C. L. DAVIS.

POWER PNEUMATIC.

APPLICATION FILED MAR. 8, 1909.

947,571.

Patented Jan. 25, 1910.

2 SHEETS—SHEET 1.

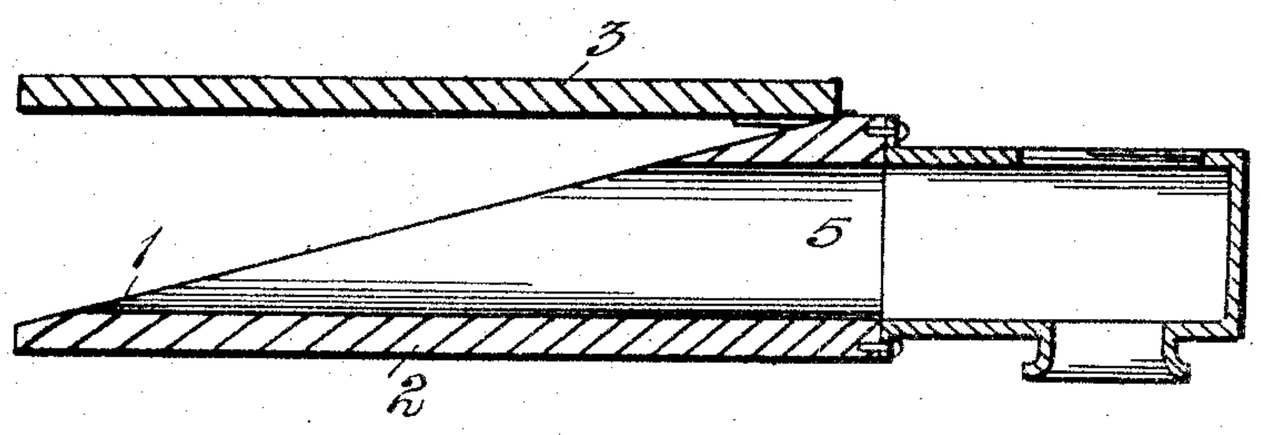

Fig. 3.

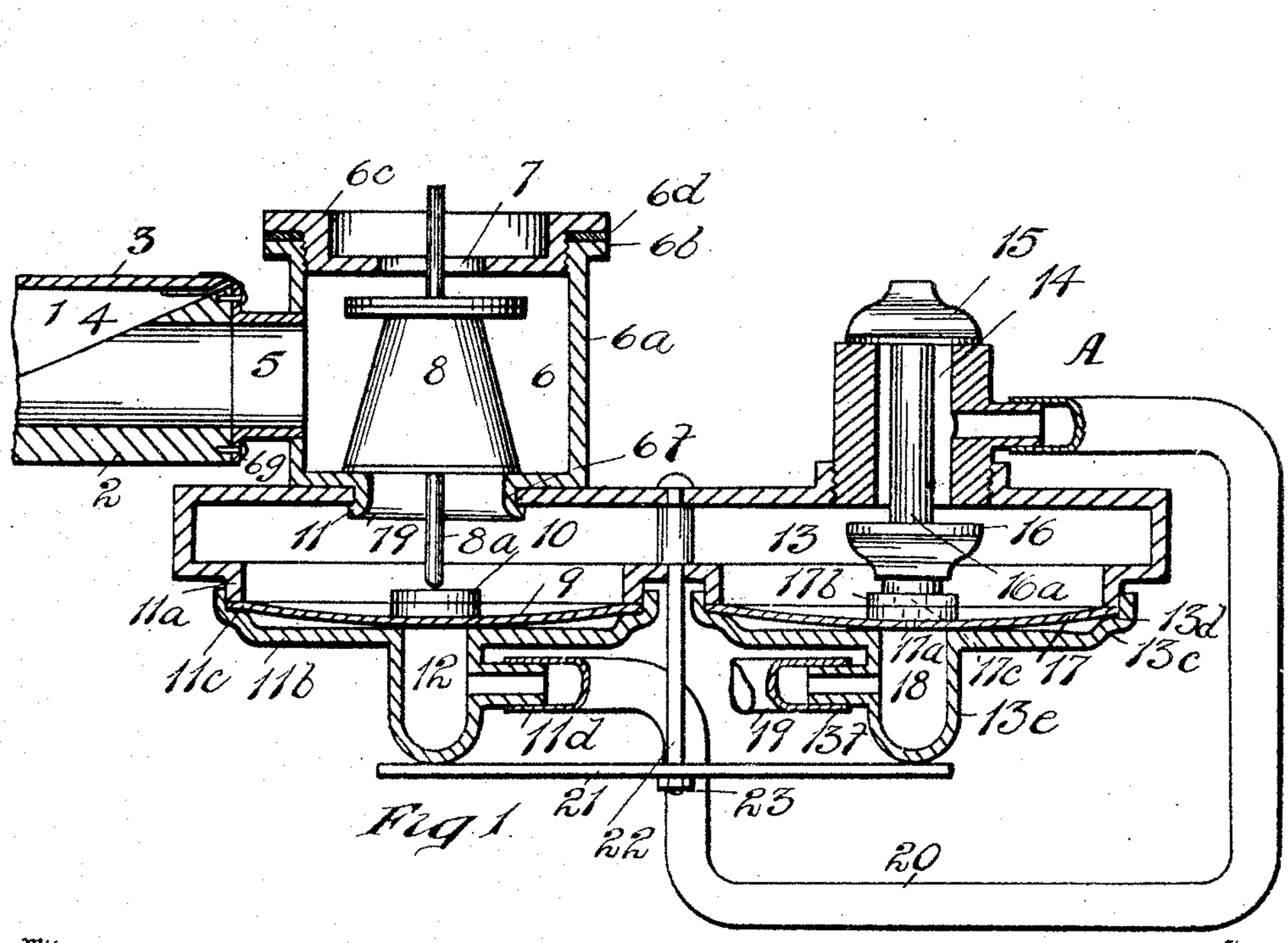

Fig. 1.

Witnesses

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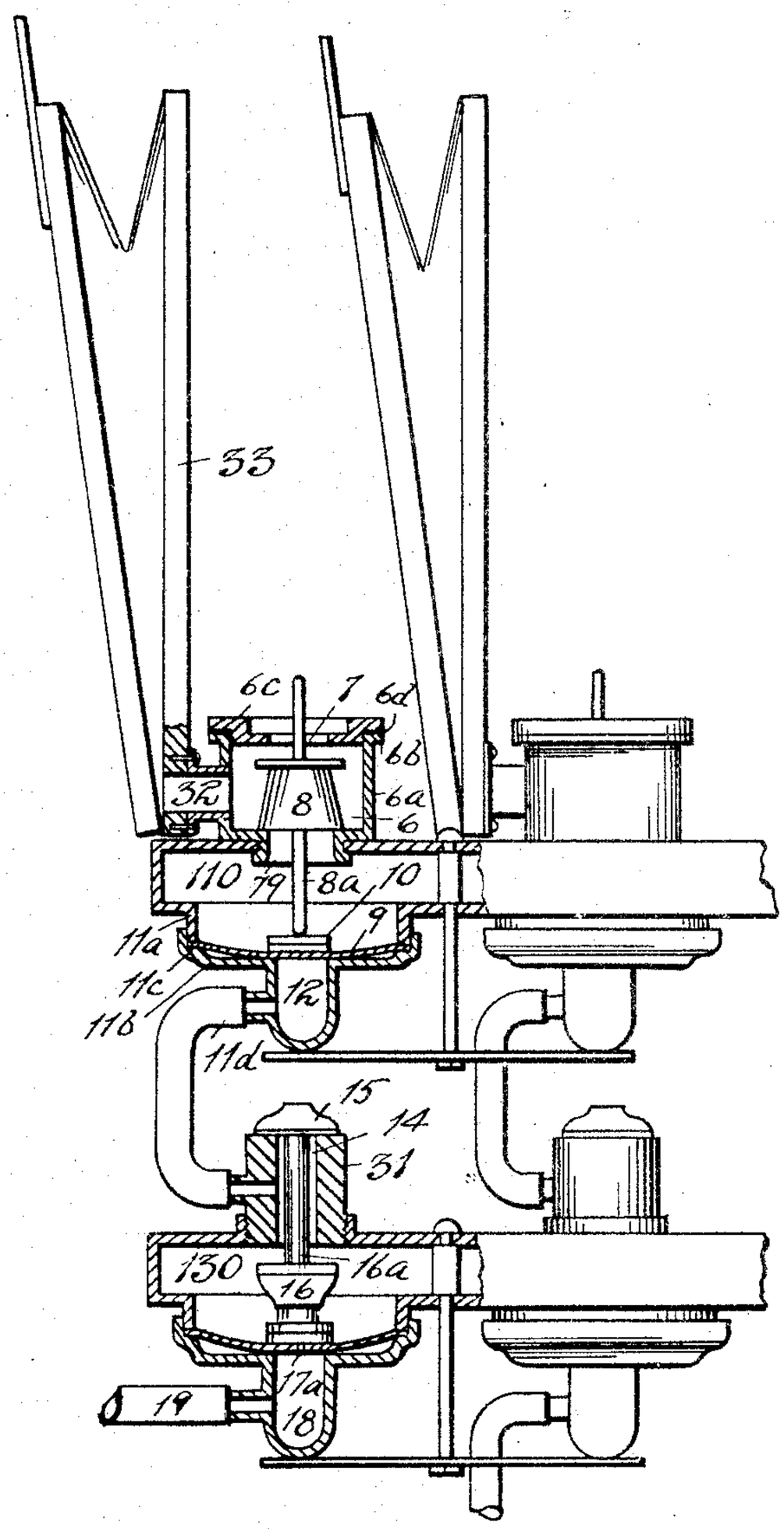

Fig. 2.

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UNITED STATES PATENT OFFICE.

CHARLES L. DAVIS, OF DETROIT, MICHIGAN.

POWER-PNEUMATIC.

947,571. Specification of Letters Patent. Patented Jan. 25, 1910.

Application filed March 8, 1909. Serial No. 481,899.

To all whom it may concern:

Be it known that I, CHARLES L. DAVIS, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Power-Pneumatics, and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to power pneumatics of the class employed to produce the hammer stroke in automatic music players. In the present application, however, the invention is not intended to be confined to music playing instruments, as this character of pneumatic action may be used in many characters of machinery other than those strictly devoted to music playing, and the object of this invention may be employed in any character of machine to which it is adapted.

In general, the device is one in which the final quick stroke, like that of a hammer, is produced by air pressure that is brought into sudden action by the actuation of a valve, and in order that the requisite amount of air, or a large enough valve may be set in motion to produce the requisite amount of pressure and force of blow, consecutive operations are employed, in the first of which a small amount of air admitted through a small port, trips a larger valve, and allows the stronger force to be brought into action, such as is necessary to produce the ultimate result desired.

In the drawings:—Figure 1, shows, in sectional elevation, a primary and secondary actuator arranged in the same horizontal plane. The axis of the power pneumatic is parallel to the short horizontal diameter of the air trunk. Fig. 2, represents a pair of pneumatic actuators, arranged in a vertical plane. The principle of action and method of construction is similar in both. Fig. 3, is an enlarged sectional elevation of the bellows and of the adjacent portion of the large air chamber.

Referring to Fig. 1, 1 indicates the power pneumatic, which is a small collapsible bellows, having the base 2 fixed in position, and the movable leaf 3 attached to the base by flexible walls 4. This pneumatic is expanded by a spring when air is admitted through the passage 5; it is contracted or collapsed against tension of the spring, when air is withdrawn through the same passage. The air enters the chamber 6 through passage 7, which passage is controlled by a valve 8; the stem of the valve 8 rests on a diaphragm 9, with an interposed button 10. The lower part of the valve stem 8^a is in a wind trunk 11, from which the wind is exhausted by well known means (which are not shown); when the air is exhausted from the air trunk the diaphragm 9 is lifted by air entering the chamber 12 from primary pneumatic A and air trunk 13. The air trunk 13 communicates with the external air through the passage 14; this passage is controlled by a valve 15 that closes the entrance end, and the valve 16 that closes the discharge end into the trunk. Underneath the base of the valve stem 16^a is a diaphragm 17 over the chamber 18, into which chamber 18 leads the conduit 19 from the tracker board, or other primary valve. The novel features of the invention do not reside in the arrangement of these passages, air trunks and chambers, but in the construction of the various parts comprising them. The chamber 6 is inclosed in a metal cylindrical shell 6^a, the top of which has flanges 6^b, and is closed by a screw cap 6^c, screwed into place with an interposed gasket 6^d, which produces a tight closure. Through the screw cap 6^c is an opening 7, closed by the valve 8. At the bottom the chamber is contracted and provided with an extension neck 79 which terminates with a flange 6^f; the neck is inserted through an opening in the top wall of the air trunk 11, and is secured in place by burnishing or peening the edge of the flange 6^f over the edge of the metal. The side outlet 5 is through a thimble secured to the metal cylinder, in any suitable way, and provided with a flange 6^g, by means of which it may be secured to the end of the power pneumatic. The lower wall of the metal box forming the air trunk 11 is perforated, and the base of the metal around the perforations turned outward to form a neck flange 11^a, over which engages a pressed metal cap 11^b, pressed into shape to form the chamber 12, and with shoulders 11^c to hold the diaphragm 9 between the turn of the shoulder and the edge of the neck flange 11^a. A nipple 11^d over which engages the end of a conduit 20 is secured to the side of the bell which incloses the chamber 12. The under

side of the metal walls of the air trunk 13 are provided with perforations similar to those in the under side of the air trunk 11, each of which is flanged, and over each of which engages a cap 13^c, provided with shoulder 13^d, and with a bell projection 13^e, into which leads the nipple connection 13^f. The diaphragm 17 serves as a gasket between the cap and the flange on which it seats, and both the caps thus described are held in place by a single spring tie bar 21, held by a bolt 22 and nut 23. The diaphragm 17 is perforated with a small "bleedhole" 17^a. The cap 17^b is provided with a suitable passage 17^c to prevent obstruction to a free passage of air through the bleedhole.

In the form shown in Fig. 2, the arrangement of the pairs of valve casings which form the complement comprising the primary pneumatic 31, the secondary pneumatic 32, and the power pneumatic 33, are exactly similar in construction, but are arranged with the air trunks 110 and 130 in vertical arrangement, instead of in horizontal parallel arrangement. The structural features of the primary pneumatic 31 are similar in all respects to that part of the mechanism shown on the right hand part of Fig. 1, and the arrangement of the parts in the secondary pneumatic 32 is similar in all respects to that shown on the left hand of Fig. 1. The arrangement, however, of the parts in the manner shown in Fig. 2 is much more compact, the vertical arrangement of the power pneumatic, and the vertical arrangement of the primary and secondary of each couple, makes it possible to create a structure occupying a very shallow space from front to back, and a complete set of these motors may be employed in places where it has heretofore been extremely difficult to use them because of limited space.

What I claim is:—

1. In combination with an air trunk having openings at top and bottom, the walls about one of said openings being flanged, a cap having a shoulder portion of complementary outline to said flanged portion, adapted to engage thereover, a diaphragm adapted to be held between said members over said opening by the engagement of its edge portion between said flanged portion of the trunk and the shoulder portion of the cap, and a plug member having a stem portion adapted to engage said diaphragm and to be actuated thereby, whereby either of said openings may be closed, substantially as described.

2. In combination with an air trunk provided with a flanged opening, a diaphragm member adapted to engage thereover, a cap adapted to engage over said opening, with a shoulder bearing within said cap, adapted to hold the diaphragm between itself and the edge of the flange, and a bell projection central to said cap, provided with a nipple for the engagement thereover of an air conduit, substantially as described.

3. In combination with an apertured air trunk having its walls outwardly flanged thereabout, a diaphragm adapted to engage the edges of the flanged portion of the wall with its peripheral edge portions, a cap member adapted to engage over the apertured portion of the trunk, and by the engagement of its shoulder portions against the opposite peripheral face of the diaphragm from that engaged by the flanged edges of the trunk wall, to hold the diaphragm in place over the aperture in the trunk, and a bracket for holding the cap and the trunk member in desired relation to one another, substantially as described.

4. In combination with parallel air trunks, each of which is provided with openings for the engagement thereover of a cap, caps engaging over each of said openings, a diaphragm interposed between each of said trunk members and its attached cap, a bracket secured to said air trunk and provided with arms adapted to engage and hold said caps in place, substantially as described.

5. In combination with primary and secondary pneumatics arranged in couples, a power pneumatic arranged with its long axis in line with the common axis of the said primary and secondary pneumatics, substantially as described.

In testimony whereof, I sign this specification in the presence of two witnesses.

CHARLES L. DAVIS.

Witnesses:
CHARLES F. BURTON,
VIRGINIA C. SPRATT.