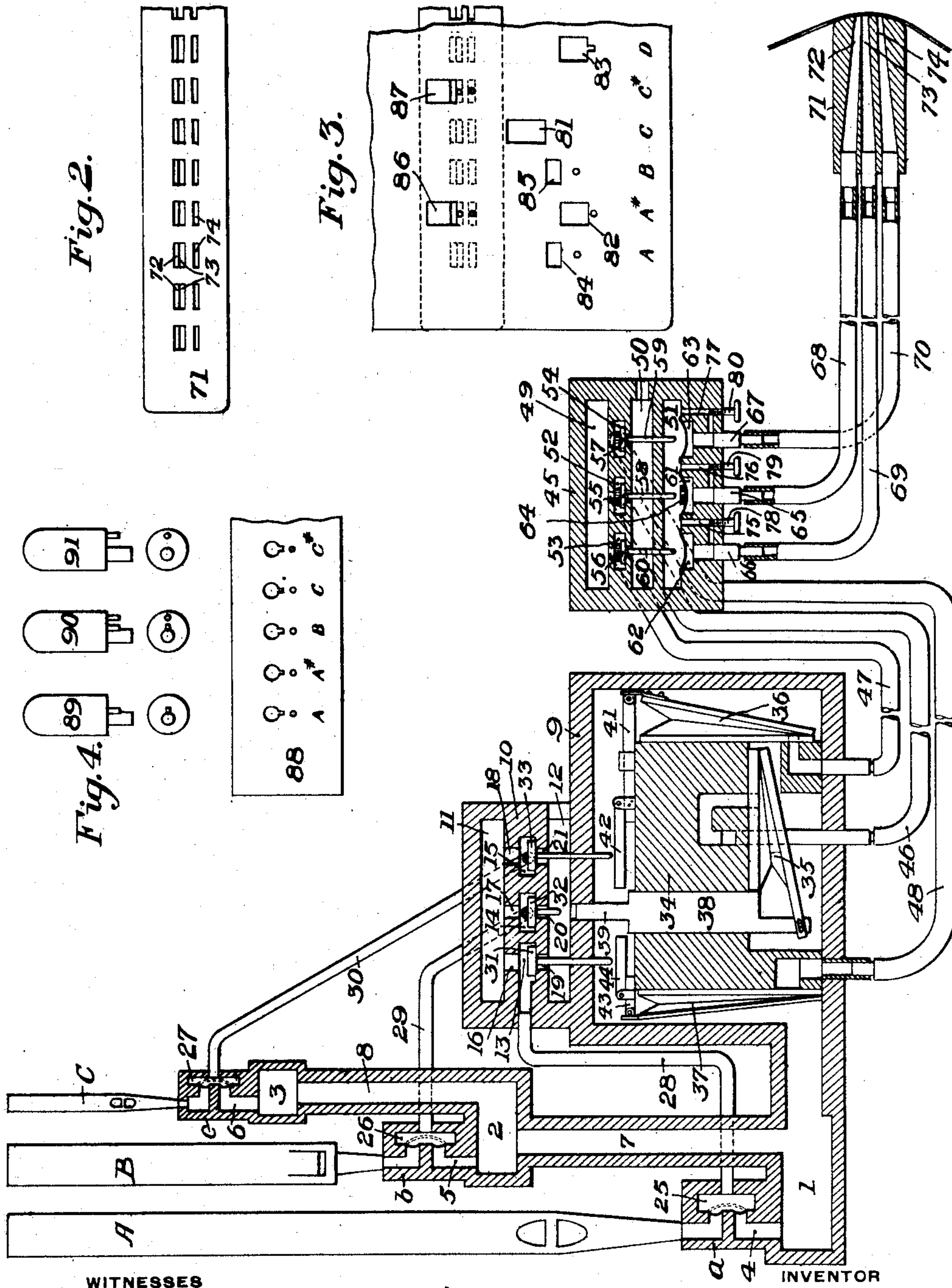


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MECHANICAL PLAYER FOR ORGANS.
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WITNESSES
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Fig. 1.

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UNITED STATES PATENT OFFICE.

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MECHANICAL PLAYER FOR ORGANS.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WILLIAM E. GIBBS, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Mechanical Players for Organs, of which the following is a specification.

In known mechanical devices for playing organs having two or more divisions or sections such as the pedal organ, great organ, and swell organ; it has always been necessary to embody in the tracker bar, two or more laterally spaced holes for each note on the musical scale, depending upon how many different voices in which it was desired to express the note. In consequence of this construction of the tracker bar, the long strip or tape of perforated paper forming the music sheet, must be provided with two or more columns of perforations for each note to correspond with the laterally spaced holes in the tracker bar. In practice, the paper forming the music sheet cannot advantageously be used above a certain width on account of its tendency to stretch and to become warped out of shape.

This invention relates to mechanical players for organs and has for its object to provide means for automatically controlling the rendition of musical compositions in such a way that each different voice will be rendered upon that section or division of the organ to which it is best adapted.

One of the particular objects of my invention is to provide in the preferred embodiment of my invention, a tracker bar of peculiar construction whereby two or more divisions of the organ can be simultaneously operated by means of a music sheet provided with a single column of perforations.

Another object is to provide a music sheet having a peculiar combination of perforations whereby it is adapted to work in combination with said tracker bar.

Other and further objects will appear in the specification and be more particularly pointed out in the appended claims.

In the drawings,—Figure 1 is a transverse vertical section through an organ embodying my invention; Fig. 2 is a front elevation of a portion of the tracker bar; Fig. 3 is a front elevation of a portion of the music sheet showing its relation to the tracker

bar; and Fig. 4 is an illustration of a set of tools by means of which the generally published ordinary music sheets, can be adapted for use with my tracker bar.

By means of the peculiar form and arrangement of the perforations in the musical sheet and in the arrangement of the holes in the tracker bar over which the music passes, I am able to sound the same recurring note successively on any division of the organ, or simultaneously on either two or three divisions, or on all three together. For instance, if the note "tenor C" is to be sounded four times in each musical measure for several successive measures; by means of my invention, said note may be sounded first on the great organ any desired number of times; then on the swell organ; then on the pedal organ; then on the swell and pedal organs together; or in any other desired combination. While this is happening, the D may be sounded successively on any other predetermined arrangement of organ divisions, such for instance as several times on the pedal organ and then alternately on the great and swell organs. Thus my invention provides means for playing upon two or more divisions of an organ, preferably by the use of a tracker bar having but a single group of vertically alined holes and a music sheet with all the perforations for each note, in a single column.

The preferred form of my invention comprises two essential parts. First, the peculiarly constructed tracker bar with the mechanism operated therefrom; and second, a music sheet having perforations of peculiar form and arrangement.

Referring more particularly to the drawing, the general arrangement and connection of the parts are diagrammatically shown in Fig. 1, in which A, B, and C each represent one of a large number of pipes comprising respectively the pedal organ, the great organ, and the swell organ. At the lower ends of said pipes are provided wind-valve boxes *a*, *b*, and *c* of a well known construction mounted upon the top covers of the wind-chests 1, 2, and 3 with which they are connected respectively by the ducts 4, 5, and 6 for conveying the organ wind to said valves. The wind-chests 1, 2, and 3 are connected by trunks 7 and 8. Connected with the valve-boxes *a*, *b*, and *c*, is a sec-

ondary pneumatic for each note of the keyboard, said secondary pneumatic being adapted in a manner to be hereinafter referred to, to effect the selection of the organ or organs upon which that particular note is to be sounded. Including these pneumatics, is an air-tight box 9 charged with organ wind. Preferably, the box 9 and the wind-chests 1, 2, and 3 extend throughout the length of the rows of pipes to form an elongated container for organ wind. Above the box 9 is a long valve chest 10 comprising an upper compartment 11 for high-pressure wind and a lower compartment 12 in free communication with the atmosphere. Intermediately of the compartments 11 and 12, are a plurality of valve chambers arranged in sets of three, there being one set for each note in the scale. Each of the valve chambers 13, 14, and 15, is connected with the high-pressure and atmospheric pressure compartments by the diametrically opposed channels 16—19, 17—20, and 18—21, respectively. Connecting the valve chambers 13, 14 and 15 with the pneumatic diaphragm valves 25, 26 and 27 respectively, are tubes 28, 29, and 30 while in the valve chambers are mounted the valves 31, 32, and 33 for alternately closing the connections with the high-pressure and atmospheric pressure compartments.

Each secondary pneumatic comprises a central block 34 having attached thereto the pneumatic elements 35, 36 and 37 which are compressible under the organ wind. In the embodiment shown in the drawings, these elements are bellows of the ordinary type the central one 35 having the outer end of the moving member slotted to receive a pin carried by a vertical slider 38. Slider 38 is provided at its upper end with an extension 39 formed in such a manner as to leave a shoulder on each side thereof for the purpose to be referred to presently. It will be seen that when the slider 38 is raised, the finger 39 engages the stem of the valve 32 and forces it into its upper position from which it is returned, as soon as the slider descends, by the high-pressure wind. Pivotaly connected with the outer end of the moving member of the bellows 36, is a sliding rod 41 mounted in guides upon the block 34. Superimposed upon this rod and pivotally connected therewith, is a second rod 42 having its outer end overhanging that of rod 41. By the compression of the bellows 36, this latter rod 42 is forced into the path of the slider 38 which raises it to operate the valve 33 in a manner similar to that of the valve 32. A similar device actuated by the bellows 37 serves the same purpose for the valve 31 which is operated through the agency of rods 43 and 44. It will be noticed that when either one or both of the valves 31 and 33 are being oper-

ated, the upward movement of the slider 38 is limited to such a degree that the valve 32 will not be operated.

Connected with the bellows 35, 36, and 37, are the tubes 46, 47, and 48 leading to the primary pneumatic 45 similar in construction to the valve-chest 10. This pneumatic comprises a high-pressure compartment 49, a compartment 50 open to the atmosphere, and a compartment 51 in which the pressure is maintained below that of the atmosphere by means of a partial vacuum created therein. Tubes 46, 47, and 48 lead respectively to the valve chambers 52, 53, and 54. Suitably mounted within these valve chambers by means of their stems 58, 59, and 60, the valves 55, 56, and 57 are adapted to successively open and close the passages connecting the valve chambers with the high-pressure and atmospheric pressure chambers. Said valve stems are packed with felt or other suitable material at the points where they pierce the partition between compartments 50 and 51 in such manner as to permit easy movement while preventing an excessive passage of air. Within the bottom wall of compartment 51 and placed respectively directly beneath the valve stems 58, 59, and 60, are the pneumatic pouches 61, 62, and 63 which in a well known manner operate the valves 55, 56, and 57. Leading from the pouches 61, 62, and 63, are the tubes 68, 69, and 70 which at their other ends connect with the tracker bar 71. Tracker bar 71 according to my invention, is constructed to provide for each note in the scale of the pedal organ, three superimposed channels opening respectively in the front face of the tracker bar at 72, 73, and 74. Mouth openings 72 and 73 are brought as near together as it is possible to bring them while the opening 74 is spaced from the hole 73 a distance slightly greater than the depth of the hole. In this manner I have thus provided three holes one above the other for each note that can be sounded on the pedal organ while for the great and swell organs which extend over the entire musical compass of the instrument, I have provided the two upper holes for each note, thus confining the holes for each note to a single column but at the same time providing an arrangement whereby two or more divisions of an organ may be played upon simultaneously by an automatic organ-playing device.

Connecting the tubes 65, 66, and 67 of the pneumatic pouches 61, 62, and 63, with the compartment 51, are the by-pass "bleed" channels 75, 76, and 77 the passages through which are controlled by the screws 78, 79, and 80. When an imperforate portion of the air-tight music sheet is passing over the openings 72, 73, and 74, these "bleed" channels serve to equalize the pressure upon the two sides of the diaphragm of said pouches.

Fastened securely to the diaphragm of the pouch 61, is a weight 64 by means of which the action of said diaphragm and pouch is made less delicate than the actions of the 5 pouches on either side thereof.

Referring now to Fig. 3, it will be seen that the punctures corresponding to the music notes are of two kinds; first, rectangular apertures of a width equal to that of the 10 holes in the tracker bar with lengths proportional to the time during which the notes controlled by the apertures, are to sound; second, one or more punctures of circular, square, or oblong shape placed slightly in 15 advance of the larger aperture. The function of the large rectangular apertures, is to allow air to enter the pneumatic action which sounds the notes, while the function of the small punctures is to let air enter the selective pneumatic action which determines 20 the division of the organ on which the accompanying note is to be sounded. The passage through the bleed channel 76 is adjusted to such a size as will render impossible, 25 an accumulation of air in the pouch 61 due to the admission of air through any of the pilot holes in the music sheet. In Fig. 3, various groupings of these punctures are shown. The "note" puncture 81 alone, normally sounds its note on the great organ because full supply of air is instantly conveyed first to the pouch 61 to operate valve 55 and secondary pneumatic 35 and valve 32 controlling diaphragm valve 26 of the great organ. Grouping 82 or 83 sounds its note on 35 the swell organ; 84 and 85 on the pedal organ; and 86 and 87 on the pedal and swell organs together. Since the grouping of the punctures determines the divisions of the 40 organ on which the note will sound, it is obvious that if the notes represented by Fig. 3 were simultaneously to reach the openings in the tracker bar, the notes corresponding to them would all be sounded at once. Note 81 45 would sound on the great organ; notes 82 and 83 on the swell organ; 84 and 85 on the pedal organ; and 86 and 87 on both the pedal and swell organs. By the use of one or more of the usual organ coupler devices, these 50 groupings may be made to play still other combinations. Thus by drawing the pedal to great coupler group 84, both pedal and great organs would be played, while group 86 or 87 would play pedal, great and swell. 55 By drawing the great to pedal coupler 81, the great and pedal organs would be played. By drawing the swell to great, group 82 would play both of these, while 86 and 87 would play all; and thus for other combinations. 60

When a group such as 82 or 83 passes over the tracker bar, the pouch 61 is not operated by the small puncture or narrow opening traversing the upper hole 72 because the 65 weight is not lifted by the small quantity of

air which enters through said small puncture; but as soon as the second row hole 73 is reached, the more sensitive pouch 62 responds and the rod 42 is forced into the path 70 of the slider 38. The spacing of the perforations in groups 84 and 85 are such as to insure that the pilot-holes come directly over the hole 74 in the tracker bar at the same instant that the edges of the larger rectangular hole coincides with the upper 75 edge of hole 72 so that immediately after the bar 44 has been moved into the path of the slider 38, said slider is forced upwardly. The pilot holes preceding the holes 84 and 85, are rendered ineffective while passing 80 over the tracker duct 73, by the bleed 75, after the pilot passes on to the tracker aperture 74. The holes of the groups 86 and 87 are similarly placed with respect to the holes 72, 73, and 74. 85

It will be obvious to organ builders that a variety of means is available for performing the functions of the apparatus interposed between the tracker bar and the organ pipes. The entire system may be operated 90 by either pressure or exhaust or by a combination of both, or by electro-magnets.

This invention contemplates apparatus either electrically or mechanically operated, whereby large pipe organs which are constructed in separate departments or divisions, may be controlled by a selective mechanism comprising a selective action for determining which departments a note is to be sounded upon; and a note-sounding action 100 for voicing the note.

According to the preferred form of this invention, one or more additional rows of holes are arranged beneath the single row usually provided in the tracker bar; the invention also consists in providing means for making these holes operative to control selective devices; in providing groups of holes in the music sheet for sounding different organ divisions through their selective action and in making the selective pneumatics 110 more sensitive than the actuating pneumatics, so that the small holes pass the upper row of holes in the tracker bar without making the notes to sound, but do cause a movement of the pneumatics connected with the 115 lower row of holes. The additional holes in the tracker bar are not similar to those in which a double cutting of the music plays two manuals, for the passing of the music sheet apertures over these lower holes alone 120 would not sound the notes.

The ordinary single manual music sheet may be used on this player without change and still play one manual at a time. In order to adapt such music to operate an organ in accordance with my invention, the music sheet may be readily converted into selective music by punching the small holes where 125 required. For this purpose the tools shown 130

in Fig. 4 may be used. A plate 88 of thin steel is provided with perforations into which the punches 89, 90, and 91 fit. These punches are thus adapted when the music is passed across the steel plate, to make the desired perforations.

Inasmuch as there are many different mechanisms which can be made use of to effect the objects of my invention without departing from the broad spirit of the invention, I do not wish to limit myself to the particular means employed in the embodiment shown and described in this specification.

What I claim is:

1. In a mechanical player for organs, the combination of pouches of different degrees of sensitiveness; a tracker board provided with openings separately connected with said pouches; said openings being alined in the direction of travel of the music-sheet across the tracker board; and a perforated music sheet provided with pilot-holes of less width than the note-sounding perforations and in advance thereof.

2. In a mechanical player for organs, the combination of pouches of different degrees of sensitiveness; a tracker-bar provided with transversely alined openings connected separately with said pouches; and a music-sheet passing transversely across said tracker-bar, said sheet being provided with note-sounding perforations and pilot-holes of less width in advance of some of said note-sounding perforations.

3. In a mechanical player for organs, the combination of a tracker-bar having transversely alined openings for each note of the musical scale; a less sensitive pouch connected with the opening first traversed by the music-sheet; more sensitive pouches connected separately with the other openings; and a music-sheet traversing said tracker-bar transversely, said sheet being provided with note-sounding perforations and pilot-holes of less width in advance of the note-sounding perforations.

4. In a mechanical player for organs, the combination of a more sensitive pouch and a less sensitive pouch, a tracker-bar with two transversely alined holes the first hole traversed by the music-sheet being connected with the less sensitive pouch and the other hole being connected with the more sensitive pouch, and a music-sheet traversing the tracker-bar, said sheet being provided with a note-sounding perforation and a pilot-hole in advance of the note-sounding perforation and of less area than any one of the holes in the tracker-bar.

5. The combination with a tracker bar having two transversely alined holes for each note of the musical scale, of a less sensitive pouch connected with the hole

first traversed by the music-sheet and a more sensitive pouch connected with the other of said holes, and a music sheet provided with note-sounding and pilot hole perforations arranged in a line in the direction of travel of said sheet, said pilot holes being of such a size as to admit only enough air to actuate the more sensitive pouch.

6. In a mechanical player for organs in which a music-sheet traverses a tracker bar, the combination with a tracker bar provided with two transversely alined holes for each note of the musical scale, said holes being separated by a partition, of a less sensitive pouch connected with the hole first traversed by the sheet and a more sensitive pouch connected with the other hole, and a music sheet provided with pilot holes admitting air sufficient to actuate the more sensitive pouch only and note-sounding holes admitting air sufficient to actuate the less sensitive pouch, all of said holes being in the same straight line in the direction of movement across the tracker bar.

7. In a mechanical player for organs, the combination of a tracker bar having two openings alined in the direction in which it is traversed by the music sheet; a pneumatic pouch connected with the opening first traversed by the sheet; a more sensitive pouch connected with the other opening; a note-sounding action operatively connected with the less sensitive pouch, said action being normally adapted to voice a given note on one department of an organ; means operatively connected with the more sensitive pouch whereby said action may be operatively connected with the action corresponding to a note of like pitch upon another department of the organ; and a perforated music sheet provided with pilot-holes in advance of some of the perforations, said pilot-holes being inoperative with respect to the less sensitive pouch but operative with respect to the more sensitive pouch.

8. In a mechanical player for organs, the combination with a tracker bar provided with two transversely alined holes for each note on the musical scale; of a pneumatic pouch connected with the hole first traversed by the music-sheet; a note-sounding action operably connected with said pouch and normally controlling a given pitched note on one department of the organ; means connected with said action whereby said action may be operatively connected with the action corresponding to a note of like pitch on another department of the organ; a more sensitive pouch connected with the other hole in the tracker bar and operably connected with the aforesaid means; and a music-sheet having note-sounding perforations some of which are provided with relatively narrow pilot open-

ings at the front ends of said perforations, said pilot-openings admitting only sufficient air to actuate the more sensitive pouch.

9. In a mechanical player for organs, the
 5 combination with a pneumatic device for automatically selecting the divisions of an organ upon which a note is to be sounded, said device comprising pouches of different degrees of sensitiveness; of a tracker bar
 10 provided with separate passages leading to said pouches, all of said passages in the tracker bar being transversely alined for each note of the musical scale; and a music sheet having punctures with pilot-holes in
 15 advance of said punctures, the quantity of air admitted through the pilot-holes being insufficient to operate the less sensitive pouches.

10. The combination with means for au-
 20 tomatically selecting the department of an organ upon which a note is to be sounded, said means comprising pneumatic pouches of different degrees of sensitiveness; of a tracker bar provided with separate channels
 25 for said pouches; and a perforated music sheet provided with pilot-holes admitting

only sufficient air to operate the more sensitive pouches, the channels in the tracker bar and the perforations in the music sheet being alined in the direction in which the
 30 sheet traverses the tracker bar whereby all note perforations and pilot-holes for each note are made to traverse all the holes in the tracker bar for that note.

11. In a mechanical player for organs, the
 35 combination of pouches of different degrees of sensitiveness; a tracker board provided with openings separately connected with said pouches and alined in the direction of travel of the music-sheet across the tracker
 40 board; and a music-sheet provided with holes of different widths, said holes being alined in the direction of travel of the music-sheet.

The foregoing specification signed at
 45 Pittsburg, Pa., this 3rd day of October, 1908.

WILLIAM EDWIN GIBBS.

In presence of two witnesses:

JOHN H. HILL,

JOHN J. JEFFREY.