No. 709,434. Patented Sept. 16, 1902.

W. A. H. BOGARDUS, L. COLLIS & G. G. POWELL.

TUBULAR DESPATCH APPARATUS.

(Application filed Nov. 29, 1901.)

(No Model.) 5 Sheets—Sheet 1.

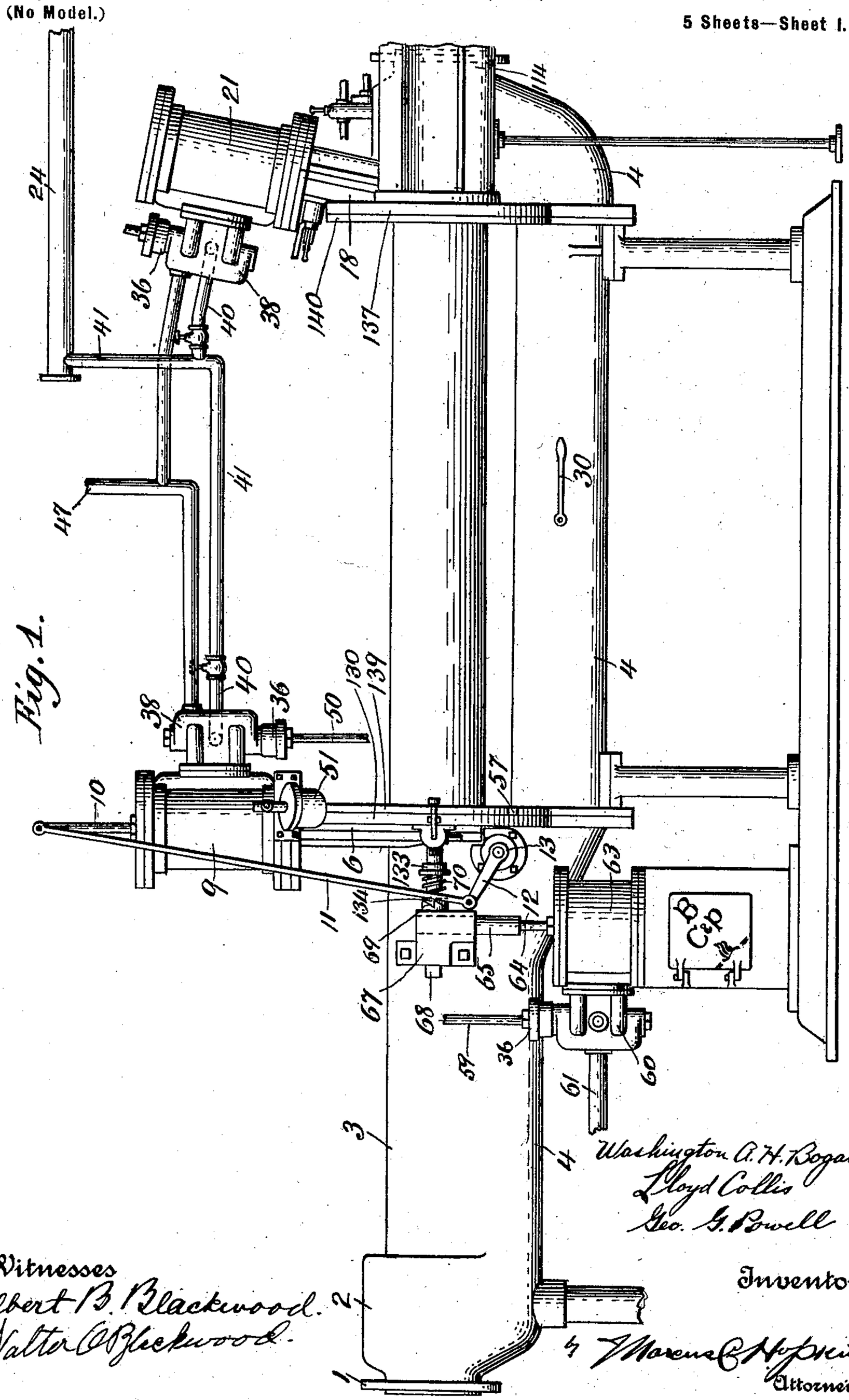

Fig. 1.

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(No Model.) 5 Sheets—Sheet 2.

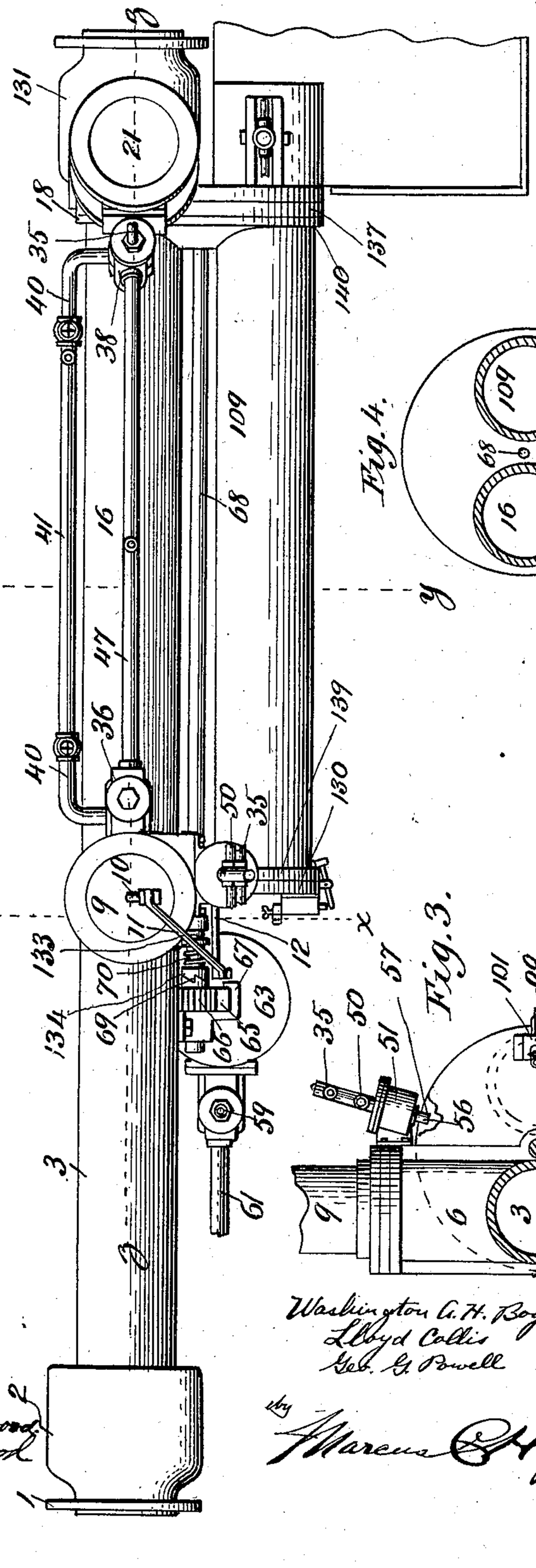

Fig. 2.

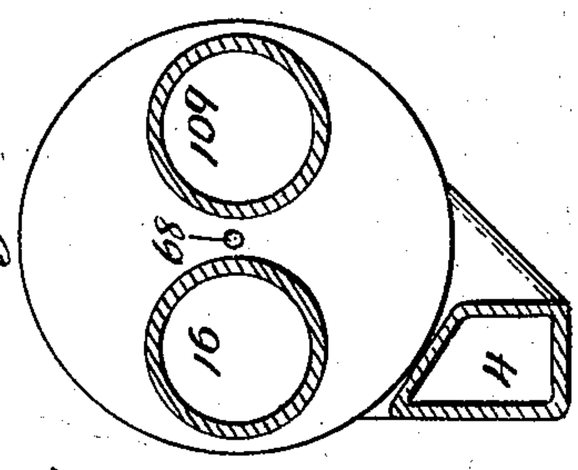

Fig. 4.

Fig. 3.

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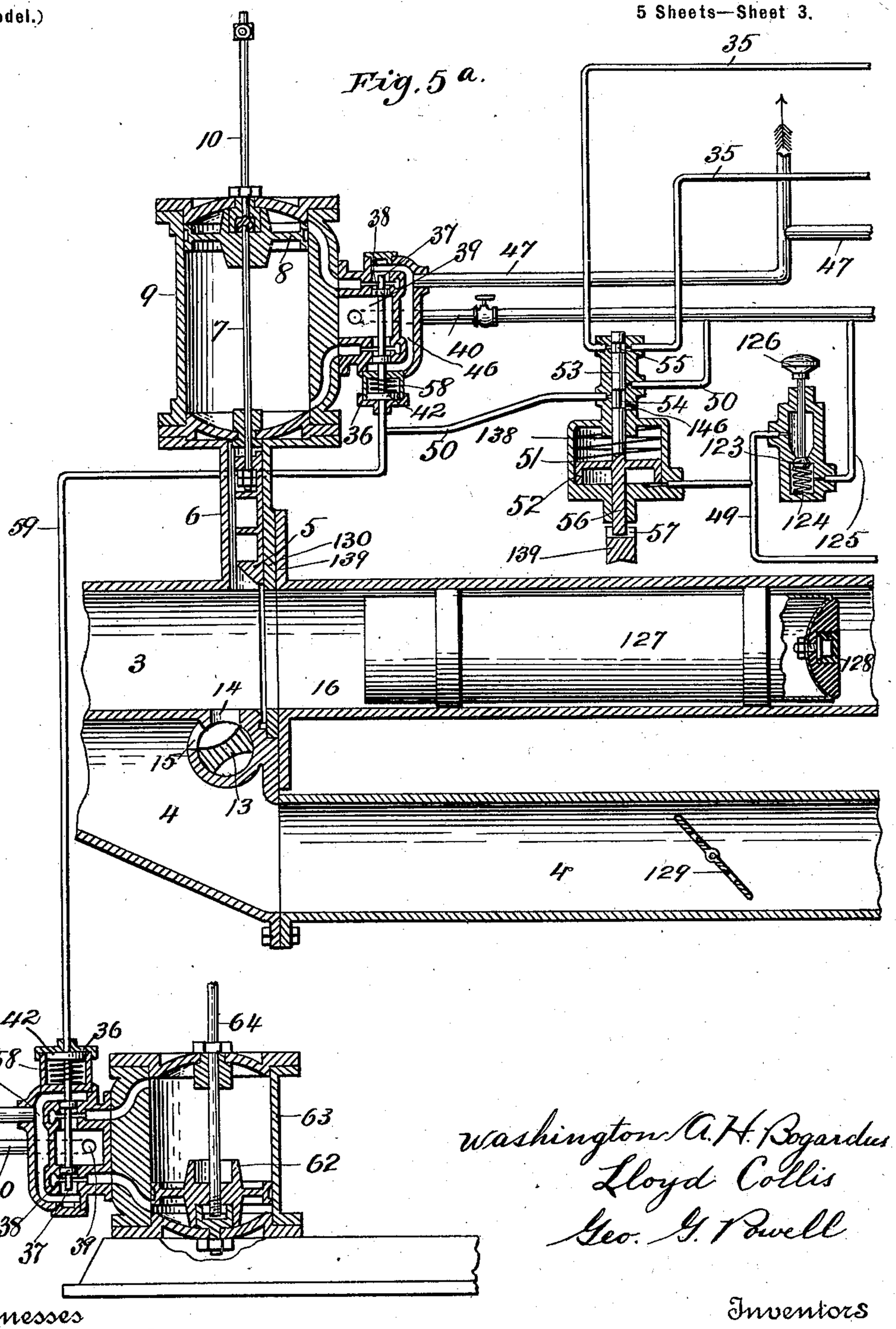
TUBULAR DESPATCH APPARATUS.

(Application filed Nov. 29, 1901.)

(No Model.) 5 Sheets—Sheet 3.

Fig. 5 a.



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TUBULAR DESPATCH APPARATUS.

(Application filed Nov. 29, 1901.)

(No Model.) 5 Sheets—Sheet 4.

Fig. 5 b.

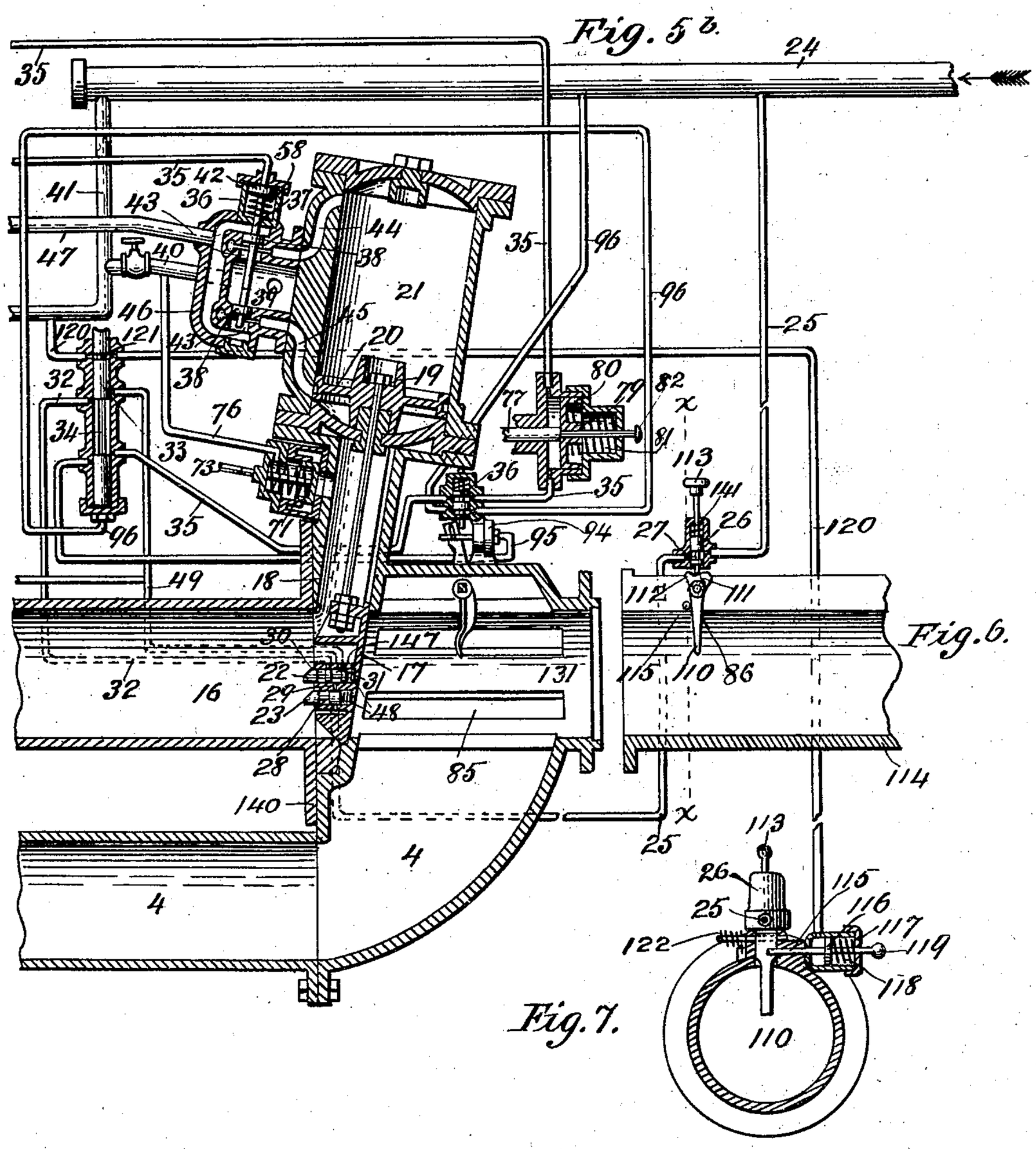

Fig. 6.

Fig. 7.

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TUBULAR DESPATCH APPARATUS.

(Application filed Nov. 29, 1901.)

(No Model.) 5 Sheets—Sheet 5.

Fig. 11.

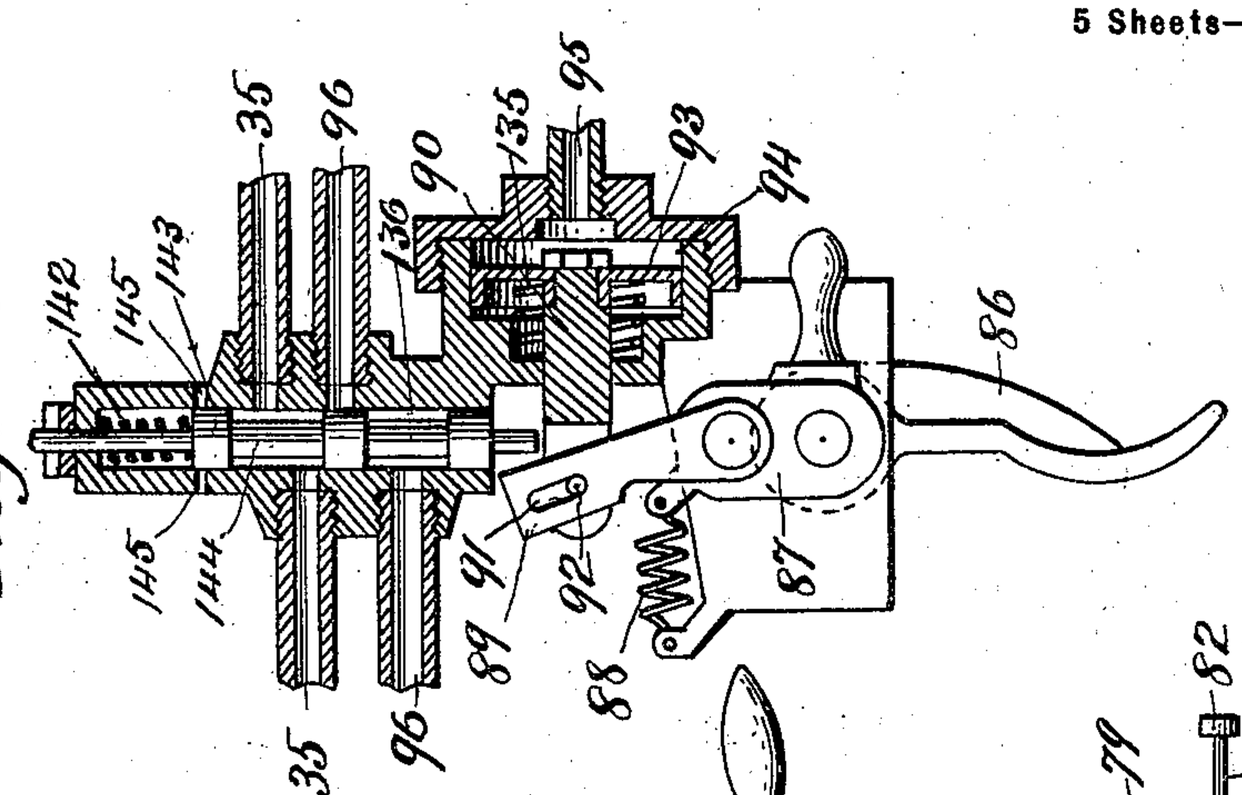


Fig. 8.

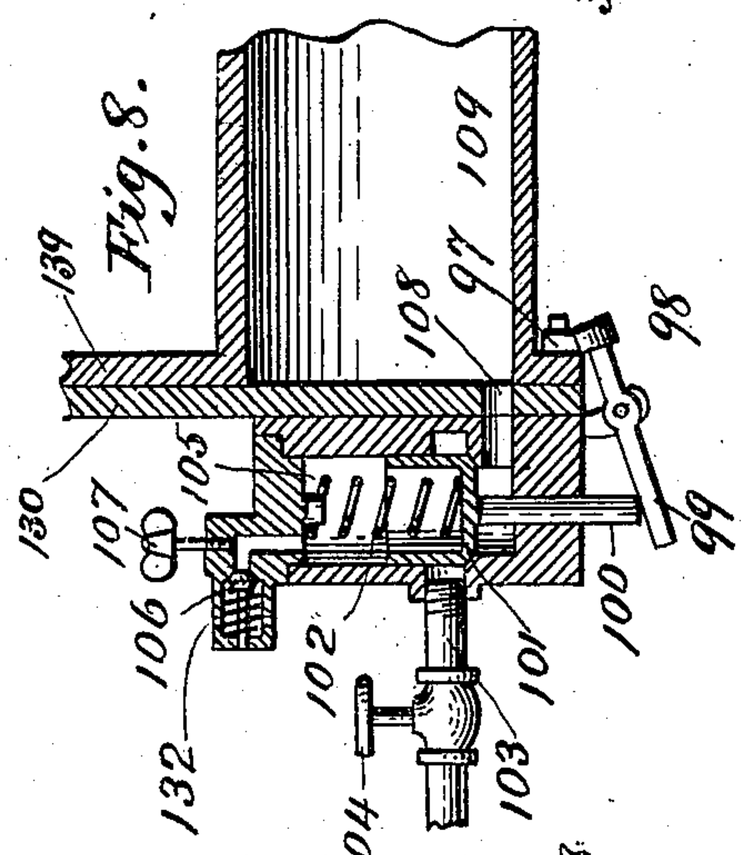


Fig. 12.

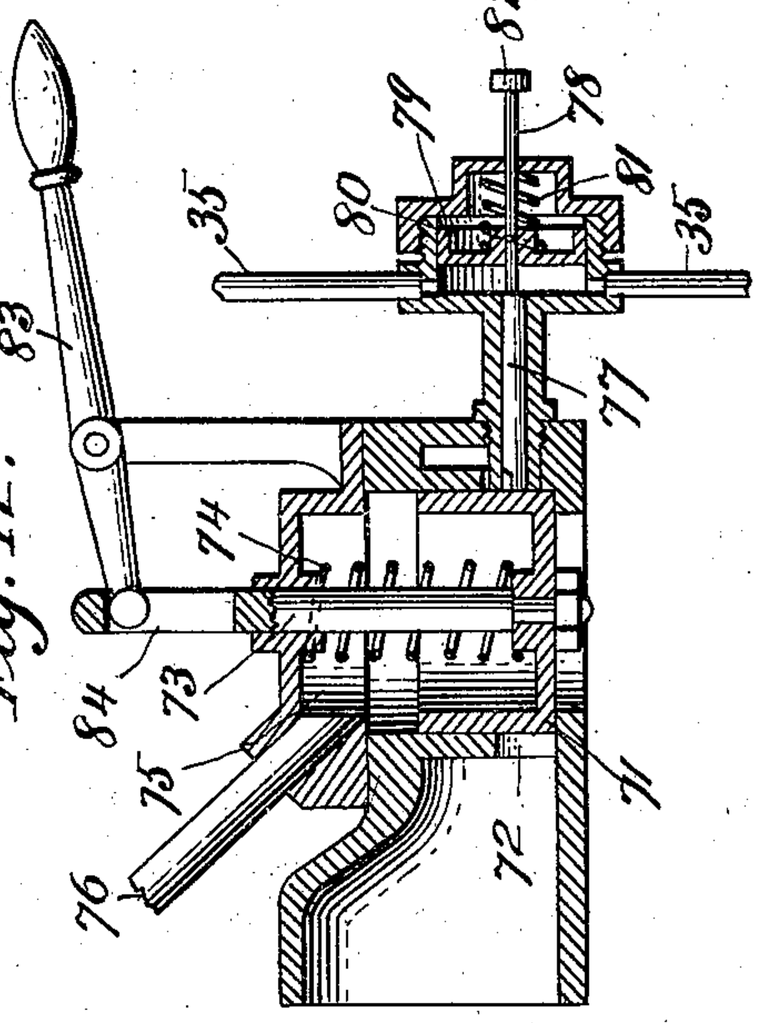


Fig. 9.

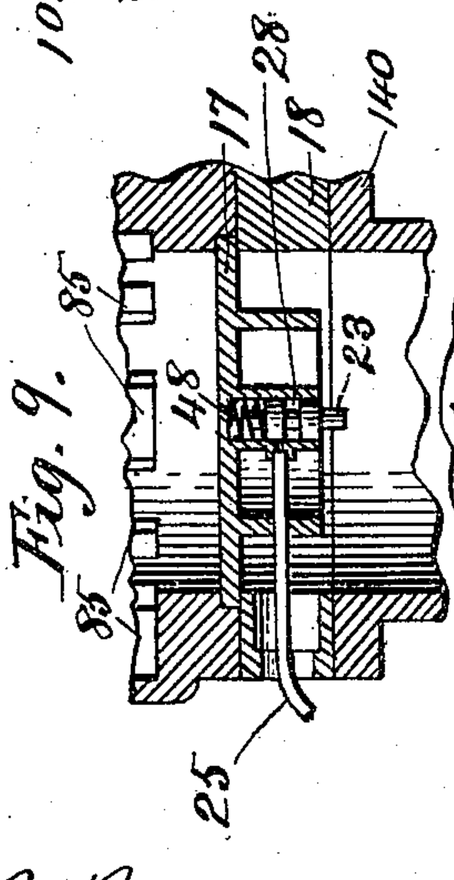
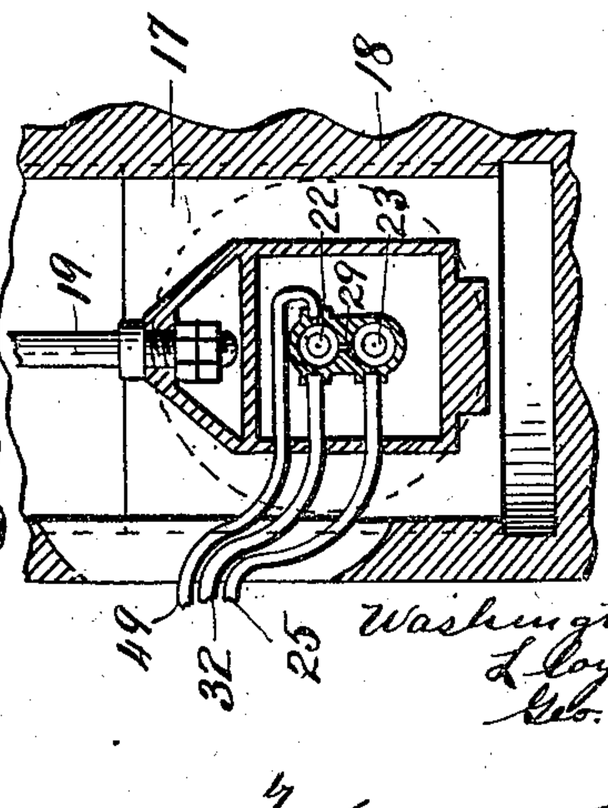


Fig. 10.



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UNITED STATES PATENT OFFICE.

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TUBULAR DESPATCH APPARATUS.

SPECIFICATION forming part of Letters Patent No. 709,434, dated September 16, 1902.

Application filed November 29, 1901. Serial No. 84,014. (No model.)

To all whom it may concern:

Be it known that we, WASHINGTON A. H. BOGARDUS, LLOYD COLLIS, and GEORGE G. POWELL, citizens of the United States, residing at New York, in the State of New York, have invented new and useful Improvements in Tubular Transit Apparatus, of which the following is a specification.

Our invention relates to transit systems in which a carrier is propelled through the medium of a confined fluid between two or more points, and has for its object to provide apparatus to receive and discriminate between carriers designed for the station at which this machine is located and those designed to pass said station, automatically ejecting the former and continuing the latter to some remaining station, to assure the proper interval between successive carriers, and to send carriers from said station; and our invention also relates to the novel construction and operation of the device hereinafter described and to the means employed to render the same positive in action and safe in operation.

The present invention is designed to use the form of carrier and corresponding positioning of operating-pins disclosed in the application to Lloyd Collis and Geo. G. Powell, Serial No. 73,595, filed August 28, 1901.

Further objects of our invention are to provide a machine of improved construction, adapted to fewer functional movements, more perfect mechanism, simpler and easier of operation, of more modern design and construction, and more perfect and complete than heretofore has been devised.

We obtain these objects in the device illustrated in the accompanying drawings, in which—

Figure 1 is an elevational view of our device; Fig. 2, a plan of same; Fig. 3, a section on line *x x* of Fig. 2; Fig. 4, a section on line *y y* of Fig. 2; Figs. 5ª and 5ᵇ, a longitudinal vertical section on line *z z* of Fig. 2; Fig. 6, a vertical longitudinal section of the pan-outlet; Fig. 7, a cross-section of the pan-outlet; Fig. 8, a sectional detail of the blow-out valve; Fig. 9, a horizontal section through the center of the exit-gate; Fig. 10, a vertical central section through the exit-gate; Fig. 11, a sectional detail of the trip-finger-valve mechanism, and Fig. 12 a sectional detail of the excess-pressure relief-valve.

Referring to the drawings, 1 is the incoming transit-pipe; 2, a lantern-casting; 3, an auxiliary cushioning-chamber, and 4 a by-pass. The transit-pipe 1, lantern-casting 2, and auxiliary cushioning-chamber 3 are arranged in alinement and form a continuous passage. Ports lead from the lantern-casting 2 into the by-pass 4. At the right-hand end of the auxiliary cushioning-chamber 3 is placed an entrance-gate 5, which is capable of vertical reciprocating movement within guides in a gate-housing 6. A piston-rod 7 connects the gate 5 with a piston 8, working in a cylinder 9, and has a projecting portion 10, which passes through a stuffing-box in the upper head of the cylinder 9. A rotary valve 13 is mounted in the main casting of the machine between the auxiliary cushioning-chamber 3 and the by-pass 4. Ports 14 lead from the extreme right-hand end of the auxiliary cushioning-chamber 3 to the rotary valve 13, and ports 15 lead from the rotary valve 13 to the by-pass 4. A crank 12 is mounted on the spindle of the valve 13 without the casting, by which the valve 13 is operated, and said crank 12 is connected by pivotal joints with the projecting portion 10 of the piston-rod 7 by a connecting-rod 11. The connecting-rod 11 is so positioned that when the gate 5 is open in its upper position the valve 13 will be open, establishing communication between the extreme right-hand end of the auxiliary cushioning-chamber 3 and the by-pass 4 through the ports 14 and 15; but when the gate 5 is closed or in its downward position such communication will be shut off. The main casting of the machine at the right of the entrance-gate 5 spreads out, forming a disk 130, the center of which disk is somewhat to one side of the opening of the auxiliary cushioning-chamber 3 through said disk. The by-pass 4 extends along the lower part of the machine for the greater part of the length thereof, passing up and communicating with a lantern-casting 131 through ports 85, the lantern-casting 131 forming a portion of the outgoing tube. At the left-hand end of the lantern-casting 131 is placed an exit-gate 17. The main casting of the

machine at the left of the exit-gate 17 spreads out, forming a disk 137, the center of which disk is somewhat to one side of the opening of the lantern-casting 131 through said disk, the disks 130 and 137 being axially coincident and of the same diameter and the openings therein from the auxiliary cushioning-chamber 3 and the lantern-casting 131 being in alinement. In the disk 137, diametrically opposite the opening leading to lantern-casting 131 and equally distant from the center of said disk, a second opening leads to the pan-casting 114. In the disk 130, diametrically opposite the opening leading to the auxiliary cushioning-chamber 3 and in alinement with the opening leading to the pan-casting 114, a port 108 communicates with a pipe 103, which port is normally closed by a valve 101. This valve 101 works in a cylinder 105 and is normally held seated by a spring 102. The cylinder 105 is closed at its upper end, (see Fig. 8,) forming a chamber above the valve 101, from which chamber air is forced through the check-valve 106 upon the raising of the valve 101 and slowly reënters said chamber through regulatable pin-valve 107 to allow of the retarded seating of the valve 101. The pipe 103 communicates with the main air-supply, which may be the line-pressure or an auxiliary source, and a regulating-valve 104 provides means for governing the air-supply in said pipe 103. A shaft 68 is journaled at the centers of and extends between the disks 130 and 137, passing through and projecting beyond disk 130.

Fast upon shaft 68 and designed to rotate therewith is a shifting member consisting of two heads 139 and 140 carrying two chambers 16 and 109. The chambers 16 and 109 are each capable of being placed in alinement with the opening of the auxiliary cushioning-chamber 3 and the outgoing tube upon the revolution of the shifting member. The shifting member is shown having one of its chambers 16 in alinement with and forming a continuation of the incoming tube and the auxiliary cushioning-chamber 3. When one chamber is in alinement with the incoming tube, the other will be in alinement with the pan-opening. It is thus seen that a straightaway passage is formed through the machine from the incoming transit-pipe 1 through the auxiliary cushioning-chamber 3 and the chamber 16 to the outgoing transit-pipe. The lantern-casting 131 is interposed in this passage or, more properly, in the outgoing transit-pipe adjacent the shifting member. The shifting member is revoluble with the shaft 68, so that either of the two chambers in the same can be brought into alinement with the straightaway passage above mentioned. The two chambers in the shifting member are positioned diametrically opposite one another on either side of the shaft 68, so that it requires the same degree of revolution to bring either into alinement with the transit-pipes.

That portion of shaft 68 projecting beyond disk 130 carries a loose gear-wheel 66. Lateral cam-teeth 69 upon said gear 66 are designed to engage similar teeth upon a sleeve 134. The sleeve 134 is keyed in a groove in shaft 68 to lock said sleeve to shaft 68, but permit of the longitudinal movement of said sleeve. A spring 70, seated against a fast collar 133, normally holds said sleeve cam-teeth in engagement with the gear cam-teeth. A rack 65 engages the gear-wheel 66 to rotate said gear. The rack 65 is carried by a piston-rod 64, connected to a piston 62, working in a cylinder 63. The upward movement of the piston 62 rotates gear 66 one half-revolution. Casting 67 maintains rack 65 in engagement with gear 66 and also serves as a thrust-bearing for said gear.

The exit-gate 17 is provided with an oblique face designed, when said gate is closed, to lie flush with the face of disk 137, and said gate is mounted within housing 18 in guides inclined to permit the gate 17 when opening to clear the disk 137 beyond the opening to lantern-casting 131. The gate 17 is connected with a piston 20, working in a cylinder 21, by a piston-rod 19.

Each of the cylinders 9, 63, and 21 is provided with a pilot-valve consisting of a reciprocating valve-stem 37, carrying valve-pistons 38 38, working in a valve-cylinder 43, which members are capable when in one position of admitting air under pressure from a chamber 39 through a port 44 to the upper side of the working piston and exhausting from below the working piston through a port 45 to a chamber 46 and when in their other position of admitting air under pressure from chamber 39 through the port 45 to the under side of the working piston and exhausting from above the working piston through the port 44 to chamber 46. Each of said pilot-valve stems is normally held in one position by a spring 58 and is designed to be moved to its other position through pressure applied to a piston 42, fast on valve-stem 37 and working in a cylinder 36. The spring 58 of the pilot-valve of cylinder 9 normally holds said valve in the position to admit pressure below and exhaust from above, piston 8 holding gate 5 normally open, that of the pilot-valve of cylinder 63 normally holds said valve in the position to admit pressure above and exhaust from below, piston 62 holding rack 65 in its normal lower position, and that of the pilot-valve of cylinder 21 normally holds said valve in the position to admit pressure above and exhaust from below, piston 20 holding gate 17 normally closed. Air under pressure is shown supplied from a main supply-pipe 24, which is in turn supplied with pressure from a compressor or preferably from the main line-pressure supply. The cylinders 9 and 21 are supplied with air-pressure from pipe 24 through pipes 41 and 40, and the exhaust from said cylinders is through pipes 47 47. The cylin-

der 63 is supplied with pressure through pipe 60 from the same source and exhausts through pipe 61.

In the wall of the gate-housing 18 an opening closed by an excess-pressure valve 71 leads to an exhaust-port 72. (See Fig. 12.) The valve 71 is mounted in a suitable casting, forming a closed chamber above said valve, to which chamber pressure is led from the pipe 40 by a pipe 76, balancing the line-pressure in the housing 18. The valve 71 is normally held seated by a spring 74 and is provided with a stem 73, having an elongated slot 84 in its projecting portion, which slot 84 allows of the rise and fall of said stem independently of a pivoted hand-lever 83, one arm of which lever extends within the slot 84 and serves to raise said valve manually upon the depression of the lever-handle. A locking-pin 77 is mounted at one side of said valve and is normally held against the same and in position to be projected under a valve by a spring 81. A piston 79, fast on said locking-pin, works in cylinder 80 to withdraw the locking-pin 77, and a knob 82 upon a projection 78 of said pin provides means of hand operation therefor.

The gate 17 carries two spring-returned valve-pins 22 and 23, which are normally projected into the registering chamber of the shifting member by springs 48 48 when said gate is closed. The valve-pin 23 normally closes communication between a port leading through a flexible connection (shown in Figs. 9 and 10) to a pipe 25 and a port 29, but upon being depressed opens said communication through an annular recess 28 in said valve-pin. The valve-pin 22 normally allows of communication through an annular recess 31 between port 29 and a port leading through a flexible connection (also shown in Figs. 9 and 10) to a pipe 49; but when said valve-pin 22 is depressed said communication is cut off and communication is established through a second annular recess 30 in said valve-pin 22, between the port 29 and a port leading through a flexible connection (shown in Figs. 9 and 10) to a pipe 32. The projecting portions of the valve-pins 22 and 23 are beveled to cause them to be depressed as the edge of the openings in head 140 are revolved past them.

Just without the pan-opening in disk 137 a trip-finger 110 is pivoted to the pan-casting 114, (see Fig. 6,) projecting into the path of an ejected or injected carrier. The trip-finger 110 is normally held in a vertical position by a coiled or otherwise configured spring 122, but may be swung up out of the path of a passing carrier in either direction. When the trip-finger is swung upward to the right hand, a cam 111 thereon raises and closes a valve 26 in the pipe 25. When the trip-finger 110 is released from this position, its spring 122 immediately causes it to assume its normal vertical position, allowing a spring 141 to open valve 26. When the trip-finger 110 is swung upward to the left hand, a cam 112 closes the valve 26, as before; but the stem of valve 26 falls slightly behind a shoulder upon cam 112, making it necessary to exert a greater force than that exerted by spring 122 to cause the trip-finger 110 to assume its vertical position, and therefore said trip-finger will remain in its raised position until said greater force is applied thereto.

A locking-pin 115 (see Figs. 6 and 7) is mounted in the pan-casting 114 and is normally projected by a spring 118 behind the finger 110 at its left, preventing finger 110 from being swung up to the left hand. A piston 116, fast on pin 115, works in a cylinder 117 and affords means for withdrawing pin 115 from the path of finger 110 when pressure is applied to cylinder 117. A projecting knob 119 upon pin 115 affords means of hand operation for said pin. Pipe 25 connects with the main air-supply pipe 24.

A locking-bolt 56 (see Fig. 3) is mounted upon disk 130 and is normally pressed against the periphery of head 139 or into notches 57 in the periphery of head 139 by a spring 138. (Shown in diagrammatical section in Fig. 5ª.) The locking-bolt 56 engages one or the other of the two notches 57 as one or the other of the chambers in the shifting member comes into alinement with the line-opening in the disks 130 and 137. A piston 52, fast on locking-bolt 56 and working in a cylinder 51, serves to withdraw locking-bolt 56 upon the application of pressure to cylinder 51 from pipe 49. An extension 53 of the locking-bolt 56 forms a valve member in which an annular recess 54 admits pressure from pipe 40 through pipes 50 and 59 to the cylinders 36 of the pilot-valves of cylinders 9 and 63, but cuts off said pressure and exhausts from said cylinders 36 through an exhaust-port 146 when the locking-bolt 56 is withdrawn or rides upon the periphery of the head 139. A second annular recess 55 in the extension 53 opens communication in the pipe 35 to the cylinder 36 of the pilot-valve of cylinder 21 when the locking-bolt 56 is in its lower position in notch 57; but such communication is closed when the locking-bolt 56 is withdrawn or rides upon the periphery of head 139. A spring-closed thumb-valve 123 (shown in diagrammatical section in Fig. 5ª) admits pressure from pipe 40 through pipe 125 to pipe 49 when manually depressed by means of knob 126.

Just without the exit-gate 17 and preferably within the space formed by the lantern-casting 131 a trip-finger 86 is journaled to actuate a shaft passing through the tube to the outside. This trip-finger 86 is designed to be thrown up by the passage of an outgoing carrier and actuates a crank portion 87 without the tube, which by means of the link 89 throws a valve 143 to its upward position. The link 89 is connected by a pin 92, working in a slot 91 in the link, with a piston-rod 90, carrying the pin 92. A piston 93, working in a cylinder 94, is securely fastened to

said piston-rod, and a spring 135 normally holds said piston-rod in its right-hand position, causing the link 89 to bear against a lower projection of the valve 143. When the trip-finger 86 is thrown up, the crank portion 87 and the link 89 are drawn down, allowing the spring 135 to cause the link to jump under the lower projection of the valve 143, and the return of the trip-finger 86 by the spring 88 forces the link and valve 143 upward, where they will remain until pressure is applied to the piston 93 through pipe 95 to force the link from under the valve 143 and allow said valve 143 to fall to its original position under the action of spring.

The valve 143 is provided with two annular recesses 144 and 136, the recess 144 when the valve 143 is in its upper position opening communication between the pipe 35 and exhaust-ports 145 and when the valve 143 is in its lower position opening communication between the two sections of pipe 35. The recess 136 when the valve 143 is in its upper position opens communication between the two sections of pipe 96 and when the valve is in its lower position cuts off such communication.

A time-lock piston 33 is designed to be connected with any of the usual forms of time mechanisms to limit the interval of fall and works in a cylinder in such manner that pressure from pipe 96 will raise said time-piston, which pressure upon the complete upward movement of said time-piston will pass to pipe 95. The time-piston 33 is provided with a valve portion in which are formed two annular recesses 34 and 121. Recess 34 is of considerable length, so that when the time-piston 33 is at its lowermost position communication is had between pipe 32 and pipe 35 and communication is cut off between pipe 32 and pipe 49, but upon the slight upward movement of the time-piston 33 communication is cut off between pipes 32 and 35 and opened between pipes 32 and 49 through recess 34 and continues so until piston 33 again reaches its lowermost position. Communication is had between two sections of pipe 120 through recess 121 when time-piston 33 is at its lowermost position, but cut off at all others.

Two cams 97 97 are provided upon the head 139 diametrically opposite one another and are designed to rock a lever 99, pivoted on a bracket projecting from the disk 130 just prior to the coming into alinement of the chambers and tubes and to allow said lever 99 to fall behind said cam into its normal position when said chambers and tubes aline. Motion is transmitted from the lever 99 when the same is rocked through a loose pin 100 to the valve 101, raising the said valve 101.

The operation of the machine is as follows: We will first describe the operation of our machine in receiving a carrier destined for the station illustrated. Such a carrier, it will be remembered, will depress but one of the valve-pins—namely, valve-pin 23. The carrier enters from incoming tube 1, cushioning in chamber 16, the excess pressure before the carrier raising excess-pressure valve 71, which is immediately locked up by locking-pin 17, exhausting the air from before the carrier, and the line-pressure coaxes the carrier up to the gate 17. It depresses valve-pin 23, admitting air-pressure from pipe 24, through pipe 25 to port 29, through annular recess 31 in valve-pin 22, through pipe 49 to cylinder 51, withdrawing locking-bolt 56, releasing the shifting member. The withdrawal of locking-bolt 56 through its valve member 53 admits pressure from pipe 40 through recess 54 and pipes 50 and 59 simultaneously to the pilot-valve cylinders 36 36 of cylinders 9 and 63, shifting said valves to their other positions, causing gate 5 to close, forming, with rotary valve 13, the auxiliary cushioning-chamber for the reception of a second carrier arriving before the ejection of the present one and causing rack 65 through the medium of the pinion 66 and the clutch mechanism on shaft 68 to rotate the shifting member one-half revolution. The withdrawal of the locking-bolt 56 also cuts off pressure in pipe 35 to cylinder 36 of the pilot-valve of cylinder 21, thus preventing the possible opening of gate 17 during the revolution of the shifting member. As the shifting member revolves the edge of the chamber opening in head 140 depresses both valve-pins 22 and 23, thus causing pressure to pass through recess 30 of valve-pin 22 to pipe 32, through the recess 34 of the time-lock piston to pipe 35, through recess 144 of the trip-finger valve 143 to cylinder 80, (shown in diagrammatical section in Fig. 5[b] and also in Fig. 12,) withdrawing locking-pin 77, allowing valve 71 to close, and thence on through pipe 35 until interrupted by the raised valve member 53 of the locking-bolt 56. As valve-pin 22 is depressed pipe 49 is exhausted through exhaust-port 147 in gate 17, causing locking-bolt 56 to be forced against the periphery of head 139 by spring 138, which, however, does not alter the position of its valve member 53. The movement of the shifting member, therefore, continues. When the edge of the opposite chamber opening in head 140 reaches the valve-pins 22 and 23, they are projected into said chamber by the springs 48 48, cutting off the main pressure from pipe 25 and exhausting pipe 32 through an exhaust-port (not shown) similar to port 147, thereby exhausting cylinder 80 and allowing locking-pin 77 to assume its normal position, bearing against valve 71. The movement of the shifting member continues as locking-bolt 56 is riding upon the periphery of head 139, and lever 99 is rocked by cam 97, opening blow-out valve 101. Then locking-bolt 56 falls into the opposite notch 57 in head 139, its valve member cutting off pressure from the cylinders 36 of the pilot-valves of cylinders 9 and 63 and exhausting the same, opening gate 5, and allowing rack 65 to ratchet back to its original po-

sition and opening communication through pipe 35 to cylinder 36 of the pilot-valve of cylinder 21, the locking-bolt 56 stopping the shifting member with the chamber 16, containing the carrier, exactly in alinement with the pan-opening, through which it is blown by pressure from the blow-out valve 101, which is regulated to close approximately upon the expulsion of the carrier from the chamber. As the carrier passes out of the pan-opening it raises the trip-finger 110 to the right hand, shutting off the main pressure through pipe 25 during its passage to prevent the possible operation of the shifting member and consequent pinching of the emerging carrier. It will now be seen that all the parts are as they were and ready for the reception of another carrier, the shifting member being identical in either position. Now supposing the entering carrier to be a through carrier, which depresses both valve-pins 22 and 23, pressure will be admitted to pipe 32 in the first instance, passing through recess 34, pipe 35, recess 36, cylinder 80, releasing valve 71, recess 55 in locking-bolt valve member 53, and on to cylinder 36 of the pilot-valve of cylinder 21, shifting the pilot-valve to its other position, opening gate 17. The line-pressure will then blow the carrier out of chamber 16 past ports 85 in lantern-casting 131 and on in the outgoing tube. As the carrier passes through gate 17 it raises the trip-finger 86, drawing crank 87 and link 89 down, link 89 jumping under valve 143. As the trip-finger 86 returns after the passage of the carrier valve 143 is raised to its upper position, cutting off communication through recess 144 and pipe 35 and exhaust-cylinder 36 of the pilot-valve of cylinder 21 through exhaust-ports 145, closing gate 17, and also admits pressure from pipe 24 through pipe 96 and recess 136 to and raises time-lock piston 33, setting the time mechanism, and after the complete raising of said time-lock piston said pressure continues through pipe 95 to cylinder 90, tripping the link 89 and returning valve 143 to its lower and original position, which cuts off the pressure to cylinder 90, allowing link 89 to again rest against the projection of the valve 143 and exhausts the pressure from the time-piston, allowing it to commence its fall, and opens communication through pipe 35 once more. The machine is now as it was, except that the time-lock is set, and we will now describe the disposition of a through carrier arriving during the interval of fall of the time-lock piston, a carrier destined for this station being unaffected by the time-lock. Upon the arrival of the carrier and depression of both valve-pins 22 and 23, as before, the pressure is admitted to pipe 32, as in the other case, and enters recess 34 of the time-piston. The time-piston being raised more or less the pressure is led to pipe 49, which produces the operations enumerated in the description of the disposition of a station-carrier, throwing the carrier out upon the pan. When a carrier is to be sent from the station, it is pushed through the pan-opening into the chamber in the shifting member opposite said opening and in its passage raises the trip-finger 110 to the left hand, which by the cam 112 closes the valve 26 and cuts off the main pressure from pipe 24, preventing the possible operation of the shifting member, and by reason of the shoulder on cam 112 the trip-finger 110 will remain in such raised position until the hand and arm of the operator are withdrawn from the opening and he pulls down said trip-finger. The operator then depresses thumb-valve 123, which admits pressure from pipe 40 to pipe 49, which operates the shifting member, carrying the carrier to the position in alinement with the tubes. The operator then depresses the lever 83 of the excess-pressure valve 71, opening said valve and exhausting the air from before the carrier, urging it to the gate 17, where it depresses both valve-pins 22 and 23, opening gate 17, and passing out, as in the case of a through carrier. If a carrier is to be sent and the time-lock piston has not completely fallen, the locking-pin 115 will prevent the raising of finger 110 to the left hand, and consequently prevent the insertion of the carrier into the pan-opening.

What we claim, and desire to secure by Letters Patent, is—

1. In tubular despatch apparatus, the combination with a tube, of a chambered revoluble shifting member coöperating through its chambers at both ends with said tube to form a continuous alined passage-way, movable abutments in said tube adjacent the ends of said member, operating means for said member and said abutments and a controller for said operating means carried by one of said abutments and operable from within the chambers of said member.

2. In tubular despatch apparatus, the combination with an incoming tube and an outgoing tube, of a chambered revoluble shifting member coöperating with said tubes through any one of its chambers to form a continuous alined passage-way and a gate in said outgoing tube adjacent said member.

3. In tubular despatch apparatus, the combination with an incoming tube and an outgoing tube, of a chambered revoluble shifting member coöperating with said tubes through any one of its chambers to form a continuous alined passage-way and a gate in said incoming tube adjacent said member.

4. In tubular despatch apparatus, the combination with an incoming tube and an outgoing tube, of a chambered revoluble shifting member coöperating with said tubes through any one of its chambers to form a continuous alined passage-way and gates in said incoming and outgoing tubes adjacent said member.

5. In tubular despatch apparatus, the combination with an incoming tube and an outgoing tube, of a chambered revoluble shifting member coöperating with said tubes through

any one of its chambers to form a continuous alined passage-way and means for obstructing said passage-way adjacent either end of said member independently of the revolution of said member.

6. In tubular despatch apparatus, the combination with an incoming tube and an outgoing tube, of a chambered revoluble shifting member coöperating through any one of its chambers with said tubes to form a continuous alined passage-way and a normally closed gate in said outgoing tube adjacent said member.

7. In tubular despatch apparatus, the combination with an incoming tube and an outgoing tube, of a chambered revoluble shifting member coöperating through any one of its chambers with the said tubes to form a continuous alined passage-way and means normally obstructing the outgoing tube adjacent said member.

8. In tubular despatch apparatus, the combination with a main receiving-chamber, an entrance-gate for said main chamber, of an auxiliary cushioning-chamber forward of said main chamber and a valvé actuated by said entrance-gate to render said auxiliary cushioning-chamber operative when said gate is closed and inoperative when said gate is open.

9. In tubular despatch apparatus, the combination with a main receiving-chamber and an entrance-gate for said main chamber, of an auxiliary cushioning-chamber forward of said main chamber, a rotary valve communicating with the rearward end of said auxiliary cushioning-chamber, an operating-crank for said valve, and a link connection between said gate and valve designed to cause said valve and gate to open and close simultaneously.

10. In tubular despatch apparatus, the combination with a tube, of a gate in said tube, operating mechanism for said gate, and controlling mechanism carried by said gate designed to control said operating mechanism.

11. In tubular despatch apparatus, the combination with a tube, of a gate in said tube, operating mechanism for said gate, controlling mechanism for said operating mechanism carried by said gate and flexible connections between said controlling and operating mechanisms.

12. In tubular despatch apparatus, the combination with a tube, of a chambered revoluble shifting member intersecting said tube, revolving mechanism for said member, a gate in said tube adjacent the rearward end of said member, operating mechanism for said gate, and controlling members for said revolving and gate-operating mechanisms carried by said gate.

13. In tubular despatch apparatus, the combination with a tube, of a chambered revoluble shifting member, revolving means for said shifting member, an exit-gate in said tube adjacent the rearward end of said shifting member, operating mechanism for said exit-gate, an entrance-gate in said tube adjacent the forward end of said shifting member, operating mechanism for said entrance-gate, an auxiliary cushioning-chamber forward of said entrance-gate, operating mechanism for said auxiliary cushioning-chamber, a controlling member mounted in said exit-gate controlling said revolving, entrance-gate and auxiliary cushioning-chamber operating mechanisms, and a controlling member mounted in said exit-gate controlling said exit-gate-operating mechanism.

14. In tubular transit apparatus, the combination with a tube, of a chambered revoluble shifting member intersecting said tube, a locking-bolt for said shifting member, revolving mechanism for said shifting member, a gate in said tube forward of and adjacent said shifting member, and means actuated by said bolt simultaneously controlling said revolving mechanism and said gate.

15. In tubular transit apparatus, the combination with a tube, of a chambered revoluble shifting member, revolving mechanism for said shifting member, a gate in said tube forward of and adjacent said shifting member, an exit-gate, a controlling member mounted in said exit-gate controlling said revolving mechanism and said entrance-gate and a hand-controller for said revolving mechanism and said entrance-gate.

16. In tubular transit apparatus, the combination with a tube, of a chambered revoluble shifting member, revolving means for said shifting member, an exit-gate, operating mechanism for said exit-gate, a controlling member mounted in said exit-gate normally controlling said exit-gate-operating mechanism and a time-lock valve mechanism designed to transfer the control of the controlling member from the exit-gate-operating mechanism to the said revolving means.

17. In tubular despatch apparatus, the combination with an incoming tube, of a revoluble chambered shifting member, a gate in said incoming tube, operating mechanism for said gate, a locking-bolt for said shifting member and a valve actuated by said locking-bolt designed to control said operating mechanism.

18. In tubular despatch apparatus, the combination with an incoming tube, of a chambered revoluble shifting member, revolving means for said shifting member, a gate in said incoming tube, operating mechanism for said gate, a locking-bolt for said shifting member, and a valve actuated by said locking-bolt designed to control said revolving and operating mechanisms.

19. In tubular despatch apparatus, the combination with a tube, of a chambered revoluble shifting member, revolving means for said shifting member, a gate in said tube forward of and adjacent said shifting member, a gate in said tube adjacent the rear end of said shifting member, operating mechanisms for said gates, a locking-bolt for said shifting member and a valve actuated by said locking-

bolt designed to control said revolving and operating mechanisms.

20. In tubular despatch apparatus, the combination with a tube, of a revoluble shifting member, a gate in said tube rearwardly of and adjacent said shifting member, a locking-bolt for said shifting member, operating mechanism for said locking-bolt, and a controlling member carried by said gate designed to control said operating mechanism.

21. In tubular despatch apparatus, the combination with a trip-finger and a time-lock valve, of a locking-pin designed to prevent the movement of said trip-finger, and operating mechanism for said locking-pin controlled by said time-lock valve.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

WASHINGTON A. H. BOGARDUS.
LLOYD COLLIS.
GEORGE G. POWELL.

Witnesses:
WILLIAM H. ROGERS,
GEORGE E. PHELPS.