No. 747,599. PATENTED DEC. 22, 1903.

E. A. FORDYCE.

SELECTIVE DEVICE FOR PNEUMATIC DESPATCH TUBE SYSTEMS.

APPLICATION FILED FEB. 14, 1902.

NO MODEL. 4 SHEETS—SHEET 1.

Fig. 1.

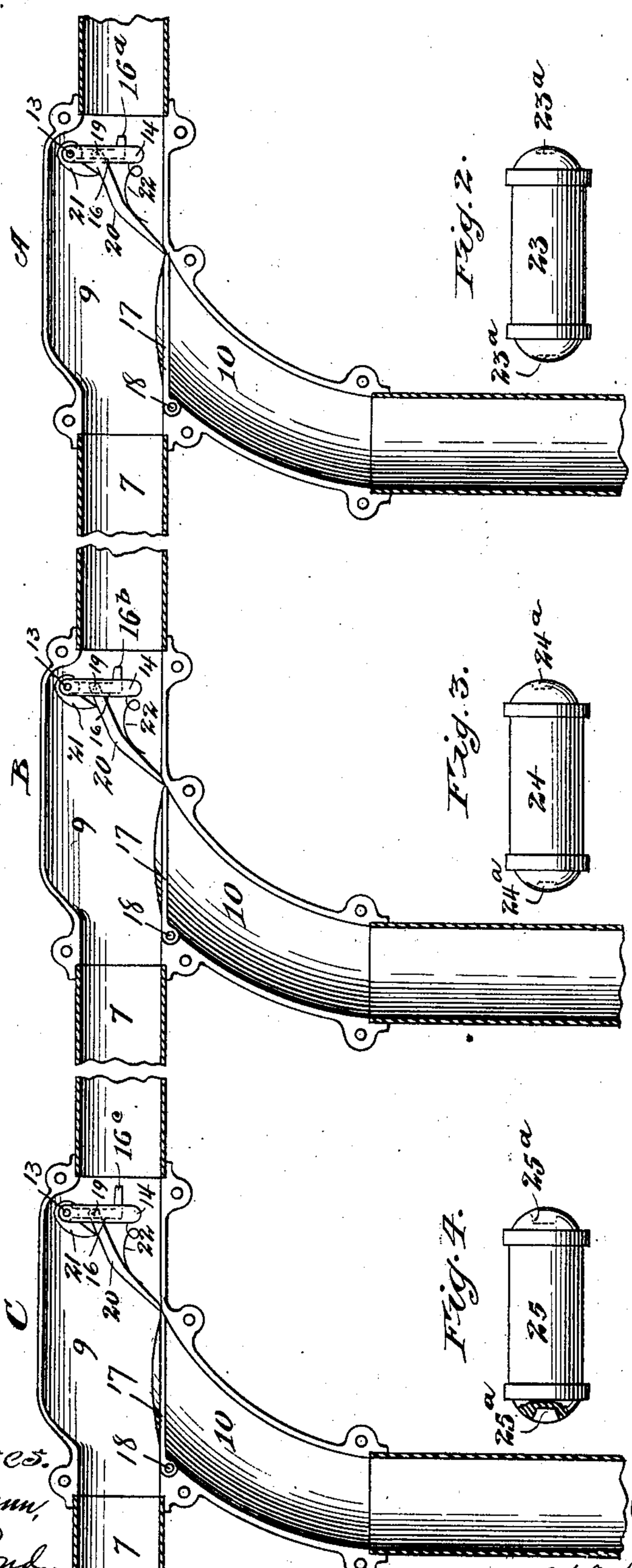


Fig. 2.




Fig. 3.




Fig. 4.




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NO MODEL. 4 SHEETS—SHEET 2.

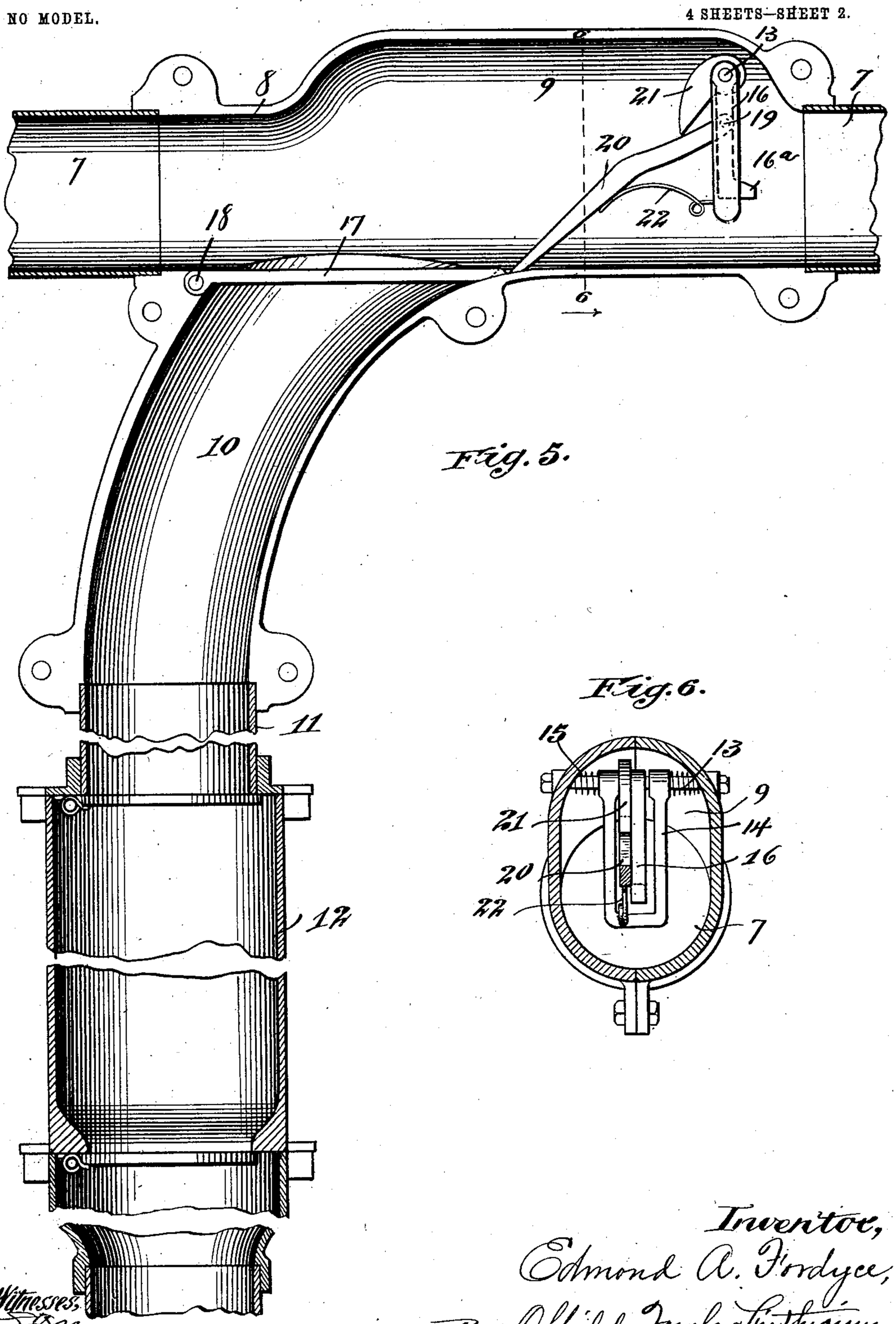


Fig. 5.

Fig. 6.




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NO MODEL. 4 SHEETS—SHEET 3.

Fig. 7.

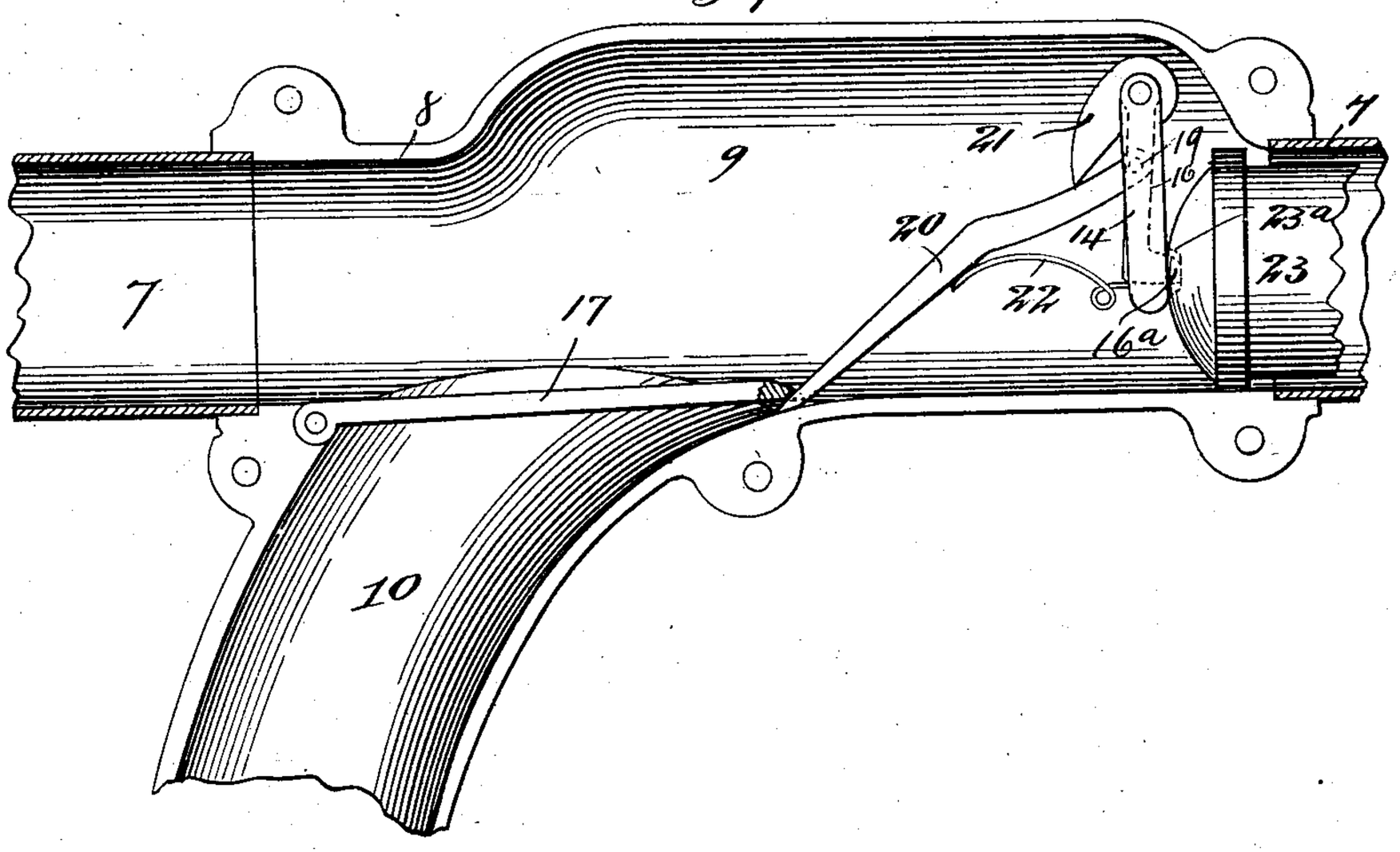
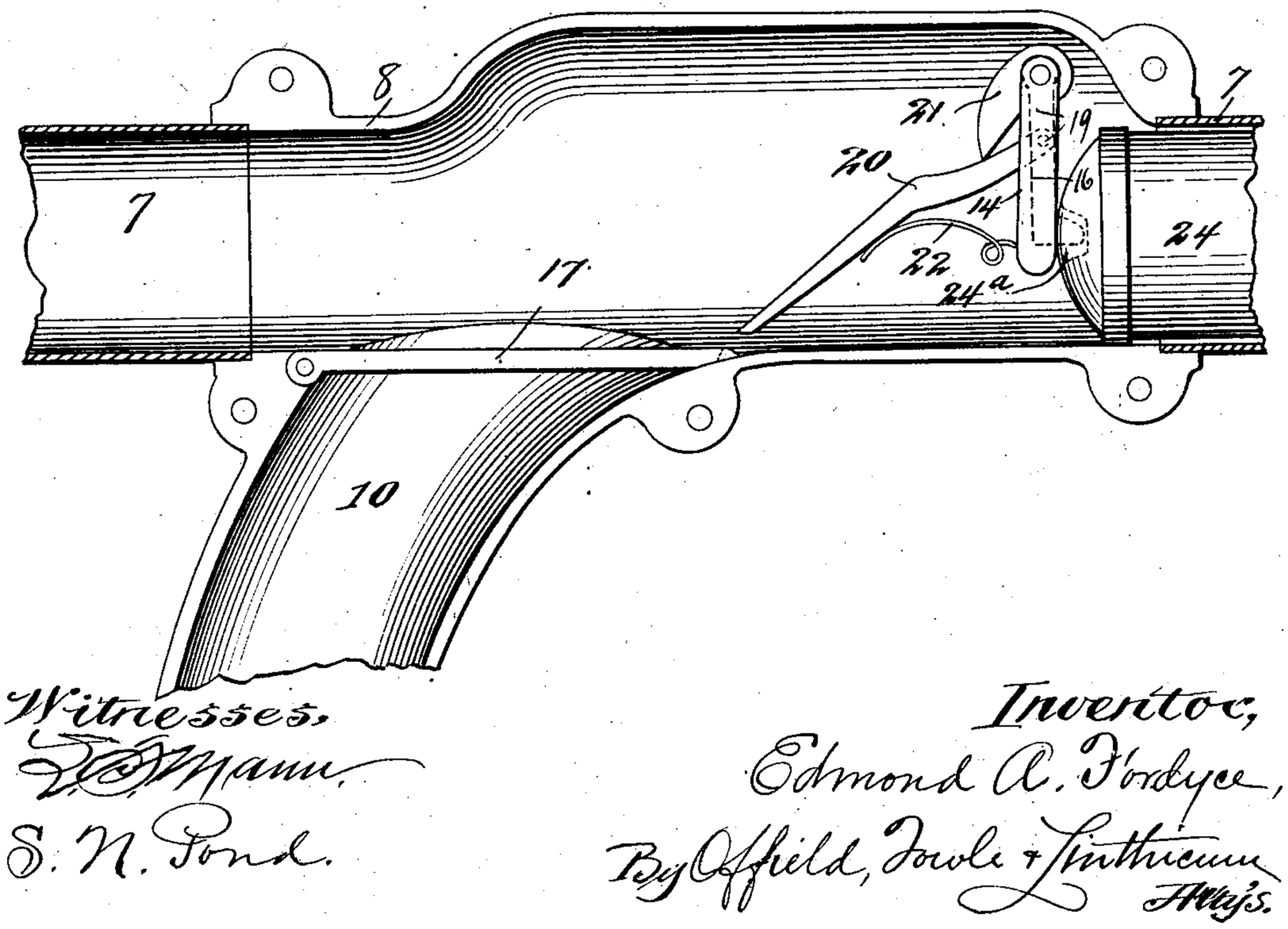



Fig. 9.

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NO MODEL. 4 SHEETS—SHEET 4.

Fig. 8.

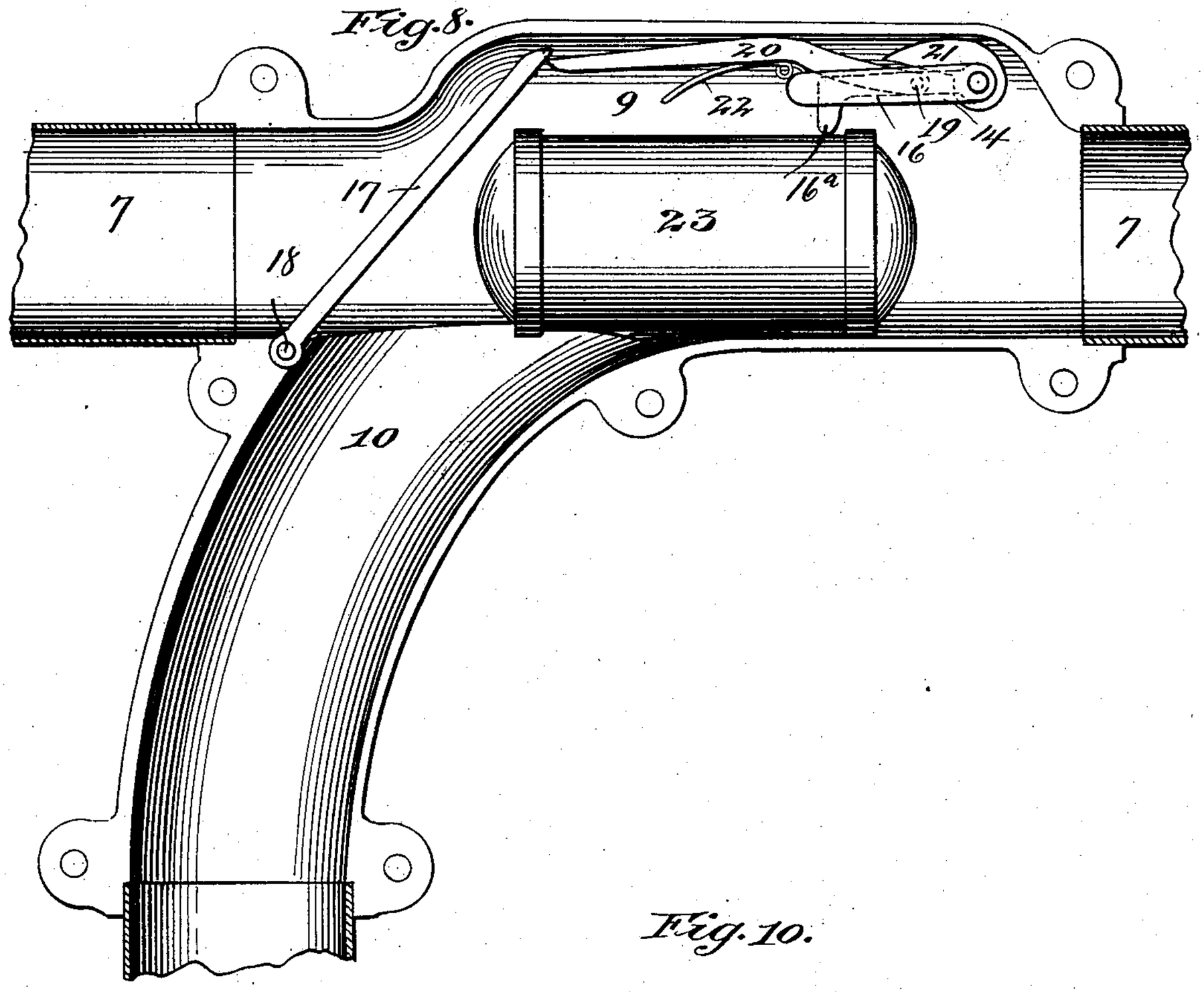
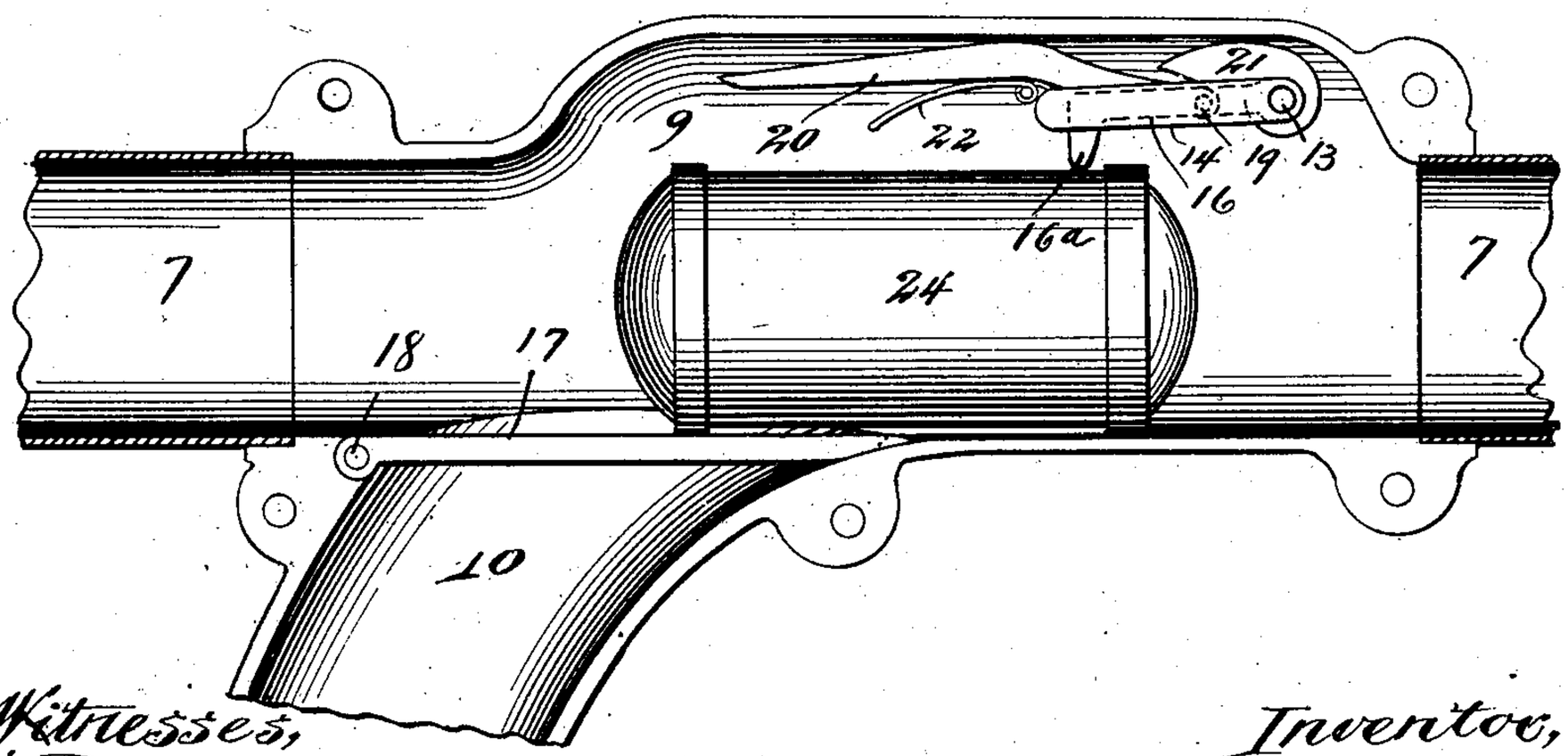



Fig. 10.

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No. 747,599. Patented December 22, 1903.

# UNITED STATES PATENT OFFICE.

EDMOND A. FORDYCE, OF CHICAGO, ILLINOIS.

## SELECTIVE DEVICE FOR PNEUMATIC-DESPATCH-TUBE SYSTEMS.

SPECIFICATION forming part of Letters Patent No. 747,599, dated December 22, 1903.

Application filed February 14, 1902. Serial No. 94,143. (No model.)

*To all whom it may concern:*

Be it known that I, EDMOND A. FORDYCE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Selective Devices for Pneumatic-Despatch-Tube Systems, of which the following is a specification.

My invention relates to pneumatic-despatch-tube systems, and has reference more particularly to the provision in connection therewith of automatic carrier selective devices designed to effect the discharge of each carrier of the system from a main line tube to the branch tube leading to its appropriate station. Devices of this general character have heretofore been devised wherein the switch-operating mechanism at the junction of each branch tube with the main tube has been actuated by selecting devices applied to the carriers, such as disks of varying diameters or pins of varying lengths applied to the heads of the carriers or, in connection with electrical actuating means, variously-spaced contact points or rings located on the cylindrical body or heads of the carriers.

A prime feature of my invention resides in a mechanism, as hereinafter described and claimed, for effecting the automatic selection of the appropriate switches through the agency of holes or recesses of varying depths formed in the ends of the carriers and preferably in the lines of the longitudinal axes thereof, while another feature of the invention resides in a novel switch-actuating mechanism contained wholly within the switch-casing, where it is completely protected from external influences tending to injure or derange the same.

The general object of my invention is to provide an improved and simplified switch-selecting device adapted to be automatically actuated by its appropriate carrier and permit the passage thereby of the other carriers of the line; and to this end my invention consists of the novel combinations and arrangements of elements composing a mechanism of this character substantially as hereinafter described, and set forth in the claims.

My invention in a preferred form is illustrated in the accompanying drawings, in which—

Figure 1 illustrates a section of the main line of a pneumatic-tube system, showing the junctions of a series of branch tubes therewith and the application of my invention to said junctions. Figs. 2, 3, and 4 are detail side elevational views of carriers adapted to serve the respective branch stations illustrated in Fig. 1, in association with which they are respectively shown. Fig. 5 is a view in central vertical section of a junction of the main tube and one of its branches, showing my invention applied thereto. Fig. 6 is a transverse vertical section on the line 2 2 of Fig. 5 looking in the direction of the arrow. Fig. 7 is a view similar to the upper portion of Fig. 5, illustrating the operation of the switch mechanism at the initial engagement therewith of a carrier intended to be discharged thereby. Fig. 8 is a view similar to Fig. 7, but showing the switch opened and the carrier about to be shunted into the branch tube. Fig. 9 is a view similar to Fig. 7, but illustrating the operation of the switch mechanism when coöperating with a carrier not intended to be discharged thereby; and Fig. 10 is a similar view showing the switch-actuating mechanism idly swung out of the way by the through carrier shown in Fig. 9.

Referring to the drawings, 7 designates a main line of tubing in which are interposed at various points junctions A B C, &c., at which carriers are designed to be switched out of the main tube to be sent to their respective branch stations. At each of these junctions is located a casing (designated as a whole by 8) preferably made as a casting in longitudinal halves adapted to be bolted together and containing a switch-chamber 9 and a depending curved branch 10, in the lower end of which latter is secured the upper end of a branch tube 11, leading to a discharge-terminal 12. At each of the junctions A, B, and C is located a switch-casing and branch tube constructed as already described, and within each casing is a switch guarding the branch tube and a switch-operating mechanism, which is itself actuated to open the switch by the contact therewith of its appropriate carrier while it is idly actuated by and to permit the passage therebeyond of carriers destined for stations farther along the line. In view of the fact that the switch-operating

mechanism at all of the several junctions is identical, with the exception merely of the variation in the size of that element which constitutes the carrier selecting device, a description of the mechanism at one junction will suffice for all.

Through and between the side walls of the casing 8, near one end thereof and above the path of travel of the carriers therethrough, is secured a horizontal pin 13, on which is loosely hung a U-shaped trigger 14, Fig. 6, said trigger being provided with one or more springs 15, here shown as encircling the pin 13 and normally tending to maintain the trigger in its vertically-depending position directly across and in the path of travel of the carriers. Also loosely mounted on the pin 13 between the sides of the U-shaped trigger 14 is a tripping-lever 16, the lower end of which has a horizontally and rearwardly extending toe which at the several branches is formed of varying lengths and projects from varying distances in rear of the trigger 14, as shown at $16^a$, $16^b$, and $16^c$, Fig. 1, it being observed that the lever having the shortest toe $16^a$ is located nearest the central station, while the lever having the longest toe is located at the branch most remote from the central station. The purpose of this peculiarity of construction will appear later.

17 designates a switch pivoted at 18 and lying across the upper end of the branch 10 and when closed serving to insure the safe passage of all carriers thereover that are not intended for the particular branch guarded by it.

To the lever 16, a short distance below its point of suspension, is pivoted at 19 a switch-operating arm 20, which, as shown in Fig. 5, normally lies in an inclined position in advance of the lever 16 and across the path of travel of the carriers, with its point disposed closely adjacent and just in front of the free end of the switch 17. Rigid with the trigger 14 at its point of suspension on the rod 13 is a shoulder-piece 21, the free pointed end of which extends forwardly and downwardly and overrides the upper edge of the switch-actuating arm 20. This shoulder-piece 21 is of course subject to the effect of the springs 15, which tend to keep it constantly pressed by a light downward pressure upon the back of said switch-actuating arm. Between the lower end of the trigger 14 and the under side of the arm 20 is interposed a bent leaf-spring 22, this spring being of sufficient stiffness to impart to the arm 20 an upward movement upon the actuation of the trigger by the carrier, but at the same time permitting a folding movement between said parts in their elevated position when swung up to provide a clearance for a through carrier.

As already stated, the switch-operating devices at the several junctions A, B, and C are alike, except for variations in the length of the horizontal projections $16^a$, $16^b$, and $16^c$ of the several levers 16.

Referring now to Figs. 2, 3, and 4, which illustrate the several carriers adapted for service at the several receiving branch terminals joining the main line at the junctions A, B, and C, respectively, it will be observed that these carriers (designated by 23, 24, and 25, respectively) are formed with holes in the outer faces of their respective heads. The holes $23^a$ of the carrier 23 are comparatively shallow, the corresponding holes $24^a$ of the carrier 24 are somewhat deeper, while the holes $25^a$ of the carrier 25 are deeper still. The holes on all of the carriers are so located that when the carriers are in transit they will be directly in line with the rearwardly-projecting toes $16^a$, $16^b$, and $16^c$ of the several tripping-levers 16, and the latter will preferably be made of such a length as to engage the carriers in the line of their longitudinal axes. The holes are, furthermore, preferably made with outwardly-flaring and rounded walls, as shown, and the upper edge of the projections of the tripping-levers 16 are correspondingly inclined and rounded to eliminate any sharp angles or corners which might cause the carrier to become hooked and hung on any of the tripping-levers, it being noted that the latter is designed to be actuated solely by contact of the extremity of its toe with the bottom of the hole or recess in the carrier-head.

Bearing in mind the described organization and arrangement of the several switch mechanisms and their coöperating carriers, the operation of the system will be as follows: Assuming that the mechanism shown in Figs. 7 to 10, inclusive, is located at the junction A, which is nearest the despatcher's office, the carrier 23 upon approaching this junction engages the toe $16^a$ of the tripping-lever by the bottom of its shallow hole or recess $23^a$, and thereby swings said lever forwardly for a slight distance before the convex head of the carrier impinges the trigger 14. This slight rocking of the tripping-lever serves to advance the switch-actuating arm 20 sufficiently to carry its point beneath the point of the switch-tongue 17, as plainly shown in Fig. 7, in which movement the arm 20 is yieldingly depressed by its contact with the shoulder-piece 21. By the time the described engagement of the free ends or points of the arm 20 and switch-tongue 17 has fairly taken place the head of the carrier strikes the trigger 14, and the continued advance of the carrier swings both the tripping-lever and the trigger upwardly through a right angle into the roof of the switch-casing, as shown in Fig. 8, in which movement the arm 20 is also carried upwardly by the movement of the trigger transmitted through the spring 22, and the upward swing of the point of the arm 20 at the same time raises the point of the switch-tongue 17, thereby elevating the latter and opening the branch 10 for the free travel of the carrier thereinto and through to the receiving-terminal 12. It will thus be seen that the carrier 23 and all other similarly-formed carriers intended for

the branch terminal 12 are automatically switched at the first junction of the series and sent to their proper and intended point of delivery. Assume now that a carrier 24 intended for the outlying terminal which is connected with the main line at the junction B is to be sent. Figs. 9 and 10 serve to illustrate the manner in which this carrier passes the junction A, idly tripping the switch mechanism and without opening the branch tube thereat. The recesses 24ª in the ends of the carrier 24 have a depth greater than the length of the rearward projection or toe 16ª of the tripping-lever. Hence the latter enters the recess 24ª in the forward end of the carrier idly without being struck and rocked by the bottom of said recess, and the rounded head of the carrier strikes the trigger 14 and through the latter and the spring 22 raises the point of the arm 20 beyond any possibility of engagement with the switch-tongue 17 before the continued advance of the carrier has had any effect upon the tripping-lever. The arm 20 having thus been raised the trigger, tripping-lever, and arm are all idly swung by the further advance of the carrier up beneath the roof of the switch-casing, and the carrier passes safely over the closed switch-tongue 17 and continues its travel to the junction B. By virtue of the fact that the same relation exists between the carrier 24 and the tripping-lever at junction B as exists between carrier 23 and the tripping-lever at junction A the switch at junction B will be opened and the carrier diverted in exactly the manner already described in connection with carrier 23 at junction A. When the carrier 25 is to be sent to the most remote outlying station connected with the main line at the junction C, this carrier by virtue of the fact that the recesses in its heads are of greater depth than the corresponding recesses in either carrier 23 or carrier 24 will severally pass the junctions A and B, idly tripping the switch mechanisms thereat in the manner already described and will actuate the switch mechanism at its appropriate junction to effect its discharge in the manner already set forth in connection with carrier 23.

It will be observed that the switch-operating mechanism is contained entirely within the casings at the several junctions, being thereby protected from external accident and injury and, furthermore, obviating the unsightly appearance of such devices when located exteriorly of the casing and tube. It will also be observed that by making that element of the selecting mechanism which is borne by the carrier in the form of holes or recesses I do away with the employment of external projections—such as pins, disks, contact-plates, and the like—which are easily liable to injury and accidental misadjustment in the more or less severe handling which the carriers receive in the service of a busy system.

I do not limit my invention to the precise details of construction or the exact relative location of the elements as herein shown and described, since the same may obviously be varied to some extent by those familiar with this art without departing from the principle of my invention.

I claim—

1. In a despatch-tube system, the combination with a main tube and a series of branch tubes leading therefrom, of switches located at the junctions of the several branch tubes with the main tube, pivoted triggers disposed across the path of travel of the carriers in advance of said switches, pivoted tripping-levers disposed alongside said triggers and having projections extending to varying distances beyond the transverse planes of the triggers, switch-operating arms pivoted to and advanced by said tripping-levers into engaging relation to their respective switches, connections between the triggers and their respective switch-operating arms for raising the latter, and a series of carriers having graduated holes in their heads to coöperate with the graduated projections of the tripping-levers, substantially as described.

2. In a despatch-tube system, the combination with a main tube and a series of branch tubes leading therefrom, of pivoted switches guarding the junctions of the several branch tubes with the main tube, pivoted triggers yieldingly held in the path of travel of the carriers in advance of the free ends of said switches, tripping-levers pivotally suspended alongside said triggers and having projections extending longitudinally of the tube to varying distances beyond the transverse planes of the triggers, switch-operating arms pivoted to and advanced by said tripping-levers into engaging relation to the free ends of their respective switches, connections between the triggers and their respective switch-operating arms for raising the latter when the triggers are impacted by the heads of the carriers, and a series of carriers having holes in their heads of varying depths to coöperate with the graduated projections of the tripping-levers, substantially as described.

3. In a despatch-tube system, the combination with a main tube and a series of branch tubes leading therefrom, of pivoted switches guarding the junctions of the several branch tubes with the main tube, pivoted triggers yieldingly suspended in the path of travel of the carriers in advance of the free ends of said switches, tripping-levers pivotally suspended alongside said triggers and having horizontal projections extending longitudinally of the tube to varying distances beyond the transverse planes of the triggers, inclined switch-operating arms pivoted to said tripping-levers and normally lying with their free ends opposing the free ends of the switches and adapted to be longitudinally advanced thereunder by the forward swing of the tripping-levers, yielding connections between the triggers and their respective switch-operating

arms for raising the latter when the triggers are impacted by the heads of the carriers, and a series of carriers having holes in their heads of varying depths corresponding to the graduated projections of the tripping-levers, substantially as described.

4. In a despatch-tube system, the combination with a main tube and a series of branch tubes leading therefrom, of pivoted switch-tongues guarding the junctions of the several branch tubes with the main tube, pivoted triggers yieldingly suspended in the path of travel of the carriers in advance of the points of said switch-tongues, tripping-levers pivotally suspended alongside said triggers and having horizontal projections extending longitudinally of the tube to graduated distances beyond the transverse planes of the triggers, inclined switch-operating arms pivoted to said tripping-levers below their points of suspension and normally lying with their free ends opposing the points of the switch-tongues and adapted to be longitudinally advanced thereunder by the forward swing of the tripping-levers, overhanging shoulder-pieces fast with the triggers and normally overriding the backs of the switch-operating arms, springs interposed between the triggers and the switch-operating arms through which the latter are raised when the triggers are impacted by the heads of the carriers, and a series of carriers having holes in their heads of varying depths corresponding to the graduated projections of the tripping-levers, substantially as described.

5. In a despatch-tube system, the combination with a main tube and a series of branch tubes leading therefrom, of pivoted switch-tongues guarding the junctions of the several branch tubes with the main tube, U-shaped triggers yieldingly suspended in the path of travel of the carriers in advance of the points of said switch-tongues, tripping-levers pivotally suspended between the arms of said triggers and having graduated toes extending longitudinally of the tube beyond the transverse planes of the triggers, inclined switch-operating arms pivoted to said tripping-levers below their points of suspension and normally lying with their free ends opposing the points of the switch-tongues, overhanging shoulder-pieces rigid with the upper ends of the triggers and normally overriding the backs of the switch-operating arms, springs interposed between the triggers and the under sides of the switch-operating arms, and a series of carriers having holes in their heads of varying depths corresponding to the graduated toes of the tripping-levers, substantially as described.

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