

No. 714,874.

Patented Dec. 2, 1902.

W. G. DAVIS.

PRESSURE CREATING DEVICE FOR CASH CARRIER SYSTEMS.

(Application filed Dec. 9, 1901.)

(No Model.)

3 Sheets—Sheet 1.

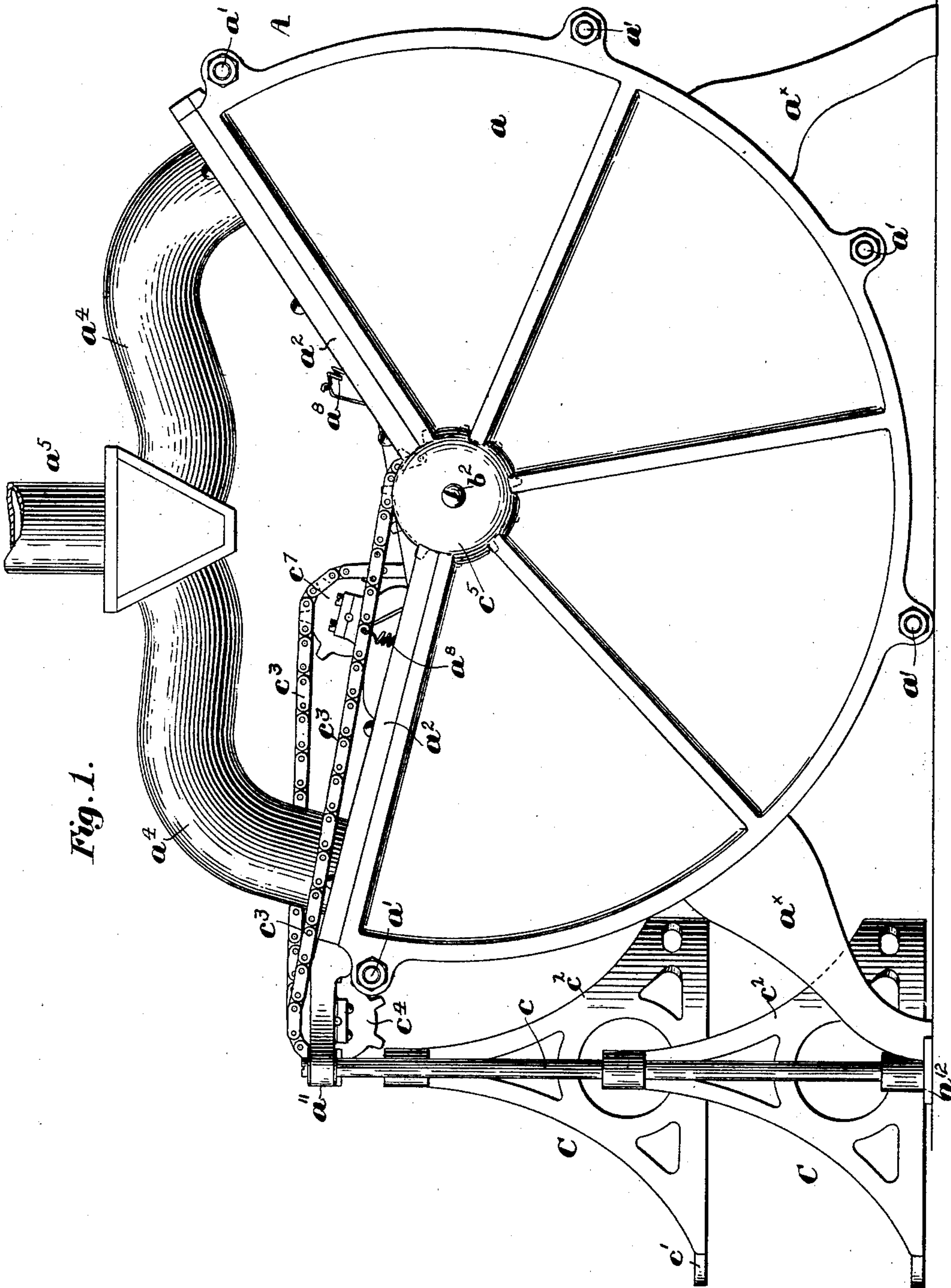


Fig. 1.

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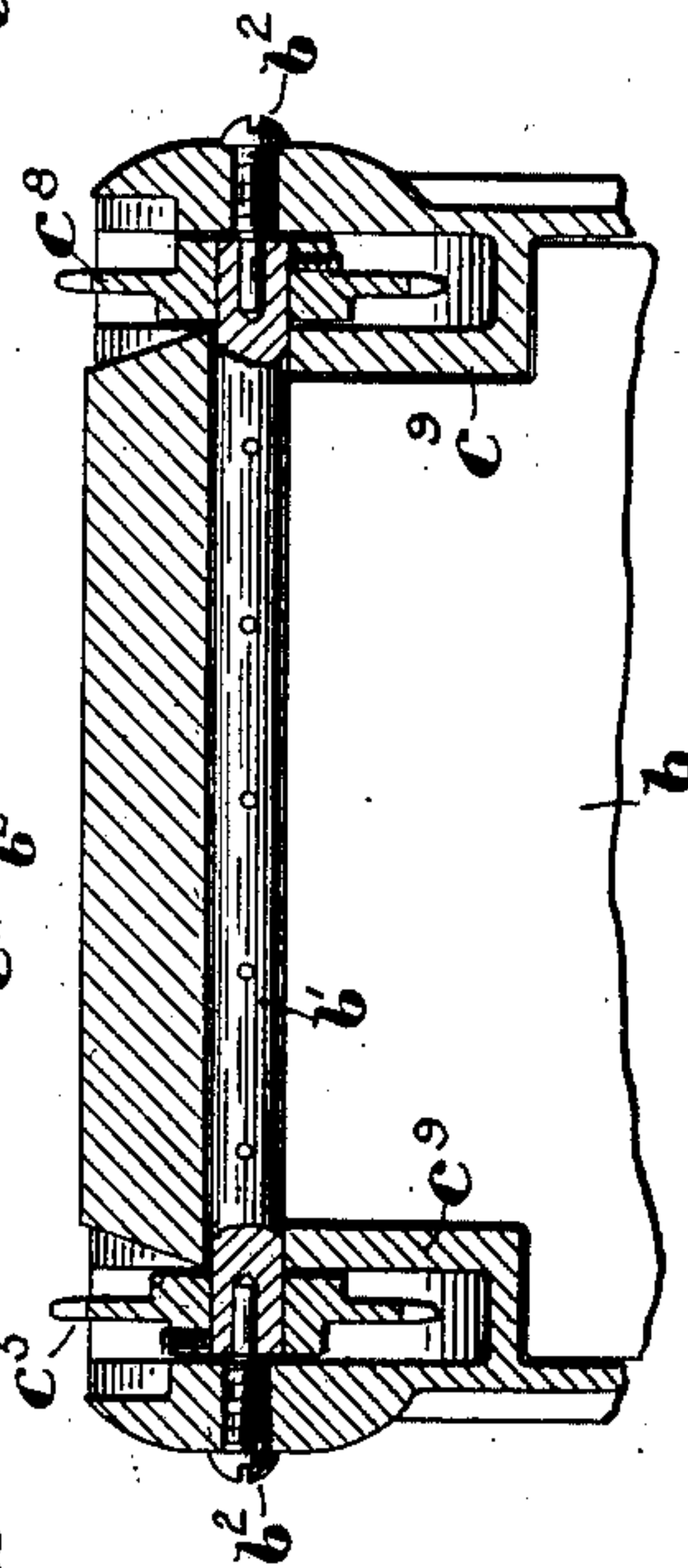
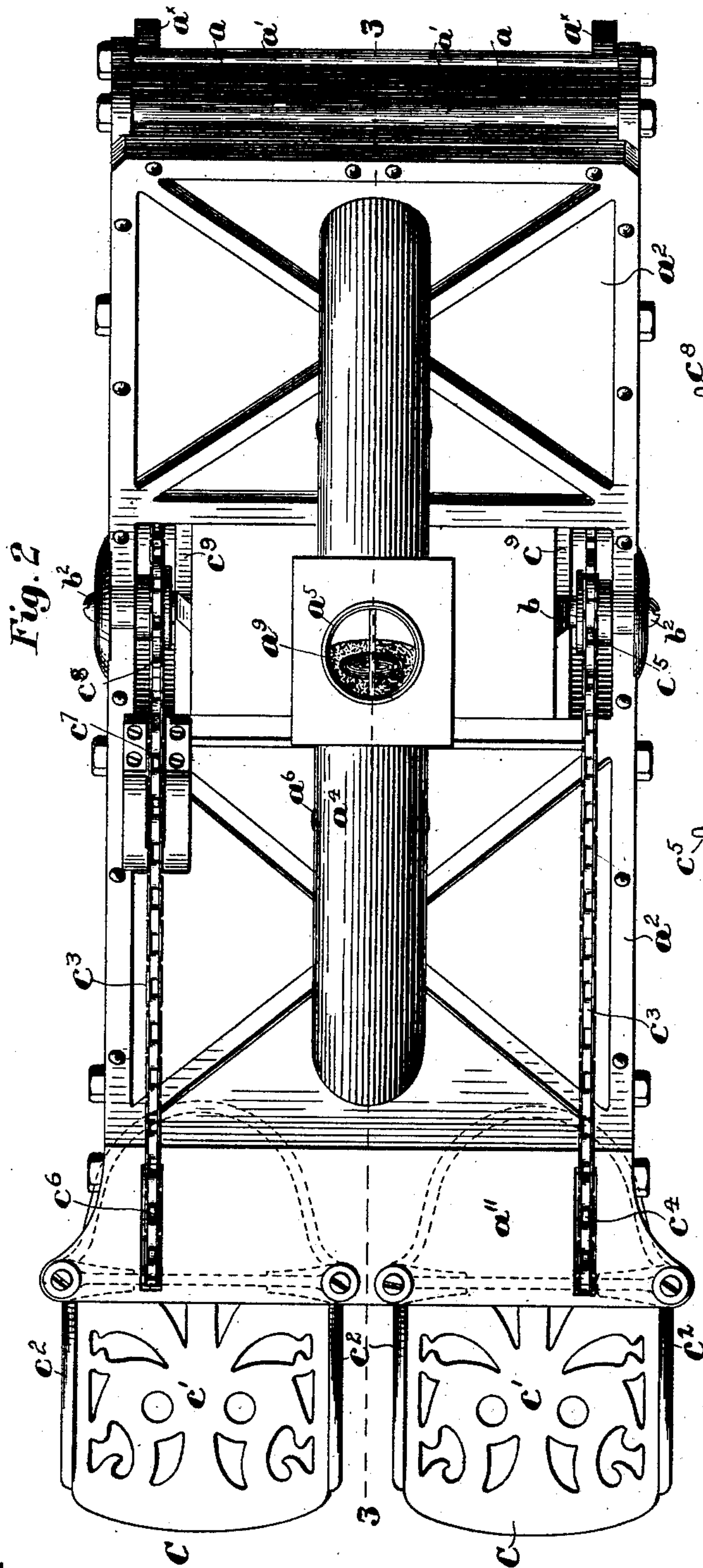
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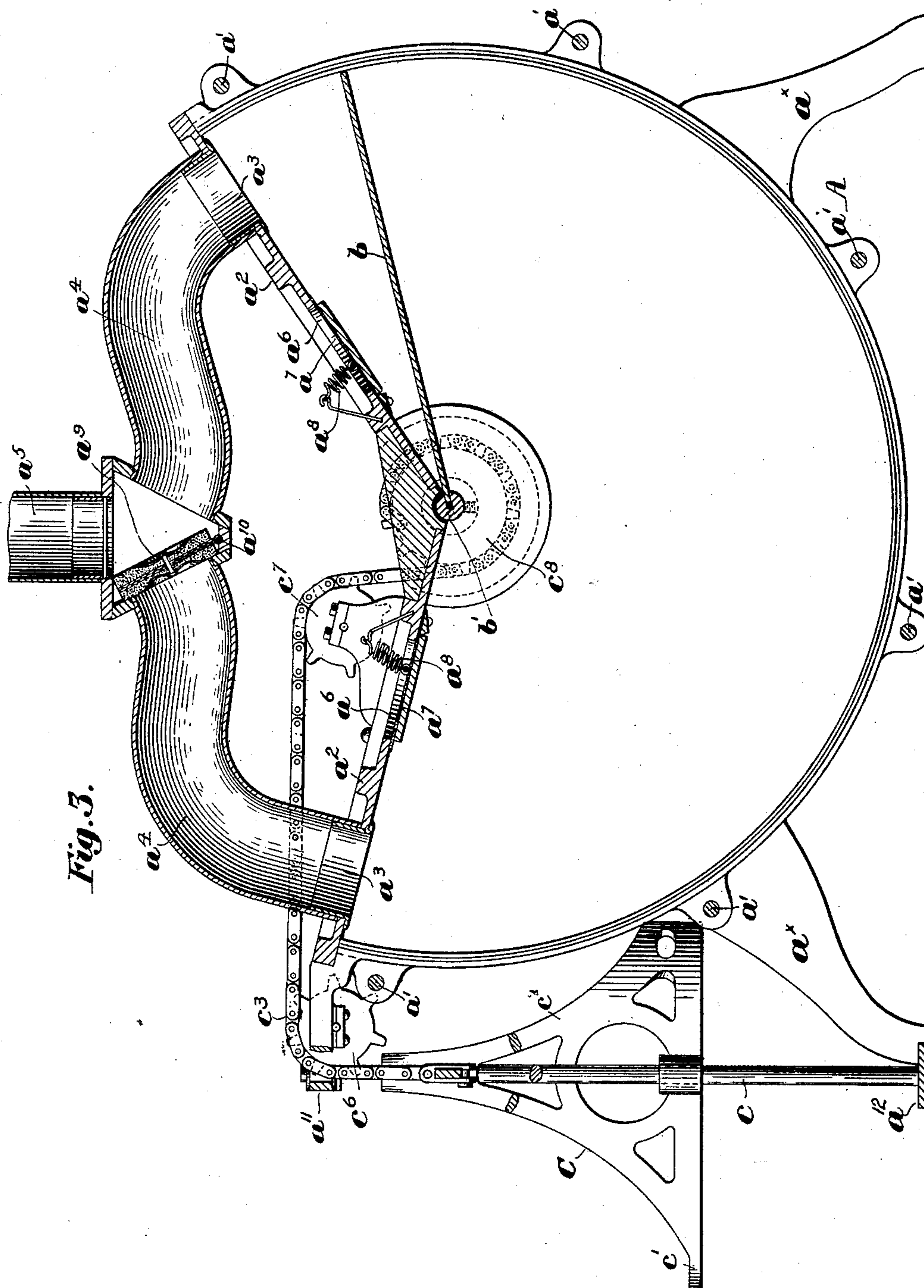
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UNITED STATES PATENT OFFICE.

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PRESSURE-CREATING DEVICE FOR CASH-CARRIER SYSTEMS.

SPECIFICATION forming part of Letters Patent No. 714,874, dated December 2, 1902.

Application filed December 9, 1901. Serial No. 85,144. (No model.)

To all whom it may concern:

Be it known that I, WILBUR G. DAVIS, a citizen of the United States, residing at Newton, in the county of Middlesex and State of Massachusetts, have invented an Improvement in Pressure-Creating Devices for Cash-Carrier Systems, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention in pneumatic-carrier systems relates particularly to an apparatus, preferably pedal-operated, for providing and propelling currents of air or equivalent fluid for driving the carrier through the transmitting-tube to its destination. Prior to my invention in systems of this type it has been common to employ manually-operable propelling devices of the type shown in Letters Patent of the United States No. 333,113, issued to me under date of December 29, 1885, such apparatus as therein shown consisting, essentially, of a vertically-arranged bellows, which is compressed by depression of a suitable treadle. Apparatus of the bellows type shown in my said Letters Patent are bulky, complicated in construction because of the many parts used in building up or making the bellows, shortlived because of the perishable nature of the material employed, single acting—that is, useful for providing and propelling current upon movement in one direction only—and as usually constructed requires an excessive range of movement of the foot-treadle, with an inconvenient application of the power thereto.

The aim of my invention is to eliminate the foregoing and other objections to apparatus of the type represented by my said Letters Patent and to provide a simple, efficient, and durable apparatus and one which may be readily and accurately adapted to the work required.

Referring to the accompanying drawings, Figure 1, in side elevation, represents an apparatus illustrating one embodiment of my invention; Fig. 2, a top or plan view of Fig. 1; Fig. 3, a vertical longitudinal section on the dotted line 3 3, Fig. 2; and Fig. 4, a cross-sectional detail showing one manner of mounting the rotary reciprocatory member employed in the device illustrated.

Referring to the drawings, in the embodiment of my invention there shown and selected for illustration herein, A is a suitable inclosing case, conveniently of cast metal and shown as made in two parts *a a*. The abutting faces of the parts *a a* are fitted one to the other in suitable manner, as by tongue-and-groove construction, and are suitably clamped one to the other, as by clamping-bolts *a'*. As here shown, the casing A is shaped like a segmental portion of a cylinder, although obviously said casing may be made more nearly or even quite cylindrical, if desired.

Within the casing A (see Fig. 3) is arranged a rotary reciprocatory member or plate *b*, mounted at its axis upon a suitable hub or shaft *b'*, which latter is pivotally mounted in suitable manner, as upon the ends of the centering-screws *b²*, Fig. 4. This construction provides a convenient means for pivotally mounting the said reciprocating member with little friction and also provides a convenient means for adjusting the said member laterally within its inclosing case to guard against undue friction of the edges of the member against or upon the side walls of said case.

The top of the inclosing case A is here shown as provided with two covers or walls *a² a²*, provided, respectively, with outlet-openings *a³*, communicating, through suitable branch pipes or conduits *a⁴*, with a common outlet-pipe *a⁵*. Obviously if the reciprocatory member *b* be rotated or swung within the inclosing case A from one cover or wall *a²* toward the other or opposing wall all the air or fluid contained between the rotating member and the said wall *a²* will be expelled through the outlet-opening *a³* and branch *a⁴* into the outlet-pipe *a⁵* regardless of the direction in which the said member is swung. The covers or walls *a²* in addition to the outlet-openings *a³* are shown provided with inlet-openings *a⁶*, controlled by suitable, preferably flap, valves *a⁷*, they being normally held to their seats by suitable springs *a⁸*. Thus as the reciprocatory member *b* is swung in one direction to expel air contained in the inclosing case at one side the inlet-valve at the opposite side thereof will open, so as to permit the said case to fill with air behind the moving member preparatory to return movement of such member to

expel the air thus drawn in. Thus the apparatus is double-acting—that is, when swung in one direction it expels the air at one side and fills the case behind it and when swung in the opposite direction expels the air previously drawn in behind it and again fills the inclosing case at that side from which the air was expelled. As herein shown, a single outlet-valve suffices for both outlet-openings a^3 . This outlet-valve is indicated at a^9 and is located at the junction of the two branch pipes a^4 with the main outlet-pipe a^5 , it being so fulcrumed, as at a^{10} , that the pressure of a column of air expelled through one of the said branches a^4 will throw the said valve over and to close the end of the other of said branches, thus to compel the air expelled through the said branch to pass directly into the main outlet-pipe a^5 and compel the inclosing case to fill through the inlet a^6 , provided for the purpose.

The reciprocatory member b may be operated in any desired manner and by any convenient power. As here shown, I have provided the inclosing case A, at one end, shown at the left, with an overhanging flange a^{11} , between which and a suitable supporting-plate a^{12} upon the floor or screwed to the legs a^x of the inclosing case is interposed a series, herein shown as four, of upright guides c . Between these pairs of guides c and sliding thereupon are the foot-treadles C C, shown as having flat treads or bottoms c' with substantially vertical sides c^2 , the latter embracing and sliding upon the upright guides c . Preferably one of these treadles is connected with the member b to swing the latter in one direction, while the other treadle is connected therewith to swing it in the opposite direction. As herein shown, the said treadles are respectively connected with said member by flexible connections, preferably sprocket-chains c^3 . The sprocket-chain from the nearest treadle, Fig. 1, and lowest treadle, Fig. 2, is shown extended upward to and over an idler wheel c^4 , Fig. 1, thence to and about a sprocket-wheel c^5 , fast on the pivot hub or shaft b' of the said member b . (See Fig. 4.) The sprocket-chain from the other treadle is shown extended also upward and over an idler wheel c^6 , Fig. 3, thence to and over a second idler c^7 , Fig. 3, thence downward to and partially about a sprocket-wheel c^8 , also fast on said pivot-shaft b' and at the opposite end thereof from the point of attachment thereto of the said sprocket-wheel c^5 . Referring to Fig. 1, it will be seen that the two sprocket-chains are attached to their respective wheels fast on the shaft b' , at opposite sides of the axis of said shaft, so that a pull upon one of said chains will rotate said shaft and swing said member b in one direction, while a pull upon the other chain will rotate its wheel and swing said member b in the opposite direction, and since both chains and their wheels are attached to one and the same shaft b' it follows that depression of one treadle by swing-

ing the said member in one direction will positively lift the other treadle, and vice versa, so that there is in the construction herein shown a simultaneous opposite or alternate movement of the treadles.

Referring to Fig. 4, the sprocket-wheels c^5 c^8 are partially inclosed in chambers or boxes c^9 , formed in the side walls of the inclosing case. This enables the shaft to be conveniently mounted upon the pivot-screws b^2 and brings the sprocket-wheels wholly within the outside limits of the inclosing case, but without any considerable sacrifice of capacity of the inclosing case, because of the location of said pockets close to the axis of movement of the member b .

The arrangement of the treadles here shown provides for the most convenient operation thereof on the part of the operator, who has simply to stand upon one treadle and permit his weight to depress the same, as distinguished from apparatus for this purpose as heretofore constructed, which have required considerable muscular effort on the part of the operator to depress the foot-treadle, which has been so arranged as to make it inconvenient or impossible for the operator to throw his entire weight upon the treadle. Having depressed one treadle, the operator has merely to transfer his weight to the other foot upon the raised treadle without even removing the foot from the first treadle, this transference of weight being sufficient to depress said other treadle. The apparatus being double-acting and the double action being easily produced simply by transference of weight from one to the other foot of the operator provides for what is substantially a continuous current of air through the outlet-pipe of the apparatus, the interruption being momentary merely at the moment of transfer of weight and change of direction of movement of the member b . Furthermore, a distinct advantage obtained by an apparatus such as here shown is that a movement of the reciprocatory member b from one to the other of its extreme positions (it of course fitting properly the inner walls of the inclosing case) causes to be expelled from the apparatus a definite ascertainable volume of air, and this volume is expelled at each reciprocation of the said member in each direction. This permits of the number of movements of the reciprocatory member required to propel the carrier a given distance or the power required to be applied for movement of the said member to propel the carrier a given distance, to be figured out accurately before or at the time of installation of the apparatus. This having been done, the required power may be obtained by employing fast sprocket-wheels c^5 c^8 of the required diameters. Thus if a low pressure only is required sprocket-wheels c^5 c^8 of relatively small diameters will be employed, producing resultant short range of movement or lift of the foot-treadles, and, conversely, if a high pressure is required relatively large sprocket-wheels

will be employed, with their added or increased leverage and correspondingly-increased movement of the treadles, it being borne in mind that whether the range of movement of the treadles be little or much the same expenditure of power—viz., the weight of the operator—is alone required.

Of course the volume of air expelled at each reciprocation of the member *b* may be varied either by varying the width of the inclosing case or by enlarging the proportion of the circle embraced by the segmental inclosing case.

The propelling means illustrating my invention may be employed in connection with any desired system of tubes for the transmission of any desired kind of carrier, whether used for cash, mail, parcel, or other service. Such systems being well known at the present day, it is unnecessary here to describe the same in detail.

My invention is not restricted to the particular embodiment thereof here shown, for obviously the same may be varied without departing from the spirit and scope of the invention.

Having described my invention, and without limiting myself as to details, what I claim, and desire to secure by Letters Patent, is—

1. A pneumatic propelling device comprising a segmental inclosing case having one or more flat faces, a rotary reciprocatory member in said case and treadle means for reciprocating it, inlet and outlet openings in said flat face at each side of the axis of said reciprocatory member, valves for said openings and means to support said case in position with its said flat face or faces and said inlet-openings uppermost.
2. A pneumatic propelling device comprising a segmental inclosing case having one or more flat faces and means to support said case in position with its said flat face or faces uppermost, a rotary reciprocatory member in said case, and a plurality of operating devices and connections between the same and said reciprocatory member whereby said operating devices may reciprocate said member respectively in opposite directions in said case, said connections passing to said member above said flat face or faces, inlet and outlet openings in the flat face of said case at each side of said reciprocatory member therein, and valves controlling the said openings.
3. A pneumatic propelling device comprising a segmental inclosing case having one or more flat faces and means to support said case in position with said flat face or faces uppermost, a rotary reciprocatory member in said case, a plurality of operating devices arranged at one end of said case, and flexible connections between the same and the said reciprocatory member, whereby said operating devices respectively may reciprocate said member in opposite directions, inlet and outlet openings in the top of said case, and valves controlling the same.

4. A pneumatic propelling device comprising a segmental inclosing case having one or more flat faces, and means to support said inclosing case in position with said flat face or faces uppermost, a rotary reciprocatory member in said case, a plurality of operating devices and flexible connections extended over said flat face or faces and connected with said reciprocatory member at opposite sides of the latter, pulleys over which said flexible connections are carried, whereby said operating devices may reciprocate said member respectively in opposite directions, inlet and outlet openings in the top of said case and valves controlling the same.

5. A pneumatic propelling device comprising a segmental inclosing case having one or more flat faces and means to support said inclosing case in position with said flat face or faces uppermost, a rotary reciprocatory member in said case, and means to reciprocate the same in opposite directions, outlet-openings in the said flat face or faces respectively at opposite sides of said reciprocatory member, a bifurcated outlet-conduit having its ends connected respectively with said outlet-openings, and a swing-valve in said conduit controlling both said outlet-openings, inlet-openings also in said flat face or faces arranged respectively at opposite sides of said reciprocatory member, and valves controlling said inlet-openings.

6. A pneumatic propelling device comprising an inclosing case, a rotary reciprocatory member therein, inlet and outlet valves, a plurality of pedal-operating members, rectilinear guides therefor, and connections between said operating members and said reciprocatory member, whereby rectilinear movements of said operating members cause rotary reciprocation of said reciprocatory member.

7. A pneumatic propelling device comprising an inclosing case, a shaft carried thereby, a rotary reciprocatory member within said case and mounted on said shaft, operating members on said shaft and pocketed in said inclosing case, they being separated from the interior of the latter by the pocket-walls, and operating means connected with said operating members.

8. A pneumatic propelling device comprising an inclosing case, a shaft therein, a rotary reciprocatory member attached to said shaft, sprocket-wheels on said shaft and pocketed in said inclosing case, being separated from the interior of the latter by the walls of said pockets, pedal-operating members and flexible connection between the same and said sprocket-wheels, to operate substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILBUR G. DAVIS.

Witnesses:

FREDERICK L. EMERY,
EVERETT S. EMERY.