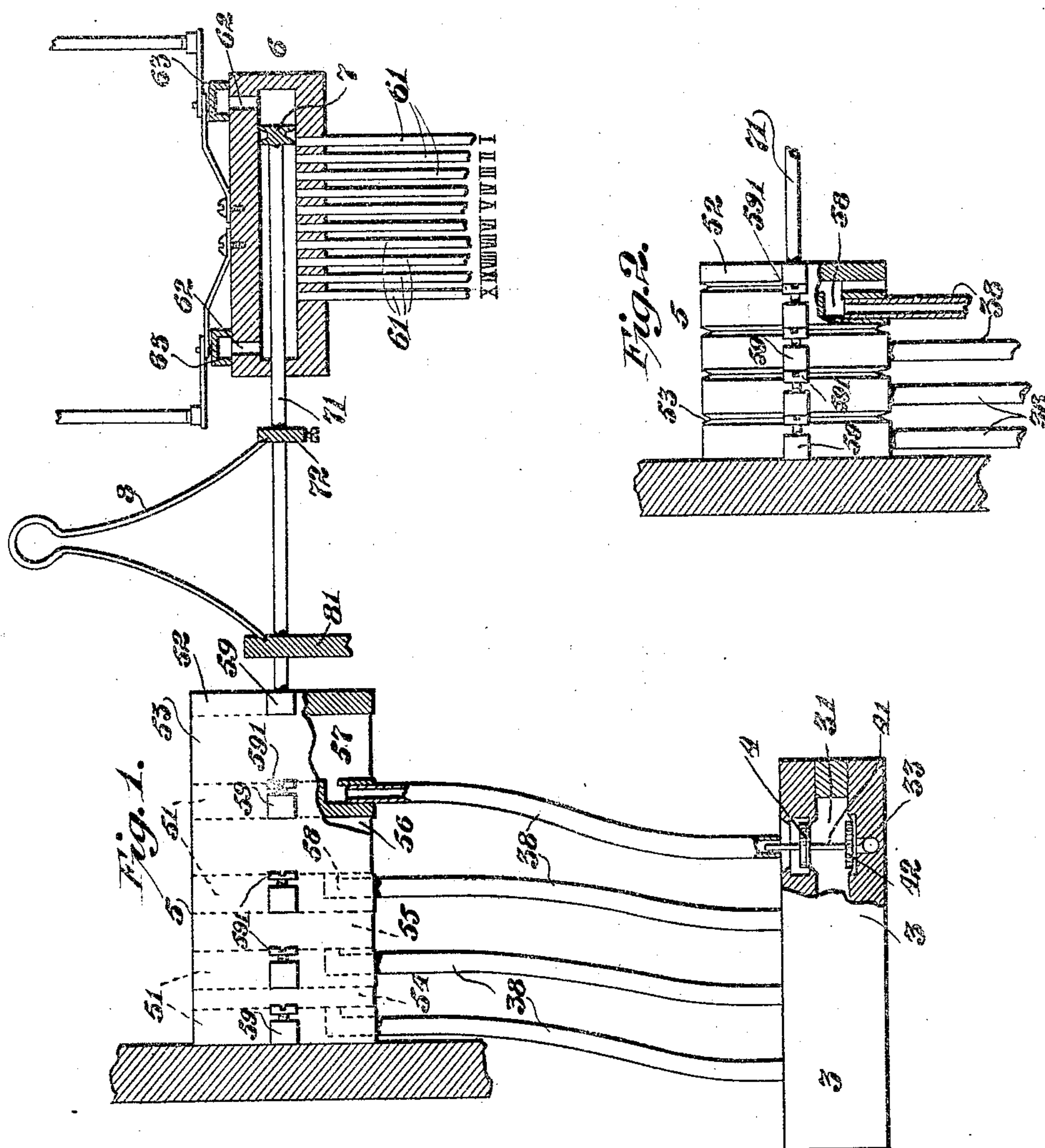


No. 819,985.

PATENTED MAY 8, 1906.

J. H. DICKINSON.
MECHANICAL MUSICAL APPARATUS.
APPLICATION FILED AUG. 26, 1904.

2 SHEETS—SHEET 1.



Witnesses
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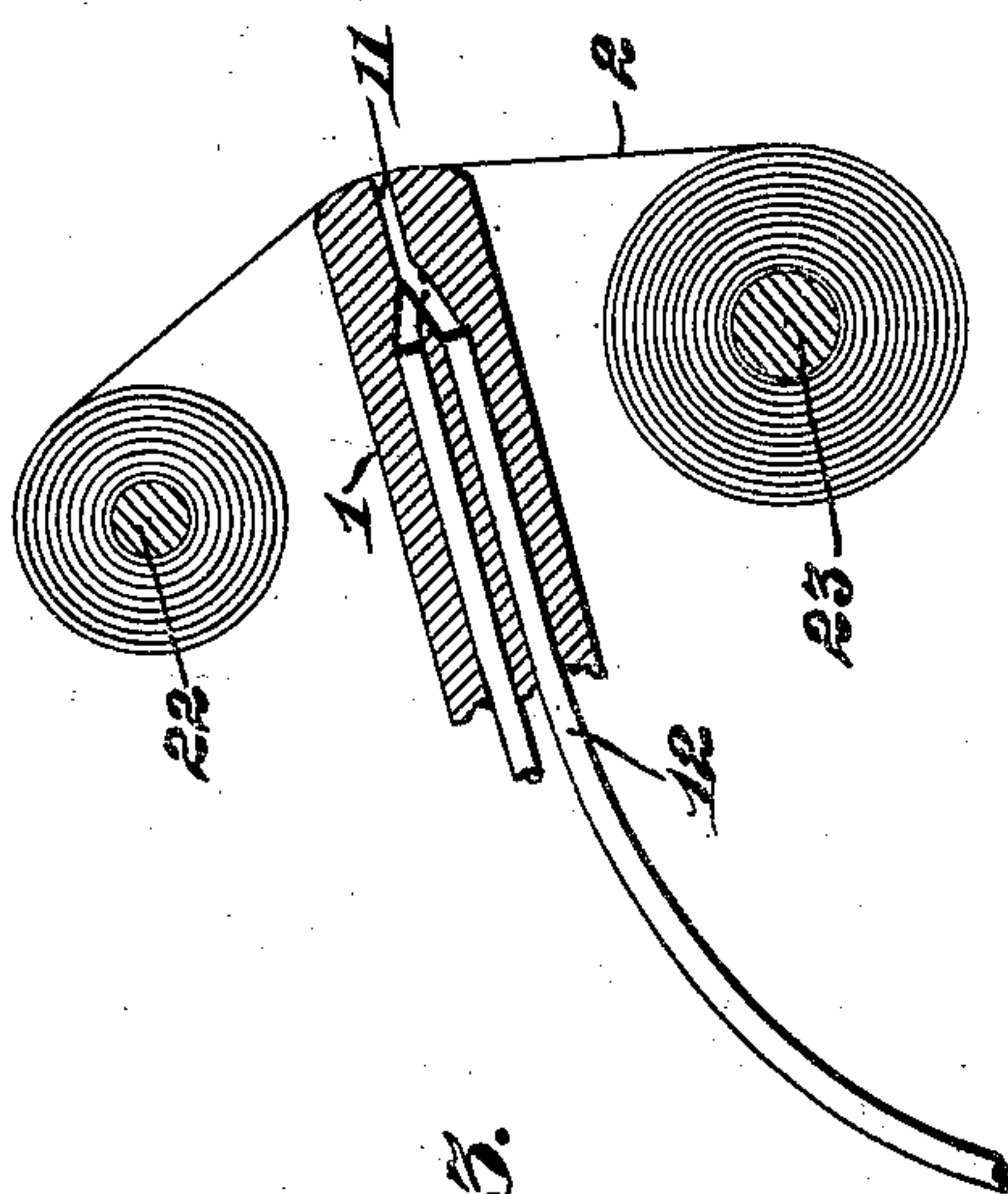
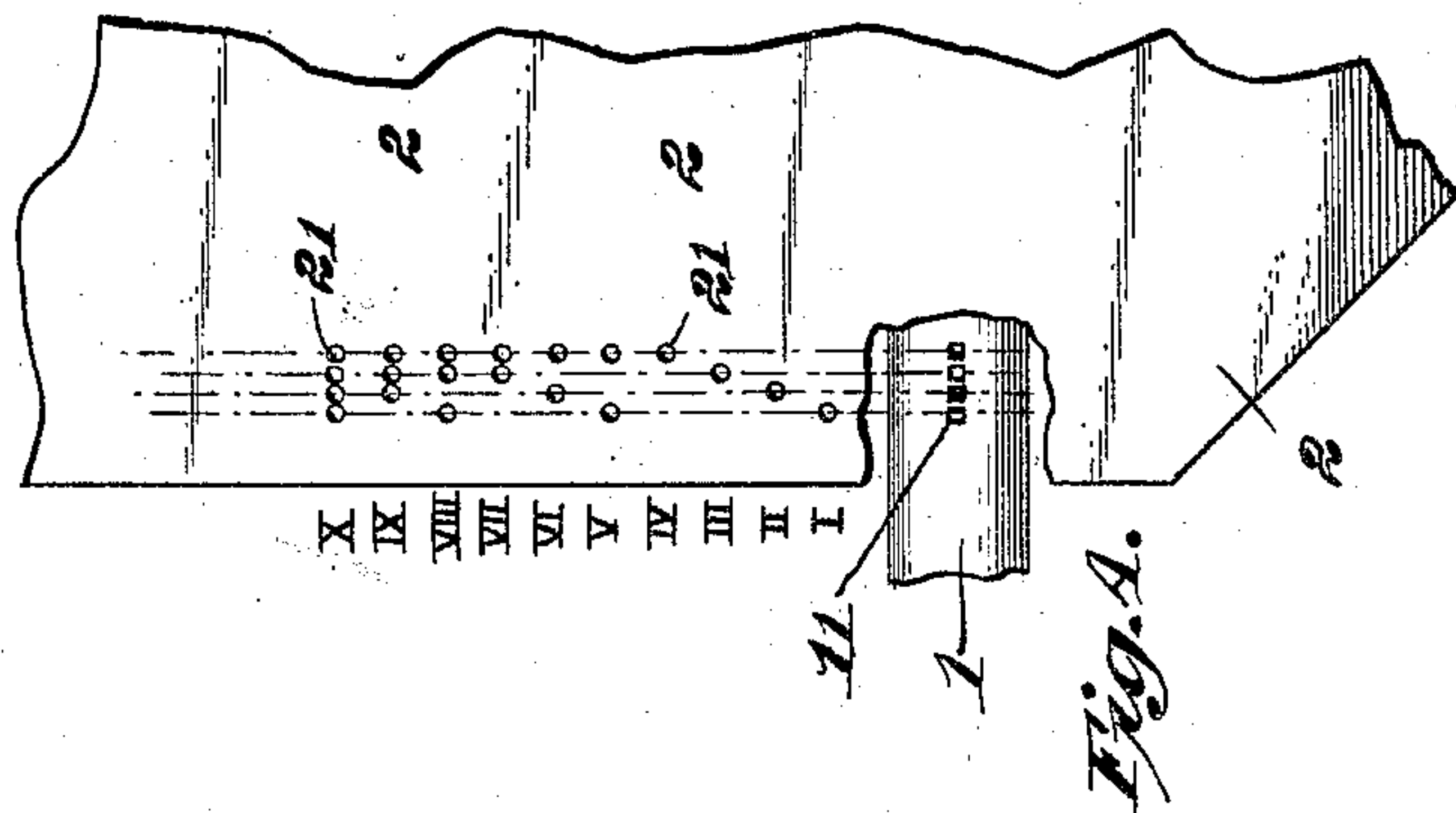
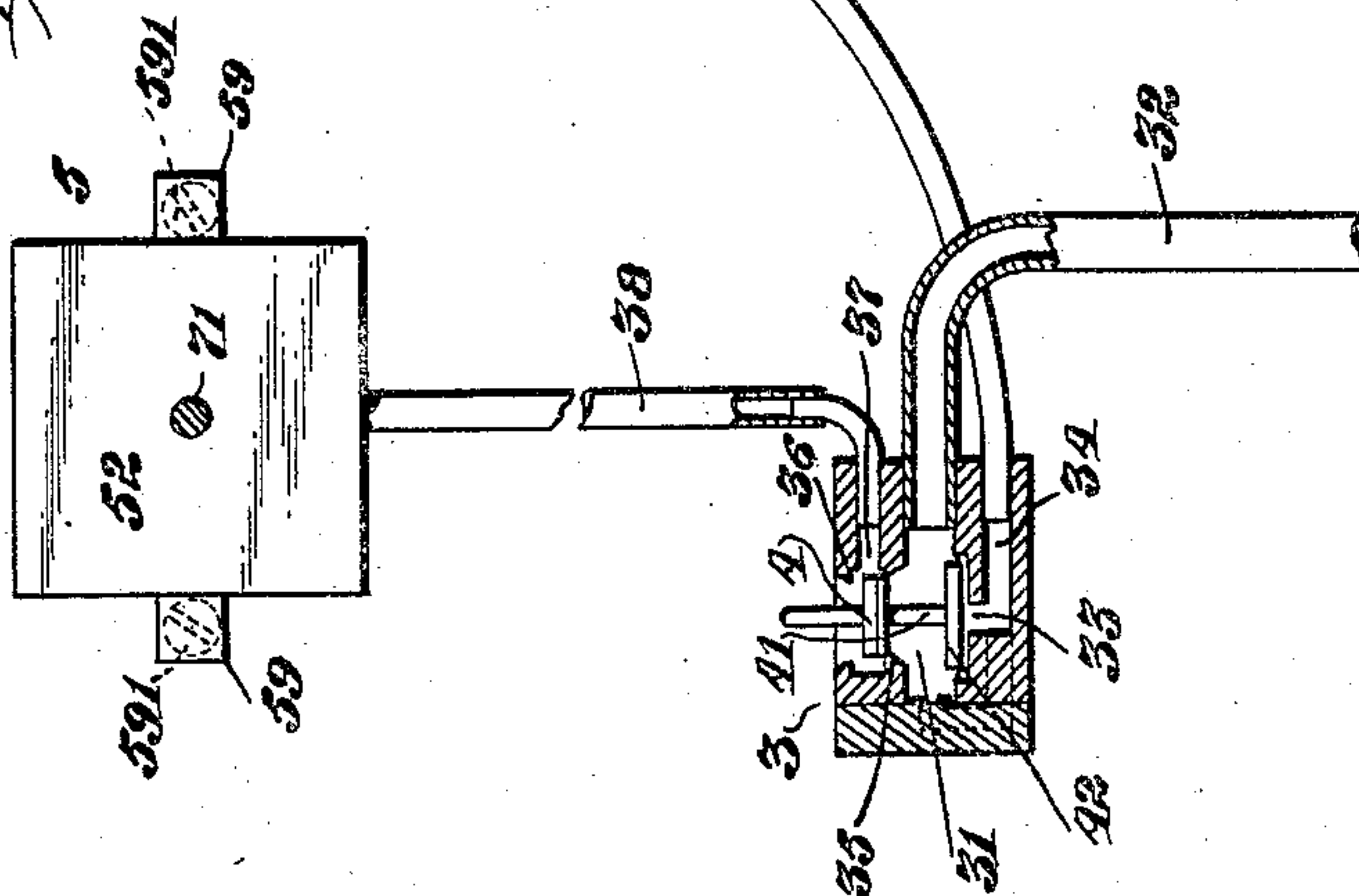


Fig. 3.



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UNITED STATES PATENT OFFICE.

JOSEPH H. DICKINSON, OF CRANFORD, NEW JERSEY.

MECHANICAL MUSICAL APPARATUS.

No. 819,985.

Specification of Letters Patent.

Patented May 8, 1906.

Application filed August 26, 1904. Serial No. 222,223.

To all whom it may concern:

Be it known that I, JOSEPH H. DICKINSON, a citizen of the United States, and a resident of Cranford, in the State of New Jersey, have
5 invented certain new and useful Improvements in Mechanical Musical Apparatus, of which the following is a specification accompanied by drawings.

My invention relates to mechanical musical
10 instruments or mechanical players for musical instruments.

It provides means for automatically actuating regulating devices for modifying the musical effect produced in various ways—as,
15 *e. g.*, the accenting of a particular note.

It also provides improved means for pneumatically shifting accenting or other controlling devices to any one of a plurality of positions.

20 I will illustrate my invention as applied to an accentuating mechanism—for example, such as is shown and described in United States Patents Nos. 743,130 and 743,065, granted November 3, 1903.

25 In the drawings, Figure 1 represents, partly in elevation, partly in section, an accent-controlling slide-valve with my actuating device applied thereto. Fig. 2 represents a portion of the actuating device in a different position. Fig. 3, partly in vertical section, shows a complete controlling device. Fig. 4 is a front elevation of a part of the
30 tracker-board and of the music-sheet.

I designate a tracker-board provided with
35 ducts 11 (shown as four in number) in addition to the regular ducts connected to the ordinary note-actuating sets of pneumatics, neither these regular ducts nor pneumatics being shown in the drawings. As shown,
40 the ducts 11 are located at one end of the usual row of ducts and are adapted to cooperate with rows of perforations 21, cut at one side of a music-sheet 2, which is wound upon music and take-up rolls 22 23 in the usual
45 manner. From each of the ducts 11 a tube 12 leads to a valve or pneumatic, (shown as located in a chest 3,) the chamber 31 of which is connected by a pipe or passage 32 to means for producing wind suction. My device
50 could be operated by either suction or pressure with only such minor changes as would be obvious to any one skilled in the art, and I will for convenience describe it as operated by a reduction of air-pressure below atmosphere—that is, by tension or suction. In the
55 pneumatic chest 3 are four valves 4, each of

which is connected by a stem 41 to a diaphragm-pneumatic 42, located between the suction-chamber 31 and a lower chamber 34, connected by a tube 12 with one of the ducts
60 11. The valve 4 moves between two seats 35 36, so as to open the upper chamber 37 alternately to the suction-chamber 31 and to atmosphere. From the chamber 37 a tube or passage 38 leads to one chamber of a com-
65 pound collapsible or accordion bellows-box 5. In the construction shown there are provided four longitudinal lines of perforations 21 in the music-sheet 2, four corresponding
70 ducts 11 in the tracker 1, and four pneumatics and pneumatic valves in the chest 3, each connected by a tube 12 to one of the ducts 11 and by a tube 38 to one of the four sections or chambers of the collapsible box 5. This
75 box is shown as secured at one end to any suitable stationary support and extending horizontally therefrom. It is also shown as having four partitions 51 and a front wall 52,
80 all connected by flexible sides 53 of any suitable material, whereby collapsible chambers 54, 55, 56, and 57 are inclosed. The sizes of the several collapsible chambers are such that
the collapse of chamber 54 gives a certain minimum adjustment or unit of motion to the front wall 52. Chamber 55 gives twice
85 as much, or two units. Chamber 56 gives three times as much, and chamber 57 four times as much. When two or more chambers collapse at once, of course their movements are added. Thus when all four col-
90 lapse the movement is ten units. In each of the partitions 51 is a controlling-port 58, connecting the chamber in front of said partitions with one of the tubes 38. Projecting laterally from each of the partitions 51 and
95 from the front wall 52 and clear of the sides 53 are stops 59. In the stops 59 on the partitions 51 are adjusting set-screws 591, which accurately limit the collapsing motions of the sections.

The end wall 52 is connected to operate
100 the rod or tube 71 against the tension of a spring 8, which acts, as shown, between a fixed stop 81 and a stop 72, secured to the rod 71. This spring holds the collapsible
105 sections or chambers in their expanded position and reexpands them when not subjected to suction.

The details of the accenting mechanism controlled by the rod 71 may be, if desired,
110 precisely as in Patents Nos. 743,130 or 743,065, and I have only illustrated so much

thereof as will help to understand the present invention. I have not attempted even to show all the details of the valve-casing 6, rod 71, and valve 7, nor the means by which the ports 62 and caps 63 are connected for controlling the pressure in the respective ends of the casing 6. At 61 I have illustrated ten pipes or ducts leading to accenting-pneumatics (not shown) to be controlled by the sliding valve or piston 7, as now well understood and shown in my said patent. The collapsible box with its different positions serves to adjust the valve 7 from its initial or end position accurately to any of ten other positions, and thus at will control the point of accent in the musical scale. When, for example, air is admitted to the tracker-duct 11, which controls the collapsible chamber 54, the valve will be shifted one unit to the left to control the first pipe 61. If the tracker-duct controlling the second collapsible section 55 is opened, the valve 7 will move two units. If the first section 54 and last section 57 are simultaneously collapsed, which would be accomplished by perforations in the sheet, as shown at V in Fig. 4, the valve will be shifted to the left five units. If, for example, all the sections are collapsed, the valve will be shifted to the left ten units. Whenever a tracker-duct controlling one of the collapsible sections is again closed after being opened, its collapsible section at once opens under the action of the spring 8, and in this way the position of the valve or piston 7 is determined by the collapsing and expanding of the sections, so as to enable it to control *seriatim* the entire range or series of accenting-ducts, and thereby shift the accent as desired.

The operation of the entire device will be clear if I describe the operation in connection with the collapse and reexpansion of a single chamber—as, for example, 57. When air is admitted to the tracker-duct 11, which controls the chamber 57, it passes down the pipe 12, raising the diaphragm 42 and valve 4, and thereby connecting the chamber 37, Fig. 3, and pipe 38 with the suction-chamber 31. The air is then exhausted from the chamber 57 through the pipe 38, and the collapse of the chamber under the effect of the external atmosphere occurs. As soon as the tracker-duct is closed and atmosphere shut off from the pipe 12 the diaphragm 42 and valve 4 fall, as well understood of pneumatic valves of this type, and thereby chamber 37 and pipe 38, leading to collapsible section 57, are connected with the atmosphere above the valve 4, allowing the spring 8 to instantly expand the chamber or section 57.

It is of course understood that the arrangement of the perforations 21 (shown in Sheet 2) is very much condensed and is diagrammatic merely to show the operation above described. In practice these perforations

will be cut of the required length and in any desired position to produce and maintain as long as desired the proper movement and position of the piston 7 for the desired accenting or other effect. It is evident that by modifications of the chest 3 and box 5 more or fewer than ten changes of position may be given to the piston 7, (or to any part that is to be moved for any purpose by the alternate collapse and inflation of the box 5.)

While I have illustrated my invention as accomplished by pneumatically-actuated means, I of course contemplate also the well-known equivalent of electrically-operated means in full or part, as the exigencies of construction may require. Thus by the words or phrases "ducts," "passages," "passage of air," or the like I include as well electrical contacts, conductors, currents, &c.

I claim—

1. In musical apparatus, a tracker, means for moving a perforated music-sheet over said tracker, an adjustable part for modifying the musical effect controlled by a perforation in said sheet, a plurality of means for moving said adjustable part in one direction, and means controlled by certain perforations in such music-sheet for actuating said moving means either separately or simultaneously.

2. In musical apparatus, a tracker, means for moving a perforated music-sheet over said tracker, an adjustable part for modifying the musical effect controlled by a perforation in said sheet, a plurality of means for moving said adjustable part, each of said last-named means being constructed and fitted to move said part to a different extent, and means controllable by certain perforations in such music-sheet for actuating said moving means simultaneously or separately.

3. In musical apparatus, a tracker, means for moving a perforated music-sheet over said tracker, an adjustable part for modifying the musical effect controlled by a perforation in said sheet, a plurality of pneumatic means for moving said adjustable part, each of said last-named means being constructed and fitted to move said part to a different extent, and means controllable by certain perforations in such music-sheet for actuating said moving means either separately or simultaneously.

4. In musical apparatus, a tracker having a plurality of ducts in addition to those controlling the sound-producing devices, means for moving a perforated music-sheet over said tracker, an adjustable part for modifying the musical effect controlled by a perforation in said sheet, and a plurality of independently-operated pneumatic means for moving said part in one direction, each of said last-named means being operatively connected to one of said ducts, said pneumatic means being constructed and fitted for either separate or cumulative operation.

5. In musical apparatus, a tracker having a plurality of ducts in addition to those controlling the sound-producing devices, means for moving a perforated music-sheet over said tracker, an adjustable part for modifying the musical effect controlled by a perforation in said sheet, and a plurality of independently-operated pneumatic means for moving said part each to a different extent, each of said last-named means being operatively connected to one of said ducts, said pneumatic means being constructed and fitted for either separate or cumulative operation.

6. In musical apparatus, a tracker having a plurality of ducts in addition to those controlling the sound-producing devices, means for moving a perforated music-sheet over said tracker, an adjustable part for modifying the musical effect controlled by a perforation in said sheet, and a plurality of independently-operated pneumatic means for moving said part in one direction, each of said last-named means being operatively connected to one of said ducts, said last-named means being constructed and fitted to operate separately or simultaneously.

7. In musical apparatus, a tracker having a plurality of ducts in addition to those controlling the sound-producing devices, means for moving a perforated music-sheet over said tracker, an accenting-valve, a plurality of collapsible sections, each operatively connected to said valve for moving said valve to a different extent, and a connection leading from each of said sections to one of said ducts, said pneumatic means being constructed and fitted for either separate or cumulative operation.

8. In musical apparatus, a tracker having a plurality of ducts in addition to those controlling the sound-producing devices, means for moving a perforated music-sheet over said tracker, an accenting-valve, a plurality of collapsible sections, each operatively connected to said valve for moving said valve in the same direction and constructed and fitted for separate or simultaneous operation, and a connection leading from each of said sections to one of said ducts.

9. In musical apparatus, a tracker having a plurality of ducts in addition to those connected with note-actuating devices, means for moving a perforated music-sheet over said ducts, an adjustable part for modifying the musical effect produced by a note-actuating perforation or group of perforations in such music-sheet, a collapsible box connected to said adjustable part and having means for moving it to each of more than two positions, and means for varying the air tension in said box controlled by the passage of air through a plurality of said ducts during such movement of the sheet.

10. In musical apparatus, a tracker having a plurality of ducts in addition to those con-

nected to note-actuating devices, means for moving a perforated music-sheet over said ducts, an adjustable part for modifying the musical effect produced by a note-actuating perforation or group of perforations in such music-sheet, a collapsible box connected to said adjustable part and having a plurality of separate chambers, and separate means for varying the air tension in each of said chambers controlled by the passage of air through one of said ducts during such movement of said sheet.

11. In musical apparatus, a tracker having a plurality of ducts in addition to those connected with note-actuating pneumatics, means for moving a perforated music-sheet over said ducts, an adjustable part for varying the musical effect produced, a collapsible box having a plurality of separate chambers, and means connected with each of said chambers, whereby said adjustable part may be moved in one direction to a plurality of positions greater in number than said ducts.

12. In musical apparatus, adjustable means for varying the accentuation at different points of the musical scale, a power-actuated device having a plurality of separately-actuable sections for moving said adjusting means, and means for controlling the actuation of said sections in various combinations to effect different adjustments of said accentuating means.

13. In musical apparatus, a tracker, means for moving a perforated music-sheet over said tracker, an adjustable part for modifying the musical effect controlled by perforations of the said sheet, and a plurality of pneumatically-actuated means for moving said adjustable part either by their separate or cumulative operation.

14. In musical apparatus, a tracker having a plurality of ducts in addition to those controlling the sound-producing devices, means for moving a perforated music-sheet over said tracker, an adjustable part for modifying the musical effect controlled by a perforation in said sheet, and a plurality of independently-operated pneumatic means for moving said adjustable part either by their separate or cumulative operation.

15. In musical apparatus, a tracker, means for moving a perforated music-sheet over said tracker, an adjustable part for modifying the musical effect controlled by a perforation in said sheet, a plurality of pneumatically-actuated means having different ranges of movement for moving said part either by their separate or cumulative operation, said part having a range of movement equal to the sum of the ranges of movement of said moving means.

16. In a musical apparatus, the combination of a series of pipes or ducts, a valve mechanism therefor, and means for adjust-

ing the said valve mechanism to control said pipes or ducts *seriatim*, said means comprising a plurality of collapsible chambers and pneumatic means for collapsing them severally or in combination.

17. In a musical apparatus, the combination of a series of pipes or ducts, a valve mechanism therefor and means for adjusting the said valve mechanism to control said pipes or ducts *seriatim*, said means comprising a plurality of pneumatics and means for operating them severally or in combination to adjust the said valve mechanism.

18. In a musical apparatus, the combination of a series of pipes or ducts, a valve mechanism therefor, and cumulatively-operative pneumatic means for adjusting the said valve mechanism to control said pipes or ducts *seriatim*.

19. In musical apparatus, the combination of a series of pipes or ducts and a sliding

valve for controlling them *seriatim*, and cumulatively-operative pneumatic means for shifting the said valve to any of a series of determinate positions.

20. In musical apparatus, the combination of a series of pipes or ducts and a sliding valve for controlling them *seriatim*, and cumulatively-operative pneumatic means for shifting the said valve to any of a series of determinate positions, the last said means including a pneumatic tracker-board and perforated music-sheet for controlling said valve.

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

JOSEPH H. DICKINSON.

Witnesses:

E. C. THOMPSON,
F. A. HUGHES.