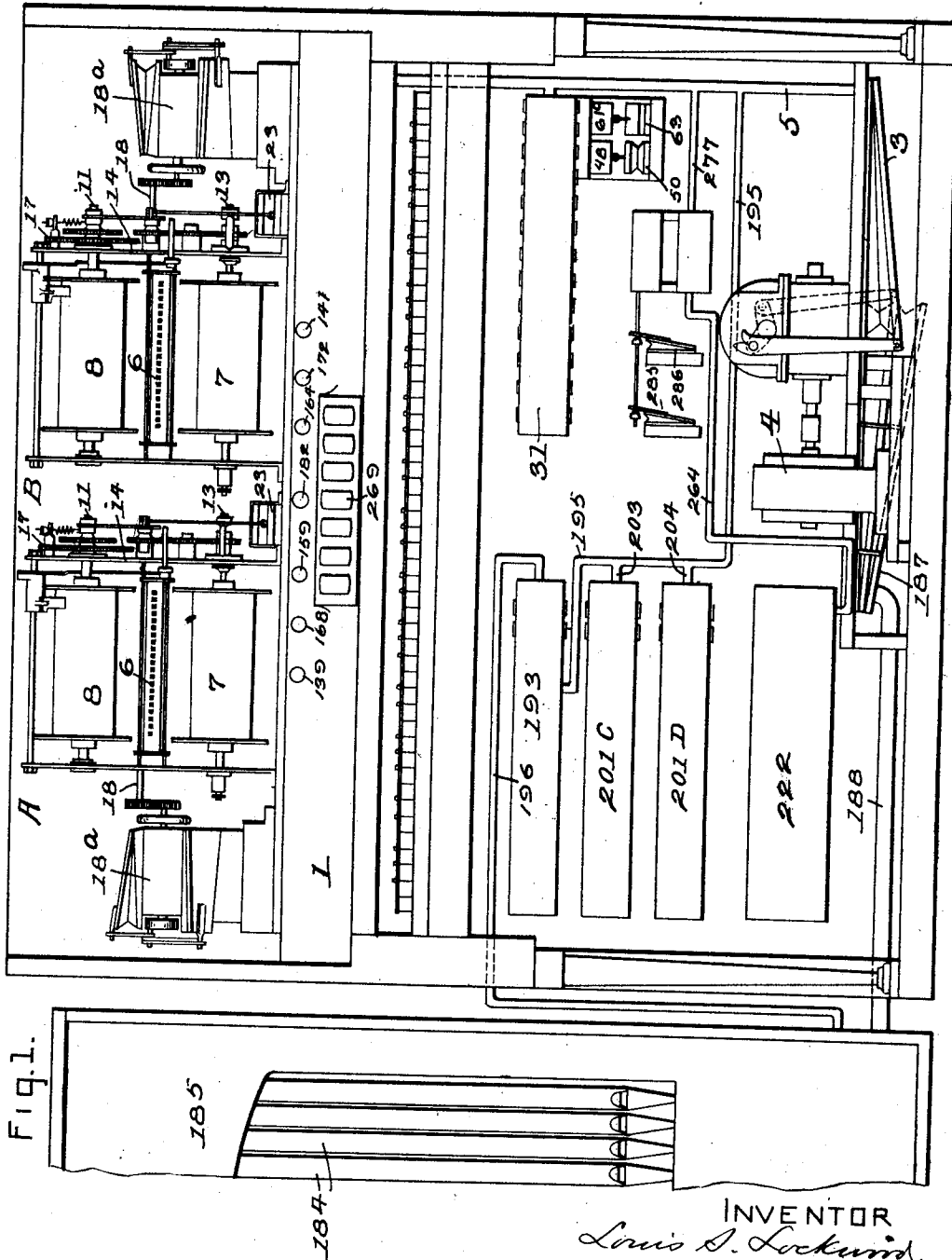


L. S. LOCKWOOD.
DOUBLE TRACKER MUSICAL INSTRUMENT.
APPLICATION FILED JAN. 20, 1916.

1,314,068.

Patented Aug. 26, 1919.

4 SHEETS—SHEET 1.



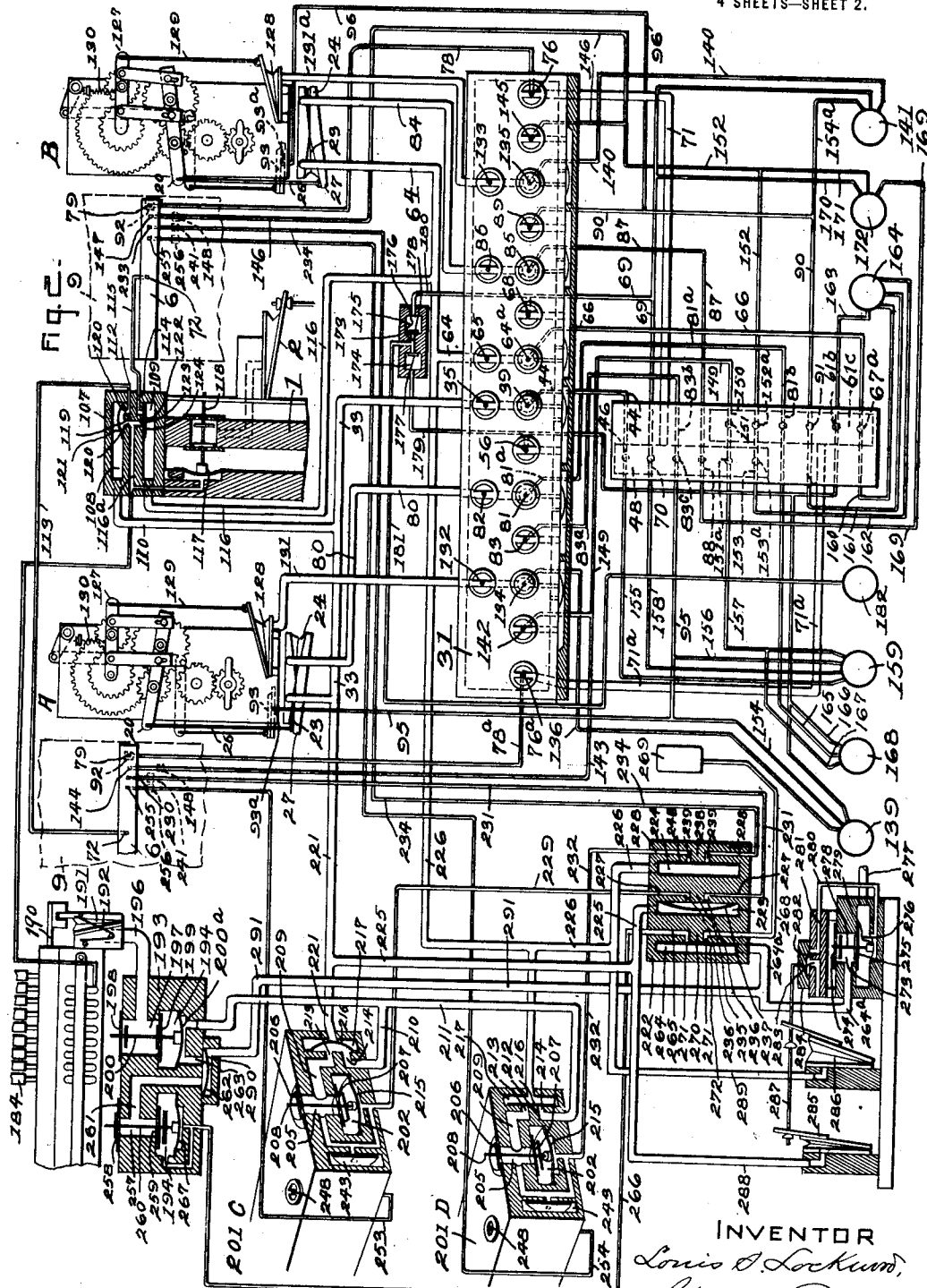
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by Geyer Popp
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4 SHEETS—SHEET 3.

Fig. 3.

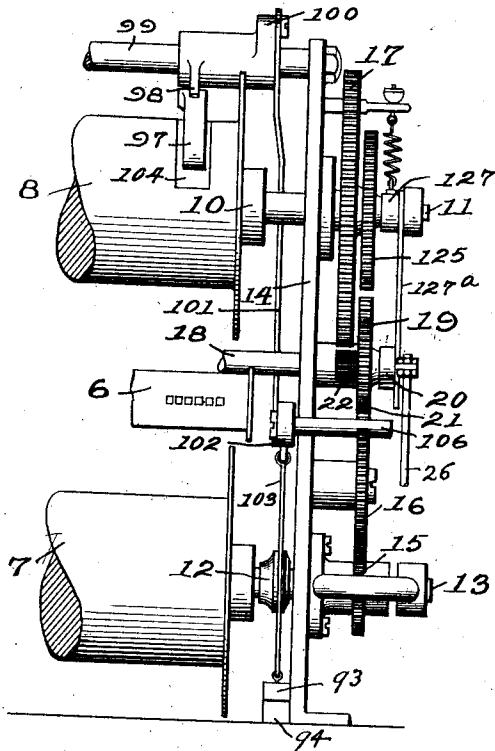


Fig. 4.

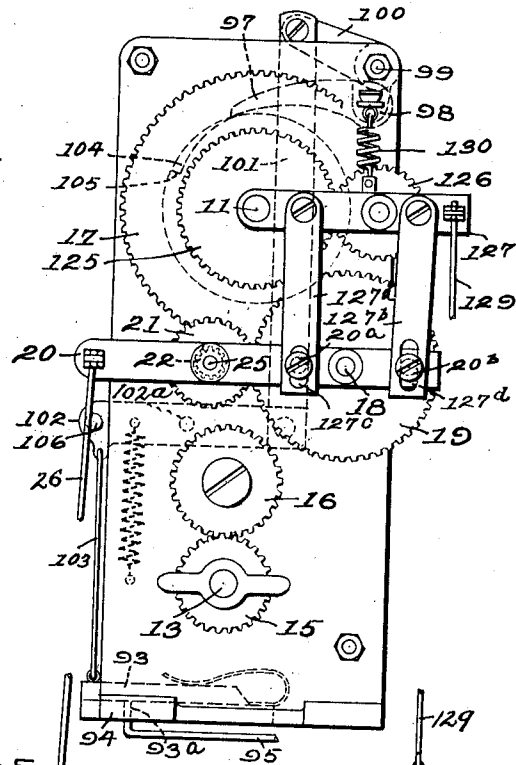
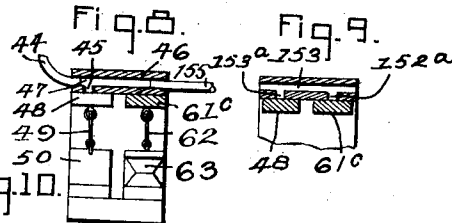
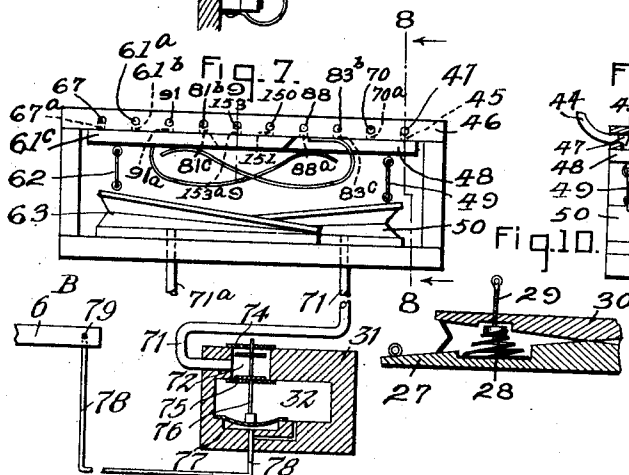
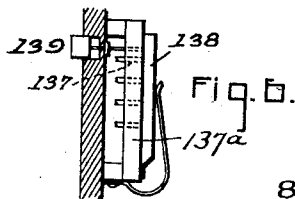
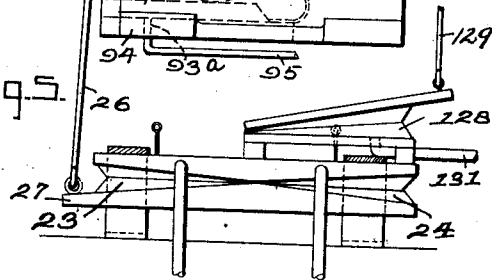


Fig. 5.



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4 SHEETS—SHEET 4.

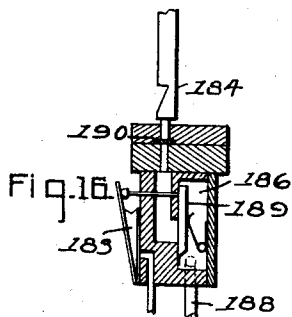
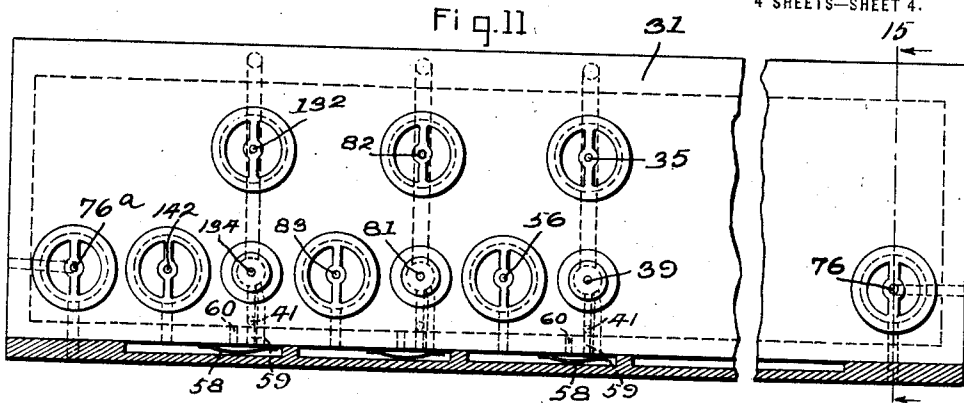


Fig. 13.

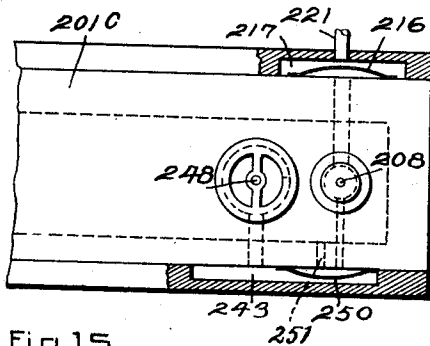


Fig. 15.

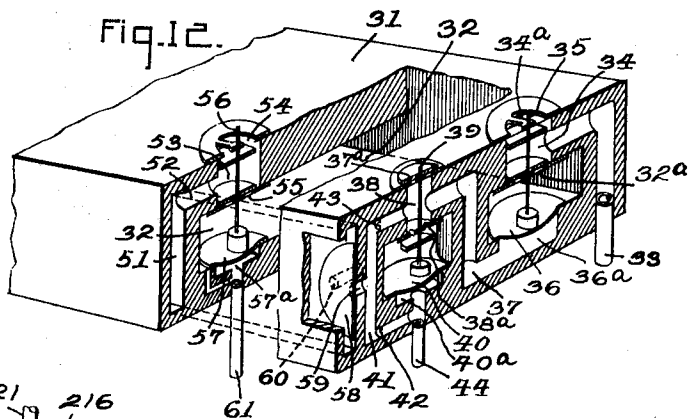
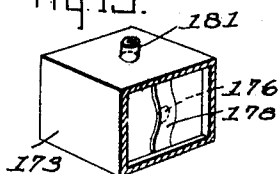
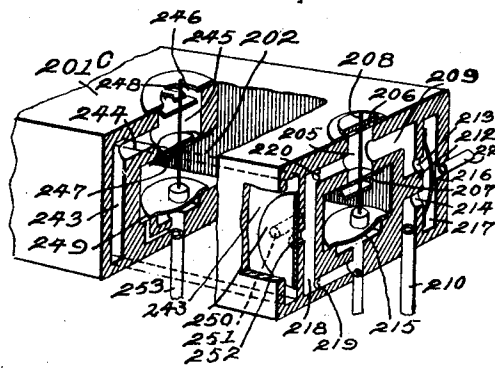


Fig. 14.



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DOUBLE-TRACKER MUSICAL INSTRUMENT.

1,314,068.

Specification of Letters Patent. Patented Aug. 26, 1919.

Application filed January 20, 1916. Serial No. 73,150.

To all whom it may concern:

Be it known that I, Louis S. Lockwood, a citizen of the United States, residing at North Tonawanda, in the county of Erie and State of New York, have invented new and useful Improvements in Double-Tracker Musical Instruments, of which the following is a specification.

This invention relates to a double-tracker instrument which is especially desirable for moving picture theaters, and more particularly to an instrument of this kind in which one or more pipe-stops, such as violin and flute pipes, and other instruments are combined with the piano.

The object of my invention is the provision of an efficient and reliable instrument of this character which may be played automatically or manually, with or without the pipe-stops, and which meets various other requirements of theater instruments, such as permitting pieces to be conveniently selected on either music sheet while the other is being played, or one music roll to be changed while the other is being played, and automatically playing the sheets alternately or successively to furnish continuous music, if desired.

In the accompanying drawings:

Figure 1 is a front elevation of an automatic piano embodying the invention with the front wall of the case removed and the piano action and the strings omitted for clearness. Fig. 2 is a diagrammatic view showing the roll-driving and controlling mechanism of the two trackers. Fig. 3 is an enlarged, fragmentary front elevation of the roll-driving mechanism of one of the trackers. Fig. 4 is an end elevation of the same. Fig. 5 is an enlarged sectional elevation of a set of the controlling pneumatics. Fig. 6 is a similar view of one of the push buttons and pallets. Fig. 7 is a sectional elevation of the duct-board and pallets and their controlling mechanism. Figs. 8 and 9 are transverse sections on the correspondingly numbered lines in Fig. 7. Fig. 10 is a fragmentary longitudinal section of one of the playing pneumatics. Fig. 11 is an enlarged sectional top plan view of the auxiliary wind chest. Fig. 12 is a fragmentary perspective view thereof, partly in section. Fig. 13 is a fragmentary top plan view, partly in section, of one of the stop-action

chests. Fig. 14 is a sectional perspective view of a fragment thereof. Fig. 15 is a transverse section of the manually-controlled valve box. Fig. 16 is a transverse vertical section of one of the pipe-wind chests.

Similar characters of reference indicate corresponding parts throughout the several views.

1 indicates the main wind chest containing a pneumatic playing action of any suitable construction, and 2, Fig. 2, indicates one of the customary striker pneumatics. The wind chest is connected with the usual main suction bellows 3 operated by an electric or other suitable motor 4, a trunk 5 connecting the said chest with said bellows.

The instrument contains a plurality of trackers and associated roll-driving and controlling mechanisms, two being shown in the drawings which are generally designated by the reference letters A and B, respectively. For brevity they are hereinafter referred to as trackers A, B, and being identical in construction, a description of one will apply to both.

6 indicates the tracker board, 7 the music roll, 8 the take-up roll, and 9 the music sheet. The take-up roll is engaged with the usual clutch member 10 secured to the take-up shaft 11, while the music roll is engaged by the clutch member 12 secured to the rewind shaft 13, which shafts are journaled in the cheeks 14 of the tracker boxes. The rewind shaft carries a spur gear 15 engaging with an idler 16. Mounted on the take-up roll shaft 11 is a spur gear 17.

The rolls of each tracker-box preferably have a separate driving shaft 18 supported horizontally in the box. Fixed to this shaft adjacent to each tracker box is a spur gear 19 and pivoted upon the shaft is a vertically movable shifting member or shipper-arm 20 carrying two transmission gears 21, 22, which are secured to a spindle 25 journaled in said arm. The gear 21 meshes constantly with the driving gear 19 on the main drive shaft 18. When the arm 20 is lowered, the gear 21 meshes with the rewind idler 16 to rewind the music sheet, while when said arm is raised, the gear 22 meshes with the take-up gear 17 to take up the music sheet.

The driving shafts 18 are preferably

driven separately by independent motors 18^a of the pneumatic or other suitable type.

Located adjacent to each roll driving mechanism is a set of playing and rewind pneumatics 23 and 24 serving respectively to shift the arm 20 into take-up and rewind position. As shown, these pneumatics may be combined in a duplex pneumatic having a single movable board 27 and the arm 20 is connected with said board by a link 26. A spiral spring 28 shown in Fig. 10 is arranged inside of these pneumatics and provided with an adjusting screw 29, extending through the stationary board 30. These springs tend to keep the pneumatics in a neutral position in which the transmitting gears 21, 22 are disconnected from both gears 16 and 17. These pneumatics are individually connected with an auxiliary wind chest 31 preferably arranged beneath the key table and having its main suction chamber 32 connected by the trunk 5 with the main suction bellows 3. The take-up or playing pneumatic 23 of tracker A is connected by a conduit 33 with a valve chamber 34 in the auxiliary chest 31 which chamber is connected with the atmosphere by ports 34^a and with the suction chamber 32 by ports 32^a which are controlled by a secondary duplex valve 35 of ordinary construction. This valve is controlled by a diaphragm 36 located in the diaphragm chamber 36^a to which leads a channel 37 connected with a valve chamber 38 which is connected with the atmosphere by ports 37^a and with the suction chamber 32 by ports 38^a. These ports are controlled by a primary or playing valve 39, the heads of which are arranged on the outer side of the chamber 38. This valve is controlled by a diaphragm 40 covering the diaphragm chamber 40^a.

A channel or by-pass 41 provided with the customary bleeds 42, 43 connects the diaphragm chamber 40^a with the valve chamber 38. When the primary playing valve 39 is raised by the diaphragm 40, atmosphere passes through the by-pass 41 and acts upon said diaphragm, holding said valve in that position until allowed to drop by the action of the releasing valve hereinafter described. Under these conditions, atmosphere also enters the channel 37 and raises the valve 35, allowing the tension in the chamber 32 to collapse the playing pneumatic 23. Leading to the diaphragm-chamber 40^a is a conduit 44 which is connected with a duct or channel 47 formed in a duct-board 46 and having a lateral port 45, as shown in Figs. 7 and 8. This port is controlled by a valve 48 preferably consisting of a spring-pressed pallet, as shown. This pallet is connected by a link 49 with a pneumatic 50.

The valve 39 is lowered or released preferably by the following means:

51 indicates a pouch chamber located in

the auxiliary chest 31 and connected by a channel 52 with a valve chamber 53 which is connected with the atmosphere by ports 54 and with the suction chamber 32 by ports 55. These ports are controlled by a duplex releasing or stop-valve 56 similar to the valve 35, which in turn is controlled by a diaphragm 57 arranged in a diaphragm chamber 57^a. Located in a pouch chamber 51 is a valve or pouch 58, which controls the ports 59, 60, the port 60 leading directly from the suction chamber 32 to the space inclosed by said pouch, and the port 59 leading to the by-pass 41. Thus by the raising of the releasing valve 56 the pouch chamber 51 is placed in communication with the suction chamber 32 and the pouch 58 is raised from the ports 59 and 60, exhausting the by-pass 41 and allowing the primary playing valve 39 to drop. The channel 37 is thereby connected with the suction chamber 32, lowering the secondary valve 35 and cutting off communication between the suction chamber 32 and the playing pneumatic 23, thereby flushing the latter and returning the corresponding shipper arm 20 to neutral position. The releasing diaphragm 57 is connected by a conduit 61 with an atmospheric duct 61^a in the valve board 46, to which duct leads a port 61^b, controlled by a spring-pressed pallet 61^c which normally closes said port. This pallet 61^c is connected by a link 62 with a pneumatic 63.

As shown in Fig. 2, the playing bellows 23 of tracker B is connected by a conduit 64 with the primary and secondary playing valves 64^a, 65 in the auxiliary wind chest 31, which valves are identical in construction with the corresponding primary and secondary valves 39, 35, of tracker A. The valve 64^a is raised by a diaphragm connected by a conduit 66 with a channel 67 in the board 46 from which leads a port 67^a controlled by the pallet 61^c and is released by a duplex valve 68, similar to valve 56, in order to raise the secondary valve 65, and flush the playing pneumatic 23 of tracker B, thereby returning the roll-driving mechanism thereof to neutral or inoperative position and stopping the corresponding music sheet. The diaphragm of the releasing valve 68 is connected by a conduit 69 with a channel 70 and port 70^a in the board 46, which port is controlled by the pallet 48.

The pneumatic 50 is connected by a conduit 71 with a valve chamber 72 which communicates with the atmosphere and the suction chamber 32 by ports 74 and 75. These ports are controlled by a duplex valve 76 actuated by a diaphragm 77 to which leads a conduit 78 connected with a controlling duct 79 of the tracker B. The pneumatic 63 is connected by a conduit 71^a with a valve chamber similar to the chamber 72 and is controlled by a valve 76^a to the diaphragm

of which leads a conduit 78^a connected with a controlling duct 79 of the tracker A. It will thus be seen that the playing pneumatic 23 of tracker A is collapsed by the opening 5 of the pallet valve 48 and flushed by the opening of the pallet 61^c, while the playing pneumatic 23 of tracker B is collapsed by the opening of the pallet 61^c and flushed by the opening of the pallet 48.

10 The rewind pneumatic 24 of tracker A is controlled by primary and secondary rewind valves 81, 82 and a releasing valve 83 similar to the valves 39, 35 and 56 of the playing pneumatic 23 of said tracker, 80 indicating the conduit which connects said rewind pneumatic with said secondary valve 82, and 81^a a conduit which connects said primary valve 81 with a channel 81^b and a port 81^c in the duct board 46. This port is controlled by the pallet 61^c. The releasing valve 83 is connected by a conduit 83^a with a channel 83^b and a port 83^c in the board 46, which port is controlled by the pallet 48. The rewind pneumatic 24 of tracker B is likewise 25 controlled by similar primary and secondary rewind valves 85, 86, and a releasing valve 89, said pneumatic being connected with the secondary rewind valve 86 by a conduit 84, while said primary valve is connected by a conduit 87 with a channel 88 and a port 88^a controlled by the pallet 48, and the releasing valve 89 is connected by a conduit 90 with a channel 91 and a port 91^a controlled by the pallet 61^c.

35 By this construction and arrangement of the controlling mechanism, the playing pneumatic 23 of one tracker and the rewind pneumatic 24 of the other tracker are simultaneously collapsed, thus taking up the 40 music sheet of one tracker and at the same time rewinding the sheet of the other.

The actuation of these sets of playing and rewind pneumatics is automatically controlled after the playing of each music sheet 45 by perforations 92 located near the ends of the sheets and coöperating with controlling ducts 79 of the tracker boards, each board having one of such ducts.

After a sheet has been rewound, its rewind mechanism is automatically stopped by any suitable means. The preferred mechanism shown in the drawings is constructed as follows:

93, Figs. 2, 3 and 4, indicates flushing 55 valves respectively located adjacent to the roll driving mechanisms of the trackers and each consisting of a spring-pressed pallet which normally closes a flushing port 93^a in a block 94. The port 93^a of the tracker A is connected by a conduit 95, channel 83^b and conduit 83^a with the diaphragm of the releasing valve 83 which controls the rewind pneumatic of tracker A. The port 93^a of the tracker B is connected by conduits 96 65 and 90 with the corresponding releasing

valve 89 of the rewind pneumatic of tracker B.

97 indicates fingers which coöperate with the take-up rolls 8, respectively, and control the flushing valves 93. Each of these fin- 70 gers is pivoted to a rock arm 98 secured to a horizontal rock shaft 99 arranged parallel with the take-up roll and supported in the adjacent tracker box. This shaft has an actuating arm 100 which is connected by a 75 link 101 with one end of a lever 102 pivoted at 102^a to the tracker box. A link 103 connects the opposite end of said lever with the flushing valve 93. As seen in Fig. 4, the finger 97 of each tracker box bears against the 80 convolutions of the music sheet opposite a transverse groove 104 in the periphery of the take-up roll, the finger bearing constantly against the music sheet by its own weight. This recess has an abrupt rear end 85 105 referring to the direction of travel of the take-up roll during the rewinding of the music sheet. So long as the recess remains covered by the music sheet during the rewinding operation, the finger is held in a 90 retracted position, as shown in Fig. 4, but when the recess is uncovered by the complete unwinding of the music sheet, the finger drops into the recess, bringing its free end into the path of the abrupt end thereof 95 which thereupon depresses the finger and causes the shaft 99 to be rocked in the proper direction to open the valve 93. The releasing valve 83 or 89, as the case may be, is thereby actuated, inflating the rewind pneu- 100 matic 24 and shifting the transmission gear 21 into neutral or stop position. A pin 106 projecting laterally from the lever 102 into the path of the rock arm 20, is preferably employed to assist the rewind pneumatic in 105 disconnecting the transmission gear 21 from the idler 16.

During the rewind of each music sheet, the companion tracker is cut off from the main wind chest 1 by any suitable means, 110 but I prefer to employ the mechanism shown in the drawings which is constructed as follows:

107, Fig. 2, indicates a cut off or chest 115 preferably arranged on top of the main wind chest 1 and containing a pair of pouch or valve chambers 108 and 109. One of these chambers, say the chamber 108, is connected by a conduit 110 and the conduit 33 with the secondary valve chamber 34 of 120 tracker A, while the chamber 109 is connected by a conduit 116 and the conduit 64 with a valve chamber, similar to the valve chamber 34, controlled by the secondary valve 65 of tracker B, whereby each of said 125 chambers is alternately exhausted and flushed by the raising and lowering of the secondary valves 35 and 65, respectively. Arranged in the cut off chest 107 adjacent to the pouch chamber 108 are a plurality of 130

channels 112, respectively connected with the note ducts 72 of tracker A by conduits, one of which is shown at 113, and arranged adjacent to the other pouch chamber 109 is a similar set of channels 114 respectively connected with the note ducts 72 of tracker B, by conduits, one of which is shown at 115. The pair or set of channels 112 and 114 corresponding to like note ducts of the two tracker boards 6, both communicate with a common channel 116^a leading to the primary pneumatic 117 which controls the valve 118 of the corresponding striker pneumatic 2. Each of the channels 112 is interrupted by a partition 119 and provided at opposite sides thereof with ports 120 which are covered by a pouch or diaphragm 121 secured at its edges to the bottom of the upper pouch chamber 108. This pouch forms a valve, which, when lowered against the upper edge of the partition 119, closes the ports 120 and cuts off communication between the corresponding striker pneumatic 117 and the corresponding duct of the board 6 of the tracker A; while when said pouch valve is raised, it opens the ports 120 and forms a passage between them, thereby connecting said striker pneumatic with the corresponding tracker board duct. It will be understood that there is such a pouch-valve for each channel 112.

Each of the channels 114 has a similar partition 122 and a pair of ports 123 controlled by a pouch-valve 124.

From the foregoing it will be seen that when the playing pneumatic bellows 23 of tracker A is collapsed by the opening of the pallet 48, the pouch chamber 108 of the corresponding tracker is at the same time exhausted, opening the pouch-valves 121, as shown in Fig. 2, and coupling the tracker A to the main wind chest. Simultaneously with this action, the pouch chamber 109 is flushed by the opening of port 70^a by said pallet 48, closing the ports 123 and cutting off the tracker B from the main wind chest. Likewise, when the pallet 61^c is opened, the pouch valves 124 corresponding to tracker B are opened and the pouch valves 121 corresponding to tracker A are closed, coupling the latter to the main wind chest and cutting off the tracker A therefrom.

While one music sheet is being played, it is desirable at times to select some particular piece on the idle sheet and bring it into position ready to be promptly played. This is preferably accomplished by the following means:

The shaft 11 of the take-up roll is provided with an auxiliary spur gear 125 which engages an idler 126 journaled on a vertically movable arm or shifting member 127 pivoted on the shaft 11. This idler is in turn adapted to engage the spur gear 19. The several gears are so proportioned that

when the idler 126 is moved to operative position, the take-up roll is driven forwardly more rapidly than playing speed, thus saving time in selecting the desired composition.

Each of the gear-carrying arms 127 is shifted in one direction by a selecting pneumatic 128 connected with it by a link 129 and serving, when collapsed, to lower the arm into operative position. A spiral spring 130 raises the arm 127 into inoperative position when said pneumatic 128 is flushed. The two selecting pneumatics 128 of the trackers A and B are connected by conduits 131, 131^a with separate valve chambers in the auxiliary wind chest 31 controlled by secondary valves 132, 133 and corresponding primary valves 134, 135. The primary selecting valve 134 of tracker A is connected by a conduit 136 with a duct 137 formed in a duct board 137^a controlled by a pallet-valve 138 shown in Fig. 6. This duct is operated by a push-button 139. The primary selecting valve 135 of tracker B is connected by a conduit 140 with a duct controlled by a similar pallet valve having a push button 141. By pushing one or the other of the buttons 139, 141 the corresponding selecting pneumatic 128 is collapsed, shifting the associated selecting gear into operative position.

At the end of each piece on the music sheet, there is preferably a stop-perforation 148 which coöperates with a corresponding tracker duct and serves to arrest the forward selecting movement of the sheet. For this purpose, a releasing or "select off" valve 142 located in the auxiliary wind chest 31 is connected by a conduit 143 with a duct 144 of tracker A coöperating with such a stop perforation, while a similar releasing or "select off" valve 145 is connected by conduit 146 with a duct 147 of tracker B. These select-off valves 142 and 145 act upon the secondary selecting valves 132 and 133 in the same manner as the releasing valve 56 acts upon the secondary valve 35, serving when actuated to flush the selecting pneumatic 128 of the corresponding tracker A or B, thereby shifting the selecting mechanism into inoperative position and stopping the sheet.

In selecting a composition near the end of the music sheet, the latter is liable to unwind completely from the music roll. To prevent this, means are provided for automatically disconnecting the selecting gear 126 from the driving gear 19, to stop the forward travel of the sheet and shifting the roll-driving mechanism into rewind position. To accomplish this, the select-off valve 142 of tracker A is connected by a conduit 149 with the channel 150 leading to a port 151 controlled by the pallet 61^c which in turn is controlled by tracker A. The se-

lect-off valve 145 of tracker B is likewise connected by a conduit 152 with a channel 153 and port 153^a, the latter being controlled by the pallet 48, which is in turn controlled by tracker B. By this arrangement, the select-off valve 142 or 145 is actuated simultaneously with the primary rewind valve 81 or 89 by the opening of the rewind pallet 61^c or 48, as the case may be, throwing the selecting mechanism of either tracker into inoperative position and at the same time shifting the corresponding rewinding mechanism into operative position.

Under ordinary conditions, each roll driving mechanism is automatically thrown into rewind position after the corresponding music sheet has been fully played and continues to rewind the sheet until it is automatically stopped. The selecting is done manually and as the operator is apt to do so during the rewinding operation, means must be provided to shift the corresponding transmission gear 21 into neutral or inoperative position before the selecting mechanism is thrown into operative position, otherwise the rewind mechanism will interfere with the selecting mechanism. This shifting action is accomplished preferably by the following means:

154, 154^a indicate conduits leading from ports controlled by the selecting buttons 139, 141, respectively. The conduit 154 connects with the conduit 95 associated with the "rewind off" or releasing valve 83 which controls the rewind pneumatic 24 of tracker A. The conduit 154^a connects with the conduit 90 associated with the rewind off or releasing valve 89 which controls the rewind pneumatic 24 of tracker B. It follows that when either of these selecting buttons is operated the corresponding selecting pneumatic 128 is collapsed, shifting the selecting gear 126 into operative position, while the corresponding rewind pneumatic is flushed, shifting the associated transmission gears 21, 22 into inoperative position.

Mechanical means are also preferably employed to prevent the shipper arm 20 from being shifted into rewind or take-up position while the arm 127 of the selecting mechanism is in its operative or selecting position. These devices consist of links 127^a and 127^b pivoted to the arm 127 and extending downwardly on either side of the driving shaft 18. 20^a and 20^b indicate screws passing through slots 127^c and 127^d in said links, respectively. When the arm 127 is in its lower or playing position, the upper ends of these slots bear against the screws 20^a, 20^b, locking the shipper arm 20 against movement. These slots are of such a length that when the arm 127 is in its inoperative position, as shown in the drawings, the arm 20 is allowed to move up or down the required distance to throw the transmission

gears 21, 22 into take-up or rewind position. When the arm 20 is shifted into either of these positions, it locks the arm 127 in its inoperative position through the medium of the slotted links 127^a, 127^b, in an obvious manner.

As before stated, after one music sheet has finished playing, a perforation at or near its end causes the other sheet to start playing. As the operator might be in the act of selecting a piece on the idle music sheet at the time this change occurs, means are provided to cut off each selecting pneumatic 128 from the suction chamber 32, an instant before the corresponding playing pneumatic 23 is collapsed. This allows the spring 130 to withdraw the selecting gear 126 from the drive gear 19, preventing said selecting gear from interfering with the operation of the playing gear 22. To accomplish this an additional port 151^a is connected with the conduit 149 leading to the releasing or select off valve 142 which serves to flush the selecting pneumatic 128 of tracker A, said port 151^a being controlled by the rewind pallet 48 of tracker B. For the same purpose, an additional port 152^a is connected with the conduit 152 leading to the releasing of "select off" valve 145 of tracker B, said port 152^a being controlled by the rewind pallet 61^c of tracker A. This arrangement renders it impossible for the selecting and playing gears 126 and 22 of the same tracker to come into operation at the same time.

To permit manual as well as automatic control of the roll-driving mechanism, the primary playing valve 39, rewind-off valve 83, select off-valve 142 of tracker A and the playing-off valve 68 of tracker B are connected by conduits 155, 156, 157, 158, respectively, with ports controlled by a pallet actuated by a push button 159, while the primary playing valve 64^a, rewind off-valve 89, select-off valve 145 of tracker B and the playing-off valve 56 of tracker A are connected by conduits 160, 161, 162 and 163, respectively, to ports controlled by a pallet actuated by a push button 164. By this manual control, either sheet can be started and the other simultaneously stopped.

To manually control the rewinding of the idle music sheet, at will, the primary rewind valve 81, primary play-off valve 56 and the select-off valve 142 of tracker A are also connected by conduits 165, 166, 167, respectively, with ports controlled by a pallet actuated by a rewind push-button 168, while the primary rewind valve 85, playing-off valve 68 and the select off-valve 145 of tracker B are connected by conduits 169, 170, 171, respectively, with ports controlled by a pallet actuated by a rewind push button 172.

173 indicates a controlling box having chambers 174, 175 and a channel 176 connecting them. Diaphragm valves 177, 178

are adapted to normally close the ends of said channel to cut off communication between them. Conduits 179, 180 connect the chambers 174, 175 with the playing-off valves 56 and 68, respectively, while a conduit 181 connects the channel 176 with a port controlled by a pallet actuated by a push button 182. Upon depressing this button, atmosphere entering through the conduit 181, opens both diaphragm valves 177, 178, and passes thence through the conduits 179, 180 and raises the playing-off valves 56 and 68, flushing whichever playing pneumatic 23 is collapsed and stopping the roll-driving mechanism and music sheet controlled thereby. By this push button 182 the sheet which is being played may be stopped without affecting the operation of the other sheet.

As best seen in Fig. 16, 183 indicates a pressure wind chest with which is combined one or more stops, such, for instance, as violin pipes 184 which ordinarily play in concert with the piano treble. This stop and its valve mechanism may be of any suitable or well known construction. In the example shown in the drawings, they are located in a case 185 adjacent to the piano. 186 indicates the pressure chamber connected with the usual pressure bellows 187 by the tube 188; 189 one of the valves or pallets arranged in said chamber and 190 the usual stop-slide. As shown in Fig. 2, this slide may be operated by a pneumatic 191, the movable board of which engages the slide. A spring 192 tends to shift the slide to its closed position. 193 indicates an auxiliary wind chest preferably arranged beneath the key-table and having its suction chamber 194 connected by trunks 195 and 5 with the main suction bellows 3. The pneumatic 191 is connected by a conduit 196 with a valve chamber 197 in the chest 193, which chamber is connected with the atmosphere by ports 198 and with the suction chamber 194 by ports 199. These ports are controlled by a duplex valve 200 of ordinary construction, which in turn is controlled by a diaphragm 200^a. The pneumatic 191 is collapsed or inflated by the action of said valve, thereby shifting the stop-slide into open or closed position. The pipe stop or stops may be coupled to either tracker to play in concert with either of the music sheets, the mechanism shown in the drawings for this purpose being constructed as follows:

It comprises two auxiliary stop wind chests 201^c and 201^d containing valve mechanisms for controlling said stops. For brevity they will be hereinafter referred to as wind chests C and D, and as they are identical in construction, a description of one will suffice for both. They are preferably arranged below the key table and their suction chambers 202 (Fig. 2) are connected

with the main suction bellows 3 by the trunks 203, 204, 195 and 5, as shown in Fig. 1. A valve chamber 205 is connected with the atmosphere by ports 206 and with the suction chamber 202 by ports 207, which ports are controlled by a duplex valve 208, the heads of which are arranged on the outer side of said valve chamber. The valve chambers 205 of the chests C and D are connected by channels 209 and conduits 210 and 211, respectively, with the chamber beneath the diaphragm 200^a of the main stop wind chest 193. Each channel 209 is interrupted by a partition 212 and provided at opposite sides thereof with ports 213, 214 adapted to be covered or uncovered by a valve diaphragm 216 secured to the wall of a pouch chamber 217. When closed against the partition 212, this pouch valve cuts off communication between the diaphragm 200^a and the valve chamber 205 and when opened establishes communication between said parts. A channel 218 provided with the customary bleeds 219, 220 connects the valve chamber 205 with the underside of the diaphragm 215 of the valve 206. The pouch chamber 217 of chest C is connected by a conduit 221 and the conduit 33 with the valve chamber 34 of the secondary playing valve 35, Fig. 12, while the pouch chamber 217 of the chest D is connected by a conduit 226 and the conduit 64 with the valve chamber of the secondary playing valve 65. Each of said pouch chambers is thus exhausted simultaneously with the corresponding playing pneumatics 23 keeping the pouch valve 216 open as long as said pneumatic remains collapsed.

When the valve 208 is raised by the diaphragm 215, atmosphere entering through the channel 218 retains said diaphragm and valves in that position while the atmosphere entering through the valve chamber 205, channel 209 and conduit 210 or 211 raises the diaphragm 200^a and the valve 200, collapsing the pneumatic 191, shifting the slide 190 to open position and causing the pipes to play in concert with the active music sheet.

During the playing of each music sheet, the controlling valve 208 in the other stop action chest C or D is cut off from the tracker by any suitable means, but I prefer to employ the mechanism shown in the drawings which is constructed as follows:

222 indicates a cut off chest which may be arranged below the chest 201^c and which contains pouch or valve chambers 223, 224. One of these chambers, say the chamber 223, is connected by a conduit 225 and the conduit 221 with the same source of tension as the playing pneumatic 23 of tracker A, while the chamber 224 is connected by a conduit 226 and the conduit 64 with the same source of tension as the playing pneumatic 23 of tracker B, whereby each of these chambers

is alternately exhausted and flushed simultaneously with the respective playing pneumatics. Arranged in the cut off chest 222 adjacent to the pouch chambers 223 and 224 are channels 227 and 228, respectively. The channel 227 is connected by a conduit 229 with the diaphragm 215 of the auxiliary wind chest C and with a duct 230 of tracker A by a conduit 231, while the channel 228 is connected by a conduit 232 with the diaphragm 215 of the auxiliary wind chest D and with a duct 233 of tracker B by a conduit 234. The channel 227 is interrupted by a partition 235 and provided on opposite sides of said partition with ports 236 which are covered by a pouch valve or diaphragm 237 which establishes or cuts off communication between the corresponding tracker duct and the diaphragm.

The channel 228 of tracker B has a similar partition 238 and a pair of ports 239 controlled by a pouch valve 240.

As the conduit 221 leading from the pouch chamber 217 of the chest 201^c and the conduit 225 leading from the pouch chamber 223 of the cut-off chest 222 are both connected with the conduit 33 leading to the playing pneumatic 23 of tracker A, they are exhausted when said pneumatic is collapsed to play the sheet of tracker A, thereby opening the pouch valves 216 and 237 and establishing communication between the duct 230 of tracker A and the diaphragm 215 and also between the valve chamber 205 of the auxiliary chest 201^c and the diaphragm 200^a of the valve 200 which controls the slide pneumatic 191, thus coupling the pipe-stop to tracker A. At the same time, the pouch chamber 217 of the chest 201^d and the pouch chamber 224 of cut-off chest 222 are both flushed simultaneously with the playing pneumatic 23 of tracker B, closing their respective pouch valves and cutting off communication between the duct 233 of tracker B and the stop-controlling valve 200 of the chest 201^d.

The raising of the controlling valves 208 is effected by perforations 241 in the music sheets registering with the ducts 230 and 233 of the tracker boards A and B in a well known manner. These valves are retained in their raised position and released at the proper time by the valve mechanism shown in Fig. 14, which is similar to that illustrated in Fig. 12. Referring to Figs. 2, 13 and 14, each of the chests 201^c and 201^d contains a pouch chamber 243 which is connected by a channel 244 with a valve chamber 245 also arranged in said chest. This chamber communicates with the atmosphere by ports 246 and with the suction chamber 202 by a port 247. Applied to these ports is a duplex releasing valve 248 controlled by the usual diaphragm 249. The pouch chamber 243 communicates with the suction cham-

ber 202 and the channel 218 by ports 251, 252, respectively, which are controlled by a pouch or valve 250 similar to the valve 58. When the valve 248 is raised, the pouch chamber 243 is exhausted, raising the pouch 250, as shown in Fig. 13, and uncovering the ports 251, 252 and exhausting the channel 218, thus allowing the valve 208 to drop and cutting off communication between the diaphragm 200^a of the stop chest 193 and the atmosphere. The diaphragms 249 of the chests 201^c and 201^d are connected by conduits 253 and 254 with tracker ducts 255 of trackers A and B, respectively, and are controlled by cooperating perforations 256 in the music sheets. It will now be understood that the valve 208 which is associated with the music sheet that is playing for the time being effects the alternate exhaustion and flushing of the slide-controlling pneumatic 191.

For the purpose of manually controlling the stops when playing the piano manually, additional mechanism is provided for actuating the duplex valve controlling the slide pneumatic 191, which is constructed as follows:

257, Fig. 2, indicates an auxiliary valve chamber located in the main stop-chest 193 and provided with ports 258 and 259 leading to the atmosphere and suction chamber, 194, respectively. These ports are controlled by a duplex valve 260 actuated by a diaphragm 267 of ordinary construction, the heads of the valve being arranged on the outside of the valve chamber 257. The latter is connected by a channel 261 with a pouch chamber 262 which in turn is connected by a channel 263 with the diaphragm 200^a. Obviously the raising and lowering of the valve 260 causes a corresponding action of the valve 200 which controls the movement of the slide 191. The diaphragm 267 may be controlled directly by a pallet or push button 269, similar to the pallet 138 and button 139, conveniently located at the front of the instrument. However, when playing automatically it is desirable to render the manual controlling valve 260 inoperative, and for this purpose it is preferably combined with a cut-off mechanism which includes a pouch chamber 264 located in the cut-off chest 222 and a cooperating channel 265 adjacent to the pouch chamber. This channel is connected by a conduit 266 with the chamber beneath the diaphragm 267 and by a conduit 268 with an atmospheric duct controlled by the button 269. Like the channels 227 and 228, the channel 265 is interrupted by a partition 270 and provided on opposite sides thereof with ports 271 controlled by an ordinary pouch-valve 272. The pouch chamber 264 is connected by a conduit 264^a with a valve chamber 273 communicating by a port 274

with the atmosphere and a port 275 with a suction chamber 276. The latter is connected by a conduit 277 and the conduit 5 with the main suction bellows 3. A duplex valve 278 actuated by a diaphragm 279 controls the ports 274, 275. This diaphragm is connected by a conduit 280 with a flushing channel 281 which may be interrupted by a partition 282 and provided on opposite sides thereof with ports 283, controlled by a D-valve 284. This valve is connected with a pair of motor-pneumatics 285 and 286 by a link 287. The pneumatic 285 is connected by the conduits 288 and 221 with the suction conduit 33 of the playing pneumatic 23 of tracker A, while the pneumatic 286 is connected by conduits 289 and 226 with the suction conduit 64 of the playing pneumatic 23 of tracker B. It follows that when either of the playing pneumatics 23 is collapsed, the corresponding pneumatic 285 or 286 is also collapsed, shifting the D-valve 284 in the proper direction to close the flushing channel 281 and cutting off the atmosphere from beneath the diaphragm 279. The valve 278 is therefore allowed to drop, admitting atmosphere to the chamber 264, closing the pouch valve 272 and cutting off the manual valve 260 from its controlling device 269.

When playing the instrument automatically, it is also desirable to cut off communication between the suction chamber 194 of the manually-controlled compartment of the main stop wind chest and the diaphragm 200^a of its automatically-controlled compartment, so that said manual control can not interfere with the operation of the valve 200 in the last-named compartment when actuated from the tracker boards. To that end, a pouch or cut-off valve 290 is arranged in the pouch chamber 262 of the main stop chest 193 and said chamber is connected by conduits 291 and 264^a with the valve chamber 273. The pouch chamber 262 is thus likewise flushed when either of the pneumatics 285 or 286 is collapsed, closing the pouch valve 290 and cutting off communication between the suction chamber 194 and the diaphragm 200^a.

The operation of the apparatus is as follows:

In Fig. 2, the parts of tracker A are in position to play its music sheet, the parts of tracker B are in position to rewind its sheet and the controlling perforation 92 at the end of the music sheet of tracker A has just come into register with the corresponding tracker-duct 79. Under these conditions atmosphere enters this tracker-duct and passes through the conduit 78^a and raises the valve 76^a (similar to the valve 76, Figs. 2 and 15), establishing communication between the auxiliary suction chamber 32 and the pneumatic 63, collapsing the latter

and opening the pallet 61^c shown in Fig. 7. Atmosphere now enters the port 67^a and conduit 66 and actuates the primary and secondary playing valves 65^a, 65 of tracker B, collapsing the playing pneumatic 23 of said tracker B and moving the corresponding shipper arm 20 into playing position to drive the take-up roll. Simultaneously with this action, the driving mechanism of tracker A is shifted into rewind position by the uncovering of the port 81^c by said pallet 61^c. The atmosphere entering said port and the conduit 81^a causes the primary and secondary rewind valves 81 and 82 to be shifted to the proper position to connect the rewind pneumatic 24 of tracker A with the auxiliary suction chamber 32, collapsing it and shifting the corresponding arm 20 into rewind position. This arm remains in this position until the music sheet of tracker A is rewound, when the finger 97 enters the recess 104 of the corresponding take-up roll and is tripped and caused to open the stop-pallet 93 of tracker A. Atmosphere now enters the conduits 95 and 83^a and raises the rewind-off or releasing valve 83, allowing the primary rewind valve 81 and the secondary valve 82 to drop as before described, thereby flushing the rewind pneumatic 24 of tracker A, shifting the arm 20 into neutral position and stopping the rewind operation. Said arm is held in this position by the spring 28 shown in Fig. 10.

The moment the music sheet of tracker B is taken up for playing, the playing pneumatic 23 of tracker A is flushed, shifting the corresponding shipper arm 20 to neutral position, and at the same time the companion tracker board is disconnected from the main wind chest. This is effected by the opening of port 61^b controlled by the pallet 61^c. Atmosphere thereupon enters the conduit 61 and raises the releasing or playing-off valve 56, lowering the primary valve 39 and the secondary valve 35 and flushing the playing pneumatic 23, through the conduit 33, as hereinbefore described, and simultaneously flushing the cut-off chamber 108 through the conduit 110 branching from the conduit 33. The pouch valves 121 are thereby closed, breaking communication between the board 6 of tracker A and the main wind chest 1. The pouch valves 124 of the other cut-off chamber 109 are at the same time opened, as before explained, establishing communication between the board of tracker B and said main wind chest.

The music sheet of tracker B continues to play until its controlling perforation 92 registers with the corresponding tracker duct 79, whereupon atmosphere enters the conduit 78 and raises the valve 76, Figs. 2 and 15, connecting the pneumatic 50 (Fig. 7) with the auxiliary suction chamber 32 and collapsing it and opening the pallet 48.

The atmosphere now enters the ports 88^a and conduit 87, causing the primary and secondary valves 85 and 86 to be raised and the rewind pneumatic 24 of tracker B to be collapsed, as hereinbefore described, thereby moving the corresponding rock arm 20 to the position shown in Fig. 2 and rewinding said sheet.

The opening of the pallet 48 causes the pneumatic 23 of tracker A to be collapsed, again taking up the corresponding sheet; at the same time the pouch valves 121 of tracker A are opened and the pouch valves 124 of tracker B are closed, thus silencing the latter.

If, while the music sheet of tracker A is playing and the music sheet of tracker B is rewinding, it is desired to play the sheet of tracker B and stop the sheet of tracker A, the button 164 shown in Fig. 2 is pressed by the operator. Atmosphere through the ducts 160 and 66 actuates the primary and secondary playing valves 64^a, 65, collapsing the playing pneumatic 23 of tracker B, and shifting the respective arm 20 into playing position, while atmosphere entering the ducts 163 and 61^a actuates the releasing valve 56 of tracker A, shifting the arm 20 of the latter into neutral or stop position, as before described.

In a similar manner, the sheet-driving mechanism of tracker A may be manually thrown into playing position while the sheet of tracker B is playing, by pressing the button 159, the conduit 155 leading from this button to the conduit 44 which leads to the actuating-diaphragm of the primary valve 39.

To select some particular piece on the music sheet of tracker B while the music sheet of tracker A is playing, the operator pushes the button 141. By this movement atmosphere is admitted to the duct 140, actuating the primary and secondary selecting valves 135 and 133, collapsing the selecting pneumatic 128 of tracker B, thereby engaging the selecting gear 126 with the gear 19 and driving the take-up roll forward at increased speed. At the end of each piece on the sheet, a select-off perforation 148 is cut which is arranged to register with the tracker duct 147. When this occurs, the select-off valve 145 is actuated and in turn actuates said primary and secondary select valves, as before described, thereby throwing the selecting mechanism into inoperative position. It is necessary to press the select button 141 at the end of each piece until the desired composition is brought in position ready to be played. Selections may likewise be made on the sheet of tracker A by pressing the button 139.

The moment the sheet of tracker A starts playing, the pouch or coupler valve 216 of the chest C and the pouch valve 237 of the

chamber 223 are opened, as shown in Fig. 2, establishing communication between the valve chamber 205 of chest C and the diaphragm 200^a of the slide-controlling valve 200, and between the conduit 231 of tracker A and the diaphragm 215 of chest C, and whenever a pipe-stop perforation of the sheet of tracker A passes the latter, the valve 200 is actuated and the slide 190 is opened, causing the pipes to play in concert with the piano. In like manner, when tracker B begins to play, the pouch valve 216 of the chest D and the pouch coupler valve 240 are opened, establishing communication between the valve chamber 205 of chest D and said diaphragm 200^a and between the conduit 234 of tracker B and the diaphragm 215 of chest D; and whenever a pipe-stop perforation of tracker B passes the latter, the valve 200 is actuated and the pipes are caused to play in concert with the piano. Whenever one of the perforations 256 registers with the duct 253 of either tracker, the corresponding releasing valve 248 is actuated, lowering the valves 208 and 200, flushing the pneumatic 191 and allowing the spring 192 to close the stop-slide 190.

Should tracker B, for example, be thrown into operation manually by pressing the button 164, while tracker A and the pipe-stops are playing in concert, the playing-off valve 56 of tracker A will be actuated, thereby flushing the playing pneumatic 23 of tracker A and returning the corresponding roll-driving mechanism to neutral position. At the same time the conduit 221 is also flushed, thus closing the pouch valve 216 of the chest C and the pouch-valve 237 in chamber 223, and cutting the tracker A off from the chest C and the latter off from the slide-controlling valve 200.

When the piano is played manually, the pneumatics 285 and 286, Fig. 2, are both in their inflated position and the D-valve is in position to admit atmosphere under the diaphragm 279, thus raising the valve 278, exhausting the pouch chamber 262 and opening the pouch or coupler valve 290 to establish communication between the diaphragm 200^a of the main slide-controlling valve 200 and the valve-chamber 257 of the auxiliary slide-controlling valve 260. Under these conditions should it be desired to manually throw on the pipe-stop to play in concert with the piano, the performer presses the button or tablet 269, whereupon the atmosphere entering through the duct controlled by the same opens the pouch or coupler valve 271, passes through the conduit 266 and lifts the auxiliary slide-controlling valve 260, thereby causing the main slide-controlling valve 200 to rise, collapsing the pneumatic 191 and opening the stop-slide 190.

Various changes or modifications coming

within the scope of the appended claims, may obviously be made in the instrument, and I do not therefore wish to be limited to the particular construction herein shown and described.

I claim as my invention:

1. In an instrument of the character described, the combination of a wind chest, a plurality of tracker mechanisms each including a tracker board and music and take-up rolls associated therewith, driving mechanism including shiftable members for alternately rotating the rolls of each tracker in opposite directions, playing pneumatics for moving said shiftable members into playing position, a pneumatic cut-off for each tracker to disconnect the same from the wind chest, the playing pneumatic and the cut off of each tracker being connected together to act in unison, valve mechanism for controlling said playing pneumatics and cut-offs, rewind pneumatics for moving said shifting members into rewind position, valve mechanism for controlling said rewind pneumatics, and pneumatic actions controlled by the trackers for actuating said valve mechanisms.

2. In an instrument of the character described, the combination of a plurality of trackers, roll-driving mechanism associated with each tracker, a set of playing and rewind pneumatics for controlling each of said roll-driving mechanisms, valve mechanisms controlling said pneumatics, a duct-board having playing and rewind ducts cooperating with said valve-mechanisms, valves cooperating with said duct-board and each controlling the playing duct of one tracker and the rewind duct of another tracker, and means for controlling said duct-board valves.

3. In an instrument of the character described, the combination of a plurality of trackers, each having a controlling duct, roll-driving mechanism associated with each tracker, a set of playing and rewind pneumatics for controlling each of said roll-driving mechanisms, valve mechanisms controlling said pneumatics, a duct-board having playing and rewind ducts cooperating with said valve-mechanisms, valves cooperating with said duct-board and each controlling the playing duct of one tracker and the rewind duct of another tracker, and means controlled by said tracker ducts for actuating said duct-board valves.

4. In an instrument of the character described, the combination of a plurality of trackers, each having a controlling duct, roll-driving mechanism associated with each tracker, a set of playing and rewind pneumatics for controlling each of said roll-driving mechanisms, valve mechanisms controlling said pneumatic, a duct-board having playing and rewind ducts cooperating

with said valve mechanisms, valves cooperating with said duct-board and each controlling the playing duct of one tracker and the rewind duct of another tracker, means controlled by said tracker-ducts for actuating said duct-board valves, and manual valves also controlling the ducts of said duct-board.

5. In an instrument of the character described, the combination of a plurality of trackers, roll-driving mechanism associated with each tracker, a set of playing and rewind pneumatics for controlling each of said roll-driving mechanisms, valve mechanisms controlling said pneumatics, a duct-board having playing and rewind ducts cooperating with said valve mechanisms, valves cooperating with said duct-board and each controlling the playing duct of one tracker and the rewind duct of another tracker, separate pneumatics for actuating said duct-board valves, and pneumatic actions controlling the last-named pneumatics and in turn controlled by the trackers, respectively.

6. In an instrument of the character described, the combination of the music and take-up rolls, rewind and take-up gears for said rolls respectively, a driving member, shiftable main transmitting gears for alternately connecting said rewind and take-up gears with said driving member, a shiftable auxiliary gear for transmitting motion from said driving gear to the take-up roll, and means for locking said main transmission gears in neutral position when said auxiliary gear is shifted to operative position and vice versa.

7. In an instrument of the character described, the combination of the music and take-up rolls, a rewind shaft having a gear, a take-up shaft having different sized gears, a driving gear, a shipper member carrying main transmission gears arranged to alternately engage said rewind gear and one of the gears of said take-up shaft, said transmission gears being driven by said driving gear, an auxiliary selecting gear arranged to transmit motion from said driving gear to the other gear of the take-up shaft, a movable supporting-member for said selecting gear, and means controlled by said supporting member for locking said shipper member in neutral position.

8. In an instrument of the character described, the combination of the music and take-up rolls, a rewind shaft having a gear, a take-up shaft having different sized gears, a driving gear, a shipper arm fulcrumed between its ends on the shaft of said driving gear and carrying main transmission gears arranged to alternately engage said rewind gear and one of the gears of said take-up shaft, said transmission gears being driven by said driving gear, an auxiliary selecting

gear arranged to transmit motion from said driving gear to the other gear of the take-up shaft, a movable supporting-member for said selecting gear, and slotted locking links 5 pivoted to said supporting member and connected with said shipper member by pins passing through their slots and arranged on opposite sides of the driving-gear shaft.

9. In an instrument of the character described, the combination of the music and take-up rolls, a rewind shaft having a gear, a take-up shaft having different sized gears, a driving gear, a shipper member carrying main transmission gears arranged to alternately engage said rewind gear and one of the gears of said take-up shaft, said transmission gears being driven by said driving gear, an auxiliary selecting gear arranged to transmit motion from said driving gear to 20 the other gear of the take-up shaft, a movable supporting-member for said selecting gear, and locking means controlled by said shipper and supporting members and arranged to lock one of said members in neutral position when the other is shifted to operative position.

10. In an instrument of the character described, the combination of a plurality of trackers each having a controlling duct, roll-driving mechanism associated with each tracker, a set of playing and rewind pneumatics for controlling each of said roll-driving mechanisms, rewind valves controlling the respective rewind pneumatics, valve 35 mechanism for controlling each of said playing pneumatics, each of said playing valve mechanisms including means for retaining the playing valve in position to exhaust the associated playing pneumatic and a releasing valve for causing said playing valve to resume its normal position to flush said playing pneumatic, a controlling box containing flushing chambers and a channel connecting said chambers, valves 45 applied to said channel, conduits leading from said chambers to said releasing valves, respectively, and manual means controlling the admission of the atmosphere to said channel.

11. In an instrument of the character described, the combination of a plurality of trackers, roll-driving mechanism associated with each tracker, a shipper member for the driving mechanism of each tracker, shifting pneumatics for said members, a pneumatic action controlling said shifting pneumatics and each comprising a suction chamber, a valve-chamber connected with one of said pneumatics and communicating by ports 60 with said suction chamber and the atmosphere, a valve-controlling said ports and a diaphragm for actuating the valve, means for retaining said valve in its operative position including a suction-channel leading 65 from said diaphragm to said suction-cham-

ber, a valve controlling said channel, and a releasing valve controlled by one of said trackers and controlling the last-named valve.

12. In an instrument of the character described, the combination of a plurality of trackers, roll-driving mechanism associated with each tracker, playing pneumatics controlling said driving mechanisms, valve mechanisms controlling said pneumatics, a 75 pipe-stop having a slide, a pneumatic for shifting said slide, a plurality of pneumatic stop-actions controlling said slide-shifting pneumatic and respectively controlled by the trackers, and means controlled by the valve 80 mechanisms of said playing pneumatics for rendering each of said stop-actions operative or inoperative simultaneously with the corresponding playing pneumatic.

13. In an instrument of the character described, the combination of a plurality of trackers, roll-driving mechanism associated with each tracker, playing pneumatics controlling said driving mechanisms, valve mechanisms controlling said pneumatics, a 90 pipe-stop and its slide, a shifting pneumatic for said slide, a main stop wind chest containing a main valve for controlling said slide-pneumatic, auxiliary stop wind chests, respectively associated with the 95 trackers and each containing an auxiliary valve which controls said main valve, each of said auxiliary valves being controlled by one of the trackers, and separate cut-offs between said auxiliary valves and said main 100 valve, controlled by the valve-mechanisms of said playing pneumatics.

14. In an instrument of the character described, the combination of a plurality of trackers having controlling ducts, roll-driving 105 mechanism for each tracker, a playing pneumatic associated with each tracker for controlling the respective roll-driving mechanism, valve mechanisms controlling said playing pneumatics, a pipe-stop having a 110 slide, a shifting pneumatic for said slide, a main stop-wind chest containing a main valve controlling said slide-pneumatic, auxiliary stop wind-chests each containing an auxiliary valve which controls said main 115 valve, pneumatic cut-offs interposed between said auxiliary valves and said main valve and respectively controlled by the valve mechanisms of said playing pneumatics, conduits leading from said tracker-ducts to 120 said auxiliary valves, respectively, and pneumatic cut-offs interposed in said conduits and controlled by the valve mechanisms of the playing pneumatics.

15. In an instrument of the character described, the combination of a plurality of trackers, roll driving mechanism associated with each tracker, playing pneumatics controlling said driving mechanisms, valve mechanisms controlling said pneumatics, a 130

pipe-stop and its slide, a shifting pneumatic for said slide, a main stop wind-chest containing a main valve for controlling said slide-pneumatic, auxiliary stop wind chests, respectively associated with the trackers and each containing an auxiliary valve which controls said main valve, each of said auxiliary valves being controlled by one of the trackers, cut-off means between each of said auxiliary valves and said main valve, and a manually-controlled valve also controlling said main valve.

16. In an instrument of the character described, the combination of a plurality of trackers, roll driving mechanism associated with each tracker, playing pneumatics controlling said driving mechanisms, valve mechanisms controlling said pneumatics, a pipe-stop and its slide, a shifting pneumatic for said slide, a main stop wind-chest containing a main valve for controlling said slide-pneumatic, auxiliary stop wind chests, respectively associated with the trackers and each containing an auxiliary valve which controls said main valve, each of said auxiliary valves being controlled by one of the trackers, cut-off means between each of said auxiliary valves and said main valve, a manually-controlled valve also controlling said main valve, and means for automatically cutting-off said manual valve from said main valve when the latter is actuated automatically.

17. In an instrument of the character described, the combination of a plurality of trackers, roll-driving mechanism associated with each tracker, playing pneumatics controlling said driving mechanisms, valve mechanisms controlling said pneumatics, a pipe-stop having a slide, a pneumatic for shifting said slide, a plurality of pneumatic stop-actions controlling said slide-shifting pneumatic and respectively controlled by the trackers, means controlled by the valve mechanisms of said playing pneumatics for rendering each of said stop-actions operative or inoperative simultaneously with the corresponding playing pneumatic, a supplemental pneumatic valve also controlling said slide-shifting pneumatic, manual means for controlling the last-named valve including a conduit leading thereto, a cut-off chamber interposed in said conduit and containing a cut-off valve, a pneumatic action including a valve chamber connected with said cut-off chamber, a valve controlling the exhaustion and flushing of said chamber and a diaphragm controlling said valve, an atmospheric conduit leading to said diaphragm, a valve applied to the last-named conduit and shifting pneumatics for the last-mentioned valve controlled by the valve mechanisms of said playing pneumatics.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."