Oct. 20, 1931. O. W. HOLMGREN 1,827,814

AUTOMATIC MULTIRECORD EXPRESSION MECHANISM

Original Filed Jan. 24, 1924 4 Sheets-Sheet 1

Fig. 1.

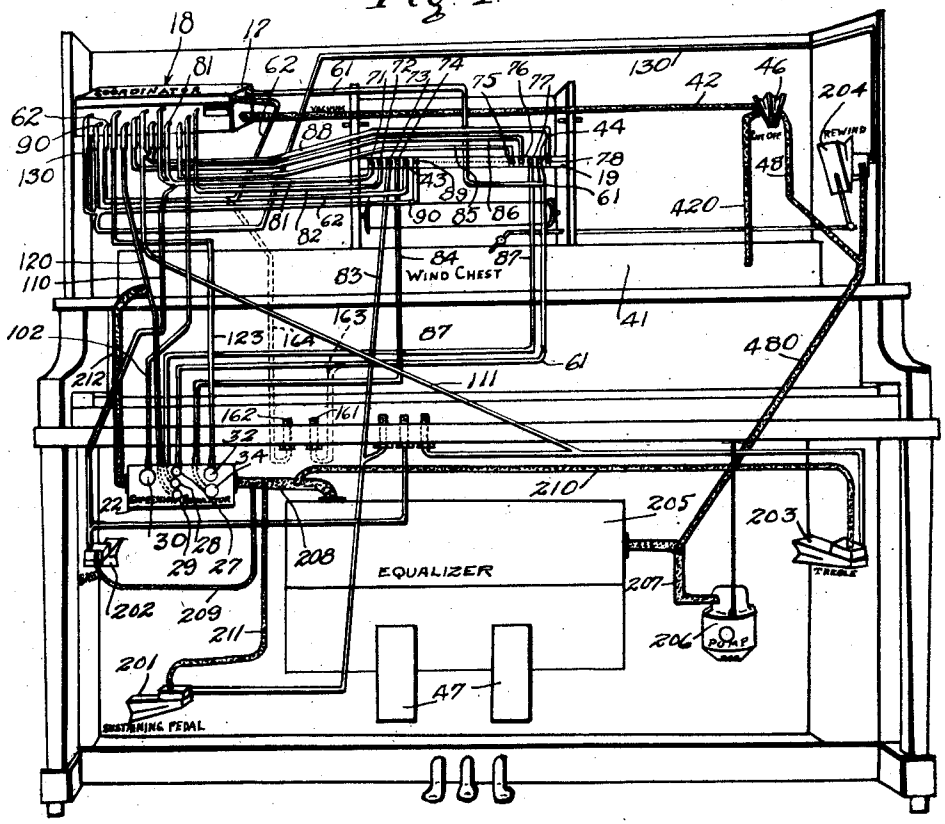


Fig. 11.

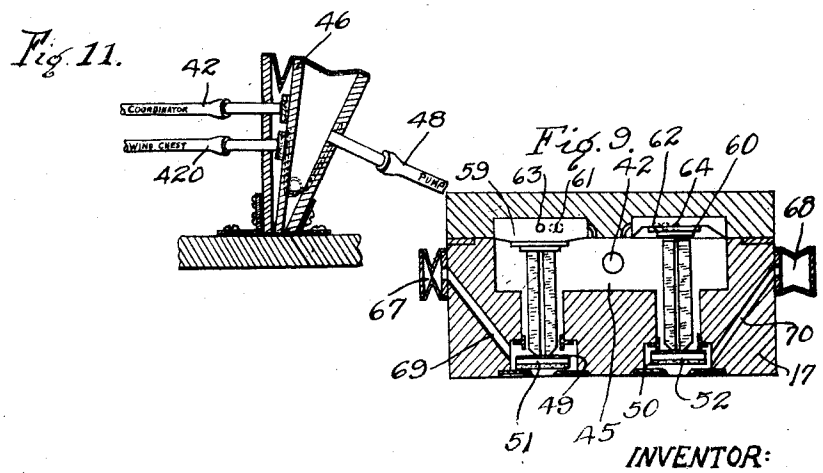


Fig. 9.

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AUTOMATIC MULTIRECORD EXPRESSION MECHANISM

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Fig. 2.

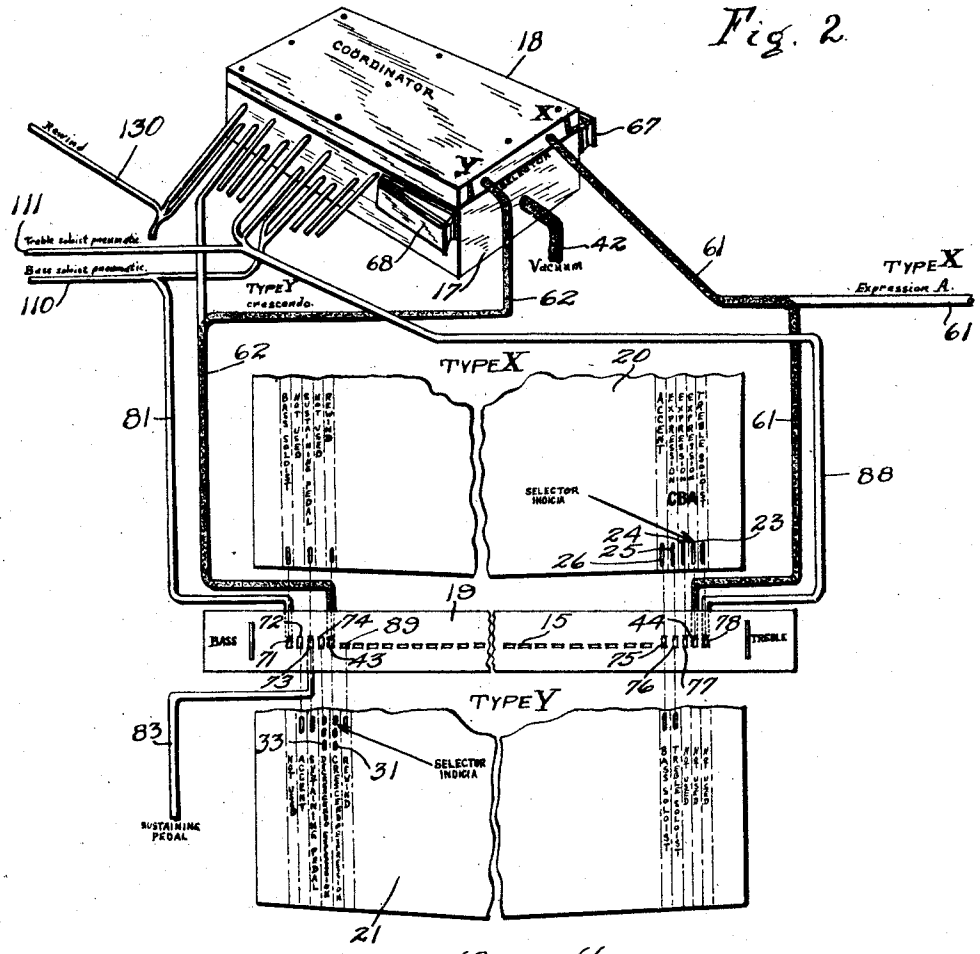


Fig. 3.

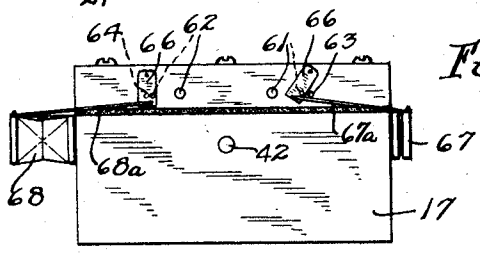
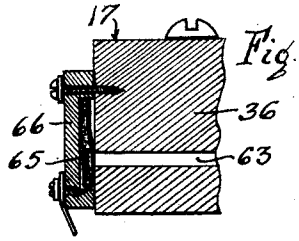


Fig. 4.



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AUTOMATIC MULTIRECORD EXPRESSION MECHANISM

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Fig. 5.

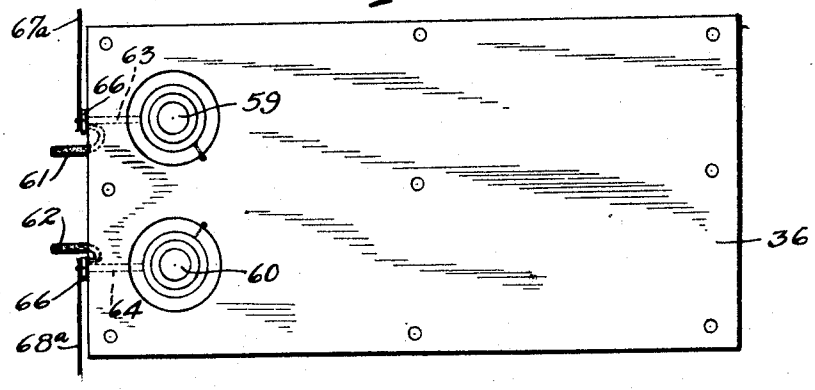


Fig. 6.

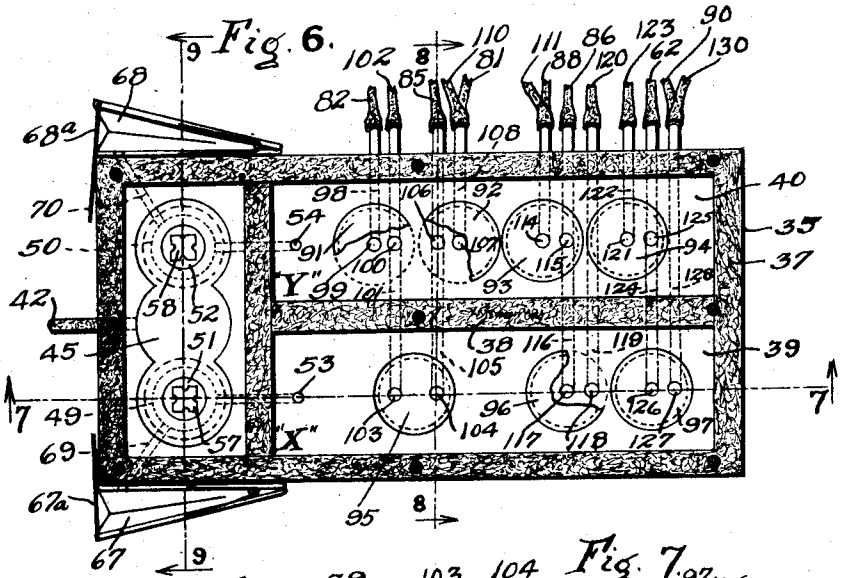


Fig. 7.

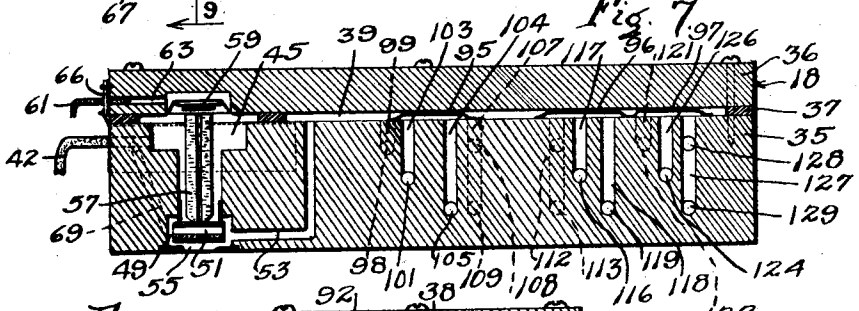
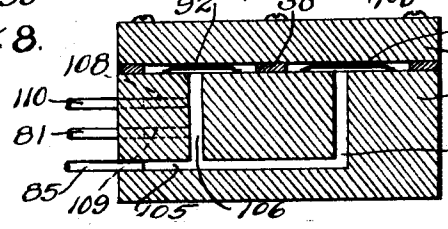


Fig. 8.



INVENTOR

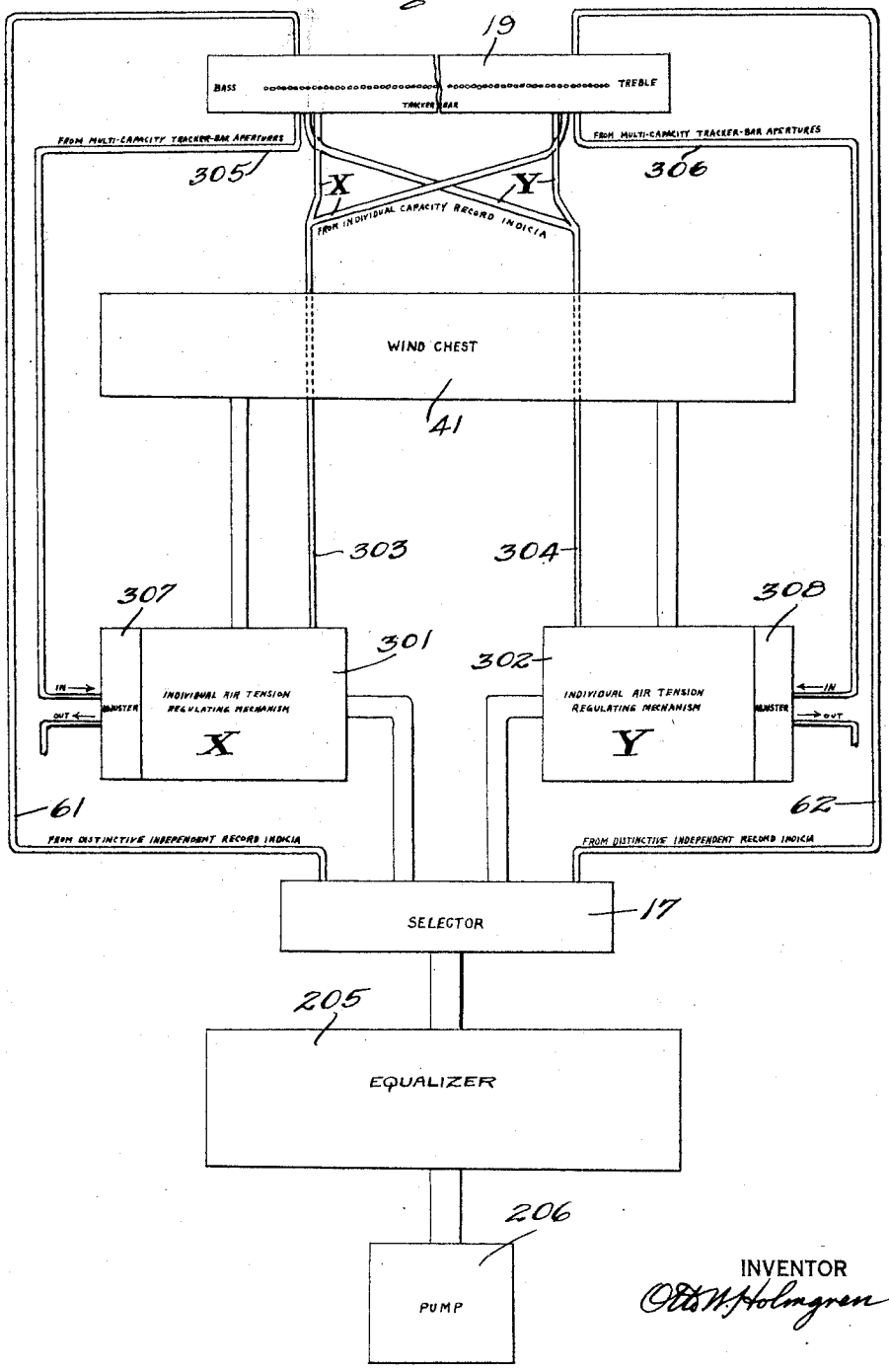
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AUTOMATIC MULTIRECORD EXPRESSION MECHANISM

Original Filed Jan. 24, 1924 4 Sheets-Sheet 4

Fig. 10



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Patented Oct. 20, 1931 1,827,814

UNITED STATES PATENT OFFICE

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AUTOMATIC MULTIRECORD EXPRESSION MECHANISM

Application filed January 24, 1924, Serial No. 688,177. Renewed March 6, 1931.

This invention relates to automatic musical instruments equipped with expression producing mechanism applicable to a plurality of music sheets or records having expression indicia or perforations of different arrangements, and more particularly to means controlled by a music sheet or record itself to cause the expression mechanism applicable to the music sheet or record to be set in operation.

Automatic musical instruments are commonly equipped with expression producing or reproducing mechanism of more or less elaborate character. Such mechanism has usually been applicable to a music sheet or record of a certain type, i. e., having the expression indicia or perforations arranged in a particular manner or sequence for production of different playing effects, so that records or note sheets of different makes or types could not be successfully played on the one instrument. The musical instrument may be equipped with expression mechanism capable of reproducing the expression prescribed by a plurality of note sheets or records of different makes or types, and this expression mechanism may consist of a unitary expression device or a plurality of separate expression producing units. In such cases it is necessary to provide suitable means for switching the proper parts of the expression unit or units into operative relation with the music sheet or record about to be played. Such switching has usually been accomplished by the manual setting of a lever or other equivalent device.

It is an object of the present invention to enable the proper expression device or piece of mechanism to be set in operation, or caused to be switched into operative relation with the music sheet or record to be played, by the music sheet or record itself. It is a further object to provide means controlled by distinctive indicia appearing on a record or music sheet itself for causing the expression mechanism or device applicable to such record or music sheet to be set in operation for production of the playing effects prescribed by such music sheet or record. A still further object is to provide an automatic musical instrument with a selector device pneumatically operated through the tracker bar, whereby the expression device or piece of mechanism applicable to the music sheet to be played is rendered operative and other expression devices or pieces of mechanism cut off during the playing of the music sheet.

Other objects will hereinafter appear, and to all these ends I have devised the constructions and arrangements described in this specification and illustrated in the accompanying drawings, forming part hereof, as illustrative practical embodiments of the present invention.

In the drawings,

Figure 1 is a front view of an automatic musical instrument illustrating one application of my invention.

Figure 2 is a diagrammatic view illustrating the selector as well as the manner in which the selector is caused to be operated from the tracker bar in accordance with any one of two particular types of note sheets.

Figure 3 is a front view of the selector.

Figure 4 is a sectional view of a preferred form of valve or cut-off forming part of the selector.

Figure 5 is a plan view of the under side of the selector and coordinator cover.

Figure 6 is a top plan view of the selector with the cover removed.

Figure 7 is a sectional view on the line 7—7 of Figure 6.

Figure 8 is a sectional view on the line 8—8 of Figure 6.

Figure 9 is a sectional view on the line 9—9 of Figure 6.

Figure 10 is a diagrammatic view illustrating the application of my invention to expression mechanism including a plurality of individual air tension regulating devices or pieces of mechanism.

Figure 11 is a detail sectional view of a suitable form of coordinator cut-off shown in Figure 1.

Referring to Figures 1 to 9 of the drawings, the tracker bar 19 is provided with a plurality of non-note-playing or expression apertures 71, 72, 73, 74 and 43 at the base end and 75, 76, 77, 44 and 78 at the treble

end, in addition to the apertures 15 which correspond with the usual playing notes. These expression apertures are adapted to register with perforations located at the respective sides of the note sheets and usually indicate the different degrees of expression or tonal intensity or effects to be produced in the rendering of the selection recorded on the note sheet, as well as indicating and effecting performance of certain specific functions by various parts of the player mechanism.

In a standard automatic musical instrument certain non-note-playing apertures of the tracker bar are usually caused to communicate more or less directly with certain specific parts of the player mechanism, such as the sustaining pedal pneumatic here indicated at 201, the bass soloist pneumatic indicated at 202, the treble soloist pneumatic 203 and the rewind pneumatic shown at 204. These pneumatics are usually connected to a vacuum supply, such as a bellows or reservoir here indicated at 205, connected to a suitable pump 206 by means of a power conduit 207. The pneumatics are adapted to be actuated when the proper aperture of the tracker bar is uncovered by a corresponding perforation appearing in the note sheet. In this instance the bass and treble soloist pneumatics 202 and 203 respectively, and the sustaining pedal pneumatic 201 are put in communication with the source of power supply, such as the equalizer 205 by a conduit 208, having branches 209, 210 and 211 leading to the respective pneumatics. This conduit 208 communicates with the expression regulator 22 and while the instrument is being played the expression regulator 22 is thus under air tension. The equalizer 205 in turn communicates with the main power duct or conduit 207 leading to the pump 206. The wind chest 41 is connected to the source of power supply through a conduit or tube 212 leading to a portion of the expression regulator 22 which is under tension supplied through the duct 208 during the operation of the instrument. The rewind pneumatic in this instance is connected directly to the main power duct 207 by a tube 480.

The tracker controlled selector device 17 is in this instance applied to a junction box or coordinator 18 arranged to effect proper juncture of the different expression apertures of the tracker bar 19 so that the expression perforations of either of two note sheets 20 and 21 may be caused to properly actuate that part of the expression regulator 22 applicable to the note sheet to be played. For illustration, I have shown the note sheet 20, indicated as type "X", having a plurality of perforations 23, 24, 25 and 26 to effect operation of a plurality of expression valves indicated diagrammatically at 27, 28, 29 and 30, respectively, in the expression regulator 22, for the purpose of producing different degrees of air tension; and the note sheet 21, designated type "Y", as of a type having one line of perforations 31 to actuate suitable valve mechanism shown diagrammatically at 32 for crescendo or "on" effects, and another line of perforations 33 to actuate suitable valve mechanism indicated diagrammatically at 34 for decrescendo or "off" effects. The expression regulator and its valve mechanism may be of any suitable character.

The coordinator 18 may be of any suitable construction, and in this instance is arranged to effect proper juncture of the different expression apertures of the tracker bar which are adapted to produce a similar result in accordance with differently located perforations of a plurality of note sheets so that the effect of the expression perforations of a particular note sheet will be communicated to the proper valves or equivalent devices of the expression regulator 22 to produce the proper degree of air tension indicated by the perforations of that note sheet and none other, or to other parts of the player mechanism. To this end the tubes leading from any apertures of the tracker bar which are employed for different purposes in different note sheets are directed to the coordinator 18 and there caused to be placed in communication with the expression valves or other devices which are to be actuated in accordance with the perforations of the particular note sheet used. Such juncture or coordination is only required in respect of tracker bar apertures which are employed for different purposes with different types of note sheets, for where an aperture of the tracker bar is utilized to effect the performance of the same function with all types of note sheets, or one function with one type of note sheet and none with note sheets of another type or types, such tracker bar aperture may be placed directly in communication with the particular part of the player mechanism which it is designed to affect.

In this instance the coordinator 18 includes a base or body 35 and a cover 36, with an air tight spacer 37 between the meeting portions of the outer sides and ends, and a central longitudinal spacer 38, whereby are formed a plurality of channels 39 and 40. Two longitudinal channels 39 and 40 are used in this instance because the invention is adapted for use with two different commercial types of music sheets, herein designated type "X" and type "Y", one channel being used for effecting coordination with each type of sheet respectively, but the coordinator may be arranged so that any number of longitudinal channels are provided to accommodate any desired number of different makes or types of note sheets. In this instance the portion of the coordinator 18 having the channel 39 may be termed the type "X" side, and the portion having the channel 40 the type "Y"

side. When in use the channel corresponding to the type of note sheet being played will be under air tension or suction, and the other channel will be open to atmosphere.

The tubes leading from the tracker bar expression apertures 71, 72, 73, 74, 43, 75, 76, 77, 44 and 78 are designated 81, 82, 83, 84, 62, 85, 86, 87, 61 and 88, respectively. The tube leading from the first playing note aperture 89 at the bass end of the tracker bar, used to operate the rewind in type "Y" playing, is designated 90. Certain of these tubes, viz., 81, 82, 85, 86 and 88 lead to the coordinator 18, and others, for the reasons already stated, to the parts of the player mechanism directly concerned. Tube 83 leads to the sustaining pedal pneumatic 201; tube 84 directly to the type "Y" decrescendo actuating mechanism 34; tube 87 to expression valve 28; and tube 61 to the expression valve 27. Tube 62 branches and leads to the coordinator and also to the selector 17 as will be hereinafter explained, because the tracker bar aperture 43 whence this tube initiates, is designed for operation of the crescendo mechanism for the type "Y" note sheet and also for the operation of the rewind with the type "X" note sheet. The tubes leading into the coordinator are combined or caused to communicate with the proper tube leading out of the coordinator to produce the proper result or effect. For this purpose the channels 39 and 40 contain a plurality of inverted pouches designated 91, 92, 93 and 94 on the type "Y" side, and 95, 96 and 97 on the type "X" side. The tubes entering the coordinator communicate with transverse and vertical ports and passages, and the pouches are adapted to cover the upper ends of adjacent vertical ports so that communication of adjacent vertical related ports with each other is effected through the pouch when the channel 40 or 39, as the case may be, is under air tension, at which time the pouches in such channel will be inflated or elevated. As the opposite channel will at such time be open to atmosphere through one of the ports 53 or 54 of the selector 17, the pouches in such channel will be depressed, closing the ends of the adjacent vertical ports in that channel and preventing communication one from the other, thus nullifying the effect of the channel. The two sides of the coordinator are thus adapted to operate each independently of the other. However, in some cases it is desirable to utilize some of the transverse and vertical ports in the inactive side while the opposite side is under air tension to effect through communication for certain of the tubes into and out of the coordinator, and this is accomplished without affecting the pouches in the inoperative channel. The functions performed by the coordinator will be apparent from a combined reading of Figures 1, 6, 7 and 8, but the arrangement of the tube courses in the coordinator will nevertheless be referred to in detail.

Tube 82, leading from the tracker bar aperture 72 communicates with a transverse passage 98 which joins the vertical port 99 leading to the pouch 91 at the "Y" side. The vertical port 99 is adapted to communicate, through the pouch 91, with a vertical port 100 leading to a transverse passage 101, this passage 101 communicating with a tube 102 leading from the coordinator directly to the expression valve 30. The passage 101 also communicates with a vertical port 103 leading to the pouch 95 at the "X" side, and this port 103 is adapted to communicate, through the pouch 95, with a vertical port 104 leading to a transverse passage 105, which passage 105, in turn, joins the tube 85 which initiates at the tracker bar opening 75, and also a port 106 leading to the pouch 92. The port 106 is adapted to communicate with a vertical port 107, and this port 107 in turn joins transverse passages 108 and 109 leading, respectively, to the tube 110 which communicates with the bass soloist pneumatic 202 and the tube 81 which initiates at the tracker bar aperture 71. Tube 111, which leads from the treble soloist pneumatic 203 and tube 88 leading from aperture 78 of the tracker bar communicate, respectively, with transverse passages 112 and 113, both of which lead to a vertical port 114 terminating beneath the pouch 93. The port 114 is adapted to communicate with a vertical port 115 leading to a transverse passage 116 and this passage 116 communicates at one end with the tube 86 which has its inception at the tracker bar opening 76 and at the other end with a vertical port 117 beneath the pouch 96. The port 117 is there adapted to communicate with a vertical port 118 leading to the transverse passage 119, and this passage 119 communicates directly with a tube 120 leading to the expression valve 29 of the expression device 22. A vertical port 121 beneath the pouch 94 at the "Y" side communicates with a transverse passage 122 leading to the tube 123 and this tube 123 runs directly to the crescendo actuating mechanism 32 of the Type "Y" expression valve operating mechanism forming part of the expression device 22.

Tube 62 leads from tracker bar aperture 43 to the selector valve operating pouch 60 and also into a transverse passage 124 in the coordinator and from this passage 124 vertical ports 125 and 126 lead to the pouches 94 and 97 respectively. At the pouch 94 the port 125 is afforded access to the port 121 and from thence to the passage 122 and tube 123, while at the pouch 97 the port 126 is adapted to communicate with a vertical port 127 which effects a juncture of two transverse passages 128 and 129 respectively with the tube 90 leading from the first playing

note 89 at the bass end of the tracker bar, and tube 130 leading directly to the rewind 204.

To operate the coordinator 18 in accordance with the note sheet played, suction is in this instance adapted to be drawn from the wind chest 41 through a tube 42 and connecting tube 420, and is caused to be communicated to one or the other of the channels 39 or 40 by operation of the selector device 17 in accordance with the particular type of note sheet about to be played. This is accomplished in this instance by means of suitable valve mechanism arranged to control communication of suction between the wind chest or exhaust source and the side of the coordinator to be rendered operative. This valve mechanism is caused to be operated from suitable apertures of the tracker bar uncovered by distinctive perforations in the note sheet corresponding to the proper side of the coordinator to be rendered operative. In this instance one expression aperture of the tracker bar is used for each type of note sheet. Each of these apertures is arranged to be uncovered by a distinctive perforation of a note sheet passing over the tracker bar. The note sheets may be provided with special apertures for this purpose but in this instance the arrangement provides for the use of a note sheet aperture for each note sheet which is distinctive in the case of that note sheet at the early part or commencement of the playing, thus adapting the device for use with commercial types of note sheets without the necessity of providing special perforations.

In this instance, in the case of the type "Y" note sheet, the fifth expression aperture from the bass end of the tracker bar, designated 43, is utilized; and in the case of the type "X" note sheet, the second aperture from the treble end of the tracker bar, designated 44, is used. In using the type "X" note sheet, the aperture 44 has no significance in this instance so far as the type "Y" note sheet is concerned; and in the case of the type "Y" note sheet the aperture 43 is the same aperture which is in some instances designed to effect operation of the rewind mechanism with type "X" note sheets or else may have no significance. In any case where this aperture 43 is used to control the rewind mechanism for type "X" note sheets the aperture in question is initially distinctive in character as applied to the type "Y" note sheet because it would not be uncovered at the commencement or during the early part of the playing of the type "X" note sheet. The aperture used for each type of note sheet is thus initially distinctive in character and is designed to operate the selector as soon as expression or increased air tension is prescribed for the note sheet. After having rendered the proper channel 39 or 40 of the coordinator operative the aperture which was initially distinctive will continue to perform its usual prescribed function during continued playing of the note sheet until the selection has been finished. Any other tracker bar apertures which might be uncovered in advance of the apertures 44 or 43 will have no effect because the coordinator will be ineffective due to absence of vacuum in the coordinator channels and normal playing would result until one of the apertures 44 or 43 is uncovered by the note sheet being played.

As shown in this instance, the selector 17 is constructed integrally with the coordinator, though it may be separate therefrom, and includes a main pressure chamber 45 having communication with the suction or exhaust supply through the conduit 42. This conduit 42 may be arranged to communicate with the wind chest conduit 420 as seen in Fig. 1, passage from one to the other of these conduits being controlled by a suitable cut-off device 46, seen at Fig. 11, whereby the selector may be rendered inoperative when using the foot pumps 47. The cut-off device 46 may be operated by suction from the pump 206 through the conduit 48 which in this instance communicates with the conduit 480.

Two opposite valve chambers 49 and 50, having valves 51 and 52 respectively, are adapted to control communication of suction from the chamber 45 to the respective sides 39 and 40 of the coordinator through the ports 53 and 54, respectively. These valves 51 and 52 are arranged so that when not in operation during the playing they may remain seated in their respective chambers 49 and 50 by reason of the suction in the main pressure chamber 45, so that suction is thus normally cut off from the coordinator channels 39 and 40 and these channels 39 and 40 are open to atmosphere through the openings 55 and 56 at the outer ends of the valve chambers 49 and 50. To operate the valves 51 and 52 they are provided with elongated stems 57 and 58. Suitable pouches 59 and 60 are in this instance provided in the cover 36 of the coordinator 18, which cover in this instance also encloses the main pressure chamber 45 of the selector 17. Each of these pouches 59 and 60 is arranged to engage its corresponding valve stem and means are provided to maintain the pouch in inflated condition so that the valve may be held open to afford communication between the main suction chamber 45 and the proper coordinator channel during the playing. To this end inflation of the respective pouches 59 or 60 is arranged to be controlled from the respective distinctive tracker bar apertures 44 and 43 when uncovered by the corresponding selector indicia or note sheet perforations 23 and 31 above referred to, the pouches 59 and 60 for this purpose having communication with the tracker bar apertures 44 and 43 by means of tubes 61 and 62, respectively.

These tubes 61 and 62 normally communicate with ports 63 and 64 leading from the pouches 59 and 60, the tubes 61 and 62 being return bent so that the tubes 61 and 62 and ports 63 and 64 have their mouths at the front face of the selector, communication normally being arranged to be established between the mouths of tube 61 and port 63, and tube 62 and port 64, by means of a channel 65 provided in a cut-off valve 66, one cut-off valve being provided for each pair of communicating mouths.

It is obvious that when the proper note sheet perforation uncovers the corresponding tracker bar aperture designed to operate the selector in accordance with the note sheet used only a single impulse of atmospheric air will be communicated to the pouch affected for each perforation. It is therefore necessary to enable this atmospheric impulse to be converted into a constantly acting pressure on the pouch so that the selector valve will be constantly held in operative position during the playing of the music sheet. For this purpose I provide in this instance two pneumatics 67 and 68, one for each pouch 59 and 60, respectively, arranged to be collapsed when the corresponding valve is first operated by suction communicated from the valve chamber 49 or 50 as the case may be through ports 69 and 70. The pneumatics are connected to the cut off valves 66 by wires 67*a* and 68*a*. When collapsed each of the pneumatics operates its corresponding cut-off valve 66 to open the corresponding pouch 59 or 60 to atmosphere through the ports 63 or 64 leading to the front face of the selector 17 and closes off the end of the tube 61 or 62 leading from the tracker bar aperture 44 or 43. The valve 51 or 52 as the case may be, is thus maintained in operative position by the constantly acting atmospheric pressure within its operating pouch and the corresponding pneumatic is held in deflated condition by the suction from the valve chamber 49 or 50, the cut-off valve 66 thus being held in position to maintain the operative relationship during the playing of the note sheet.

Keyboard buttons 161 and 162 may be provided for manually setting the selector in accordance with the type of music sheet being played and may also be useful for perfecting the adjustment during the playing. These buttons 161 and 162 are arranged to admit atmospheric air to branch tubes 163 and 164 respectively, communicating with the type "X" selector actuating tube 61 and type "Y" selector actuating tube 62.

It is obvious that when playing non-expression note sheets the tracker bar expression apertures will normally remain covered so that the coordinator 18 and selector 17 will not be operated.

In operation of the selector for instance with a type "X" note sheet, the valve 51 is normally held closed by vacuum in the vacuum chamber 45 of the selector 17 so that the channel 39 of the coordinator is open to atmosphere and the pouches in the channel 39 thereby held closed. When the proper tracker bar aperture 34 is uncovered by the proper note sheet perforation 23 an impulse of atmospheric air will be caused to inflate the pouch 59 and at the same time collapse the pneumatic 67, and the pneumatic 67 in turn will be caused to move its cut-off valve 66 to a position to uncover the port 63. This will place the pouch 59 under constant atmospheric pressure, at the same time closing the port 61 through which the intermittent atmospheric impulse was transmitted from the tracker bar. Inflation of the pouch 59 will cause the pouch to move the valve 51 to a position closing the opening 55 against admission of atmospheric air to the port 53, and this inflated condition will be maintained due to the constantly acting atmospheric pressure within the pouch 59. With the valve 51 in this closed position, suction acting through the conduit 42, chamber 45, past the valve stem 57 and through the coordinator channel or port 53 will raise the pouches 95, 96 and 97 and thus render the channel 39 of the coordinator operative in accordance with the roll being played until the playing of the roll has been completed.

Referring to Figure 10, a plurality of expression devices 301 and 302 are provided, one applicable to each particular type of expression note sheet desired to be played on the instrument. These expression devices 301 and 302 may be independent in character and substantially like the expression devices usually provided for the different types of note sheets. Each of these expression devices includes means for effecting regulation of the air tension, said means being operated in the usual manner from the expression apertures of the tracker bar, communication of the intermittent atmospheric impulses being transmitted direct to the valve operating means by the tubes 303 and 304 respectively in the case of apertures which have a particular significance in one type of note sheet and no significance in other note sheets, and indirectly by the tubes 305 and 306 in the case of tracker bar apertures which have a dual or multi-capacity significance by reason of being employed for different purposes in different note sheets. The indirect connection of the tubes 305 and 306 is effected through adjusting means 307 and 308 respectively forming part of each expression device 301 and 302, which adjusting means is rendered operative when selection of the expression device 301 and 302 has been effected according to the note sheet being used. The adjusting means are thus associated with the expression mechanisms or devices applicable to the particular types of note sheets and perform the same

function as the coordinator 18 hereinabove referred to in detail. The expression devices 301 and 302 in this instance function as independent units and the selector 17 is interposed between the power plant 206 or equalizer 205 and the expression devices. The selector operates in all essential particulars as referred to hereinabove except that instead of controlling the adjustment of a coordinator, the selector in this instance controls the suction from the wind chest to and through either one of the expression devices as prescribed by the note sheet used.

The particular adaptations shown are not the only applications which are possible in accordance with my invention, because the expression devices 301 and 302 indicated in Figure 10 may be replaced with reproducing mechanism, of any commercial type, so that the invention comprehends a single automatic musical instrument equipped as well with a plurality of reproducing devices, either of which will be rendered operative in accordance with the particular reproducing record used, thus placing at the disposal of the user of an instrument the record libraries of a plurality of reproducing action manufacturers and enabling the user to play on one instrument the selections recorded by the artists for the different reproducing devices or mechanisms, the possibilities of which are readily apparent.

Having described my invention, I declare that what I claim is:

1. A record controlled musical instrument including expression producing means for use with a plurality of records having expression controlling media of different arrangement, and record controlled means associated with said expression producing means whereby to render said expression producing means operative in accordance with the expression controlling media of the record used with the instrument.

2. A perforated-sheet controlled automatic musical instrument having a tracker bar and including expression producing means for use with a plurality of sheets having different arrangements of expression controlling perforations, and sheet controlled means associated with said expression producing means and with said tracker bar whereby to render said expression producing means operative in accordance with expression controlling perforations of the sheet in use with the instrument.

3. In an automatic musical instrument, a tracker having expression controlling apertures, means to enable said expression controlling apertures to operate interchangeably with note sheets having different arrangements of expression controlling perforations, means pneumatically controlled by a note sheet passing over said tracker to initially operate said first named means for said passing note sheet, during commencement of said passage and means to maintain said first named means in operative position for said passing note sheet during the remainder of the latter's passage.

4. In an automatic musical instrument, a tracker bar, a selector having ducts communicating with said tracker bar, and expression mechanism applicable to note sheets having differently arranged expression controlling perforations, said selector being controlled by the note sheet played and arranged to pneumatically operate expression mechanism applicable to said note sheet being played by an initial exposure of one of said ducts at said tracker bar, and means to maintain said expression mechanism in operation for said note sheet being played independently of subsequent exposure of said duct.

5. In an automatic musical instrument, expression mechanism for a plurality of note sheets having expression controlling perforations of different arrangements, a tracker bar, pneumatic means operated by a particular note sheet passing over said tracker bar to select expression mechanism applicable to said particular note sheet, and means to maintain the selected expression mechanism in operation during subsequent passage of said note sheet.

6. The combination in a sheet controlled automatic musical instrument, of a tracker having expression controlling and note playing apertures, expression producing mechanism, means to operate said expression producing mechanism in accordance with the expression controlling perforations of any one of a plurality of note sheets differing in the arrangement of the expression controlling perforations, pneumatic means controlled through an aperture of said tracker bar exposed by a note sheet passing thereover to initially render said operating means effective in accordance with said passing note sheet and means to maintain the effective condition of said operating means during subsequent passage of said note sheet.

7. In an automatic musical instrument having expression mechanism to operate in accordance with expression indicia of any one of a plurality of different expression records, means to coordinate said indicia for the respective records and means mechanically set by the particular record used whereby expression mechanism operates for the used record only.

8. The combination in a sheet controlled automatic musical instrument having a tracker bar and expression mechanism, for expression records of a plurality of types, of pneumatic means operated by the passing note sheet passing said tracker bar whereby said expression mechanism operates in accordance with the expression perforations of

said note sheet, said expression mechanism including an expression regulator for expression note sheets of a type, different from said passing note sheet, said regulator being rendered inactive by operation of said pneumatic means.

9. The combination in a sheet controlled automatic musical instrument having a tracker bar and expression mechanism to operate in accordance with the expression perforations of any one of a plurality of note sheets which differ in the arrangement of the expression perforations, of ducts to coordinate the expression apertures of the tracker bar which serve different purposes with different types of note sheets, and pneumatic means set by the note sheet passing said tracker bar to render said coordinating ducts operative.

10. The combination in an automatic musical instrument having a tracker bar, of expression producing means including an expression regulator for expression note sheets of one type and a differently acting expression regulator for expression note sheets of another type, and a selector pneumatically operated by the note sheet used with said tracker bar said selector being arranged to render the expression regulator applicable to said used note sheet operative and said differently acting expression regulator inoperative.

11. In a note sheet controlled automatic musical instrument having a tracker bar, expression producing means adaptable for use with note sheets having different arrangements of expression controlling perforations, and a selector having ducts in communication with apertures of said tracker bar, said selector controlled by apertures in said different note sheets and adapted to be operated by the particular note sheet used, whereby to render said expression mechanism operative in accordance with said particular different note sheet.

12. The combination in a note sheet controlled automatic musical instrument having a tracker bar and expression producing means applicable to note sheets having different arrangements of expression controlling perforations, and pneumatic means whereby the initial exposure of a control duct of the tracker bar by the note sheet passing thereover renders effective expression producing mechanism applicable to said passing note sheet for the balance of its playing.

13. The combination in a note sheet controlled automatic musical instrument having a tracker bar and expression producing means applicable to note sheets having different arrangements of expression controlling perforations, said tracker bar having a plurality of control apertures respectively applicable to the controlling perforations of different types of note sheets, and means whereby an initial exposure of the tracker bar control aperture applicable to the note sheet being played effects setting of the expression mechanism with reference to said note sheet being played for the balance of its playing.

14. The combination in a note sheet controlled automatic musical instrument having a tracker bar and expression producing means applicable to note sheets having different arrangements of expression controlling perforations, said tracker bar having a plurality of control apertures respectively applicable to the controlling perforations of different types of note sheets and means whereby initial exposure of the tracker bar control aperture applicable to the note sheet being played effects setting of the expression mechanism to operate in accordance with said note sheet being played, said initial setting rendering said control duct operative to perform another function during subsequent uncovering thereof during the playing of said note sheet.

15. The combination in an automatic musical instrument having a tracker bar and expression mechanism applicable to a plurality of types of expression note sheets which differ respectively in the arrangement of the expression controlling perforations, of a selector device which renders said expression mechanism operative in accordance with the particular type of note sheet played on the instrument, said selector having a plurality of ducts applicable to the respective types of note sheets, and said tracker bar having selector control apertures applicable to said respective different type note sheets, said ducts communicating with said selector control apertures, each of said types of note sheets having a perforation initially distinctive as to its type to correspond with the tracker bar selector control aperture applicable thereto, whereby exposure of said tracker bar selector control aperture operates said selector and said selector renders the expression mechanism operative in accordance with the note sheet being played.

16. The combination in an automatic musical instrument as set forth in claim 13 in which means are associated with the selector to coordinate expression controlling apertures of the tracker bar applicable to the respective types of note sheets, said coordinating means being arranged to communicate with the tracker bar selector controlling apertures through said ducts, for operation by an initial exposure of one of said selector controlling apertures.

17. In a perforated sheet controlled automatic instrument, effect-producing means adaptable for use with perforated sheets having different arrangements of effect-

producing perforations, and a selector controlled by perforations in said different sheets, said selector adapted to be operated by the particular perforated sheet used and arranged to render said effect-producing means operative in accordance with said particular perforated sheet.

In testimony whereof, I have signed this specification.

OTTO W. HOLMGREN.