cage structure 13 during the operation of discharging a carrier from the cage, a pair of checking or locking devices 40 are provided. The carrier checking devices consist of arms pivoted at 41 on a spider element 42 carried by a perforated extension member 43 of the tube 10 and arranged to rock or swing horizontally about the pivotal points into and out of positions in which the free ends of the members 40 project through the walls of the tube extensions 43 into the path of movement of the carriers passing downwardly through the tube 10. In order to swing the arms 40 about their pivots the other extremity of each arm carries in a hinged or pivoted relation thereto an operating bar 44 which is engaged by the vertical portion of the operating member 26 which connects the diaphragm 21 with one of the carrier ejecting devices 14 or 15. A spring device 45 carried on the arm 40 engages the operating member 44 and tends to swing it about its pivotal connection with the arm 40 to thereby move the operating member to a position substantially at right angles with the arm 40. The spring-held member 44 thereby forms a loose connection which provides for a relatively considerable movement of the member 26 to produce a smaller movement of the arm 40 and at the same time to provide a cushioning and yielding effect which will prevent jamming of the locking arm 40 against a carrier in the tube extension 43. A coil spring 46 cooperates with the pivot pin 41 and the arm 40 to withdraw the arm to inoperative position upon the return of the operating member 26 to normal position. A pair of spring-pressed wing members 49 act to hold the interposed carrier in an erect vertical position.

It will thus be seen that the operation which ejects a carrier into one or the other delivery chutes 11 and 12 simultaneously blocks the travel of another carrier into the cage 13 until the carrier ejecting member has been returned to its normal position. The apparatus thereby functions to deliver to the operator actuating one of the valve devices 33 or 35, a single carrier for treatment of its contents by the operator. It will also be seen that an operator desirous of having a carrier delivered to her station has merely to operate the corresponding valve 33 or 35 to thereby cause the carrier to be ejected from the cage 13 into the appropriate delivery chute 11 or 12.

While the pneumatically operated distributing or delivering device such as has been described has been found to give complete satisfaction in practice it is also possible to operate the discharge mechanism through the use of manually actuatable mechanical means. An example of a construction of this nature is shown in Figure 10 of the drawings in which a pneumatic dispatch tube 50 is equipped at its lower end with four inclined carrier delivery chutes 51, the delivery chutes being arranged at angles of substantially ninety degrees separating each other. In order to discharge carriers 52 from a cage or compartment 53 into the appropriate devlivery tube 51, manually operable ejector members 54 are provided which are adapted to be rocked about horizontal axes by means of hand crank members 55. The crank handles 55 are also arranged for operation through handle members 56 stationed closely adjacent the position of the operator and attached to flexible members 57 leadiing over guide pulleys 58 and 59 to the crank handles 55 already referred to. By this arrangement a simple downward pull on a handle 56 has the effect of swinging a crank handle 55 from a lower to a more elevated position and thereby swinging the corresponding ejector 54 through a suitable distance to eject a carrier

into the delivery chute 51 disposed at the opposite side of the cage 53. A coil spring 60 operates to swing the discharge member 54 to its normal position upon release of the handle member 56 by the operator.

In Figure 12 of the drawings there is shown a position of the parts in which one of the carrier ejecting devices 54 is shown, in dotted line position, in the act of ejecting a carrier 52 from its position in the cage of framework 53, the carrier being about to fall into the delivery tube 51 at the left-hand side of the drawing. It will be seen that this operation is brought about by a pull on the tensile member 57 which leads to the operator's station at the left-hand side of the table or desk at which the operators are stationed.

Referring to Figure 13 of the drawings, it will be seen that there are four carrier discharge devices 54 arranged in a substantially square formation in surrounding relation to the outlet or discharge end of the tube 50. This obviously provides for the distribution of the carriers arriving through the tube 50 to four different operators who may be seated at the four sides of a table or desk. The inclined delivery chutes 51 are arranged to deliver carriers discharged into the open upper ends 63 thereof to the corresponding operators' stations which are arranged at substantially ninety degrees to each other about the discharge end of the dispatch tube.

In order to support the various instrumentalities referred to, a cage or framework 53 is provided which is attached at its upper end to the tube 50 through a spider member 65 which encloses the tube and provides a terminus for the upper ends of the cage rods 53. The spider member 59 provides also a bearing support for the shafts 66 on which the guide pulleys 59 are mounted at angles to each other of substantially ninety degrees as is clearly shown in Figure 13. The lower end of the cage member terminates in a bridging member 61 which in operation provides a seat or rest on which the individual carriers 67 are supported immediately following their emergence from the mouth of the tube 50 thereabove. Supported on the inclined delivery chutes 51 are bracket members 62 which support at their upper ends the guide pulleys 58 over which the tensile members 57 pass to terminate in the handle members 56 placed adjacent the operators' stations.

In order to hold the carriers 67 in an upright position following their discharge and during the period of their resting on the seat 61 spring-pressed wing members 68 are provided which depend from a collar 69 enclosing the tube 50 and extend inwardly toward each other at a point below the open end of the tube 50, the wing members thus serving to engage opposite sides of the interposed carrier 67 and to hold the same in an upright position such as is shown in full lines in Figures 11 and 12 of the drawing.

Referring to Figures 17 and 18 an electrical form of operating means is provided. It will be seen that the carrier discharging members 75 are pivotally mounted at 76 in such manner that the upper ends 77 thereof are pivotally connected to the core members 78 of the solenoids or coils 79 so that energization of the coils 79 produces a corresponding pull on the upper ends 77 of the carrier discharging members and thereby forces the lower end of the carrier discharging members into engagement with the carrier 80 resting on the seat 81. In order to provide for the energization of the desired coil 79 by the operator, an electrical circuit 82 is provided having a source of current 83 and including branch circuits 84 leading to the coils 79. Suitable circuit closers 85 located in the branch circuits 84 at points accessible to the operators at their stations provide for the closing of the circuits as desired so as to divert carriers into the chutes leading to the operators' stations.

In order to suitably support the pneumatic type mechanism shown in Figures 1 to 9 of the drawings a spider-shaped framework 82 carried by the cage structure 13 and the lower perforated section 43 of the tube is provided with arms 83 to which stay rods 84 are attached for supporting engagement of the pneumatic cylinders 19 and 20 at their outer ends. In addition, inclined and laterally extending strut members 85 are provided which engage with the table or desk at their lower ends and provide a lateral brace for the mechanism described.

Referring again to Figure 8 of the drawings, the inclined delivery chute 12 is shown in section and to include elongated ways or track rails 86 which, with the edges or shoulders 87, provide a directing path or way along which the carriers slide to the lower end of the chute with a minimum of frictional contact therewith. At the lower end of the chute an opening 88 is provided in which the carrier is received and from which it can be readily taken by the operator for such treatment as its contents may require.

What I claim is:—

1. In a discharge terminal for pneumatic dispatch tubes, a carrier directing member movably mounted at the discharge end of the tube, and means actuatable from a distance and under the control of an operator for moving the directing member to direct a carrier laterally from a position in axial alinement with the tube.

2. In a discharge terminal for pneumatic dispatch tubes, a carrier directing member

pivotally mounted at the discharge end of the tube, a chute leading from the discharge end of the tube to an operator's station, and means actuatable from a distance and controlled by the operator for causing the carrier directing member to swing to a position for directing a carrier into the chute leading to the operator's station.

3. In a discharge terminal for pneumatic dispatch tubes, a plurality of carrier directing members movably mounted at the discharge end of the tube, a plurality of operators' stations, and means actuatable from a distance and under the control of each operator for actuating the carrier directing member appropriate to the operator's station to divert a carrier to that station.

4. In a discharge terminal for pneumatic dispatch tubes, a plurality of carrier directing members pivotally mounted at the discharge end of the tube, a plurality of operators' stations, chutes leading from the discharge end of the tube to said operators' stations, and means actuatable from a distance and under the control of each operator for actuating the carrier directing member appropriate to the chute leading to said operator's station.

5. In carrier distributing apparatus for pneumatic dispatch tubes, a plurality of carrier directing members pivotally mounted at the discharge end of the tube, means associated with each carrier directing member for swinging the member into a position at the end of the tube to direct a carrier in a lateral direction, a plurality of operators' stations, and means at each operator's station for bringing about the actuation of the carrier directing member appropriate to that station.

6. In carrier distributing apparatus for pneumatic dispatch tubes, a table having stations for operators at its opposite sides, a downwardly projecting tube having its discharge end spaced above the center of the table, carrier delivery chutes extending from the discharge end of the tube to said operators' stations, carrier directing members mounted at the discharge end of the tube for directing carriers into said delivery chutes, and means at each operator's station for bringing about the actuation of the carrier directing member appropriate to that station.

7. In a discharge terminal for pneumatic dispatch tubes, a carrier directing member mounted at the discharge end of a tube, and a pneumatic device under the control of an operator for directing a carrier delivered by the tube to the operator's station.

8. In a discharge terminal for pneumatic dispatch tubes, carrier directing members mounted at the discharge end of a tube, a plurality of operators' stations, chutes leading from the tube to the operators' stations, and pneumatically operated devices under the control of the operators for directing carriers through the chutes to the appropriate stations.

9. In a discharge terminal for pneumatic dispatch tubes, carrier directing members pivotally mounted at the discharge end of a tube, a plurality of operators' stations, chutes leading from the discharge end of the tube to said operators' stations, a pneumatically operable device connected to each carrier directing member for swinging the member into position at the delivery end of the tube to direct a carrier into one of said chutes, and a valve device accessible to each operator for bringing about the actuation of the appropriate pneumatically operable device to divert a carrier into the chute leading to the operator's station.

10. In carrier distributing apparatus for pneumatic dispatch tubes, a plurality of carrier-directing members pivotally mounted at the discharge end of the tube, a pneumatic device for each member connected into the pneumatic system and arranged to operate one of the carrier directing members, a plurality of operators' stations, chutes leading from the tube to the operators' stations, a valve device accessible to each operator's station, and a connection between each of said valve devices and one of said carrier directing members, whereby actuation of the valve will result in the operation of the appropriate carrier directing member to direct a carrier into the chute leading to the operator's station.

11. In carrier distributing apparatus for pneumatic dispatch tubes, a pair of carrier directing members pivotally mounted at opposite sides of the discharge end of the tube, a pair of pneumatic devices mounted adjacent the carrier directing members and operatively connected thereto, a connection between one side of each pneumatic device and the pneumatic system, a pair of operators' stations located at opposite sides of the discharge end of the tube, a manually operable valve device at each operator's station, and a connection between each valve device and the other side of the pneumatic device appropriate to that station, whereby actuation of either valve device will bring about the operation of the corresponding pneumatic device to cause a carrier to be delivered at the respective operator's station.

12. In carrier distributing apparatus for pneumatic dispatch systems, a pair of carrier directing members pivotally mounted at opposite sides of the discharge end of the tube, a pair of pneumatic devices mounted adjacent the carrier directing members and operatively connected thereto, a connection between one side of each pneumatic device and the pneumatic system, a pair of operators' stations located at opposite sides of the

discharge end of the tube, a manually operable valve device at each operator's station, a connection between each valve device and the other side of the pneumatic device appropriate to that station, whereby actuation of either valve device will bring about the operation of the corresponding pneumatic device to cause a carrier to be delivered at the respective operator's station.

13. In carrier distributing apparatus for pneumatic dispatch systems, a table having operators' stations at opposite sides thereof, a downwardly extending dispatch tube having its discharge end spaced above a central portion of the table, carrier delivery chutes leading from the discharge end of the dispatch tube to the operators' stations, a pair of carrier directing members pivotally mounted at opposite sides of the discharge end of the tube, a pair of pneumatic devices mounted adjacent the carrier directing members and operatively connected thereto, a connection between one side of each pneumatic device and the pneumatic system, a manually operable valve device accessible to each operator's station, a connection between each valve device and the other side of the pneumatic device appropriate to that station, whereby actuation of either valve device will bring about the operation of the corresponding pneumatic device to cause a carrier to be delivered at the respective operator's station.

14. In a carrier distributing apparatus for pneumatic dispatch systems, carrier directing members pivotally mounted at the discharge end of a pneumatic dispatch tube, pneumatic devices mounted adjacent the carrier directing members and operatively connected thereto, a connection between each pneumatic device and the pneumatic system, a plurality of operators' stations, a control device at each operator's station, a connection between the control device and the pneumatic device appropriate to that station, and a stop device operable by each pneumatic device for checking the progress of following carriers while a carrier is being diverted by one of said carrier directing members.

15. In a carrier distributing apparatus for pneumatic dispatch systems, carrier directing members pivotally mounted at the discharge end of a pneumatic tube, pneumatic devices mounted adjacent the carrier directing members and operatively connected thereto, said pneumatic devices consisting of a chambered member having a flexible diaphragm mounted to divide the chamber into two compartments, the compartment at one side of the diaphragm being connected to a source of partial vacuum, a spring arranged to move the diaphragm in the other direction when equal pressure conditions exist on opposite sides of the diaphragm, said diaphragm having a mechanical connection with one of said carrier directing members, a plurality of operators' stations, a control valve at each operator's station connected to the compartment at the other side of the diaphragm, and a by-pass around the diaphragm for quickly equalizing pressure conditions on opposite sides of the diaphragm following an operation.

Signed at New York, in the county and State of New York, this 17th day of August, 1925.

WILLIAM H. DINSPEL.