

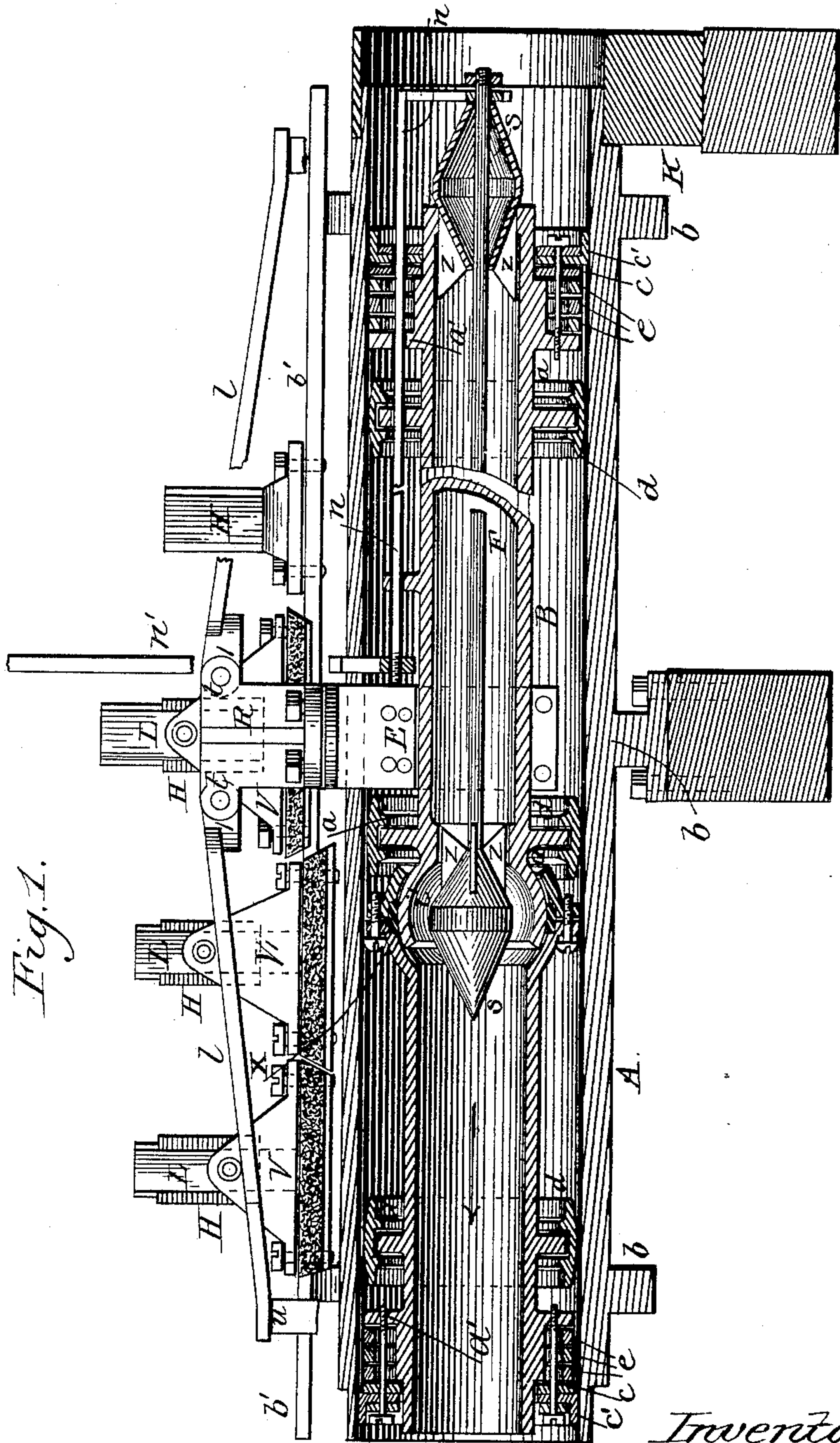
(No Model.)

3 Sheets—Sheet 1.

G. L. DU LANEY.
PNEUMATIC RAILWAY SYSTEM.

No. 450,700.

Patented Apr. 21, 1891.



Witnesses

Inventor

D. P. Sibley
J. F. Herring

Geo. L. Du Laney

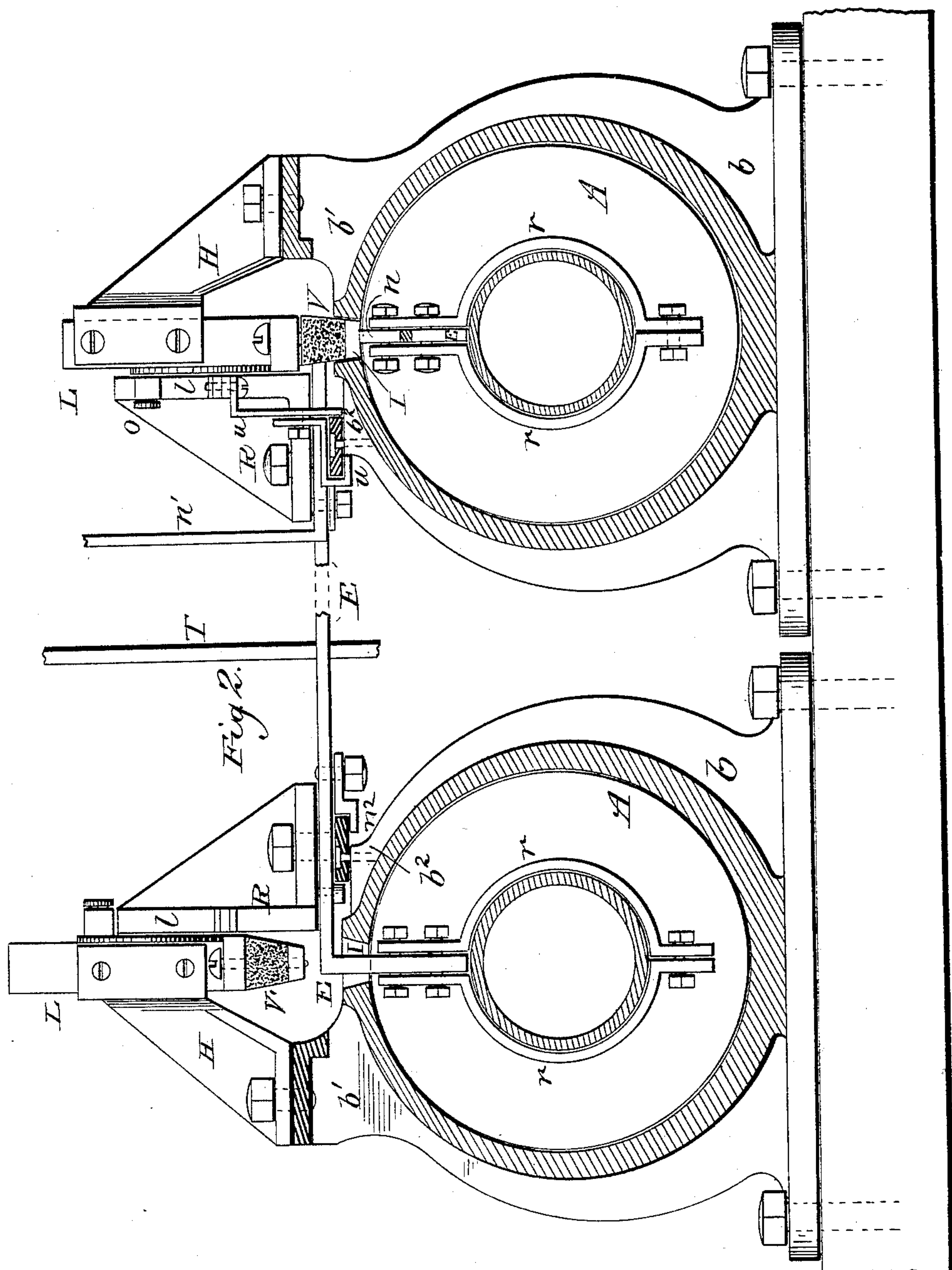
(No Model.)

3 Sheets—Sheet 2.

G. L. DU LANEY.
PNEUMATIC RAILWAY SYSTEM.

No. 450,700.

Patented Apr. 21, 1891.



Witnesses

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(No Model.)

3 Sheets—Sheet 3.

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Fig. 4

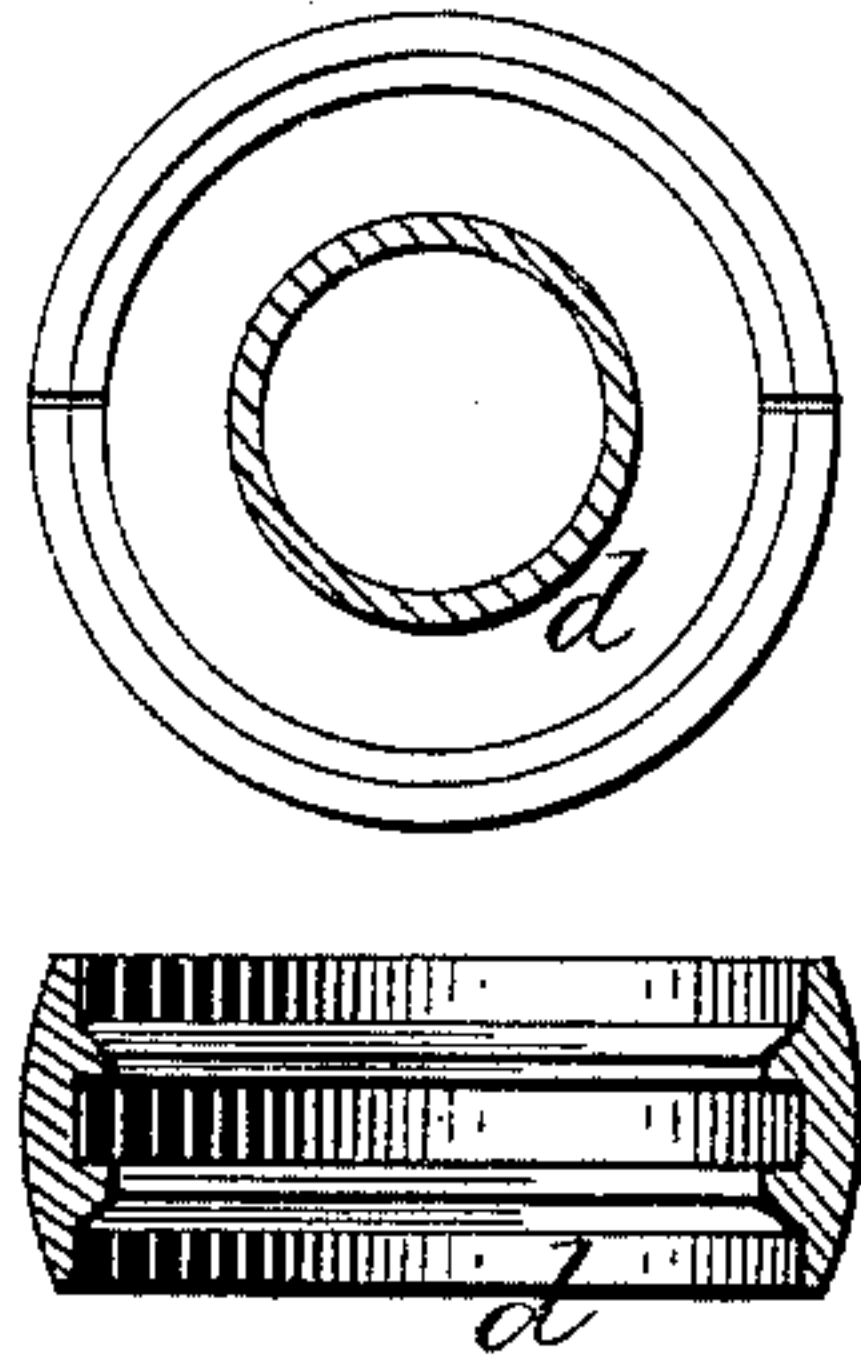


Fig. 3.

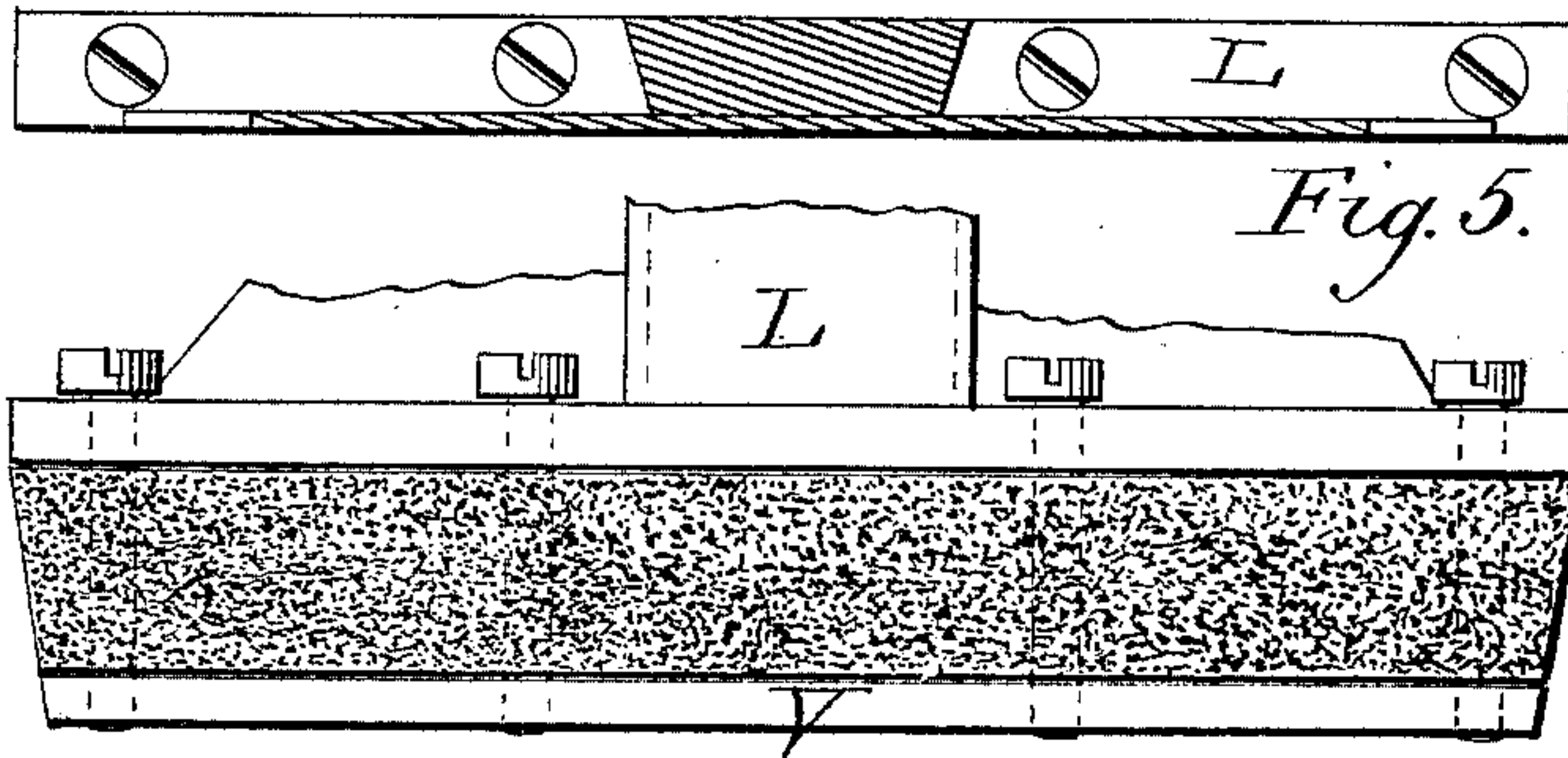
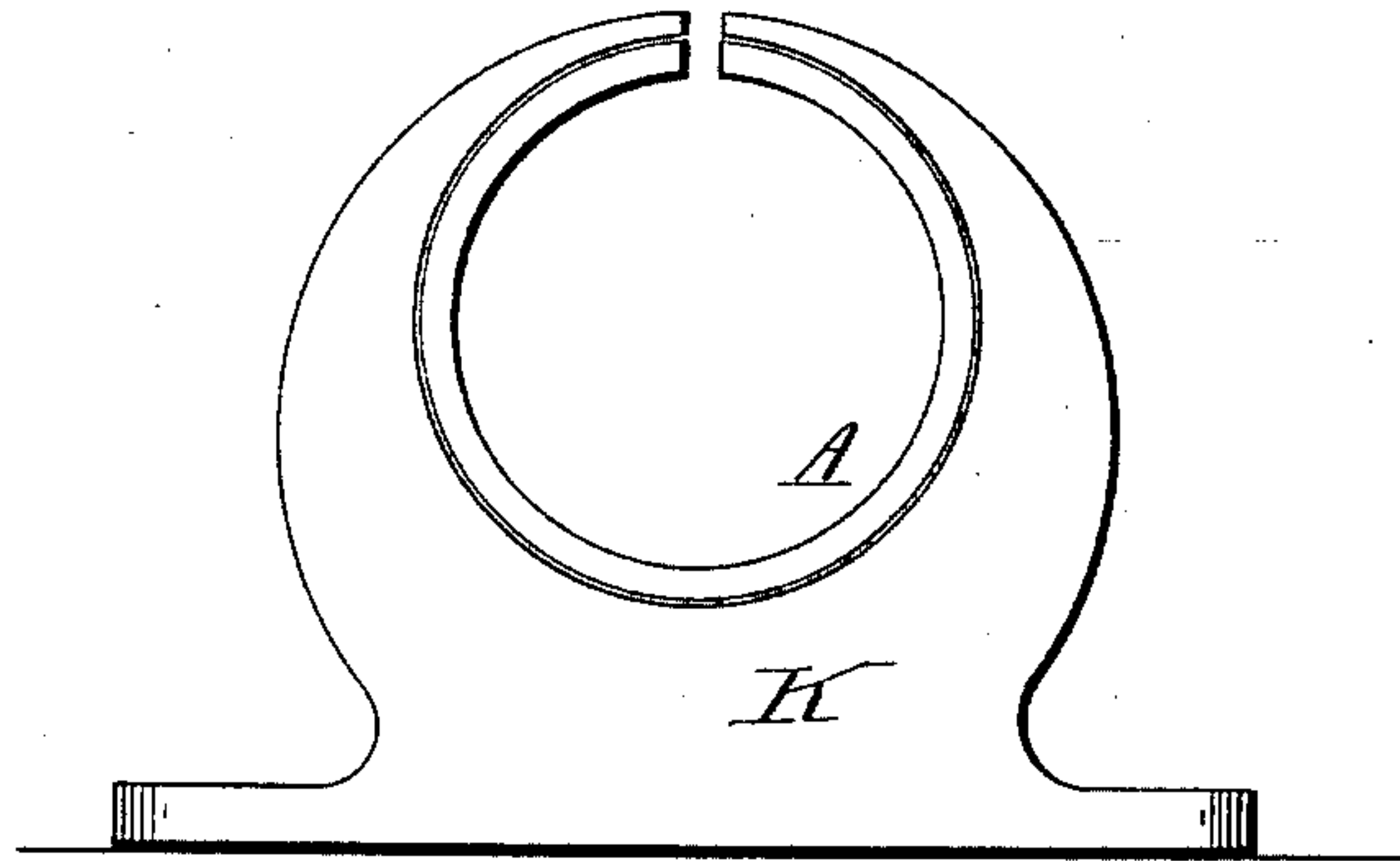


Fig. 5.

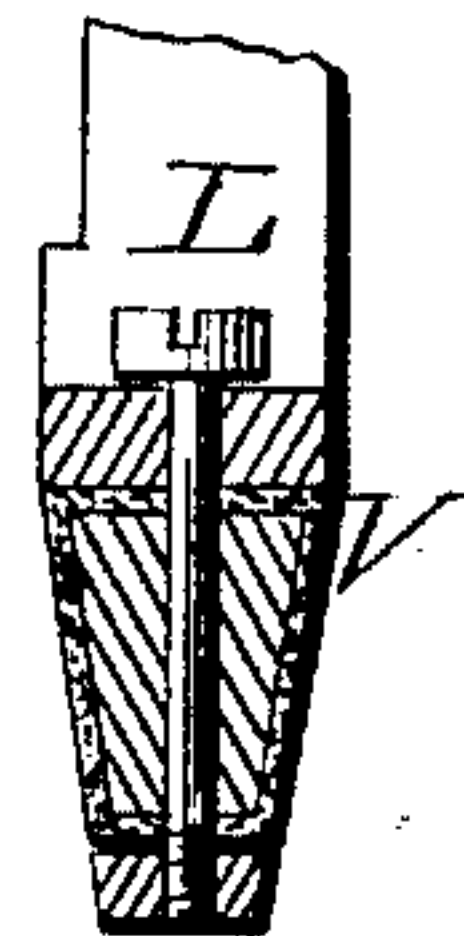


Fig. 6

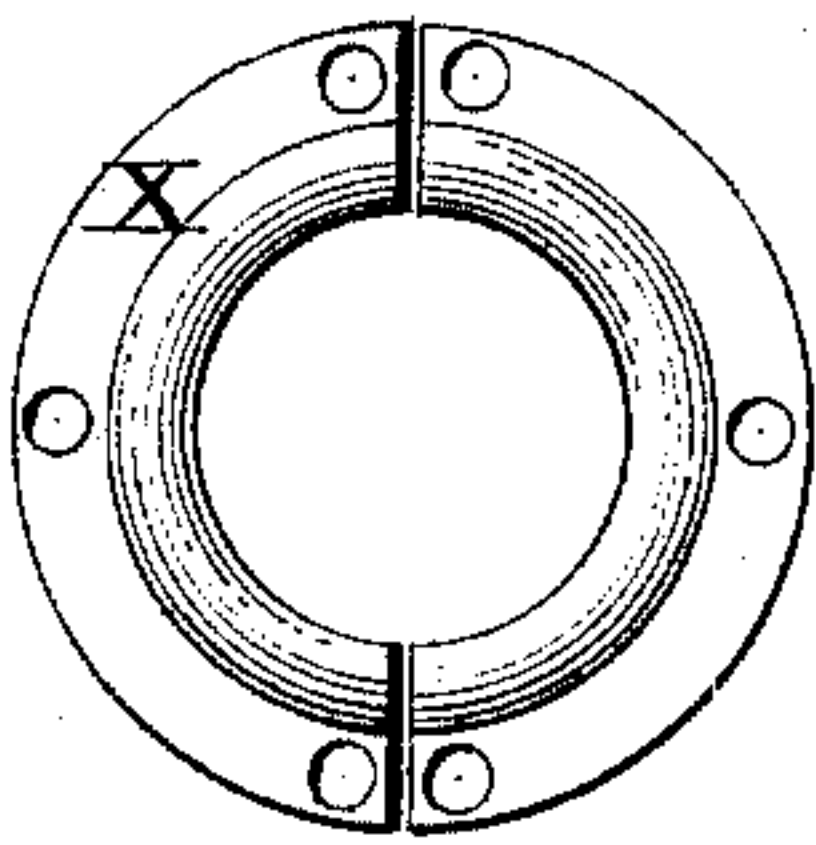


Fig. 7.

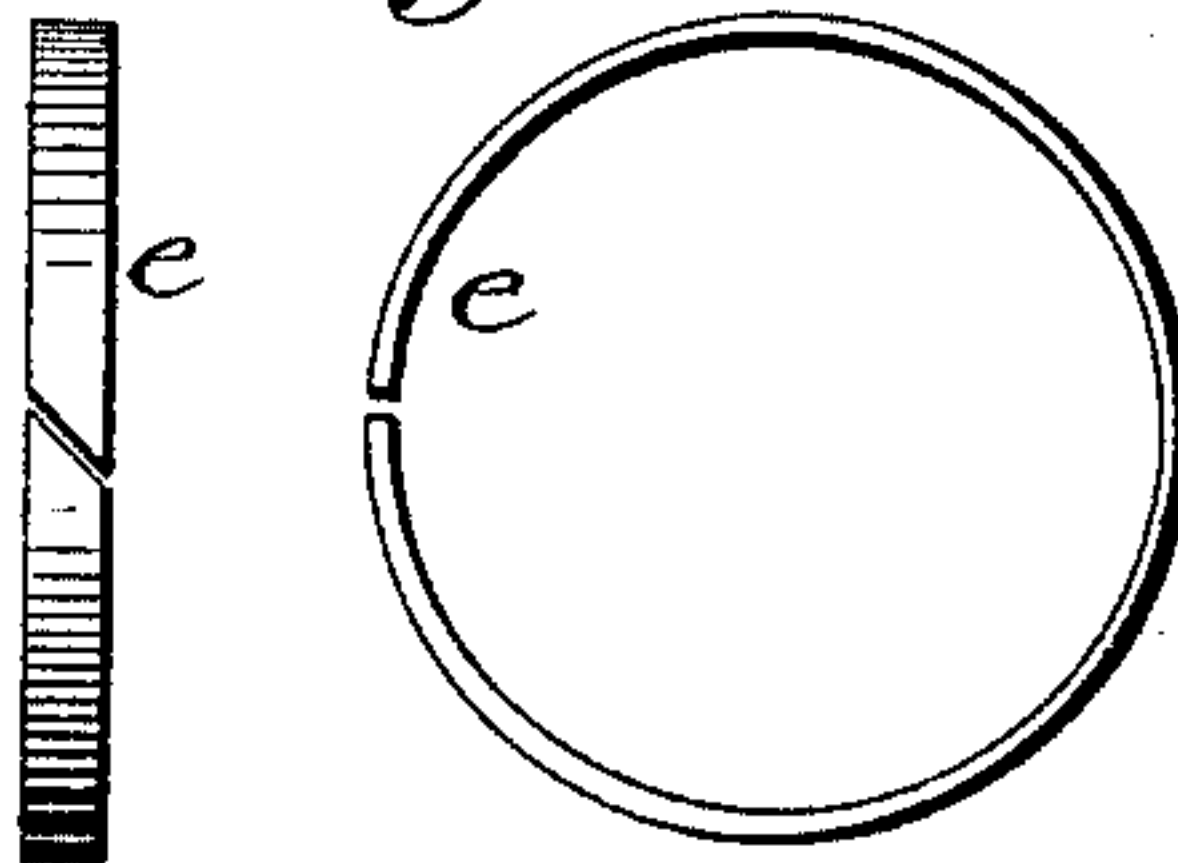
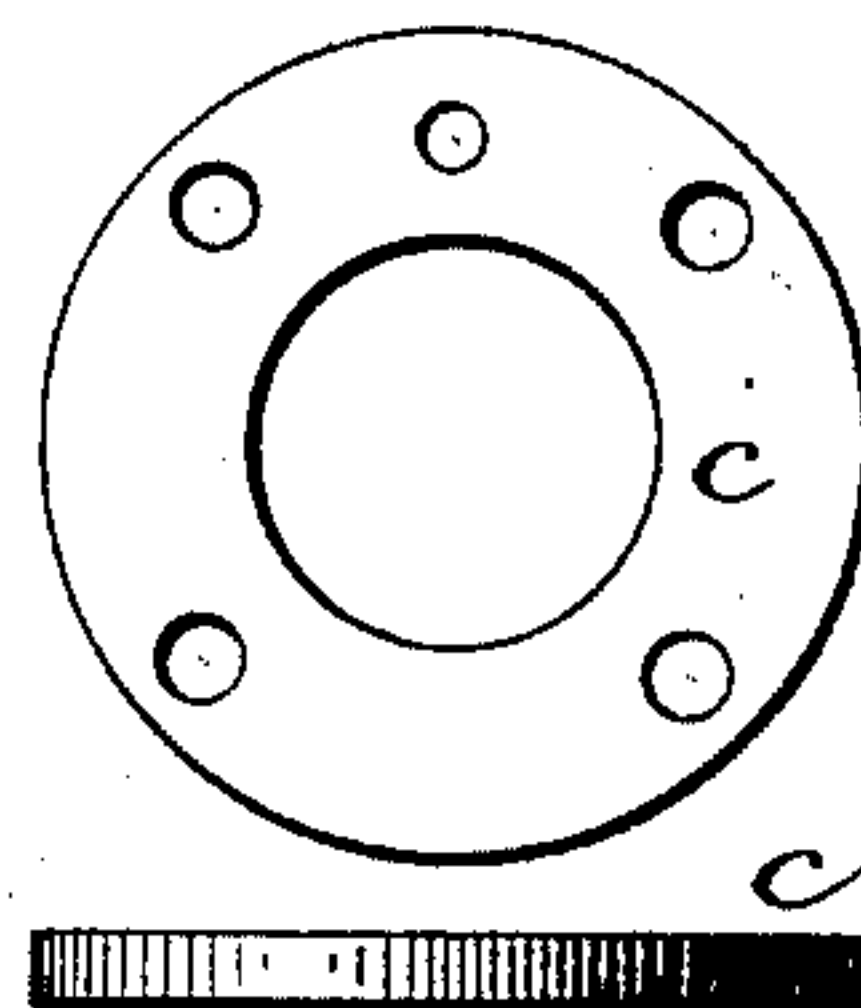


Fig. 8.



Witnesses

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UNITED STATES PATENT OFFICE.

GEORGE L. DU LANEY, OF NEW YORK, N. Y.; JAMES W. DU LANEY
ADMINISTRATOR OF SAID GEORGE L. DU LANEY, DECEASED.

PNEUMATIC-RAILWAY SYSTEM.

SPECIFICATION forming part of Letters Patent No. 450,700, dated April 21, 1891.

Application filed September 18, 1889. Serial No. 324,367. (No model.)

To all whom it may concern:

Be it known that I, GEORGE L. DU LANEY, of the State, county, and city of New York, have invented certain new and useful Improvements in Pneumatic Railways; and I hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings and letters and figures of reference marked thereon.

Figure 1 is a vertical longitudinal sectional view of the line-tube and the piston-tube and other parts of the general construction. Fig. 2 is a transverse view of twin tubes enlarged and other parts of the system. Fig. 3 is an elevation of the union-joint or truss-yoke section, which receives and supports the tenoned ends of line-sections. Fig. 4 is a plan and sectional view of piston-bearings. Fig. 5 shows enlarged elevated side view of stopple-key with stem broken away, also a longitudinal and cross-sectional view of the same. Fig. 6 is a plan of the cap constituting the detachable part of the piston-joint. Fig. 7 is a plan and side view of the packing-ring. Fig. 8 represents views of the packing-disk.

The nature of my invention relates to the peculiarity of the sectional construction of the air-chamber or line-tube in pneumatic railways; also, to the peculiarity of the construction of the line-slot through which the driving-bar passes; also, to the provision and application of a longitudinal pilot-rail, which supports and guides the extremities of the shifting device employed in operating the slot-closing mechanism; also, to the peculiar construction and manner of applying the slot-closing mechanism to the line-tube; also, to the peculiar construction and arrangement of mechanical devices for operating automatically the slot-closing attachments; also, to the novel and peculiar construction of an articulated piston with heads and bearings; also, to the means provided for opening and closing the aperture through the center of the piston, by which means the vacuum in the air-chamber is controlled; also, to the combination and application of twin-tubes to the system.

The sections of line-tube A are made of cast-iron or any other suitable material and of any desired size or shape or any conven-

ient length. About the circumference of each section are cast solidly with the body of metal suitable ribs *b*, which impart great rigidity without adding materially to the weight of the cast. The ribs *b* are extended at their upper extremities into suitable shoulders, which receive and sustain the longitudinal rails *b'* *b*². The rail *b'* is preferably cast integral with the extended end of the rib *b*, the rail being provided for the support of the stocks H, as will be more fully elucidated further on. The rail *b*² is provided as a suitable guide for piloting the shifting-runners *u*, which actuate the slot-closing mechanism described elsewhere. It also serves as a support and guide to the driving-bar E, a description of which will be given further on. The flange cast to the under side of the central rib serves as a base for the support of the section, and by means of which the section is made secure to the sill of the road-bed, as shown.

The sections of tubing being cast as above described are bored out smoothly to a corresponding size, after which a slot I is cut longitudinally through each section, through which the driving-bar E passes en route. The walls of said tube are made to slope inwardly toward the center of the tube in a line about radial from the center of the tube, thus imparting to the sides of the slot the form of a wedge. This construction of a slot makes it possible for the slot-closing device to impinge against the walls or sides of the slot, as will be seen more clearly by reference to the drawings. The sections of line-tube are connected with each other, so as to form a continuous line, by means of an independent yoke-like truss K, Fig. 3. The bore through each of these independent connecting-pieces is of a diameter to correspond exactly to the tenoned ends of the sections A. (See Figs. 1 and 3.) This construction admits of expansion and contraction in each section without affecting the general length of the line, as each section is subject only to its own independent fastenings, thus securing freedom of longitudinal play in each connection.

Along the upper plane of the rail *b'* is mounted adjustably a series of independent stocks H, in the heads of which play vertically suit-

ably-constructed plungers L, which carry on the cross-head formed on the lower end of the same peculiarly-constructed longitudinal wedge-shaped plug-like stopple-keys V V'.

5 By reference to the drawings it will be observed that the keys V are made wedge-shaped on each end, (inclined inward and downward,) while the reverse condition is maintained in the keys V'. (See Fig. 1.) The object of this construction is several fold, to wit: 10 When closed with the slot I, the ends of the keys V will impinge against the ends of the keys V' as well as against the sides of the slot I in the tube A, thus insuring the more perfect closing of the joints in the several parts. It also provides against lateral impingement, one against the other, while being lifted from the slot I to admit of the free passage of the driving-bar E, as shown. The 15 keys V and V' are preferably constructed in two parts, and are secured adjustably by means of screws to the cross-head above referred to. By this means a thin sheet of cork, leather, or other suitable material is clamped 25 between the parts, as shown in the drawings. By this construction the sides and ends of the several keys are provided with a packing that will more readily secure a perfect closing of the joints in the several parts.

30 The driving-piston B is unique in shape and novel in construction. The barrel is articulated—made flexible—near its center, in order that it may readily conform to curves, graduations, &c., of the system without changing materially the relation of the driving-bar E 35 to the slot I in the line-tube A. The joint X is made preferably of the orbicular form of construction, as shown. The annular strip of leather packing i, placed between the parts 40 when being bolted together, as illustrated, serves to protect the parts against wear, as well as to insure a more perfect fitting joint.

Annular ribs a a a are cast integral with the body of the piston-barrel, about which are 45 secured suitably-constructed bearings d d d. These bearing fit snugly the bore of the tube A, thus sustaining the piston in position and protecting the packing rings and heads against wear and tear while leaving them free 50 to adjust themselves to the bore of the tube A, and by means of which a more perfect contact between the packing-rings and tube is secured and equalized. It will be noticed by reference to the drawings that an annular 55 channel is provided on the inside of said bearings which shall exactly correspond to and fit over the periphery of the ribs a a a, as shown in the drawings. By this means and in conjunction with the line-tube A they are 60 held in position and are free to play in their bearings while in action. Near the extremities of the piston-barrel are cast also integral with the body additional ribs a' a', between which and a detachable disk c are secured, 65 by means of screws, the several flexible packing-rings e e e. Between the disk c and the disk c' is secured a leather packing, which

will impart additional security against any leakage of the piston-heads. (See Fig. 1.)

70 The device employed in controlling the vacuum in the line-tube A by the admission or exclusion of air to the chamber consists in providing the steel rod F at each end with conical-shaped stopples S S. Each of said stopples is provided with suitable wings Z Z Z, 75 which find their bearings in the ends of the major portion of the piston B. (Represented in Fig. 1.) The rods n and n' are connected with the rod F, as shown. By moving the rod n and its connections back and forth the aperture 80 through the tube B is opened or closed by the stopples S S at the will of the driver. The rod n is so arranged in its configuration and connections as to play through the slot I in the line-tube A in conjunction with the driving-bar E, as shown in Fig. 2. 85

The driving-bar E is secured to the piston B by means of clamps r r and screw-bolts, as shown in Fig. 2. The upper horizontal end of the bar is supported in suitable guides n² 90 by the pilot-bar b², as shown on the left in Fig. 2. By being thus supported the bar is secured against contact with the sides of the slot I in the tube A, as will be seen by reference to the drawings. On the upper horizontal 95 portion of the bar E is mounted an angle-iron or stanchion-bracket R, which receives and supports the several parts provided for operating the stopple-keys. To the spurs t t are secured links l l, the extremities of which 100 have a vertical throw. To these links are in turn secured the shifting-runners l l, whose extremities have a lateral play as they glide along the pilot-rail b², guided by the brackets u u, which depend from the ends of the bars 105 to the rail b², which they partly encircle, as represented in the drawings. By such construction the runners l l will readily conform to the configuration of curves, grades, &c.

The plungers L above referred to are provided with suitable pins and frictional rollers 110 O, which extend across the path of the shifting-runners l l. As the piston B is advanced through the line-tube A to its work, carrying with it the driving-bar E and its belongings, 115 as above described, the shifters l l engage with said rollers o, forcing them, together with the plungers L and stopple-keys V V', upward along the inclined plane of the parts and out of the path of the advancing bar E, as represented in the drawings. As the bar passes on, 120 the keys resume their positions in the slot I by passing down the incline of the rear bar. It will be observed by referring to the drawings that the pins and rollers above referred 125 to are set alternately in a higher or lower plane on the plungers L, the object of which is to cause the major keys V to be lifted slightly in advance of the minor keys V', in order to obviate any tendency to impingement longitudinally one against the other as 130 they are lifted from the slot I in the line-tube A, as shown.

The bar T, depending from the bed of the

car across the path of the driving-bar E, engages with the same, causing the car to be moved forward.

The employment of twin tubes in one system similarly equipped is advantageous in many ways. They may be used conjointly in drawing heavy loads or separately, as occasion may require. In case of the disabling of one system the other may be employed while repairs are being made. Again, they may be employed to move loads in opposite directions on a single track with suitable provision for shunting in passing trains, &c.

I claim—

1. In a system for pneumatic-railway transmission, the air-chamber A, when constructed with a wedge-shaped line-slot I, ribs *b*, with shoulder-extensions and longitudinal rails *b'* and *b''*, as described, and for the purpose specified.

2. In a system for pneumatic-railway transmission, the air chamber or tube A, when provided with a longitudinal rail *b'*, stocks H, plunger L, provided with frictional rollers *o*, and stopple-keys V and V', substantially as described, and for the purpose specified.

3. In a system for pneumatic-railway transmission, the combination of sections A with independent yoke-trusses K, as and for the purpose specified.

4. The piston B, when constructed with annular ribs *a a a*, provided with bearings *d d*, ribs *a'*, packing-rings *e e e*, and disks *c*, substantially as set forth.

5. The combination of the following devices for joint operation in controlling the vacuum in the air-chamber of a pneumatic-railway system: the piston B, rod F, conical stopples S S, with wings Z, rods *n* and *n'*, as described, and for the purpose specified.

6. In a pneumatic-railway system, the line-tube A, piston B, driving-bar E, stanchion-bracket R, links *l l*, runners *l l*, brackets *u*, and pilot-rail *b''*, substantially as described, and for the purpose specified.

7. In a pneumatic-railway system, the combination of the wedge-shaped line-slot I with the line-slot stopple-keys V V', when constructed substantially as described, and for the purpose set forth.

8. The combination for joint operation of the frictional rollers *o* with the shifting-runners *l l* and their dependent mechanical devices, substantially as described, and for the purpose named.

GEORGE L. DU LANEY.

Witnesses:

M. M. RICH,
A. E. RICH.