(No Model.) 5 Sheets—Sheet 1.

C. F. PIKE.

SWITCH RAIL FOR PNEUMATIC DESPATCH TUBE SYSTEMS.

No. 578,943. Patented Mar. 16, 1897.

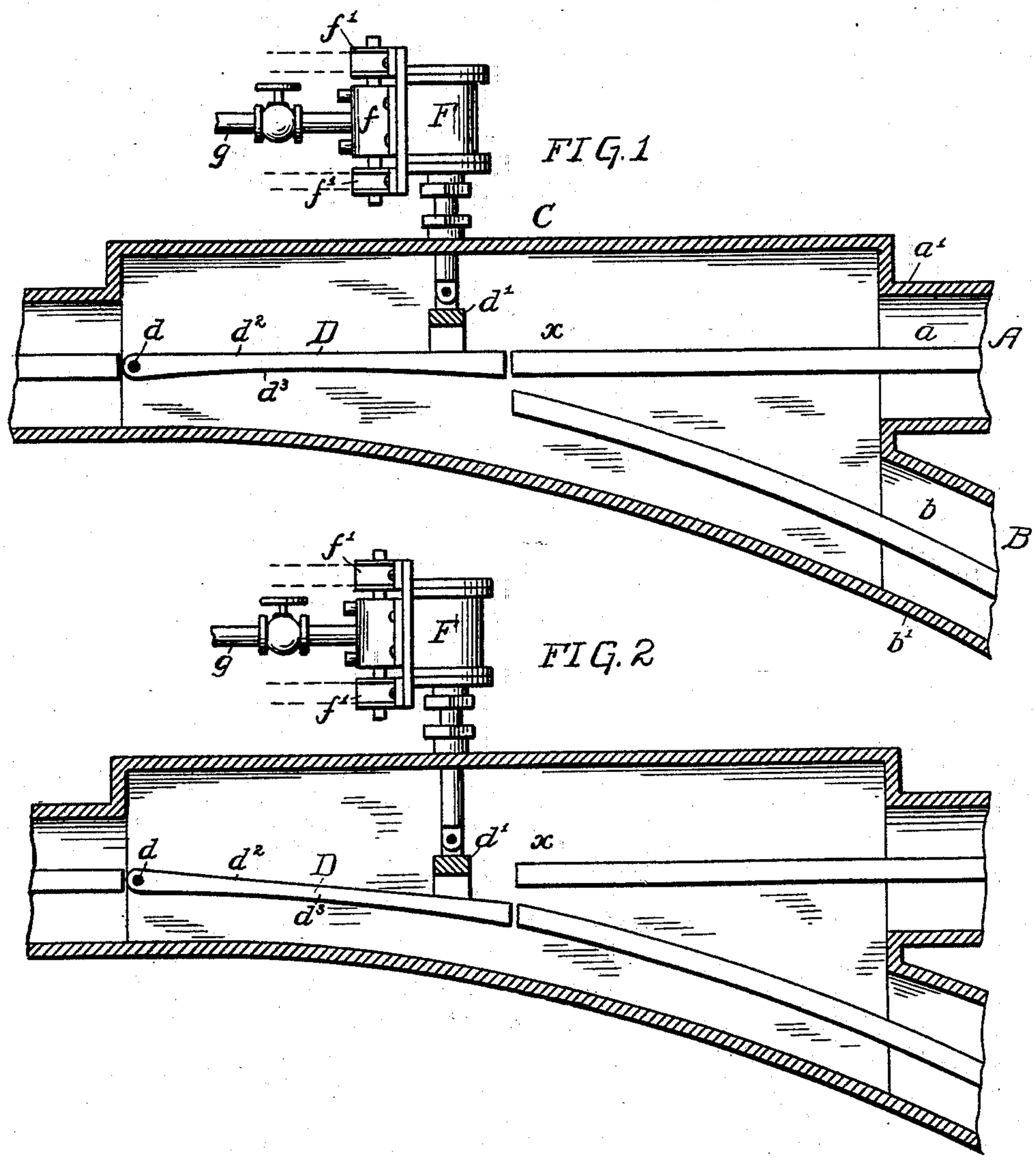
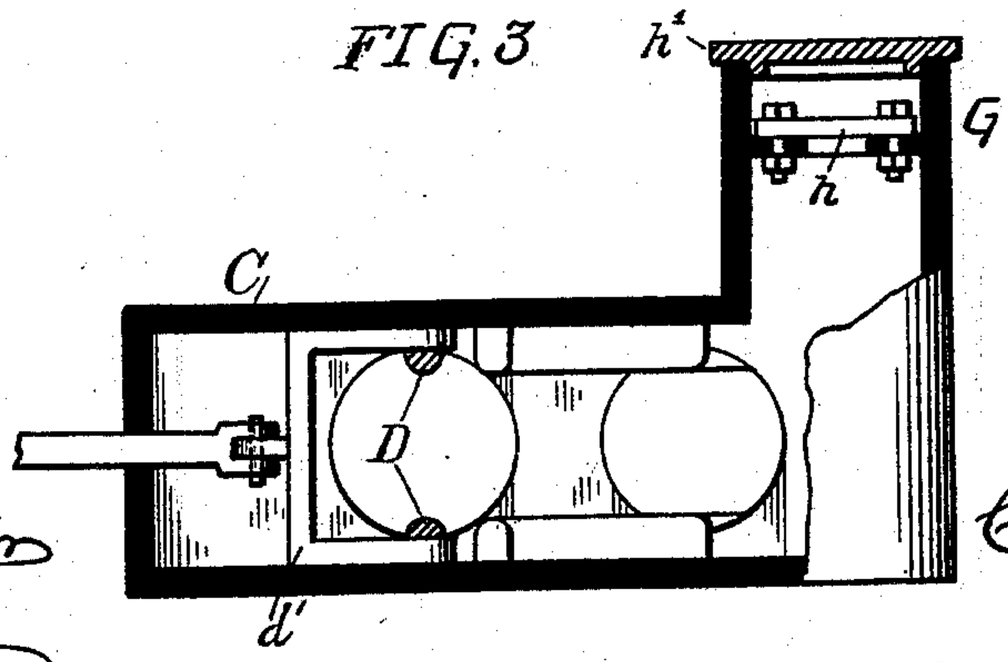


FIG. 1

FIG. 2

FIG. 3



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Jno E. Parker
J. Henderson

Inventor:
Charles F. Pike,
by his attorney,
William A. Pike

(No Model.) 5 Sheets—Sheet 2.

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FIG. 4

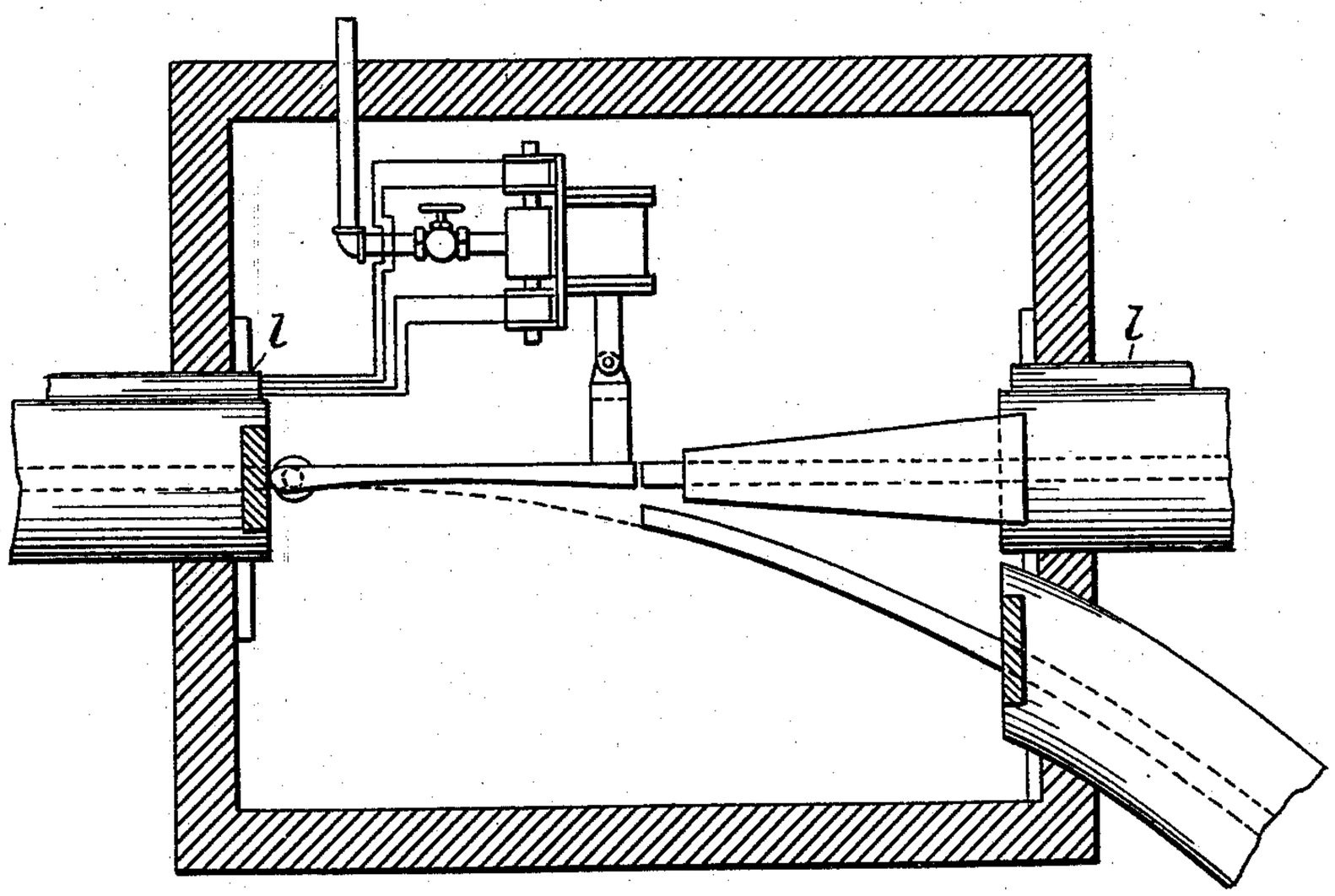
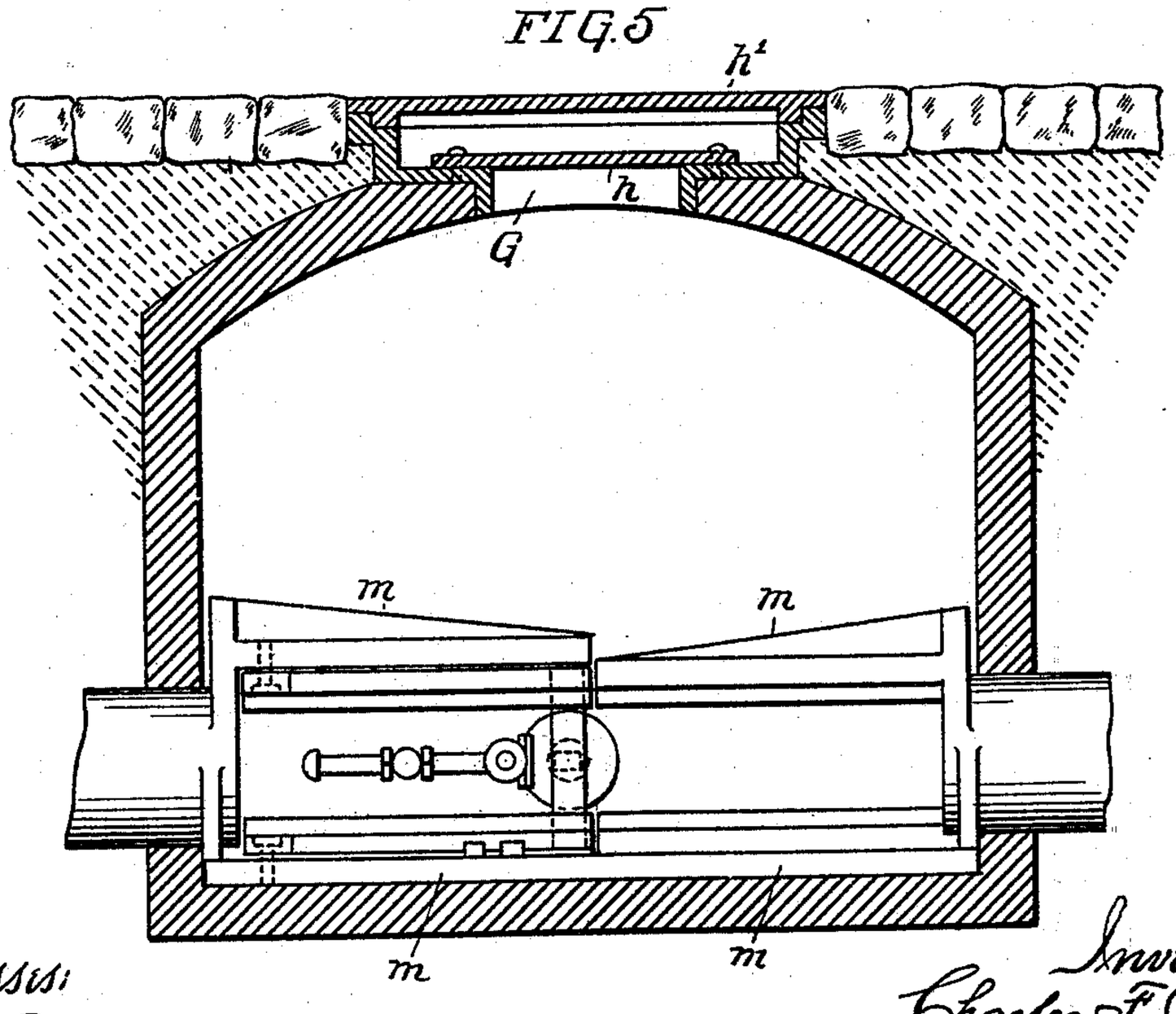


FIG. 5



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(No Model.) 5 Sheets—Sheet 3.

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FIG. 8

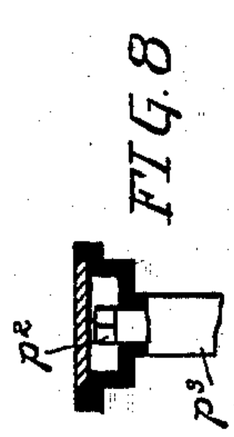


FIG. 6

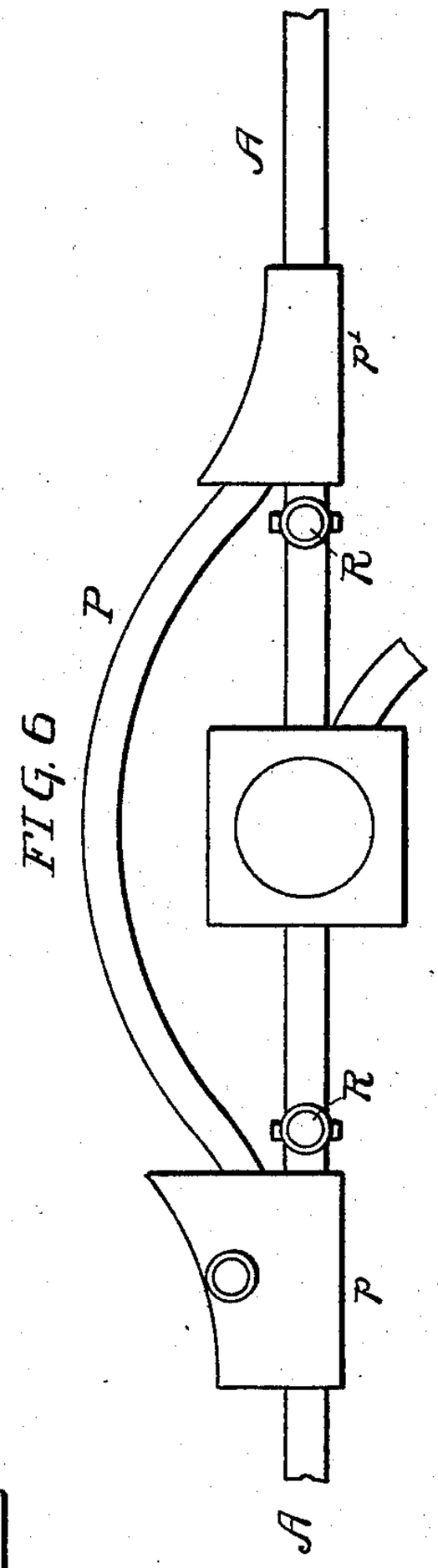


FIG. 7

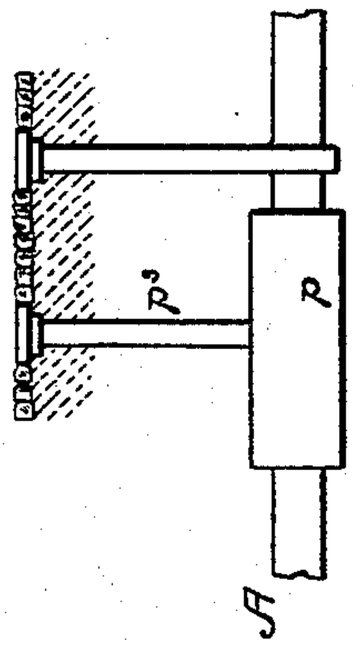
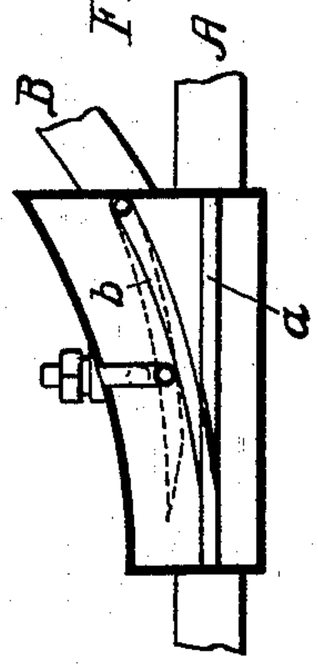


FIG. 9



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(No Model.) 5 Sheets—Sheet 4

C. F. PIKE.

SWITCH RAIL FOR PNEUMATIC DESPATCH TUBE SYSTEMS.

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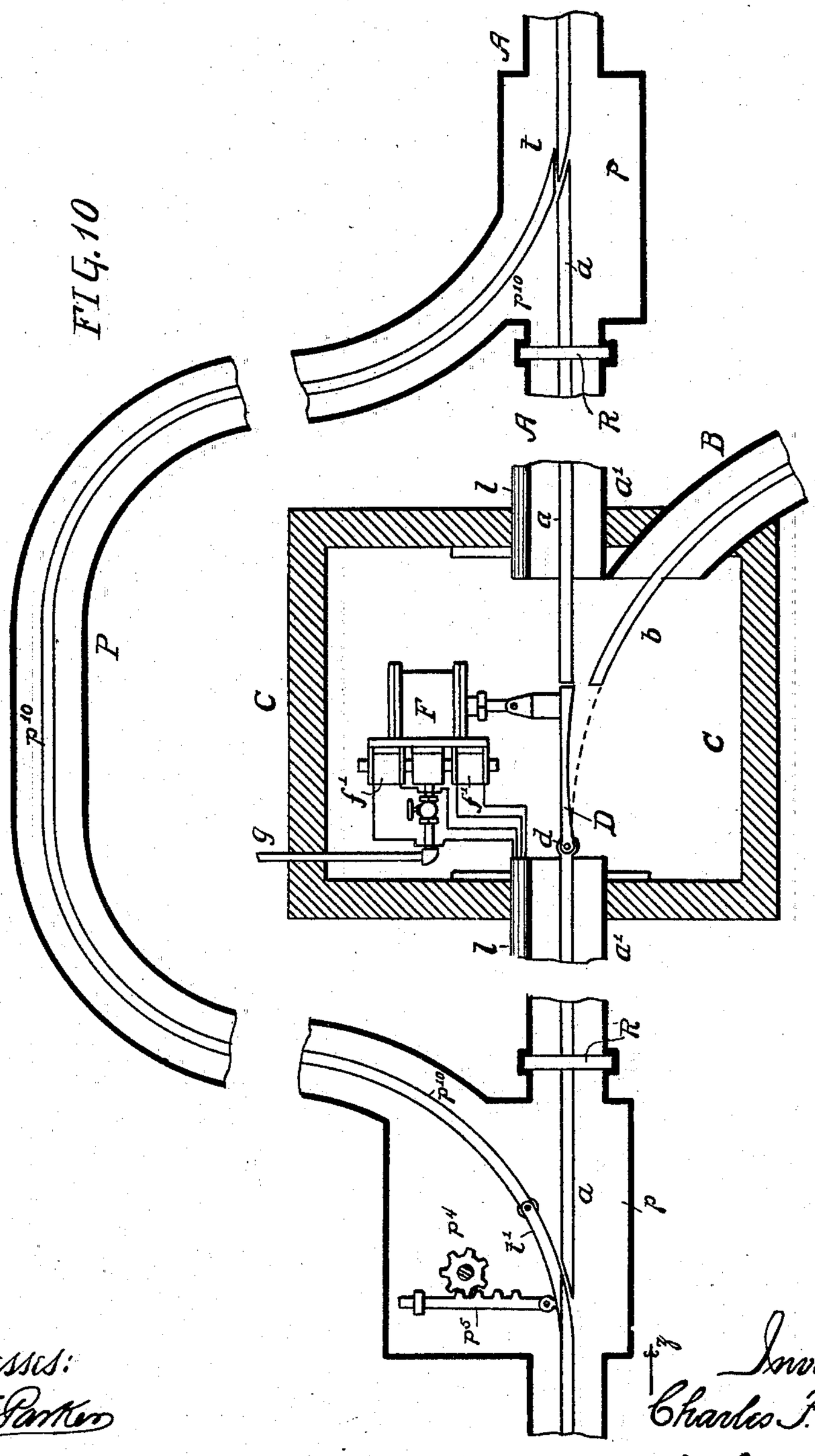
FIG. 10



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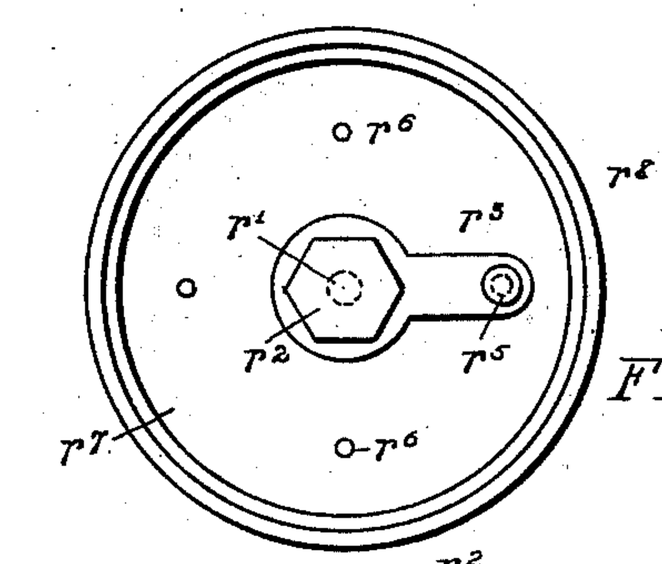

FIG. 12

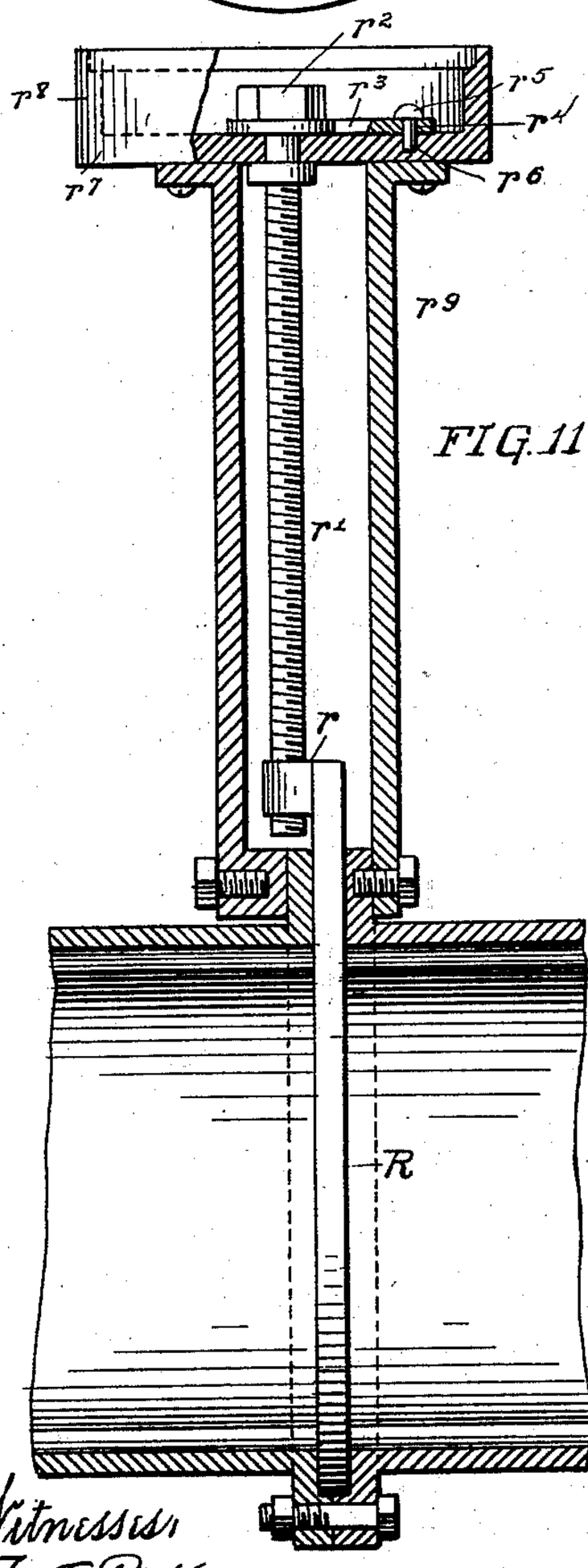

FIG. 11

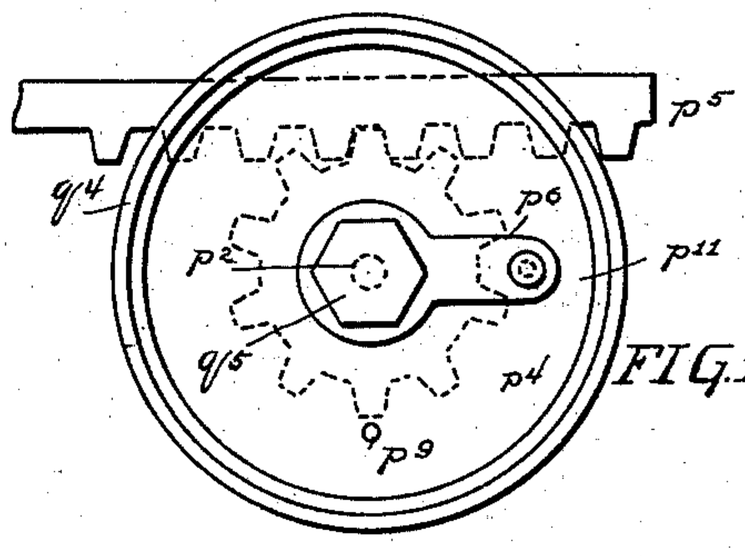

FIG. 14

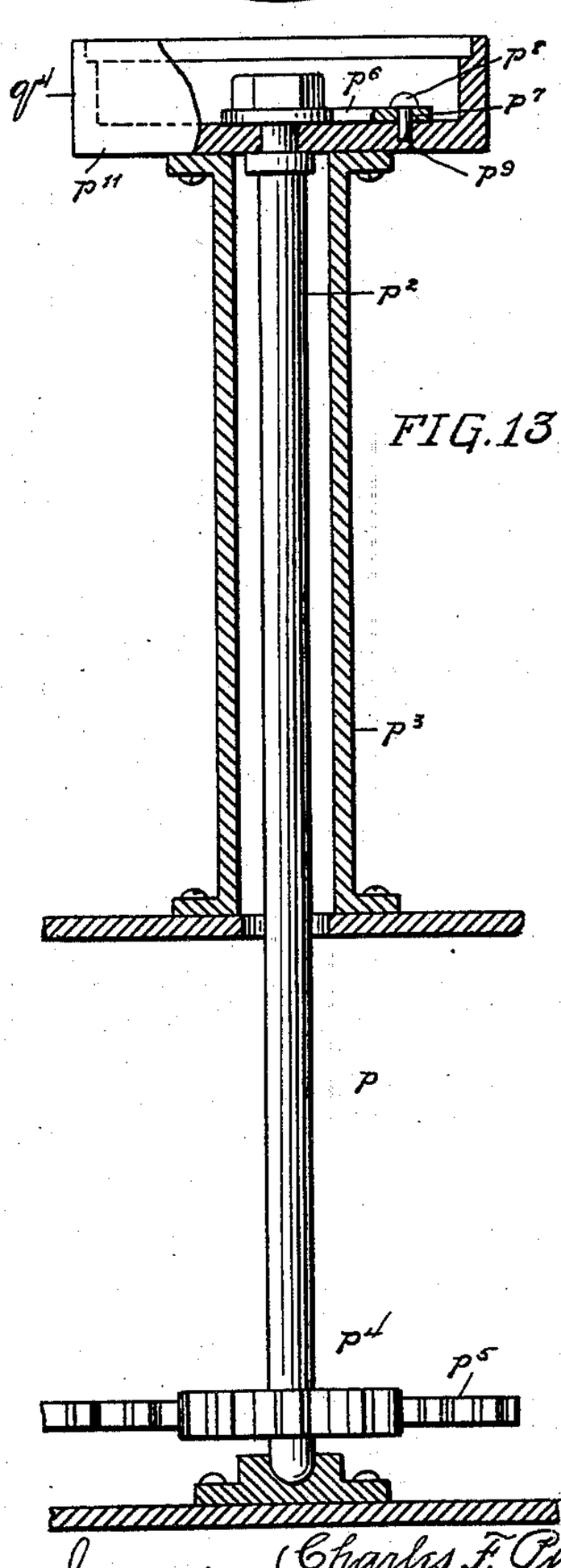

FIG. 13

Witnesses:
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UNITED STATES PATENT OFFICE.

CHARLES F. PIKE, OF PHILADELPHIA, PENNSYLVANIA.

SWITCH-RAIL FOR PNEUMATIC-DESPATCH-TUBE SYSTEMS.

SPECIFICATION forming part of Letters Patent No. 578,943, dated March 16, 1897.

Application filed May 31, 1895. Serial No. 551,216. (No model.)

To all whom it may concern:

Be it known that I, CHARLES F. PIKE, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Switch-Rails for Pneumatic-Despatch-Tube Systems, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention has relation generally to pneumatic-despatch or transit systems, and particularly to that form of the same wherein the tubes are provided with top and bottom ways or guides for the wheels of wheel-supported carriers to travel in or upon and in which suitable switches, employed for diverting the carriers from one part to another of the system, form a part of the top and bottom ways or guides, said switches being inclosed in air-tight boxes to which the diverging tubes join and having suitable actuating mechanism for setting and resetting them.

My invention has for its objects, first, simple, durable, efficient, and light-weight forms of switches for the system or for the top and bottom tubeways or guides, and, second, an economical and durable form of air-tight boxes or casings for the switches or for them and their actuating mechanism, said casings or boxes being so arranged that they are easy of access from the street or surface roadway when the system is laid underground, and such access is attainable for repairs or for other purposes without interfering with or delaying the traffic in or through the system.

My invention accordingly consists of the combinations, constructions, and arrangements of parts as hereinafter more particularly described in the specification and pointed out in the claims.

Reference is had to the accompanying drawings, wherein—

Figure 1 is a sectional plan showing the junction of a straight and a curved tube, top and bottom ways or guides in the tubes, air-tight switch-boxes joining said tubes and having top and bottom ways or guides corresponding to those in the tubes and a form of switches therein, and a form of power appliances for actuating the switches in accordance with my invention, the switches being shown set for the main or straight tube. Fig. 2 is a like view showing the switches set for the curved or diverging tube. Fig. 3 is a cross-section through the switch-box and showing a form of manhole for said box. Fig. 4 is a sectional plan of another form of switch-box and actuating mechanism for the switches located therein. Fig. 5 is a vertical section, partly in elevation, of the same. Fig. 6 is a plan of a main line and diverging tube joined by an air-tight switch box or casing, a loop tube connected with said main line, forming a run-around, air-tight boxes or casings at the junctions of the ends of the loop and the tube with which said ends join, and valves between the loop junction-boxes and said switch-box for cutting off the power and carriers from said switch-box and diverting the same to the loop to admit of access of the linemen to the switch-box for inspection or repairs without interfering with the traffic. Fig. 7 is an elevation of a loop junction-box and part of one of the straight tubes, with upwardly-extending pipes leading to the roadway-surface for inclosing actuating devices for moving the switch in the loop junction-box and for controlling the opening and closing of the gate or gates in said straight tube. Fig. 8 is a sectional view of a form of upper part of said upwardly-extending pipes, showing a form of actuating-stem in said pipes for said switch or gate. Fig. 9 is a sectional plan of loop junction-box and a form of switch therein. Fig. 10 is a sectional plan of Fig. 6, drawn to an enlarged scale. Fig. 11 is a sectional elevation, drawn to an enlarged scale, showing a form of pipe extension and actuating mechanism therein for the gates in the straight tube between the loop junction-boxes and the switch-box. Fig. 12 is a plan view of the top of extension-pipe shown in Fig. 11 with the cap or cover removed. Fig. 13 is a view similar to Fig. 11, showing a form of actuating mechanism for the switch in the loop junction-box indicated in Fig. 9 and to the left of Fig. 10; and Fig. 14 is a plan view of the top of the extension-pipe shown in Fig. 13 with cap or cover removed and also showing part of the actuating mechanism for said switch.

A represents the main or a straight line or other analogous tube of the system, and B a

curved or diverging line leading thereto. They are both broken away as they approach to junction and their respective ends a' and b' are joined to the ends of an air-tight casing or box C, in which are located the switches D for diverting the carriers from one to the other of said tubes. These boxes or casings C, I denominate "switch-boxes," as they inclose the main switches D of the system.

a and b respectively represent the ways or guides in the tubes A and B for the carrier-wheels to travel in or upon. As shown, said guides or ways are of the form of rails projecting into the bore of the tubes, but they may be of any other suitable form and be located relatively to the bore of the tubes, as desired. These ways or guides extend into the switch-box C, as illustrated, and are cut away therein, as indicated at x, and in this cut-away part are located the switch or switches D.

If the tubes A and B and the switch-box C have top and bottom ways or guides $a\ a$ and $b\ b$, respectively, corresponding top and bottom switches should be provided, as shown more plainly in Fig. 3, which have substantially the same cross-section as that of the ways or guides $a\ b$.

As shown, the switches D are single or tongue switches pivoted or otherwise loosely connected at d to the casings or boxes C. When top and bottom switches D are used, they are connected by a frame d' near their free ends, which frame supports the free end of the upper switch and prevents said end from sagging downwardly. (See more plainly Fig. 3.) Frame d' is bifurcated or U-shaped, so that its vertical side extends beyond the body or path of the carriers, so as not to interfere with their movement or travel over the switches. These single-tongue switches D have one straight side d^2 and a curved side d^3, adapted, respectively, to the straight and curved guides or ways a and b when alternately moved to either of them.

The advantage of the curved side d^3 for the switches is that as the wheels of the carrier strike said curved side when the switch is set for guides or ways b said wheels hug the curved side d^3 throughout its length and the carrier is gradually diverted along said curved side to meet the ways b without undue friction or grinding action of the carrier-wheels against the side of the switch, which would be the case if said side d^3 were straight.

The switch boxes or casings C may be of any suitable form and material. If for small diameter of tubes, they are preferably provided with a removable top or side for access thereto, but for tubes of large diameter or cross-sectional area, which admit of access thereto of the linemen, they may be constructed as the demands of service and their location above or below ground require and be provided with manholes, as hereinafter set forth.

The switches D may be actuated as desired. In the drawings a compressed-air, vacuum, or other power cylinder F is shown for actuating the switches, said cylinder having a power-controlling valve f, which may be electrically controlled by oppositely-located magnets or solenoids f' to admit the power from the supply-pipe g to the cylinder at either end for actuating the switches.

As any suitable power or other appliances may be employed for setting the switches I do not confine myself to the forms shown and described, but I consider said forms useful for large and heavy switches on account of quick and positive action and also as the use of the motive power of the system is available for operating the same.

In Figs. 1, 2, and 3 I have shown these power appliances located outside of the switch-boxes C, while in Figs. 4, 5, and 10 they are inclosed within the switch-boxes C. When the latter are on the surface or below the same, they may be provided with manholes G, attached to or built up from said boxes C, as shown in Fig. 3, and these holes are preferably provided with an inner sealed lid or cover h and an outer or surface cover h' to maintain the air-tight condition of the switch casings or boxes C. When the tubes are laid underground, the switch boxes or casings C may be built up around the tubes, as indicated more plainly in Figs. 4, 5, and 10, the top of the switch casing or box C, if desired, approaching the surface and having thereat a manhole G with double covers $h\ h'$. In such cases the casing-walls may be of brick or cement, or both, so as to be air-tight, and suitable supports or brackets m extend from the ends a' and b' of the tubes A and B, leading into said casing for supporting the switches D and the ways or guides a and b in said casing or box. (See more plainly Fig. 5.) In this form of switch-casing C it is preferably made large enough to accommodate the actuating devices for the switches.

In order to admit of access of the linemen to the switch boxes or casings C without interfering with the traffic and danger to said attendants, a loop or run-around P is provided, and at the junctions of the ends of the loop with the tube A are provided loop junction boxes or casings $p\ p'$ of any suitable construction. (See more plainly Figs. 6 to 14, inclusive, and particularly Fig. 10.) In tube A, between the switch boxes or casings C and the loop-end junction-boxes $p\ p'$ are located gates or valves R R, which, when down or closed, cut out that portion of the tube A between the valves R R, including the casing or box C, from the system to divert the traffic or motive power to the loop P.

In loop-end junction-box p' a suitably-arranged frog t is provided for the ways a and p^{10} in tube A and loop P, respectively, and in the other loop-end junction-box p is located a pivoted tongue or other switch t'. It and the gates R in tube A are preferably provided with actuating mechanism manually con-

trolled. In the drawings I have shown the gates R, having a threaded lug r, (see more plainly Figs. 11 and 12,) engaging a stem r', which has at its upper end a turning-nut r^2 and a finger r^3, which turns with the stem r', and has near its outer end an opening r^4, through which passes a pin r^5 into a registering opening r^6 in the lower side r^7 of the cap r^8 of pipe extensions r^9, projecting upwardly from gates R R. By turning screw-stem r' with a crank or handle applied to nut r^2 the gates R are raised and lowered and are locked in said respective positions by the pin r^5, passing through finger-opening r^4 and one of the registering openings r^6. The switch t' in loop-end box p is manually operated by means of a stem or shaft p^2, projecting upwardly through suitable pipe-casings p^3, and having at its lower end a gear-wheel p^4, engaging a rack p^5, suitably mounted in loop junction-box p and engaging with the switch t', as shown more plainly in Figs. 10, 13, and 14. Said pipe p^3 has an upper cap q^4, a shaft or stem p^2, a turning-nut q^5, a finger p^6, with opening p^7 for the pin p^8 to pass through and engage with registering opening p^9 in the lower side p^{11} of cap p^4, the same as described for the pipe r^9 and stem r' for gates R R. The caps r^8 and p^4 are provided with suitable covers, as shown. The valves R are normally open or raised and the switches t' are normally set, as indicated in dotted lines, Fig. 9, to open the tube A to the carriers or close loop P to the same.

The electrical circuits for the electrically-actuated devices in the casings C are suitably led into and out of the same, as desired, or as shown at l, Figs. 4 and 10.

It will be noted that the foregoing improvements are especially adapted for tubes of large diameter or cross-sectional area where the switches to be moved would be of some length and weight. The switches D are, however, also adapted for small tubes, in which case other devices than power appliances may be substituted for actuating the switches.

If desired, instead of having the single switch D (shown in Figs. 1 and 2) for switch box or casing C) movable into the path of the different leading lines the switch t' for loop junction-box p, Fig. 10, may be substituted, in which case said switch t', when in switch-box C, moves to and from the way or guide a and forms a part of the curved guide or way b. The straight way or guide is immovable, but transversely grooved to permit the carrier-wheels to pass over it when a carrier is diverted from one tube to another, and the free end of the switch is chamfered or feathered to aline with the straight way or guide a when set thereto, the same as if located in loop-junction p. The power or other actuating appliance F may connect with and move such substituted curved switch the same as for switch D. In other words, the switches in switch-box C and loop junction-box p may be identical in construction, if desired, or they may vary and have the same or different actuating mechanism, as desired, or the demands of service require.

It is obvious that the extension-pipes p^3 and r^9 from the switch-boxes and tubes and the loop P, gates r, and switch t' may be used in connection with systems of pneumatic tubes which are unprovided with ways or guides a b, or those in which the carriers therefor are not wheel-supported. So, too, it is obvious that the details of construction and arrangement of parts may be greatly changed without departing from the spirit of my invention.

Having thus described my invention, what I desire to claim and secure by Letters Patent is—

1. In a pneumatic-despatch-tube system, the single switch D composed of upper and lower members united together at their free ends, pivoted at their opposite ends, and having a straight and a curved side, substantially as set forth.

2. In a pneumatic-despatch system the combination of tube A, a loop or run-around P, junction-boxes for said tubes A and P, gates in tube A between said junction-boxes, actuating mechanism for said gates, a switch in one of said junction-boxes and actuating mechanism for setting said switch, substantially as set forth.

3. In a pneumatic-tube system, the combination of diverging or differently-leading lines A and B, switch-box C at the junction of said tubes, gates or valves R R in tube A, actuating mechanism therefor, a loop or run-around P having end junction-boxes $p\,p'$ with tube A, a switch in box p and actuating mechanism, substantially as set forth.

4. In a pneumatic-tube system the combination of tube A having gates R R upwardly-extending pipes r^9 from said tube, caps r^8 for the pipes r^9 and actuating mechanism for gates R R inclosed in said pipes r^9 and caps r^8, substantially as set forth.

5. In a pneumatic-tube system, the combination of a loop-end junction-box p, a switch t' in said box, a pipe p^3 extending upwardly from said box, a cap p^4 for said pipe p^3 and actuating mechanism for the switch inclosed in said pipe p^3 and cap p^4, substantially as set forth.

In testimony whereof I have affixed my signature in presence of two witnesses.

CHARLES F. PIKE.

Witnesses:

THOS. S. RODGERS,

JOHN H. HUDSON.