

No. 751,808.

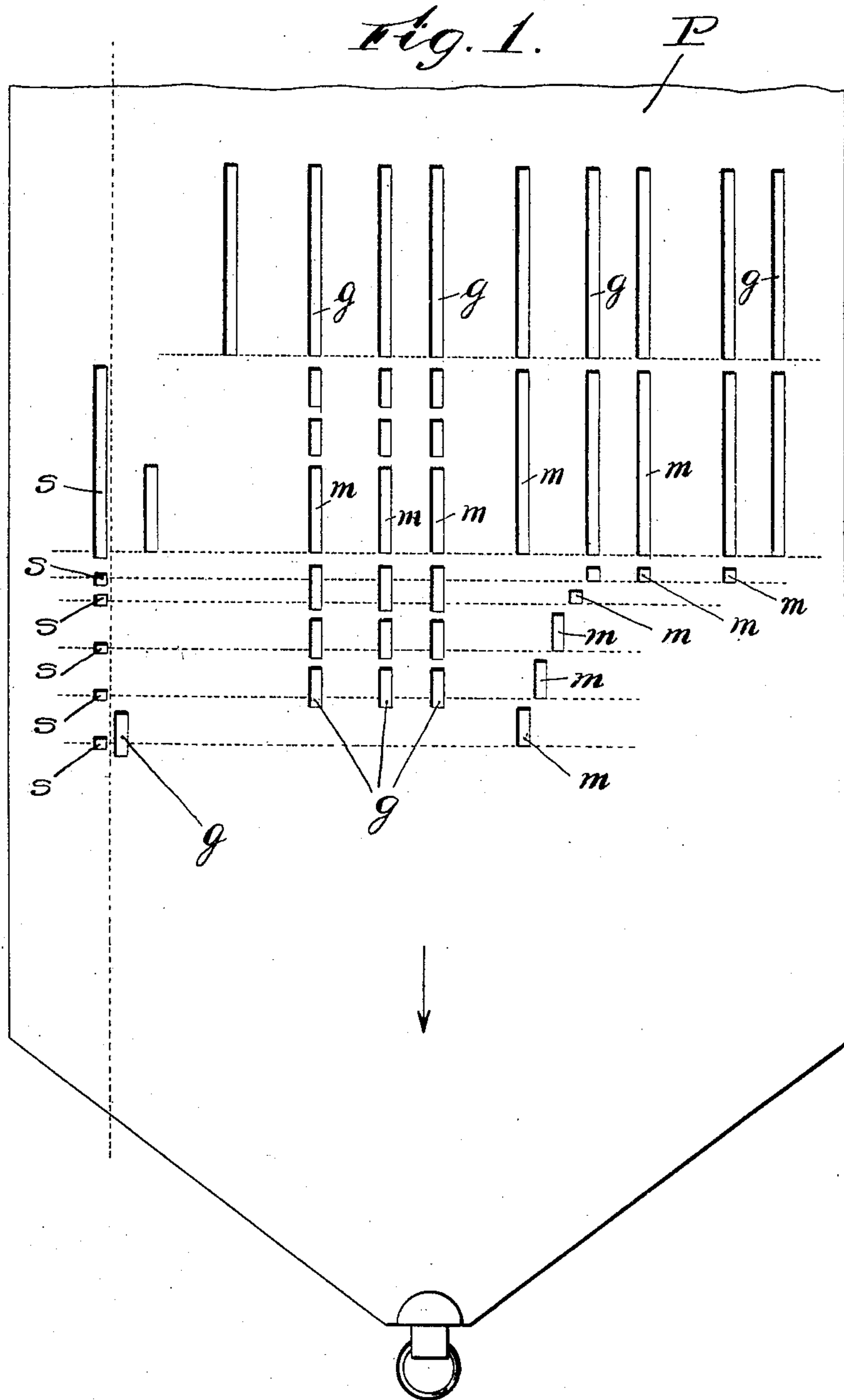
PATENTED FEB. 9, 1904.

W. H. REES,
AUTOMATIC MUSICAL INSTRUMENT.

APPLICATION FILED MAY 22, 1903.

NO MODEL.

3 SHEETS—SHEET 1.



Witnesses:
C. F. Wesson.
M. E. Regan.

Inventor:
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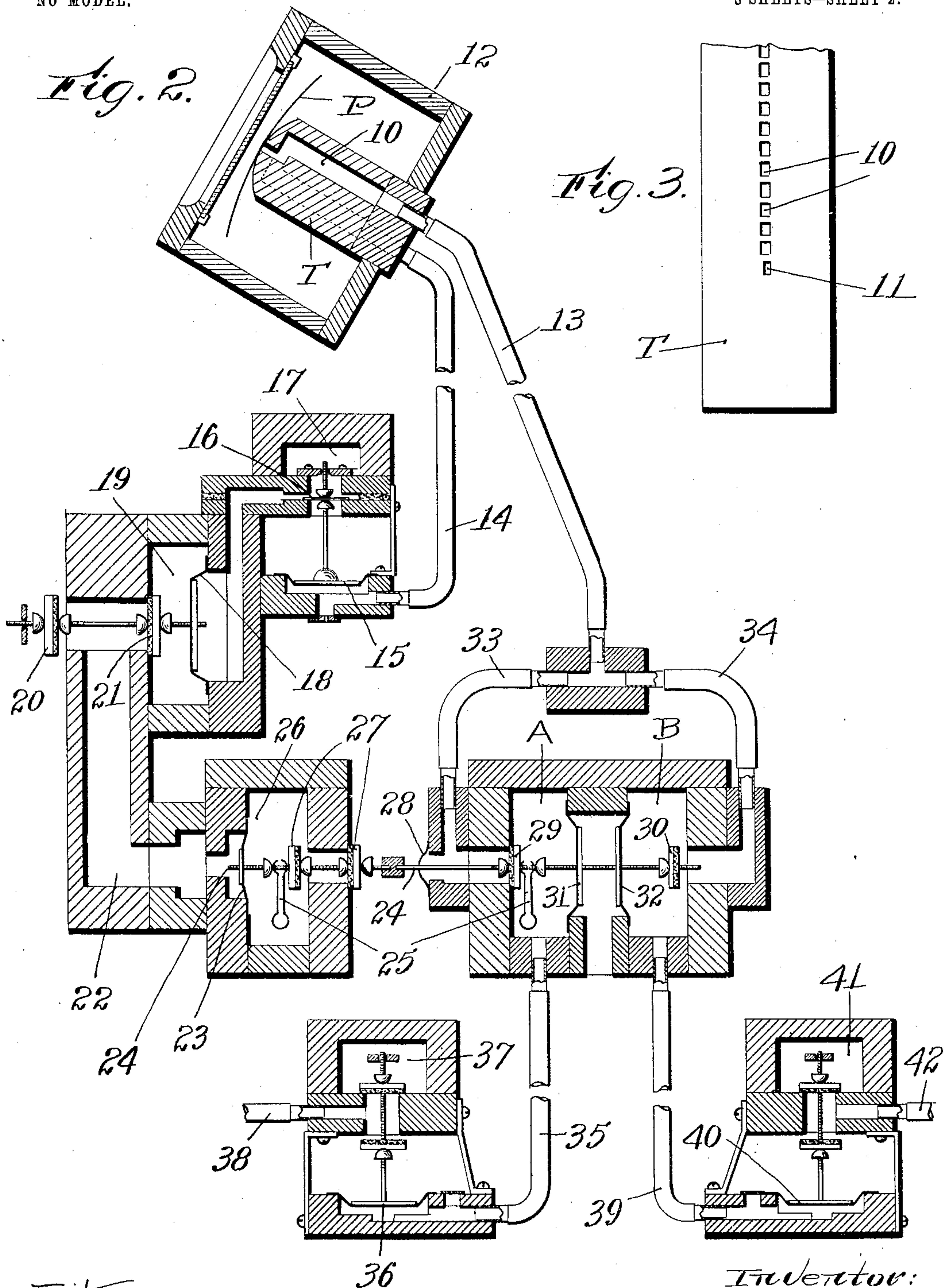
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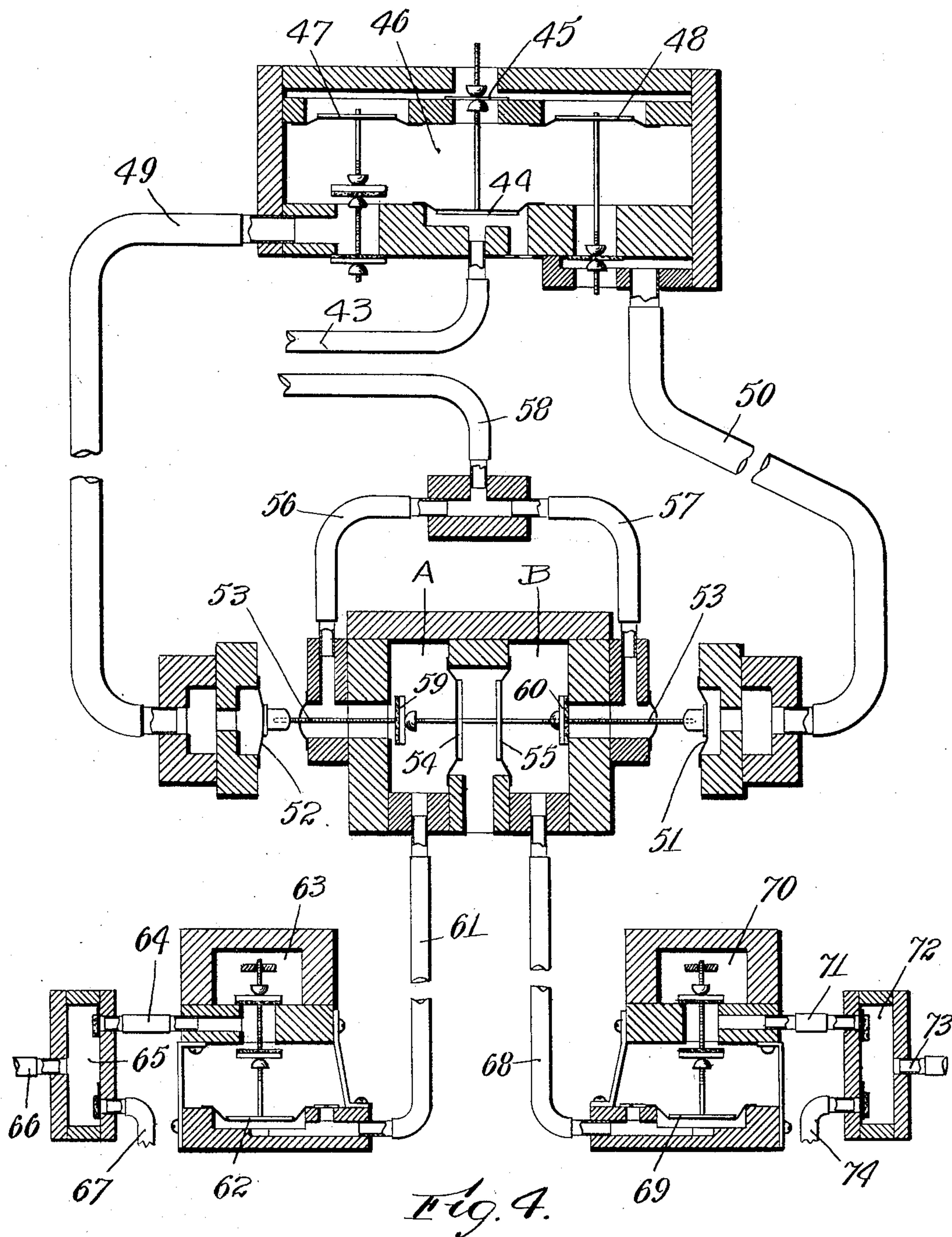
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3 SHEETS—SHEET 3.



Witnesses

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UNITED STATES PATENT OFFICE.

WILLIAM H. REES, OF BOSTON, MASSACHUSETTS.

AUTOMATIC MUSICAL INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 751,808, dated February 9, 1904.

Application filed May 22, 1903. Serial No. 158,329. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. REES, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Automatic Musical Instrument, of which the following is a specification.

This invention relates to an automatic mechanism which has been designed for playing an organ having two or more sets of reeds, pipes, or other sounding appliances. The invention may also be applied to other types of musical instruments.

The especial object of this invention is to provide a simple and efficient switch mechanism for permitting the desired notes being sounded on one manual of an organ or similar instrument and at the same time cutting said note or said notes out of the chord which is being sounded on the other manual.

To these ends this invention consists of the parts and combination of parts, as hereinafter described, and more particularly pointed out in the claims at the end of this specification.

In the accompanying three sheets of drawings, Figure 1 is a fragmentary view of a part of a music-sheet or perforated paper for controlling an automatic musical instrument constructed according to this invention. Fig. 2 is a transverse sectional view of sufficient parts of a musical instrument to illustrate the application of my invention thereto. Fig. 3 is a fragmentary view showing part of the tracker-board, and Fig. 4 is a sectional view illustrating a modified construction.

In a prior application for patent filed by me October 18, 1902, Serial No. 127,793, I have shown, described, and claimed a pneumatically-controlled set of connections for automatically playing an organ or similar instrument in which the sounding of notes upon one or the other manual, as desired, or the production of a coupled effect is made to depend upon specially-perforated paper and the use of a tracker-board having double the ordinary number of channels—that is to say, in my prior application for patent I have shown a mechanism which practically combines a

switching mechanism with the playing connections for each note.

The especial object of my present invention is to provide a simplified and improved construction in which a switch-actuating mechanism is employed which is common to the connections for sounding all of the notes.

A mechanism constructed according to this invention instead of being controlled from a tracker-board having double the ordinary number of channels and by especially perforated paper is designed to be controlled from a tracker-board having one channel for each note across the width of the tracker-board and in addition thereto a single channel for operating the switch-actuating mechanism for selecting which one of the manuals or set of sounding devices certain notes will be sounded upon.

Referring to the drawings for a detail description of an apparatus embodying my invention, as shown in the second sheet of drawings, T designates the tracker-board. The tracker-board T, as herein illustrated, is provided across its face with ordinary channels 10, corresponding to the notes of the organ or other instrument, and with a single or special end channel 11 for operating the switch-actuating mechanism. The tracker-board T, as shown diagrammatically in Fig. 2, may be inclosed in a pressure-chamber 12, and the paper or music-sheet may be drawn over the tracker-board by any of the ordinary appliances, which it is not necessary to herein show or describe, the shape and proportion of the pressure-chamber 12 in the present illustration being diagrammatic merely. Leading from the ordinary channels 10 of the tracker-board T are the pipes or passages 13. Leading from the end perforation 11 of the tracker-board T is a passage or pipe 14, connected to admit pressure to operate a pneumatic 15. The pneumatic 15 raises a valve 16 to cut off the pressure-chamber 17 and vent the pneumatic 18. When the pneumatic 18 has been vented, it is shifted by the pressure in the chamber 19. Operated by the pneumatic 18 are valves 20 and 21, which are arranged so that when the

diaphragm 18 is shifted by pressure in the chamber 19 pressure will be admitted to a passage 22. Operated by the pressure from the passage 22 are a series of pneumatics corresponding with the number of notes. In the present instance but a single set of operating connections appear in Fig. 2, it being understood that the passage 22 is common or connects to the entire series of devices. As shown herein, 23 designates one of the pneumatics controlled by the pressure in the channel 22. Extending from the pneumatic 23 is a long valve-stem 24. The valve-stem 24 extends through a pressure-chamber 26 and carries valves or pallets 27. When pressure is admitted to the passage 22, the pressure on diaphragm or pneumatic 23 is equalized, so that the pressure in the chamber 26, acting on the pallets or valve 27, shifts the long valve-stem 24. The long valve-stem 24 extends through a packing or flexible pressure-retaining piece 28 into a switch-box. The switch-box, as herein shown, is divided into two compartments A and B by the diaphragms 31 and 32. The diaphragms 31 and 32 are connected to the valve-stem 24, and also secured on the valve-stem 24 are the valves 29 and 30 for closing the inlets to compartments A and B of the switch-box. The long valve-stem 24 is supported on the spring-arms 25, which insure the proper seating of the valves. Connected to the tracker-board pipe or channel 13 are branches 33 and 34, which connect with the compartments A and B, respectively. Considering now the action of these parts when standing in the normal position (illustrated in Fig. 2) it will be seen that when air-pressure is first admitted through the tracker-board pipe or passage 13 to the compartment B an unbalanced pressure will be exerted upon the diaphragm 32, and inasmuch as the diaphragm 32 is of comparatively large area and has an active surface considerably in excess of the switch-operating diaphragm or pneumatic 23 it will be seen that the admission of pressure to the compartment B will maintain the parts in their normal position even in spite of the admission of pressure to that channel 22 which is common to all the switch-controlling diaphragms.

The compartments A and B of the switch-box are connected to sound the same note upon two different manuals of the organ, and when a note is being sounded upon one manual by reason of pressure being admitted to compartment B it will be seen that the switching devices are locked, as it were, by unbalanced pressure in compartment B, so that said switching devices can not operate so long as pressure is maintained in such compartment, and, on the other hand, when the switch-valve 27 has been thrown to its other position and pressure admitted into compartment A

said pressure in compartment A will also serve to maintain or lock the parts in their other position. It results from this that when a chord or a number of notes are being sounded by reason of pressure being admitted through certain ones of the tracker-board channels, if, while said notes are being sounded, pressure is admitted through the switch-channel of the tracker-board all the switching devices of the remaining notes of the organ will be shifted from normal position, except such notes as are being actually played or sounded upon the normal manual, and if after such switching action has taken place pressure is admitted to any other ones of the tracker-board channels notes will be sounded or played upon the other manual or set of sounding devices of the organ.

The connections between the compartments A and B and the speaking appliances may be of any usual or ordinary form. For example, as herein illustrated the compartment A is connected by a pipe or passage 35 to operate a diaphragm 36, and the diaphragm 36 lifts the valves or pallets for admitting pressure from a chamber 37 to a pipe 38, and in the same manner the compartment B is connected by a pipe 39 to operate a pneumatic 40 to raise the pallets or valves for admitting pressure from a chamber 41 to a pipe 42. The pipe 38 sounds the note on one manual of the organ while the pipe 42 sounds the same note upon the other manual of the organ.

In an apparatus constructed according to my invention the pipes 38 and 42 can never act simultaneously, or, in other words, so far as the devices of this invention are concerned when a note is being sounded upon one manual it will not be sounded upon the other manual.

I am of course aware that it has already been proposed to utilize one or more channels of a tracker-board to throw in what are known as "melody-stops;" but in such constructions all notes of the melody or upper manual must also be sounded in the accompaniment or bass of the lower manual. The simultaneous sounding of the melody in both manuals of an organ I regard as objectionable, as it prevents the production of such artistic effects as can be secured only by keeping the melody distinct and separate from the accompaniment. For example, in any musical compositions certain notes after being played upon the upper manual or as a melody are repeated as a refrain on the lower manual; but in playing devices provided with the so-called "melody-stops" the simultaneous sounding of the melody on both manuals of the organ completely destroys the effectiveness of repeating the melody on the lower manual alone as a refrain.

Referring to the first sheet of drawings for

a description of the perforated paper employed for controlling an apparatus constructed according to this invention, the perforations made across the width of the paper P are all intended to control or sound the notes of the instruments, except a single line of perforations *s* along one edge of the paper, which perforations *s* operate the switch mechanism. Whether a note corresponding to any particular line of perforations will be sounded upon the upper manual or the lower manual of the organ depends upon whether such perforation is in advance of a switch-controlling perforation. For example, the chord represented by the first transverse line of perforations includes a perforation *g*, which is in advance of the switch-perforation, and hence sounds a note in the lower manual or accompaniment, and a perforation *m*, which is slightly behind the switch-perforation *s* and which therefore sounds a note of the melody or on the upper manual. In the chord represented by the second transverse line of perforations three notes, *g*, will be sounded in the accompaniment or lower manual, one note, *m*, in the melody or upper manual. The third, fourth, and fifth chords are of the same character; but in the sixth chord it will be seen that a long switch-perforation *s* is in advance of all the notes. Therefore all the notes which are sounded while this long switch-perforation is open will be played upon the upper manual or melody. The chord represented by the last transverse line not being affected by any switch-perforation will be sounded entirely upon the lower manual. So far as the control of my mechanism by the perforated paper is concerned each manual is sounded entirely independent of the other, and if it is desired to sound both manuals in unison the operator can readily employ mechanical coupling appliances.

In the third sheet of drawings I have illustrated a modified construction. Referring to Fig. 4, 43 designates the pipe or channel which is connected to the channel 11 of the tracker-board. The pipe 43 admits pressure to operate a diaphragm 44, which diaphragm 44 controls a valve 45 to admit pressure from chamber 46 to operate the two diaphragms 47 and 48. The diaphragm 47 operates the pallets or valves for cutting off the pressure from chamber 46 to the pipe or passage 49, and the diaphragm 48 opens a valve for admitting pressure to the pipe 50. Pressure from the pipe 49 actuates a pneumatic 52 to shift the long valve-stem 53, and pressure admitted through the pipe 50 acts on diaphragm 51 to shift the long valve-stem 53 in the opposite direction. The valve-stem 53 extends through a switch-box of substantially the same construction as that illustrated in Fig. 2—that is to say, this switch-box comprises compartments A and B, which are separated by diaphragms 54 and 55.

The diaphragms 54 and 55 are carried by the long valve-stem 53, and also secured on the valve-stem 53 are the valves 59 and 60 for closing the entrance to compartments A and B, respectively.

58 designates one of the tracker-board pipes, which are connected to the ordinary tracker-board channels, and the pipe 58 connects through branches 56 and 57 to the compartments A and B, respectively. Pressure from compartment A is admitted through pipe 61 to actuate a pneumatic which operates the pallets or valves for admitting pressure from chamber 63 to pipe 64. If desired, the pipe 64 may be led directly to the speaking devices of the organ; but in some instances pipe 64 may open through check-valve into a valve-box 65. Also opening through a check-valve into the box 65 is a pipe 67, by means of which a note may be sounded when the organ is to be played manually. The valve-box 65 is connected through pipe 66 to the speaking devices in the usual way. In the same manner pressure from compartment B is admitted through pipe 68 to actuate the pneumatic 69 to shift the pallets or valves for admitting pressure from chamber 70 through pipe 71 to valve-box 72. Pressure to the valve-box 72 may also be admitted through pipe 74 when it is desired to sound a note manually, and the valve-box 72 connects through pipe 73 to the speaking mechanism.

In the present application for patent I have not shown the reeds, pipes, or other speaking instrumentalities themselves, as these devices may be of the ordinary types, which need not be herein shown or described. It is also to be understood that throughout the specification and claims I have referred to the two notes which are to be selected and controlled from the same channel of the tracker-board as a note of an upper manual and a note of a lower manual, respectively. I do not mean that said notes necessarily differ in pitch or even that they should be sounded by different characters of speaking instrumentalities. For example, the two notes controlled from one channel of the tracker-board may be sounded on the same set of pipes or reeds differing from each other by an octave or other interval of pitch.

I am aware that numerous changes may be made in practicing this invention by those who are skilled in the art without departing from the scope thereof as expressed in the claims. I do not wish, therefore, to be limited to the construction I have herein shown and described; but

What I do claim, and desire to secure by Letters Patent of the United States, is—

1. In a construction of the class described, the combination of an upper manual, a lower manual, a tracker-board channel, connections

to control the speaking mechanism either in the upper manual or in the lower manual and including means for preventing a note sounded in the upper manual from being simultaneously sounded in the lower manual.

2. In a construction of the class described, the combination of upper and lower manuals, a tracker-board having channels, each one of which is connected to control a note in the upper manual and also a note in the lower manual and means for preventing the same note from being simultaneously sounded in both manuals.

3. In a construction of the class described, the combination of upper and lower manuals, a tracker-board having channels, a switch connecting each channel to control a speaking mechanism of the upper manual or a speaking mechanism of the lower manual and means for shifting all of the switches except those corresponding to the note or notes being sounded, whereby notes sounded in advance of the operation of the switches will be played in one manual and notes sounded while the switches occupy their shifted positions will be sounded in the other manual.

4. In a construction of the class described, the combination of upper and lower manuals, a tracker-board having channels, a switch connecting each of said channels to control a speaking mechanism to sound a note either in the upper manual or in the lower manual and means for shifting all the switches except those which correspond to the note or notes being sounded, the switches in normal position connecting tracker-board channels to sound notes of the bass or accompaniment on the lower manual, said switches when occupying their shifted positions connecting the channels to sound notes of the melody or air in the upper manual alone.

5. In a construction of the class described, the combination of upper and lower manuals, a tracker-board, switches for connecting each of the tracker-board channels to sound a note either in the upper manual or in the lower manual, tracker-board-controlled means for shifting all the switches except those corresponding with the note or notes being sounded and a perforated music-sheet having a line of switch-controlling perforations and a plurality of rows of note-perforations, the note-perforations having edges in advance of the switch-controlling perforations sounding notes on one manual while note-perforations whose edges are in alignment with switch-perforations sound notes upon a different manual.

6. In a construction of the class described, the combination of tracker-board channels and a switch mechanism for each of said channels, said switch mechanism comprising a switch-box having two compartments, one controlling a speaking mechanism for sounding a

note in one manual and the other controlling a speaking mechanism for sounding a note in a different manual.

7. In a construction of the class described, the combination of a tracker-board having channels, and a switch mechanism for each of said channels, said switch mechanism comprising a switch-box having two compartments, one of which controls a speaking mechanism to sound a note in one manual and the other compartment of which controls a speaking mechanism to sound a note in a different manual and means whereby the existence of pressure in one of said compartments will prevent pressure being admitted to the other of said compartments.

8. In a construction of the class described, the combination of a tracker-board and a switch mechanism for each channel of the tracker-board, comprising a switch-box having two compartments, one controlling a speaking mechanism to sound a note in one manual and the other controlling a speaking mechanism to sound a note in another manual, valves controlling the inlets into said compartments and two diaphragms, each one of which is acted upon by the pressure in one of said compartments to hold the inlet-valve of the other compartment closed.

9. In a construction of the class described, the combination of a tracker-board, and a switch mechanism for each channel of the tracker-board comprising a switch-box having two compartments, each one of which is independently connected to control the speaking devices for sounding a note in one manual, inlet-valves for said compartments, and connections between said inlet-valves for closing one valve when the other valve opens, means for causing the pressure in one compartment to hold the inlet-valve of the other compartment closed, pneumatic means for shifting the inlet-valves at times when there is no pressure in either of said compartments, and tracker-board connections for controlling said pneumatic means.

10. In a construction of the class described, the combination of a tracker-board and a switch mechanism for each channel of the tracker-board comprising a switch-box having two compartments, controlling speaking devices sounding a note for different manuals, a valve-stem carrying valves for said compartments, a diaphragm connected to the valve-stem and acted upon by the pressure in one compartment for holding the inlet-valve of the other compartment closed and a diaphragm of smaller power for shifting the valve-stem at times when no pressure exists in either of said compartments.

11. In a construction of the class described, the combination of a tracker-board, a switch mechanism for each channel of the tracker-

board comprising two compartments, and means controlled by the pressure in one compartment for closing the inlet-valve of the other compartment, a valve-shifting pneumatically - actuated means which is powerful enough to be operated only at such times when there is no pressure in either compartment, and means controlled from a marginal tracker-board channel for admitting pressure

to simultaneously operate such of the valve-shifting means as are free to be shifted. 10

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

WILLIAM H. REES.

Witnesses:

LOUIS W. SOUTHGATE,
MARY E. REGAN.