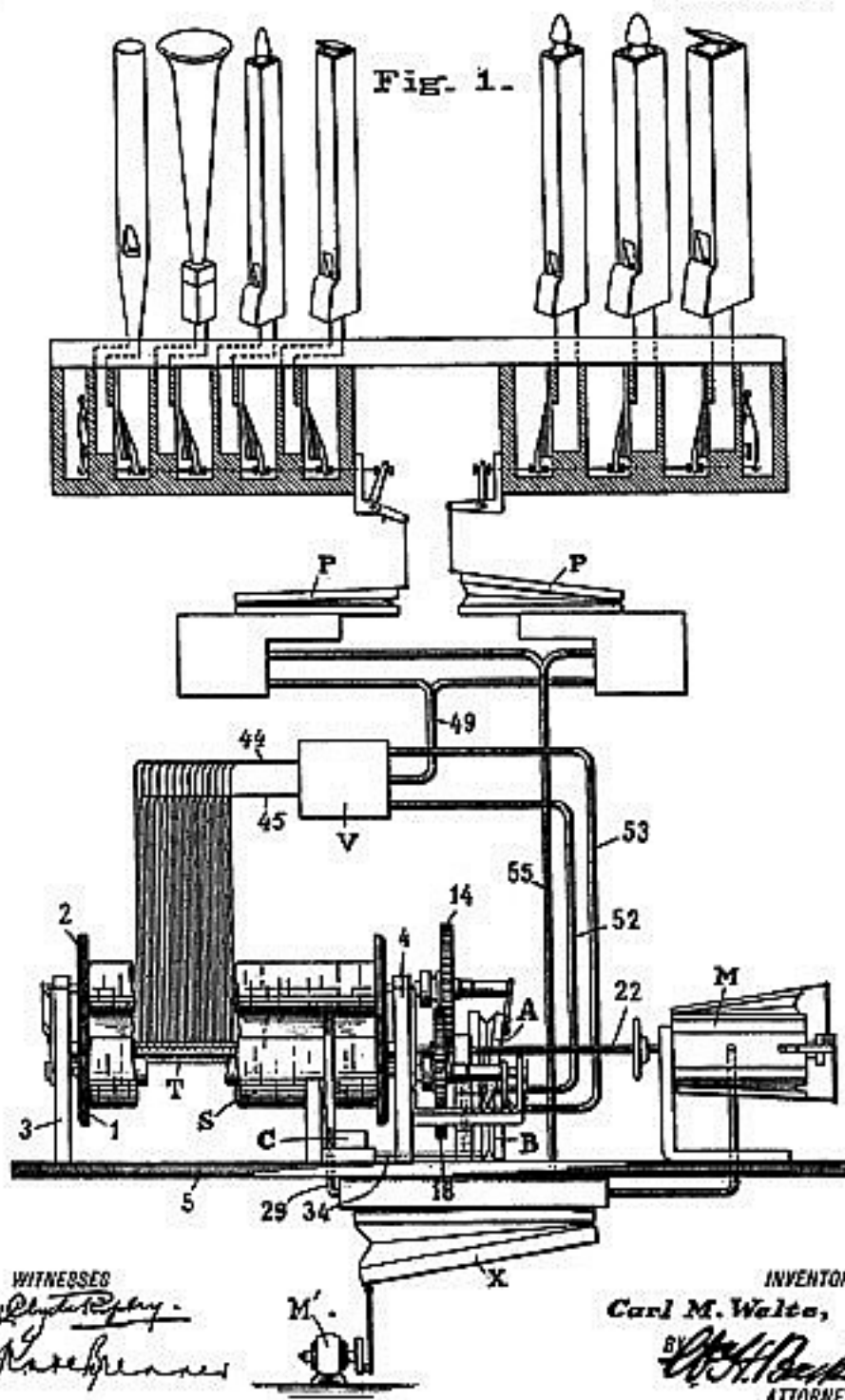


C. M. WELTE.
 DRIVING AND CONTROLLING MECHANISM FOR MUSIC ROLLS.
 APPLICATION FILED DEC. 9, 1913.

1,211,799.

Patented Jan. 9, 1917.
 6 SHEETS—SHEET 1.



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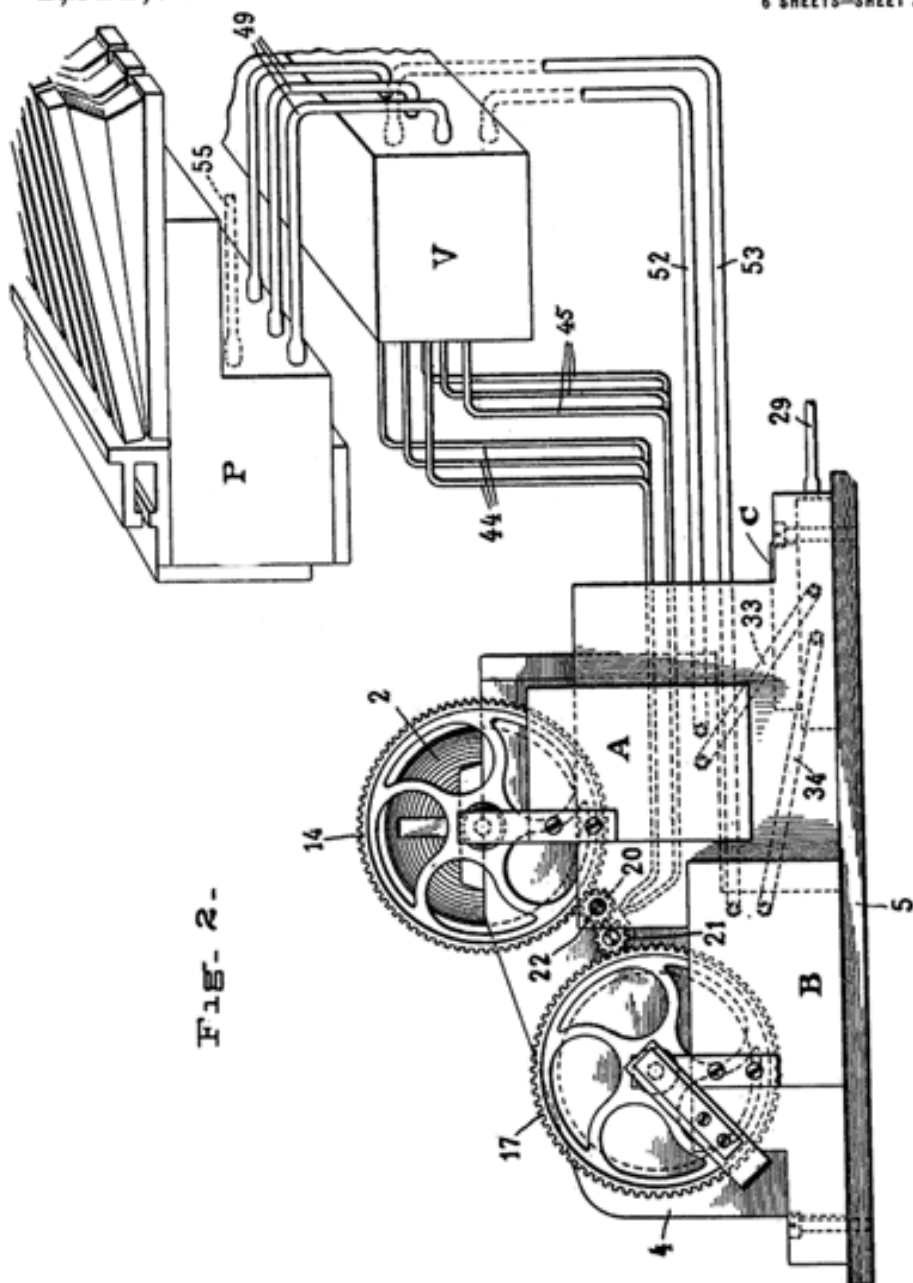


FIG. 2-

WITNESSES
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...

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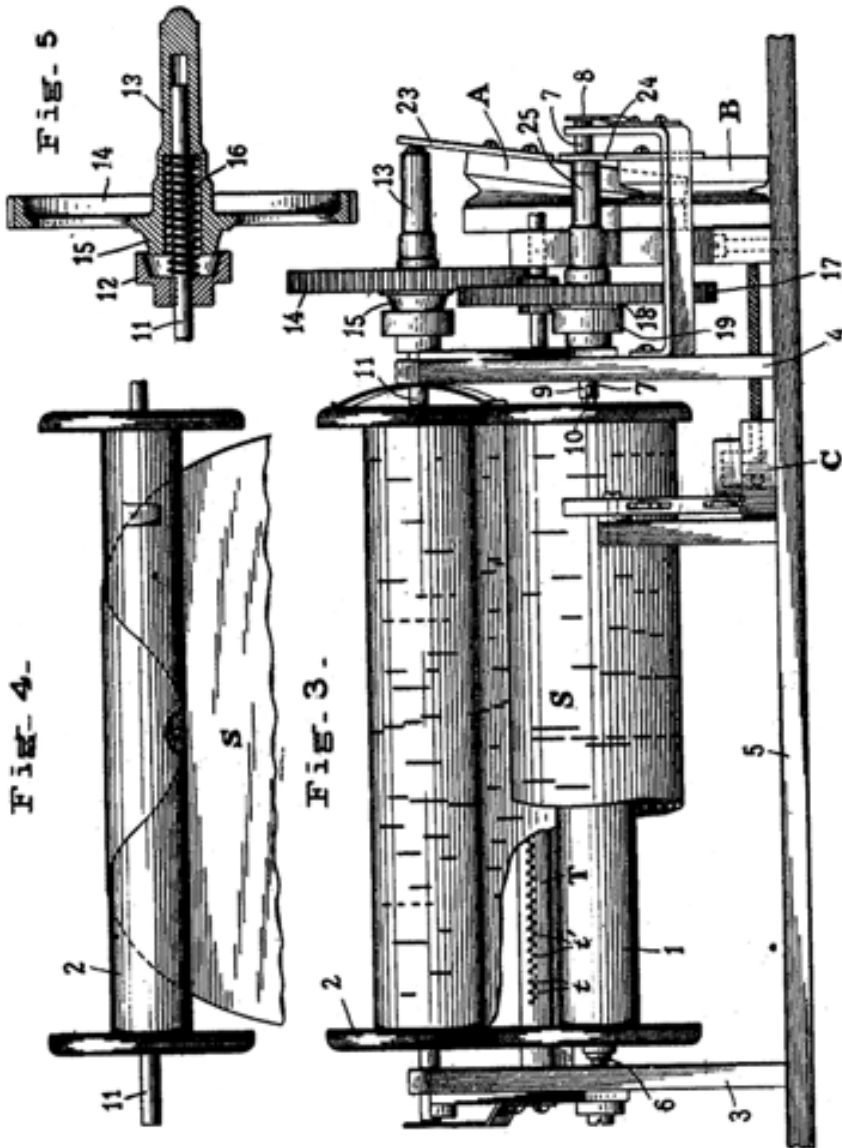
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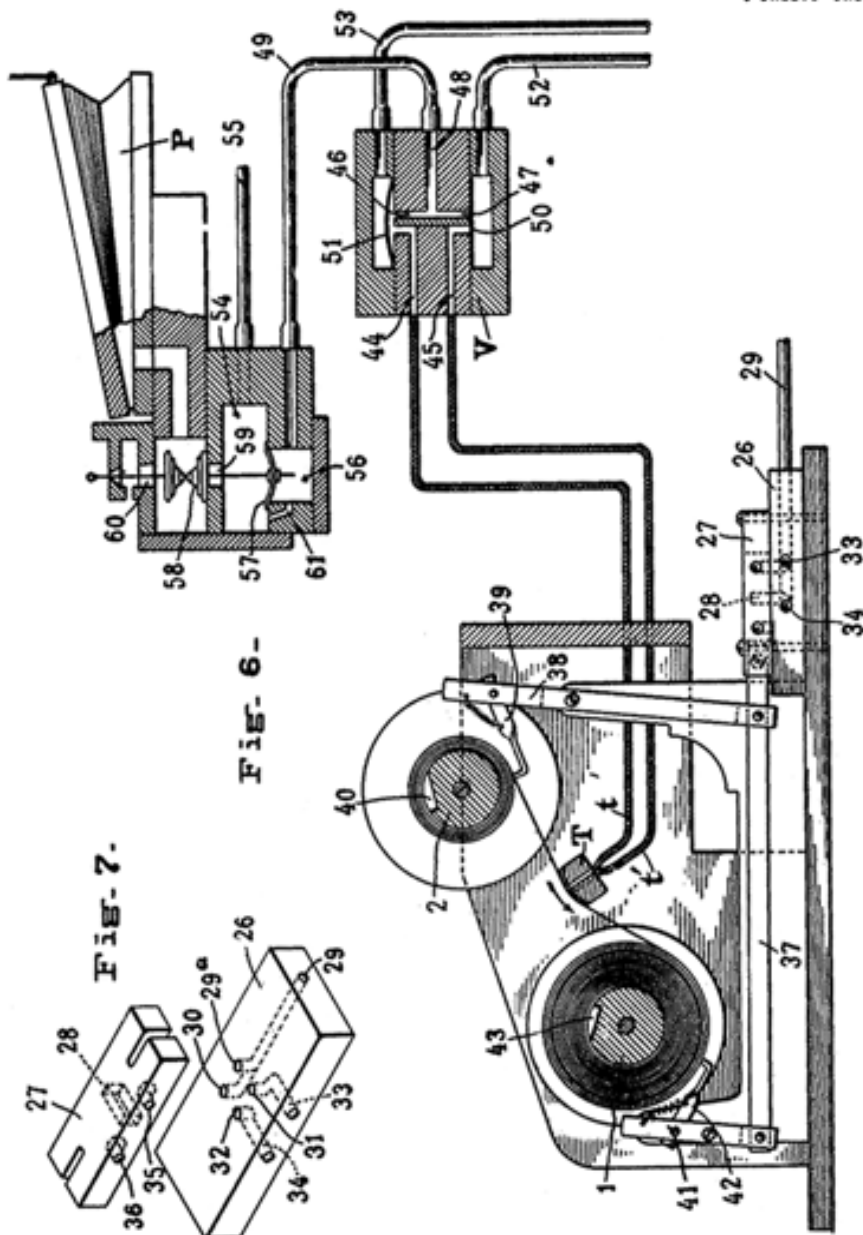


FIG. 6-

FIG. 7-

WITNESSES
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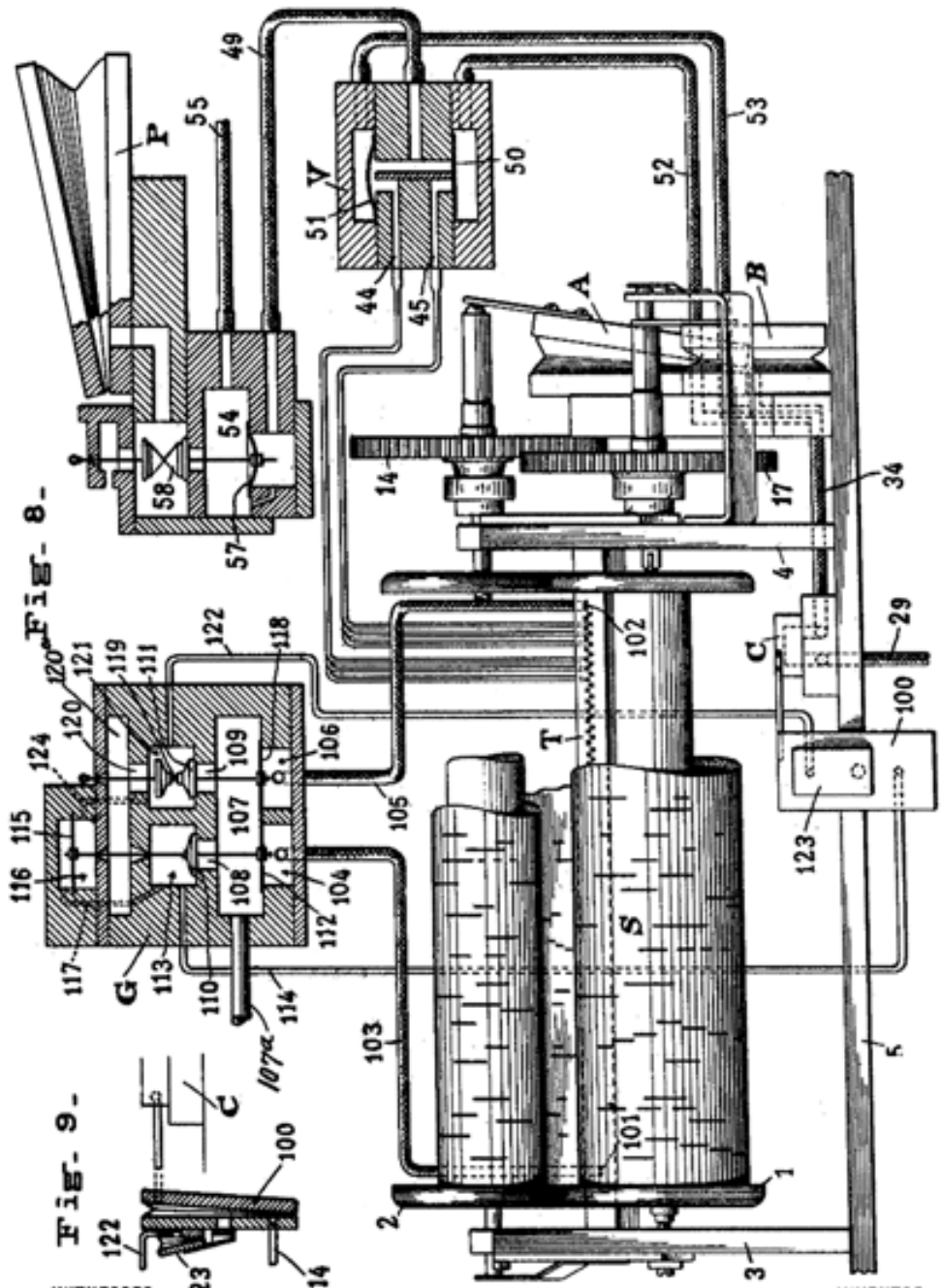


FIG- 8 -

FIG- 9 -

WITNESSES

J. J. [Signature]
W. [Signature]

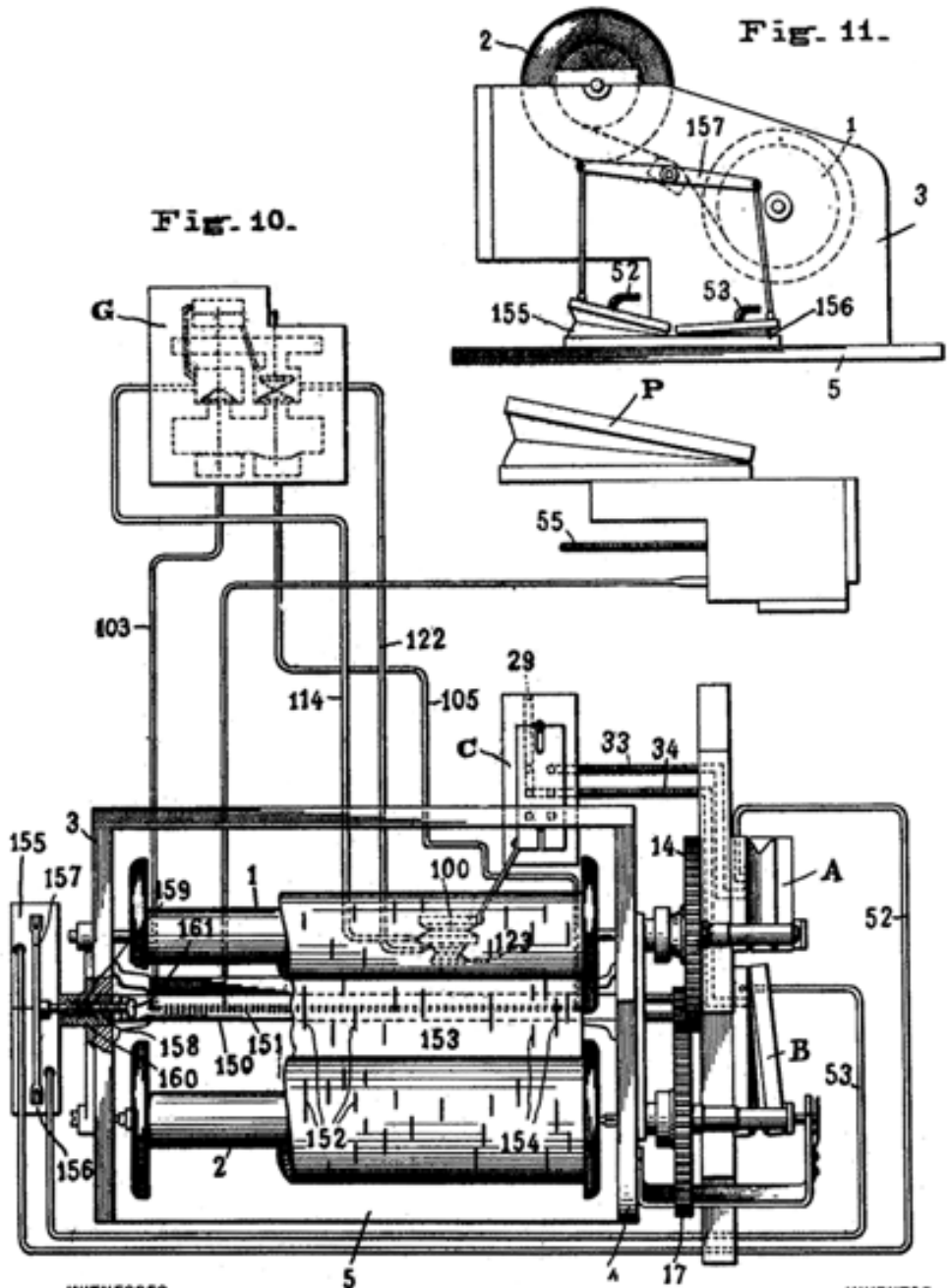
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Patented Jan. 9, 1917
 6 SHEETS—SHEET 6.



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UNITED STATES PATENT OFFICE.

CARL M. WELTE, OF NEW YORK, N. Y., ASSIGNOR TO M. WELTE & SONS, INC., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

DRIVING AND CONTROLLING MECHANISM FOR MUSIC-ROLLS.

1,211,799.

Specification of Letters Patent.

Patented Jan. 9, 1917.

Application filed December 9, 1913. Serial No. 805,547.

To all whom it may concern:

Be it known that I, CARL M. WELTE, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Driving and Controlling Mechanism for Music-Rolls, of which the following is a full, clear, and exact description, whereby any one skilled in the art may make and use the same.

The invention relates generally to new and useful improvements in mechanically operated musical instruments and while it is directed to the driving and controlling mechanism for music rolls, it embodies various mechanisms used with the particular driving and controlling mechanism described, so that the perforated music sheet or sheets during its winding and re-winding movements may produce continuous playing of the instrument.

The invention is designed to be utilized with any type of musical instrument wherein a perforated music sheet, card, tablet or similar device is employed in conjunction with a tracker-board or tracker-boards having ducts or conduits which are suitably connected to pneumatically actuated and controlled devices for actuating the various sounding devices of the instrument. In devices of this character, it has been common practice to employ a perforated music sheet in conjunction with a tracker-board having ducts which as they are opened by the perforations of the sheet registering therewith, actuate the various sounding devices. Such a music sheet is carried on two rollers arranged on opposite sides of the tracker-board and as the sheet is played it is unwound from one roller and wound upon the other. Ordinarily, after the sheet has been wound from one roll to the other in the playing operation, it must be re-wound and, of course, during the re-winding movement, the sounding devices are silent. This necessarily causes a pause in the operation of the instrument, after the selection or selections, represented by the perforations of the sheet, have been played.

Various arrangements have been used heretofore to overcome the lost time and provide for continuous playing of an instrument. One method is to employ a plurality of tracker-boards and a plurality of music

sheets with winding and re-winding mechanism for each pair of rolls. In such a device, a duplication of parts is necessarily required in order that one of the music sheets may be playing while the other is re-winding and this leads to complications which amount practically to a duplicate mechanism for each instrument with reversing clutches and many more or less complicated devices, to say nothing of the liability of uncertain action and the great amount of space which such a duplication of mechanism requires. Another method of producing continuous playing is to use an endless music strip upon a single tracker-board, but obviously, to provide for a number of selections, a long music-strip must be used and it requires a great amount of space for carrying such an endless strip. Furthermore, the guiding and controlling mechanisms for such a strip entail complications which, to a great extent offset the advantages of continuous playing and it is difficult to thread such an endless strip through the mechanism. Therefore, time is lost and annoyance is occasioned whenever it is desired to re-place a music sheet to produce a new set of selections.

It is one of the principal objects of the present invention to provide an extremely simple and condensed form of mechanism which will provide for continuous playing of the instrument with but a single music roll, although a plurality of rolls and a duplication of the simple mechanism employed may be utilized. In the event of duplication, an instrument is provided which will render many more selections with less complicated mechanism than heretofore employed.

It is also an object of the invention to provide for a direct drive of the rolls in either direction while the driving motor and its gear connections are always moving in the same direction. This avoids the necessity of shifting the power connections intermediate the motor and gearing and gives a very silent and extremely efficient drive for the rolls so that either roll may be a driving roll to draw the music sheet across the tracker-board.

It is a still further object to secure a pneumatic control of all of the mechanisms and to automatically control the air passages or ducts of the tracker-board.

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With the above objects in view, the invention is directed and has for its principal objects, the elimination of complications of the multiple tracker devices, and endless music strip devices above referred to and the increasing of the capacity of an instrument for continuous or intermittent playing without adding to the complications to secure such a result.

The various devices embodying the invention are applicable to any type of so-called mechanical musical instrument, whether it be a piano-player, orchestrion, piano or other wind or string instrument and provides for the playing of a maximum number of selections for a given length of perforated music sheet or sheets.

Referring to the drawings, Figure 1 is a view somewhat diagrammatic, illustrating the various parts of the mechanism. The key pneumatics are for illustration shown as controlling the playing valves of a wind instrument. Fig. 2 is an end view of the music rolls and appurtenant parts illustrated in Fig. 1 showing the connections and valve and player pneumatics in diagrammatic perspective. Fig. 3 is a front face view of the music rolls and appurtenant mechanism illustrated in Fig. 2. Fig. 4 is a detail view of the music roll with the sheet unwound. Fig. 5 is a detail view of the driving gear of the non-removable roll. Fig. 6 is a detail cross-sectional view through the rolls and tracker-board illustrating a mechanical method of controlling the main shift valve and illustrating the connections from the tracker to the tracker-controlling valve and a single player pneumatic. Fig. 7 is a detail perspective view of the two members making up the shift valve. Fig. 8 is a diagrammatic view illustrating a pneumatic control for the driving mechanism in lieu of the mechanical control illustrated in detail in Fig. 6 for actuating the shift valve. Fig. 9 is a detail view of the valve actuating pneumatic illustrated in Fig. 8. Fig. 10 is a detail view illustrating a means of relatively shifting the music-sheet and tracker-board to provide registration of the tracker-openings with either series of note perforations. Fig. 11 is an end view of the parts illustrated in Fig. 8.

In the accompanying drawings only such details of mechanism as relate particularly to the rolls and their driving mechanism are shown and these are illustrated in conjunction with diagrammatic views to illustrate the operation and thus avoid the complications of showing the details of a complete instrument.

In the accompanying drawings, the music-rolls 1, 2 are mounted in suitable bearings in supports 3, 4, which, in turn, are mounted upon a suitable base 5. These rolls 1, 2 are located on opposite sides of a tracker-board

T, over which the music sheet S is drawn in one direction or the other depending upon which of the rolls 1, 2 is acting as the driving roll. The roll 2 is permanently arranged in its supports, while the roll 1 may be removed. The roll 1 may be removed from its bearing 6 by forcing it endwise against its driving shaft 7, said shaft being normally pressed inward by a spring 8 and having at its inner end a slot 9 which will engage a pin 10 formed on the spindle projecting from the end of the roll. This provides for ready insertion and removal of the music-roll and its music sheet.

The non-removable roll 2 has an extended shaft 11 which projects through a clutch member 12 into the hub 13 of a driving gear 14. This gear 14 has a clutch member 15 arranged to engage the clutch member 12 and the two clutch members are normally separated by a spring 16 arranged upon the shaft 11 and within the hub of the gear. An identical arrangement is provided for the gear 17 which has a clutch member 18 adapted to be engaged with and disengaged from a clutch member 19 which is suitably connected with the driving shaft 7 of the roll 1. The two driving gears 14, 17 which act respectively as driving gears for the rolls 2 and 1 are interconnected by a main driving pinion 20 and an intermediate pinion 21. The main driving pinion 20 is connected with the main driving shaft 22 which is driven by the wind-motor M. This motor is in turn actuated by the main suction bellows X, which is herein illustrated as actuated by a motor M'.

It will be noted from the above that the driving motor M through its shaft 22, pinions 20 and 21 will constantly drive the gears 14, 17 in opposite directions and that the gears, pinions and driving connections are always in mesh. The driving effect of either of the gears 14, 17 will be imparted to the respective rolls 2, 1, dependent upon which of the respective clutch devices are in engagement so that as one roll acts as a driving roll to draw the music-sheet S over the tracker, the cooperating roll will act as an idler. Obviously, with this arrangement, the music-sheet S may be positively drawn in either direction across the tracker-board T.

Appurtenant to the outer ends of the hubs of the gears 14, 17 are wind-motors A, B, either of which may be connected with the atmosphere or subjected to the suction of the main bellows X and thereby collapsed. When expanded, these bellows A and B release the clutches of the respective gears 14, 17 and when subjected to exhaust, they cause an engagement of said clutches. It will be noted that the bellows A has a projecting finger 23 which over-lies the outer end of the hub 13 of the gear 14 and the bellows B

has a finger 24 which engages the outer end of the hub 25 of the gear 17. This finger 24 permits a free movement of the shaft member 7 which shaft is, of course, connected with the clutch member 19 through a sliding key and key-way not specifically illustrated. The faces of the pinions 20 and 21 are sufficiently wide to permit axial movement of the gears 14, 17 without disengagement of the gears 14, 17 therefrom and thus the whole gear system is constantly in mesh whether the gear 14 is clutched to the shaft 11 or the gear 17 is clutched to its shaft 7.

The pneumatic motors A and B are controlled by a shift valve C. This valve is best illustrated in Figs. 3, 6 and 7 and consists of a stationary block or section 26 and a movable block or section 27. The block 26 has a duct, which is connected with the main suction X through a tube and duct 29. This duct terminates in ports 29^a, 30. The block is also provided on its upper face with ports 31, 32 which connect respectively with the pneumatics A and B through ducts 33, 34. The upper or movable valve-block 27 has formed on its under surface a channel 28 which is designed to connect the port 29^a with the port 31 or the port 30 with the port 32. There are also formed in the movable block 27 channels 35, 36 which open to the atmosphere and which connect either the port 31 or the port 32 of the stationary block with the atmosphere. When the block 27 is in one position, the pneumatic B, through the duct 34, port 32, channel 28, port 30 and tube and duct 29 will be connected with the main suction X and will be collapsed while the bellows A through the duct 33 and channel 35 will be open to atmosphere and will be expanded. This is the position of the parts illustrated in Figs. 3 and 6. When the valve member 27 is at the opposite limit of its play, the bellows A will be subjected to suction of the main bellows X, due to registration of the ports 31 and 29^a with the channel 28 and thereupon the port 32 will be open to atmosphere through the channel 36. The movable block 27 may be shifted in any desired manner. As illustrated in Figs. 3 and 6, this shifting is effected mechanically by a shift-bar 37 which is connected with a pivoted lever 38 which has a latch 39 adapted to engage a notch 40 of the roll 2 and is also connected with a pivoted bar 41 having a latch 42 adapted to engage a notch 43 in the roll 1. As illustrated in Fig. 6, the music-sheet S is presumed to be winding upon the music-roll 1 and unwinding from the music-roll 2. As soon as the notch 40 is uncovered by the music-sheet, the pawl 39 will engage the notch 40 and the movable block 27 will be shifted to collapse the bellows A and inflate the bellows B. This will clutch the gear 14 to the shaft 11 and the music-sheet will then

be wound upon the roll 2 and unwound from the roll 1. From the above, it will be seen that the sheet will be continuously moved either in one direction or the other at the same speed and without appreciable pause. Of course, it is to be understood that the driving mechanisms for the rolls as above described may be used in conjunction with any type of machine and with any type of music-roll and tracker-board and if used with two independent tracker-boards and two sets of music-rolls and perforated music-sheets, one set of rolls may be in playing operation while the second set is rewinding with the tracker closed off. The mechanism is herein shown in conjunction with a special type of perforated music-roll which is not, *per se*, specifically claimed herein, as it forms the subject-matter of a co-pending application. This perforated music-roll S, has two distinct series of perforations, one series representing selections which will play during the movement of the sheet in one direction across the tracker T and the other set representing selections which will be played during the movement of the sheet in the opposite direction across the tracker-board. That is, there are perforations arranged in parallelism lengthwise of the sheet which are designed to be effective to admit air to the tracker-ducts while moving in one direction and with a distinct series of perforations, which will admit air to the tracker-ducts during the movement of the sheet in the opposite direction.

For purposes of convenience and illustration, the tracker-board T is shown as having two distinct series of openings, one series *t* which will correspond to the perforations of the music-sheet to be played, while the said sheet is moving in one direction and a series *t'* which will be effective for playing when the sheet is moved in the opposite direction. It, of course, is obvious that the tracker-duct openings *t* and *t'* must be controlled so that either one or the other of the series of openings will be effective for actuating the player-pneumatics. This illustration of the double series of tracker-openings in a single tracker-board T simplifies the showing and while it is an effective device for playing the roll having the double set of perforations to produce continuous playing, it is not absolutely essential to the invention. It is, of course, obvious that any device which will shift an ordinary tracker-board or the music-rolls bearing a perforated sheet as described, relatively to each other, to secure registration of the tracker-ducts and the music-sheet perforations, may be utilized. Such a mechanism will provide for the register of a single row of tracker-ducts with one set of perforations of the roll during the movement of said roll in one direction and will register with the other

set of perforations during the movement of the sheet in the opposite direction. The same results may be obtained by either shifting the music-rolls axially or shifting the tracker-board. The latter form of shifting mechanism is illustrated in Figs. 10 and 11. As illustrated in Figs. 1 to 8 inclusive, the two sets of tracker-openings are controlled with reference to the player pneumatics by a simple form of valve mechanism V which, in turn, is actuated by the main bellows or suction through the valves C and the bellows A and B. The valve mechanism V has a channel 44 which is connected with one set of tracker-openings *t* and a channel 45 connected with the second set of tracker-openings *t'*. It is also provided with passages 46, 47, both of which connect through passages 48 with ducts 49 which correspond in number with the player pneumatics and the tracker-openings and are arranged to release the valves of the player pneumatics. The passages 44, 46 and the passages 45, 47 are controlled respectively by diaphragms 50, 51 and these diaphragms are actuated by connection to the main suction through the bellows A and B to which they are connected by ducts 52, 53. As illustrated in Fig. 6; the duct 53 connecting with the bellows B subjects the diaphragm 51 to the suction of the main bellows and raises said diaphragm so that the ducts *t* are connected with the player pneumatics through a series of tubes 49. In the drawings, there is but a single pneumatic illustrated with a single pneumatic 49 and single tracker-duct *t*, although it is to be understood that there is a separate tracker-duct connection for each player pneumatic. The diaphragm valve 50, as illustrated, is closed inasmuch as the bellows A is expanded and open to atmosphere. Therefore, as shown, the tracker-ducts *t* are effective for playing the set of perforations while the music-sheet is unwinding from the roll 2 and is winding upon the roll 1. As soon as the travel of the music-sheet is reversed, the bellows A is subjected to suction and the bellows B is open to atmosphere. Thereupon, the valve 51 will close and the valve 50 will open. This will connect the passages 45, 47 so that the tracker-ducts *t'* will be operative with reference to the player pneumatics for playing the selections of the music-sheet as it is wound upon the roll 2 from the roll 1. A simple form of player pneumatic is illustrated in which a suction chest 54 is suitably connected through a duct 55 with the main suction bellows X and the suction of the trunk 54 is made effective upon any one of the player pneumatics P by the opening of the tracker-duct for said pneumatic. As air is admitted to a chamber 56, a diaphragm 57 rises and carries with it a valve 58 which opens a port 59 and closes .. normally open

atmospheric port 60. This collapses the player pneumatic P to sound the note corresponding therewith. The valve 58 will return to its seat and cover the port 59 inasmuch as a bleed-hole 61 is provided for equalizing the pressures on either side of the diaphragm 57.

It will be seen from the above that the main shift-valve C in controlling the action of the bellows A and B for clutching either of the gears 14, 17 to their respective shafts 11 or 7 to drive one or the other of the music rolls 1, 2 simultaneously controls the two series of tracker-ducts *t, t'* and as the music-sheet is playing while traveling in one direction, one set of tracker-ducts is closed off and is inoperative while the other series is connected to the player pneumatics and is operative with reference thereto. As soon as the direction of travel of the music-sheet is reversed, the condition of the two series of tracker-ducts is reversed. From this it will be noted that with a very simple arrangement, a continuous playing of the instrument is effected and it is obvious that the same connections and mechanism may be employed with a plurality of tracker-boards if desired, thus giving a maximum number of musical selections for the instrument with a given length of perforated music-sheets.

In Fig. 8, there is illustrated a mechanism for controlling the position of the valve C by pneumatic means rather than by the mechanical means illustrated in Fig. 6 and this provides a control directly from the music-sheet. The valve C and its various pneumatic connections for actuating the clutches of the gears, the bellows A and B and the control of the tracker is identical with the mechanism heretofore described, but in place of the pivoted levers and latches connecting directly with the music-rolls, there is a pneumatic control direct from the tracker-board. The sliding member of the valve C is connected with the movable board of a pneumatic motor 100 which is expanded and collapsed by a valve mechanism G. The tracker-board T, in addition to the ordinary series of tracker-openings for playing the perforated music-sheet, is provided with openings 101, 102. The opening 101 is connected through a duct 103 with a diaphragm chamber 104. The tracker-opening 102 is connected through a duct 105 with a diaphragm chamber 106. These ports 101, 102 are controlled by perforations in the music-sheet through which atmospheric air may pass when the perforations uncover the ports. The valve mechanism G has a suction chest 107 which is connected with the main source of suction X in any suitable manner as by a duct 107^a and is provided with ports 108, 109, each of which is controlled by valves 110, 111. The valve 110 rises when the tracker-opening 101 is open

to the atmosphere by means of a perforation of the music-sheet (not shown) inasmuch as the under side of its diaphragm 112 is then subjected to atmospheric pressure. As it rises, the valve chamber 113 is subjected to suction and through a duct 114, the bellows 100 is collapsed. Connected with the spindle of the valve 110 is a diaphragm 115 which is arranged in a chamber 116. As the chamber 113 is subjected to suction, the upper side of the diaphragm 115 is subjected to suction through a duct 117. This holds the valve 110 away from its seat and maintains the bellows 100 in collapsed position until the pressure is equalized upon both sides of the diaphragm 115. The tracker-opening 102 when uncovered by the music-sheet admits air to the diaphragm chamber 106 and thereupon the diaphragm 118 rises carrying with it the valve 119 which opens the port 109 and closes an atmospheric port 120 which port communicates with a trunk which is open to the atmosphere. This movement of the valve subjects the valve chamber 121 to the suction of the chest 107 and through a duct 122, a pneumatic 123 is collapsed, opening the inlet of the pneumatic 100 and permitting it to expand. As the valve 119 opens the chamber 121 to suction of the suction-chest 107 and closes the air inlet 120, the under side of the diaphragm 115 is subjected to the suction of the valve-chamber 121 through a duct 124 and thereupon the valve 110 closes the valve opening 108. The bellows 100 will, of course, remain expanded until it is again closed by the opening of the tracker-duct 101. From the above, it is apparent that the valve C will be automatically shifted and will be held in either position of its play by the bellows 100 as it is collapsed by the opening of the tracker-duct 101 or released and expanded by the opening of the tracker-duct 102. Of course, the shifting of the valve by means of the pneumatic 100 will simultaneously change the operative condition of either series of tracker-duct openings through the valve mechanism V exactly as heretofore described.

It is apparent from the above description that the control of the music rolls and the tracker-ducts may be effected directly by the music-sheet through pneumatic means as readily as by the mechanical means specifically illustrated in Figs. 1, 2, 3 and 6 of the drawings and in either event, the control may be wholly automatic.

It is, of course to be understood that the exact form of clutch device used between the gears 14 and 17 and their respective shafts is immaterial. As illustrated in the drawings, a cone-type is employed but it is obvious that a toothed-clutch may be just as readily adapted.

Direct reference has been made in the

above description to the tracker-board T having two distinct series of tracker-ducts t, t' , each series corresponding to individual sets of perforations in the music-roll S so that as the roll is moved across the tracker in one direction, one series will operate to actuate the sounding devices while the second series of ducts is inoperative and vice versa when the roll is moved in the opposite direction, the first-named series of tracker-ducts which has been playing will be made inoperative while the second series becomes operative. This form of tracker-board, of course, requires a series of tracker-ducts for each series of tracker-openings and these ducts, as above described, are controlled through the valve mechanism V. Reference has also been made to various substitute arrangements including a shifting tracker-board having a single series of ducts or a stationary tracker-board with a single series of ducts combined with music-rolls which may be shifted axially. In either case, either of the sets of playing perforations of the music-sheet may be brought into proper registering position with the tracker-openings to play the instrument.

By using a shifting tracker-board with a single series of ducts or by shifting the rolls, the mechanism as a whole is greatly simplified as to the number of parts employed inasmuch as a single series of tracker-ducts may be connected directly with the player pneumatics and by shifting the tracker or the rolls after the music-sheet has been wound from one of its rolls to the other, the same tracker and same set of tracker-ducts will operate to play the instrument. Such an arrangement is illustrated in Figs. 9 and 10 of the drawings where a tracker 150 having tracker-openings 151 may be shifted endwise a sufficient distance to move the tracker-ducts 151 from a registering position with one set of perforations 152 of the music-sheet 153 into registering position with the second set of perforations 154 of said sheet. The rolls in this case are mounted as illustrated in Figs. 1, 3 and 8 of the drawings. To shift the tracker-board, but a comparatively slight movement is required and this may be conveniently effected by a pair of pneumatics 155, 156, the pneumatic 155 being connected to the bellows A and the pneumatic 156 being connected to the bellows B. These pneumatics in turn are suitably connected with a bar 157 mounted upon a short shaft 158 which has a thread 159 of coarse pitch engaging a threaded socket in a boss 160. The shaft 158 extends into and engages the tracker-board through a head 161 and has a free rotary movement with reference to the tracker. It is obvious that upon turning the shaft 158, the screw-thread 159 will carry the shaft 158 in an axial direction and will thereupon shift the

tracker-board 160 a sufficient distance to cause its tracker-openings 151 to register with either the series of openings 152 or 154. The tracker-board, of course, is mounted in a suitable slide-way so that it is held against all movement except in an endwise direction. Obviously, a similar mechanism might be applied to the bearings of the rolls if desired so that the rolls may be shifted and the tracker held in a stationary position. It is obvious that with such an arrangement, the tracker-openings 151 may have ducts connecting directly with the under side of the diaphragms 87 of the respective player pneumatics and that a continuous playing of the instrument may be effected with a most simple form of mechanism.

In Figs. 9 and 10 the parts are illustrated in a position corresponding with the movement of the music-sheet illustrated in Figs. 3, 6 and 8 and whether the mechanical shifting device for the shifting valve C illustrated in Fig. 6 or the pneumatic control for the shifting valve C illustrated in Fig. 8 is employed is immaterial, inasmuch as the bellows 156 will be collapsed whenever the bellows B is collapsed and simultaneously, the bellows 155 will be expanded as the bellows A is expanded. Similarly, as the bellows A is collapsed the bellows 155 will be exhausted and the bellows 156 will be expanded as the bellows B is open to atmospheric pressure and expanded and therefore, the movement of the tracker from registering position with one series of note perforations to the other series of note perforations will occur simultaneously with the clutching movements of the gears 14, 17 with reference to their respective rolls 2 and 1. Obviously, the exact details and arrangement of the parts may be varied to a great extent without departing from the spirit or intent of the invention which contemplates providing for the continuous playing of an instrument by maintaining a registration of the note perforations of the music-sheet with playing tracker-openings during its movement in two directions across the tracker-board and simultaneously effecting a proper drive for drawing the music-sheet in either direction across said tracker-board.

What I claim as my invention and desire to secure by Letters Patent is:

1. In a musical instrument, a tracker-board, a pair of music rolls, a driving shaft for each music roll, a clutch member upon each of said shafts, a driving gear operatively mounted upon each of said shafts and each provided with a clutch member and means for releasing the clutch intermediate the gear and shaft, pneumatics for clutching either of said gears to their respective shafts and a driving shaft and gear connections common to both of said gears.

2. In a musical instrument a tracker-board, a pair of music rolls and a perforated music sheet capable of operatively controlling the tracker-board in either direction of movement across said tracker-board, driving gears appurtenant to each of said music-rolls, clutching and releasing devices appurtenant to each driving gear and its respective roll, pneumatics controlling said clutching devices, a valve controlling said pneumatics, pneumatic means including tracker-ducts and perforations in the note sheet for automatically controlling said valve and automatic means for simultaneously effecting a relative movement of the music sheet and tracker-board.

3. In a musical instrument, a tracker-board, a pair of music rolls, a driving gear for each of said music rolls, a shaft and gear connections common to both of said driving gears, clutch devices intermediate each of said driving gears and its music roll and automatically controlled pneumatics for actuating each of said clutch devices, a valve mechanism controlling said pneumatics and an automatically actuated pneumatic controlling the movement of said valve, said automatic pneumatic having a valve action controlled from the tracker-board and music sheet whereby said valve may be automatically moved and held in predetermined positions.

4. In a musical instrument, a tracker-board, a pair of music-rolls, a driving shaft for each music-roll, a friction clutch member upon each of said shafts, a driving gear operatively mounted upon each of said shafts and each provided with a friction clutch member and releasing spring intermediate the gear and shaft, pneumatics for clutching either of said gears to their respective shafts and a driving shaft and gear connections common to both of said gears.

5. In a musical instrument, a tracker-board, a pair of music-rolls and a perforated music-sheet capable of operatively controlling a tracker-board in either direction of movement across said tracker-board, driving gears appurtenant to each of said music-rolls, clutching and releasing devices appurtenant to each driving gear and its respective roll, pneumatics controlling said clutching devices, a valve controlling said pneumatics and pneumatic means including tracker-ducts and perforations in the note-sheet for automatically controlling said valve.

6. In a musical instrument, a tracker-board, a pair of music-rolls, a driving gear for each of said music-rolls, a shaft and gear connections common to both of said driving gears, clutch devices intermediate each of said driving gears and its music-roll, pneumatics for actuating each of said

clutch devices, a shifting valve controlling
said pneumatics, a pneumatic controlling
said valve, said pneumatic having a valve
action controlled from the tracker-board
5 and music-sheet for deflating it and a valve-
action controlled by the tracker-board and
music-sheet for inflating it whereby the
shifting valve may be automatically moved
and controlled.
10 7. In a musical instrument, a tracker-
board, a pair of music-rolls, a driving gear
for each of said music-rolls, a shaft and
gear connections common to both of said
driving gears, clutch devices intermediate
15 each of said driving gears and its music-
roll, pneumatics for actuating each of said
clutch devices, a shifting valve controlling
said pneumatics, a pneumatic controlling
said valve, said pneumatic having a valve
20 action controlled from the tracker-board
and music-sheet for deflating it and main-
taining it in a state of deflation and a valve
action for inflating said pneumatic and

maintaining it in a state of inflation during
the driving engagement of either of said 25
rolls.

8. In a musical instrument, a tracker-
board, a pair of music-rolls and a music-
sheet capable of operatively controlling
said tracker-board as it is drawn across 30
said board by either of said rolls, a driving
gear for driving each of said rolls, clutch
devices intermediate the driving gears and
rolls, automatic means for clutching one of
said gears to its roll and releasing the other 35
of said gears from its roll after the music-
sheet has been drawn across the tracker-
board in one direction and automatic means
coöperating therewith for simultaneously
shifting the music-sheet and tracker-board 40
relatively to each other as the clutches are
shifted.

CARL M. WELTE.

Witnesses

WM. B. HILL,
KATE BRENNER.