

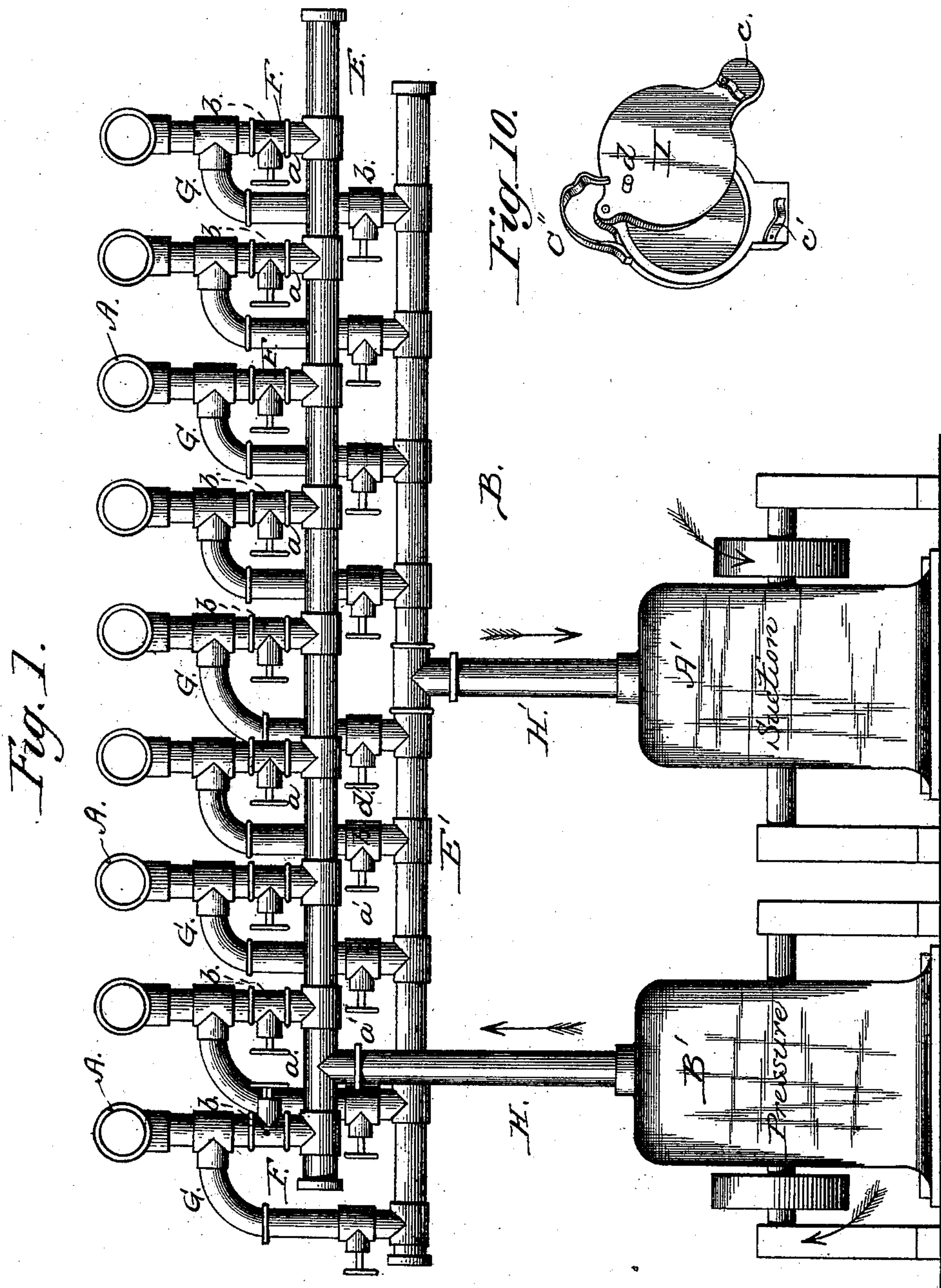
(No Model.)

3 Sheets—Sheet 1.

J. F. McLAUGHLIN.
ELECTRICAL PNEUMATIC DISPATCH TUBE.

No. 359,540.

Patented Mar. 15, 1887.



Witnesses

Harry S. Rohrer,

Geo. H. Dickson

Inventor

James F. McLaughlin

By his Attorney J. R. Harding

(No Model.)

3 Sheets—Sheet 2.

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Fig. 3.

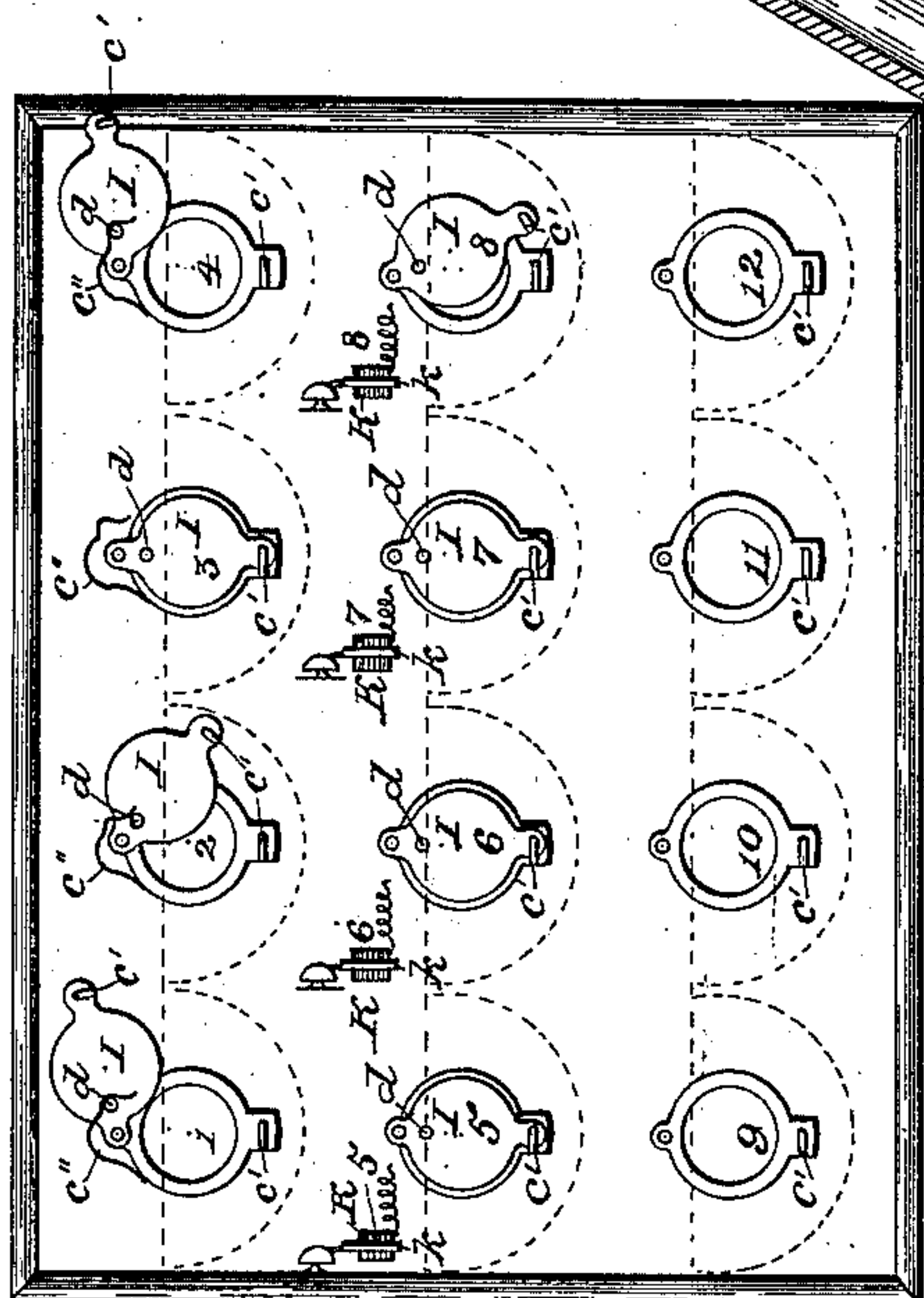
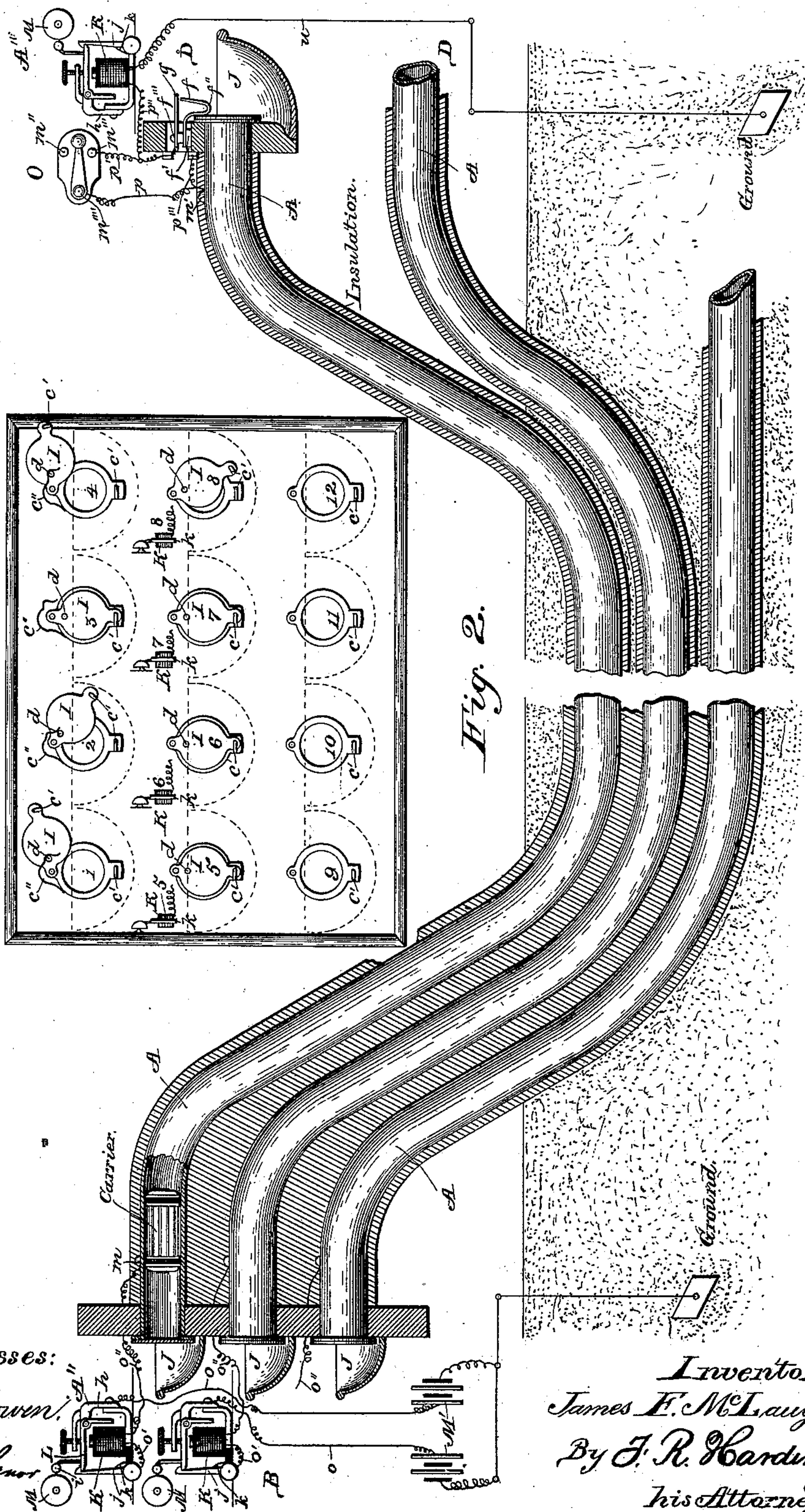


Fig. 2.



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(No Model.)

3 Sheets—Sheet 3.

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Fig. 7.

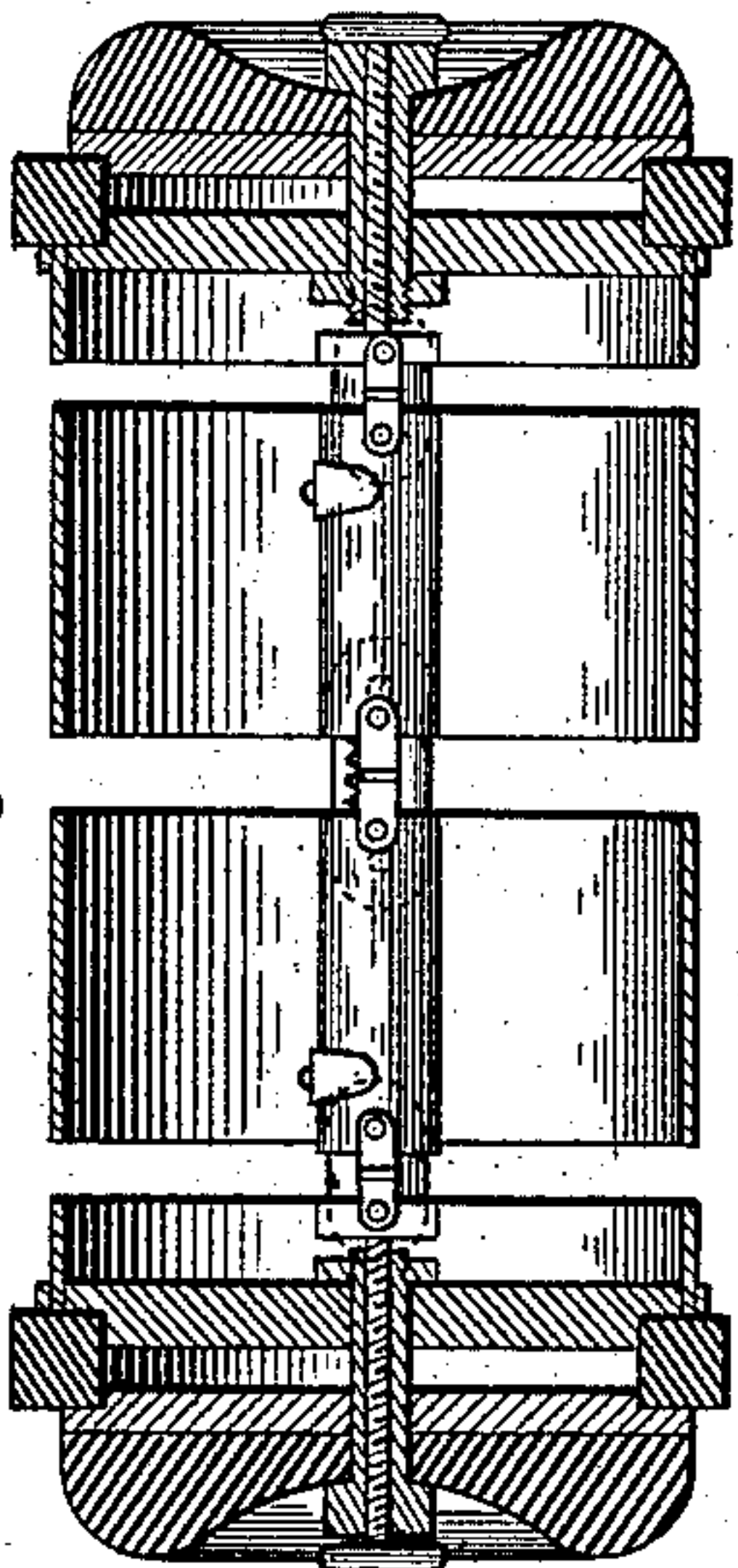


Fig. 8.

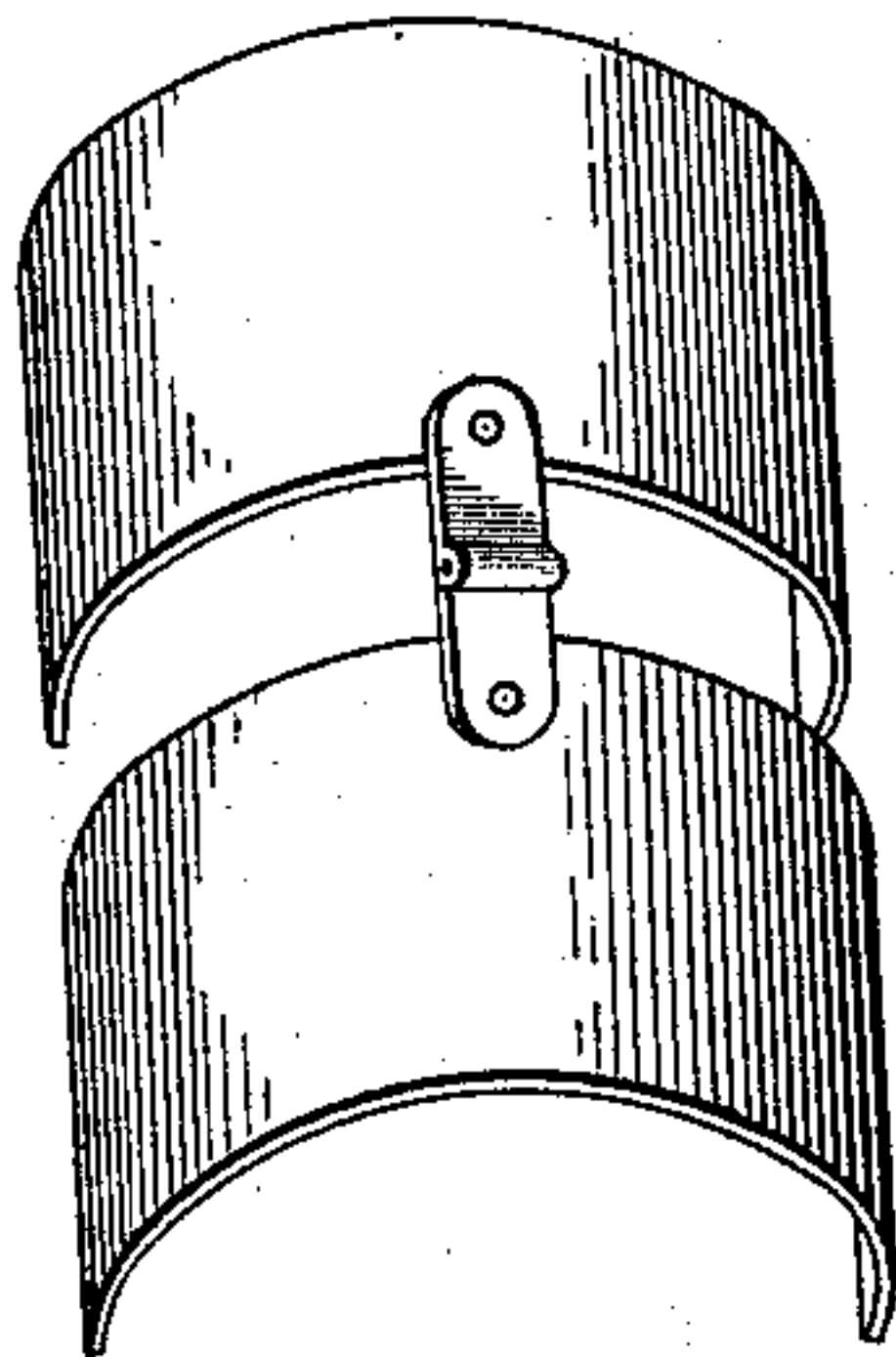


Fig. 9.



Fig. 6.

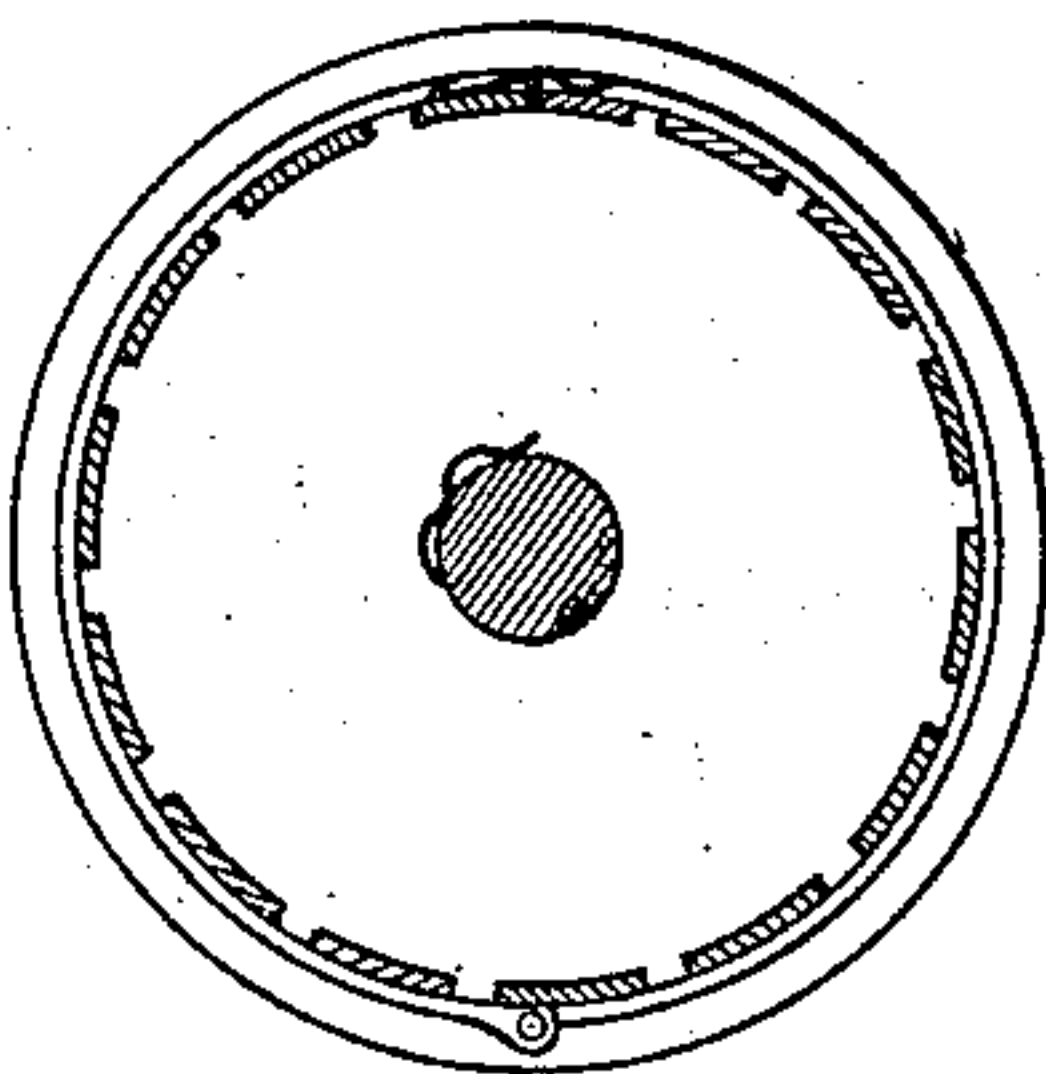


Fig. 5.

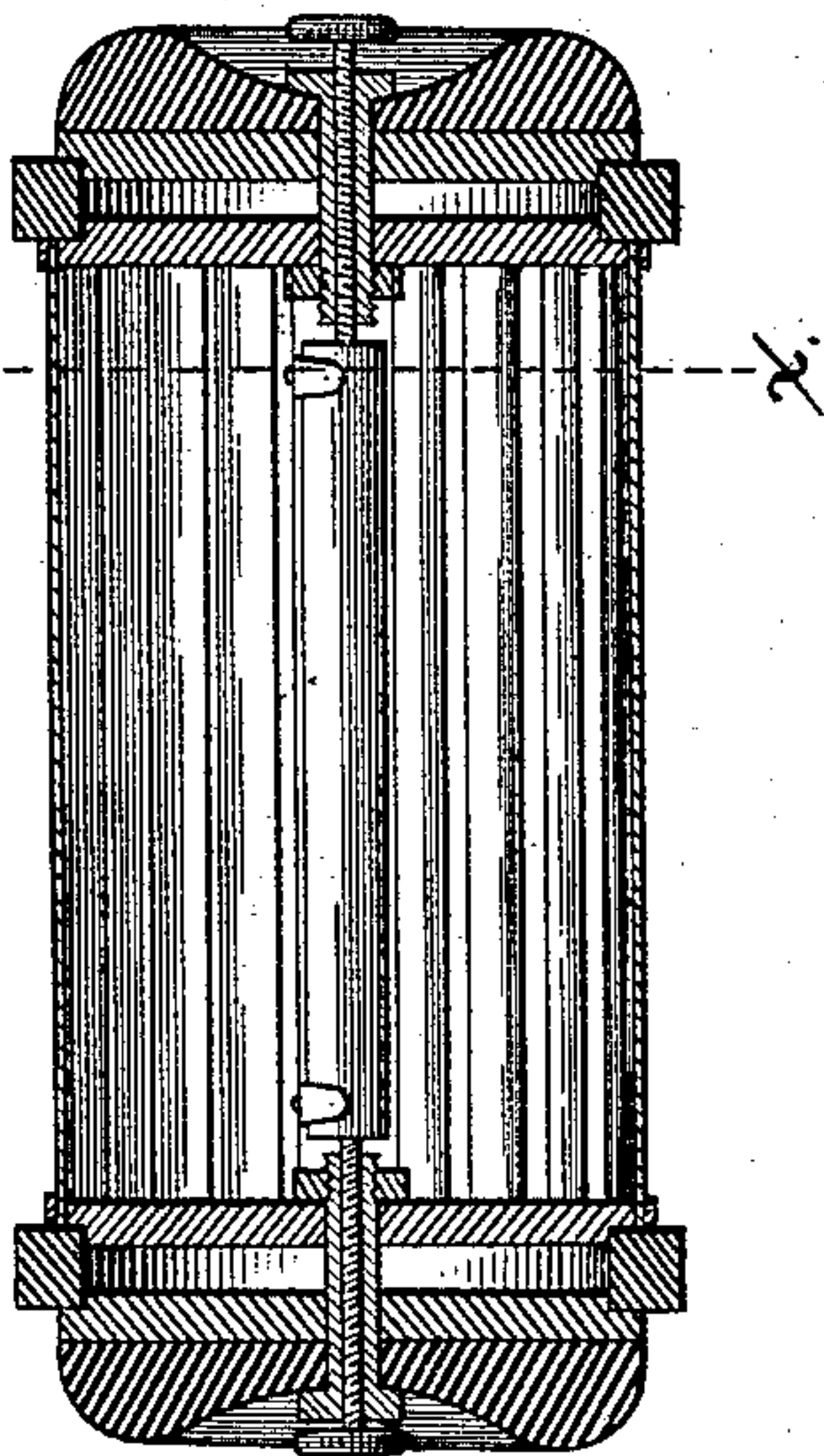
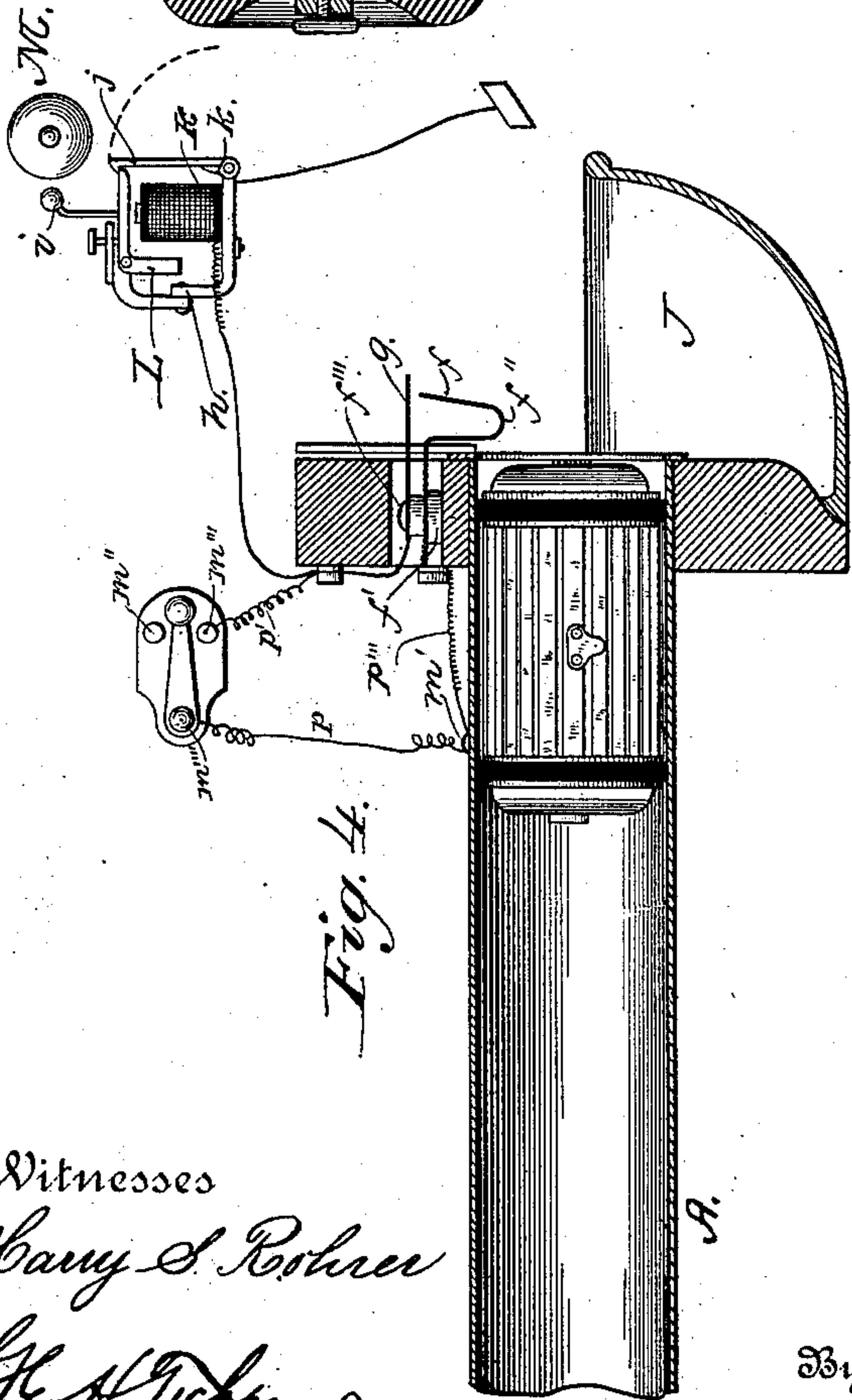


Fig. 4.



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UNITED STATES PATENT OFFICE.

JAMES F. McLAUGHLIN, OF PHILADELPHIA, PENNSYLVANIA.

ELECTRICAL PNEUMATIC DISPATCH-TUBE.

SPECIFICATION forming part of Letters Patent No. 359,540, dated March 15, 1887.

Application filed November 8, 1886. Serial No. 218,339. (No model.)

To all whom it may concern:

Be it known that I, JAMES F. McLAUGHLIN, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Electrical Pneumatic-Dispatch-Tube Systems and Exchanges; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification.

My invention relates to electro-pneumatic tube-dispatch systems for transmitting goods, parcels, letters, &c., from different initial or terminal stations located at suitable and intermediate points along the line through a system of underground pneumatic tubes properly arranged and provided with certain appurtenances and auxiliary devices essential to the proper operation and convenience of said system.

This invention has for its object, first, to construct and arrange an electro-pneumatic dispatch service or system in which one single tube serves the double purpose of both sending and receiving the carrier over the line between any one station and the central office or exchange, thereby simplifying the construction and operation of said system, insuring the certain delivery and return of the carrier, and dispensing with more than half of the tubes now in ordinary use in such systems; second, to furnish each tube with certain new and improved electro-mechanical devices for indicating the departure and arrival of the carrier to the operator, and, third, to provide means whereby the power applied for transmitting the carriers through said tubes or conveyers can be so changed and directed as to cause the said carrier to be forwarded or returned by the agency of the transmitting power and through the same tube.

With these ends in view my invention consists in certain details of construction, arrangement, and combination of parts, which will be more particularly and fully described hereinafter, and the points of novelty in which will be designated in the appended claims.

Referring to the accompanying drawings,

Figure 1 is a view in elevation of the exchange end of the different tubes, the pressure and suction blowers for imparting differential motion through the distributing-pipes to the carriers, the branches connecting the tubes proper with the distributing-pipes, and the valves for changing the motion from pressure to suction, or vice versa. Fig. 2 is an elevation, partly in section, showing the exchange and station ends of each underground tube and the electro-mechanical devices arranged on the ends thereof for signaling and operating the same at the arrival and departure of the carrier. Fig. 3 is a view in elevation of the exchange or switch end of the tubes, showing all the tubes congregated together and provided with the hinged doors for closing the ends thereof. Fig. 4 is an enlarged detail view, partly in section, showing the carrier within the tube and the devices arranged on the end thereof for signaling the arrival and departure of said carrier. Fig. 5 is a longitudinal sectional view of an improved carrier designed to fit and travel through the pneumatic tubes. Fig. 6 is a transverse section of the same. Fig. 7 is a longitudinal sectional view of carrier, showing hinged central shaft. Fig. 8 is a detail perspective view showing the manner of hinging the covering or ribs of the carrier. Fig. 9 is a perspective view of the central hinged flexible shaft of the carrier, which both serves the purpose of securing the parts of said carrier together and of a paper-roll, as will be hereinafter explained. Fig. 10 is a detail perspective view of one of the doors for the ends of the pneumatic tubes.

Like letters of reference mark the same parts in all the figures of the drawings.

Referring to the drawings by letters, A A A are a number of pneumatic tubes, arranged as shown, radiating from the central office or exchange-station B to the different initial stations D D, located at suitable or desirable points throughout the store, warehouse, or other locality in which the system is placed. The tubes are preferably arranged the most of their length underground, as shown in Fig. 2, with the ends connecting with the exchange or central office, B, and the stations D D emerging from under ground at convenient points near said stations, as shown in Fig. 2. These tubes are preferably made of iron of conven-

ient size to accommodate the carrier and the necessary thickness to withstand the pressure of transmitting power for the carriers. In this system, as before stated, there is but one tube connecting with any one station D and the exchange B which conveys the carrier to or from the exchange or central office B and the station, as will appear from the explanations given hereinafter.

In describing the hereinbefore-mentioned system, we will premise or suppose that it is located in a store or warehouse having a cashier's desk or bundle-counter, and different stations situated at certain points where it may be desirable to have communication or connection by means of underground conveying-tubes with the cashier's desk or other initial station.

By arranging my system to conveniently meet the requirements of such store or warehouse, it is deemed preferable to have the exchange or central office B located at the cashier's desk or bundle-counter, as that point would naturally be the destination of most of the carriers sent from remote initial stations. Therefore, from the above explanation it will be hereinafter understood that the converging point or exchange B is identical with the cashier's desk, and the blower or fan for imparting the transmitting power is arranged underneath and in connection with the two distributors E E', so that the operator can readily apply and direct said power at will by certain devices hereinafter explained.

Referring to Fig. 2, A A A A represent the pneumatic tubes connecting with the different stations D D and centering or converging at the exchange B, in the manner shown, so that each and every tube will be within easy reach and manipulation of the operator.

F F each designates a straight metallic pipe of smaller diameter than tubes A A, opening at their tops into said tubes and communicating at their bottom with the power-distributing pipe E, and midway on each of these pipes F F, between the tubes A A and the distributing-pipe E, is jointed the curved elbow-pipes G G, which communicate with said pipes F F at the top and the second distributing-pipe, E', at the bottom. The pipes F F and G G are securely jointed to tubes A A and distributors E E' by suitable air-tight couplings, as shown, and are each provided with a valve, *a a'*, respectively secured immediately above the distributors E E' in ground-joints *b b*, for the purpose of controlling the power accumulated in said distributors and supplied by the pressure and suction blowers A' B', suitably connected to the distributors by straight funnels or pipes H H'. These distributing-pipes E E' are designed to be constantly charged and supplied, respectively, with pressure or suction from the blowers A' B', and might be preferably of larger diameter than the tubes A A, in order to withstand the heavy pressure from said blowers. Thus, when either one of the valves

a a' is opened, either pressure or suction is admitted into tubes A A, through pipes F F or G G, from the distributing-pipes E E', thereby furnishing a transmitting or motive power for the carrier either to or from the exchange B through the same tube; and in order to prevent said suction or pressure from expanding or injuring, by its sudden introduction, any of the tubes A A, said tubes are curved or headed, as shown in Fig. 2, so that the power admitted from distributors will be somewhat deflected into the course or direction of the tube A.

At each end of the tubes A A are pivotally hinged the doors I I, which prevent the egress of the air from the tubes, and are each provided with a spring-catch, *c*, which engages with a similar catch, *c'*, on the end of the tubes, and serves to prevent said doors from swinging beyond a center and holds them in a closed position.

c'' is another spring, secured at one end on the top and end of the tube, having a lip or tongue at its end for engaging with a pin-projection, *d*, on the door I, so as to hold the door open when desired.

J J designate the receivers or aprons for the reception of the carrier when it has been discharged from the open tube by the agency of the transmitting power. One of the aprons J J is secured at the end of the tube both at each and every initial station and at the exchange B.

When an operator at any of the initial stations D D desires to send the carrier to any destination whatsoever, he first removes the hinged door I and inserts the said carrier in the open end of the tube. This action automatically, by means of certain electro-mechanical devices hereinafter explained, signals or indicates to the operator at the exchange B that the said carrier has started to its destination, and he consequently opens the door at the exchange end, so that the carrier may fall in the receiver or apron J J.

The electro-mechanical apparatus for signaling the arrival and departure of the carrier at the different initial or terminal stations and exchange consists in providing each station end of the tubes A A with a depending spring, *f*, secured at its inner end to the binding-post *f'*. This spring may be rigidly fastened to said binding-post, so as to have sufficient flexibility at its depending or projecting portion *f''* to make contact with plate *g*, which is secured to second binding-post, *f'''*, and insulated from spring *f*, or may be pivotally fastened and provided with a finger or stud for making such contact when the carrier is inserted, as may be desired.

It will be understood that only the terminal station ends of the tubes A A are provided with the springs *f* and *g* and binding-posts *f'* and *f'''*, the exchange end of each tube merely having an annunciating apparatus, A², electrically connected by means of line to the

binding-post m' of each terminal station, which in turn is locally and electrically connected to both the switch-point m''' and the spring f .

The electro-mechanical annunciating apparatus A^2 at exchange B consists of the magnet K, having its lower pole, h , converted and brought up parallel to its height; the pivoted elbow-shaped armature L, secured on the vertical or upper end of said pole, the bell-rod i , attached to the end of the horizontal arm of said armature, the gong M, the plate j , pivoted at its lower end, insulated from magnet K, and having catch on its upper end to normally engage the horizontal arm of armature L, said plate being provided with a small spring, k , near its pivot, the tendency of which is to throw down plate j when the magnet K attracts armature L. The annunciating devices A^3 at terminal or station ends of tubes A A are similar to A^2 in construction, except there is no necessity of having the plate j insulated from magnet K. The line-circuit extends from each binding-post m over tube A to the corresponding binding-post m' at station end.

O designates a button-switch of the ordinary construction having the contact-point m''' , the stop m'' , and the switch-lever m'''' . The lever m'''' is electrically connected by wire p with binding-post m' , as shown, and the switch-point m''' is in circuit with the magnet K of annunciating device A^2 and spring g , respectively, by wires p' p'' . The binding-post m' is also connected by wire p''' with spring f , and the magnet K is electrically connected by wire u with ground. Thus, when a carrier is inserted in the mouth of tube A at station D, (the switch-point m''' not being in contact with lever m''''), the spring f is forced in contact with spring g , which automatically closes the circuit from battery M' up through wire o , pole h , armature L, plate j , and wire o' , and the magnet K of annunciator A^2 is energized, which causes the attraction of armature L and allows the plate j to be forced down by action of spring k , thereby announcing to exchange that carrier is ready at station D. The current then passes out of magnet K by wire o'' over the line through wire p''' into spring f . The operator at station D now changes the lever m'''' , bringing it in contact with point m''' . Now, when operator at exchange wishes to signal to station D that carrier has started back, he merely replaces drop or plate j , (which has been previously forced down by signal from station D,) which action will close the circuit from battery M' , and the lever m'''' being, as before stated, in contact with point m''' , the current will pass over the line up through wire p , lever m'''' , point m''' , and wire p' into magnet K of apparatus A^3 , thereby energizing said magnet, causing the attraction of armature L and the drop of plate j , which will notify to station D that carrier has started from exchange. The current then passes over wire u to ground.

As shown in Fig. 2, the tubes A A are insulated, so as to prevent ground-connection.

Each station has, of course, a chart conveniently placed within vision of the operator or clerk, which indicates the different numbers or letters of the different stations.

The carrier designed to be used in connection with the pneumatic system is of improved construction, being arranged so as to travel around curves in the tubes A, and arranged to facilitate the action of the transmitting power. This carrier, however, I do not desire to particularly describe nor claim in this application, it, together with the engine for supplying transmitting power, being designed to form subject-matter of separate applications.

The operation of my invention is as follows: Should a clerk or salesman desire to send a carrier from station numbered 1 in Fig. 3 to station numbered 2, same figure, he removes lever m'''' of switch O, if in contact with point m''' , puts the desired money or article into carrier, closes it securely, opens the door I, (it being understood that the operator at exchange has the pressure-valve of station 1 closed and suction-valve open,) and inserts said carrier, which bears marked upon it the number of the station (2) to which it is destined, into the tube, which action causes the spring f to form contact with plate C, signals the annunciator at station 1, and the same similarly signals to operator at exchange that carrier from No. 1 has started, and therefore exchange-operator opens door I. Then operator places switch-lever m'''' in contact with point m''' , as previously explained. When carrier marked No. 2 reaches the exchange it falls into the apron J, and the operator then picks up carrier from said apron or receiver J J, notes its destination marked thereon, closes valve a' of pipe E' of the tube which communicates with station No. 2, opens valve a of pipe E of same tube, which changes power from suction to pressure, opens door of tube leading to station No. 2, inserts carrier, which necessarily (as before described) signals to clerk or salesman at No. 2 that carrier is coming from exchange, and closes the door I of tube leading to No. 2. When carrier reaches station No. 2 it is taken out of apron by operator, opened, and contents disposed of. Then operator at exchange changes pressure to suction, and the clerk at No. 2 remarks and replaces carrier, thereby again notifying exchange-operator that carrier is returning. When carrier again arrives at exchange, operator, by replacing plate j to position shown at exchange, Fig. 2, signals back to No. 2. The operator removes it from apron, changes suction of tube leading to No. 1 to pressure, inserts carrier in said tube, and it (the carrier) is returned to its original station, (No. 1.) Then the exchange-operator changes the power of both tubes (1 and 2) back to suction.

In this before-described manner articles—

such as goods, letters, parcels, &c.—can be readily, quickly, and simply conveyed from one station to another, and return with certainty, ease, and rapidity.

5 I am aware that an electro-pneumatic system for transmitting dispatches having, first, an apparatus for introducing into a receiving-chamber at the end of the message-pipe compressed air; second, a mechanism for opening
10 communication between said pipe and the air-exhaust; third, means for cutting off at will both the compressed-air and exhaust chambers; and, fourth, an electro-mechanical arrangement for automatically cutting off the
15 compressed air, has been used heretofore. However, such I do not claim, inasmuch as the main or compressed-air chamber is operated by pistons and valves, which in turn are actuated by a series of auxiliary valves and pis-
20 tons, the exhaust and compressed air chambers being connected by pipes with a cylinder, which is operated by keys or buttons and spring-valve, and the message tube or pipe is provided with an air-compressing apparatus,
25 and a cut-off mechanism consisting of a piston and slide-valve is arranged between said message-tube and the receiving-chamber; but

What I do claim is—

1. The means for actuating and conveying
30 a carrier in either direction, which consists of the distributing-pipes holding, respectively, pressure and suction power, a branched pipe connecting each conveying-tube with both distributing-pipes, the valve located in each
35 branch of the connecting-pipe, and a series of conveying-tubes arranged and constructed in the manner hereinbefore described.

2. In a pneumatic dispatch-tube system, the apparatus for conducting and controlling the
40 power which actuates the carriers in either direction, consisting of a series of branched pipes, each opening at its top in a conveying-tube and communicating, respectively, by its branches or lower ends, with the distributing-pipes, a
45 valve located in each branch of said branched pipes, and the distributing-pipes, arranged and constructed to operate substantially as set forth.

3. The combination of the two reservoir or
50 distributing pipes suitably connected with an engine for producing the transmitting power with a series of branched pipes respectively communicating with said distributing-pipes at their bottoms and opening at their tops into
55 the conveying-tubes, a controlling-valve located in each branch of the branched pipes, and the series of conveying-tubes, as shown and described.

4. The combination of a suitable carrier, the conveying insulated tubes, the mechanism 60 for controlling and directing the pressure and suction power at exchange, and the electro-mechanical signaling apparatus arranged at each end of the conveying-tubes, as described.

5. The combination of the two distributing- 65 pipes, the pipes F F and G G, the valves *a a'*, and the doors I I with the tubes A A, as set forth.

6. The combination of the tubes A A, the battery, the electrical connections, the annun- 70 ciating devices A² and A³, and the switch O, as specified.

7. The combination of the pneumatic con- 75 veying-tubes, the distributing-pipes holding, respectively, pressure and suction power, the branched pipes provided with controlling-valves and respectively connecting the tubes with the distributing-pipes, and the electro- 80 mechanical signaling devices arranged on each end of tubes, with a suitable carrier designed to fit in and travel through said tubes, as set forth.

8. The combination of the distributing-pipes E E' with the pipes F F and G G, as set forth.

9. The combination of the two distributing- 85 pipes, the pipes F F and G G, and the valves *a a'*, as set forth.

10. The combination of the two distribut- 90 ing-pipes, the pipes F F and G G, the valves *a a'*, and the tubes A A, as set forth.

11. The combination of the metallic tubes conducting the current from battery located at exchange to the initial station with the elec- 95 tro-mechanical signaling apparatus arranged at each end of tubes, substantially as described.

12. The combination of the metallic tubes for conducting the current from battery lo- 100 cated at the exchange to the initial station with the electro-mechanical devices for signaling both at the exchange end and station, and a suitably-constructed carrier, and means for conveying the said carrier back and forth through the system of pneumatic tubes, as de- 105 scribed.

13. The combination of the spring *f*, con- 105 tact-plate *g*, the circuit-tubes A A, the magnets, the pivoted armatures, and the annunciating devices attached to and operated by said armatures, as set forth.

In testimony that I claim the foregoing as 110 my own I affix my signature in presence of two witnesses.

JAMES F. McLAUGHLIN.

Witnesses:

JULIUS SOLGER,
O. E. DUFFY.