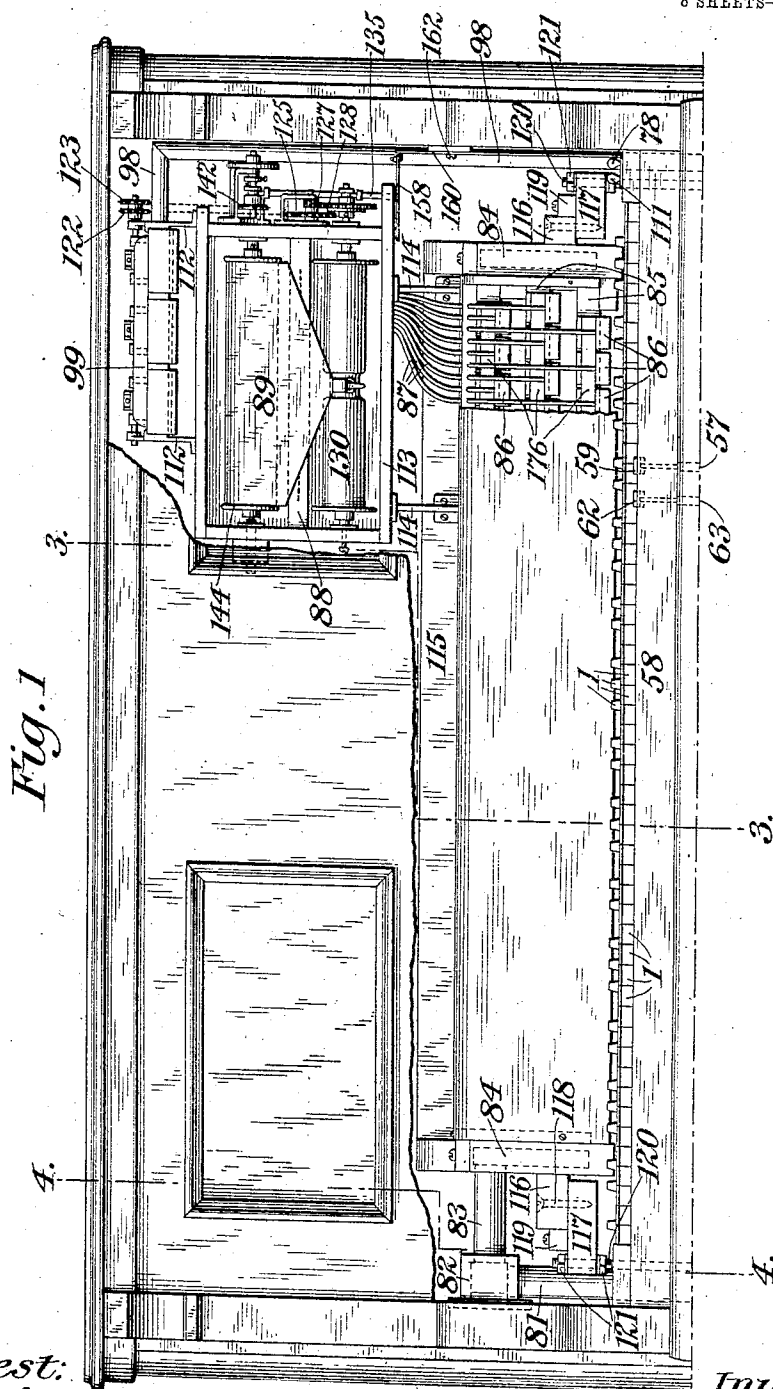


C. A. KUSTER.

MECHANICAL MUSICAL INSTRUMENT.

APPLICATION FILED JAN. 16, 1905.

8 SHEETS—SHEET 1.



Attest:

A. N. Jesbera.
M. A. Brayley.

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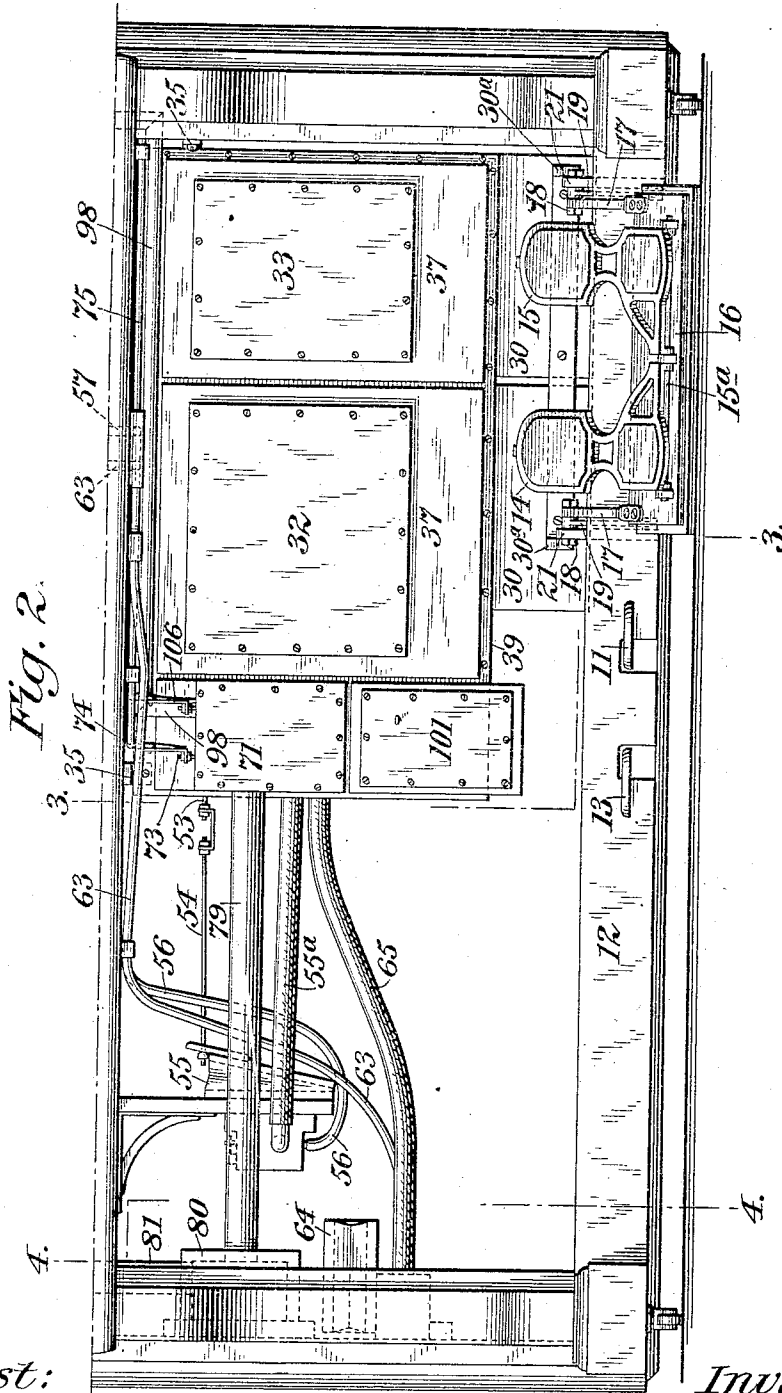
No. 817,856.

PATENTED APR. 17, 1906.

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8 SHEETS—SHEET 2.



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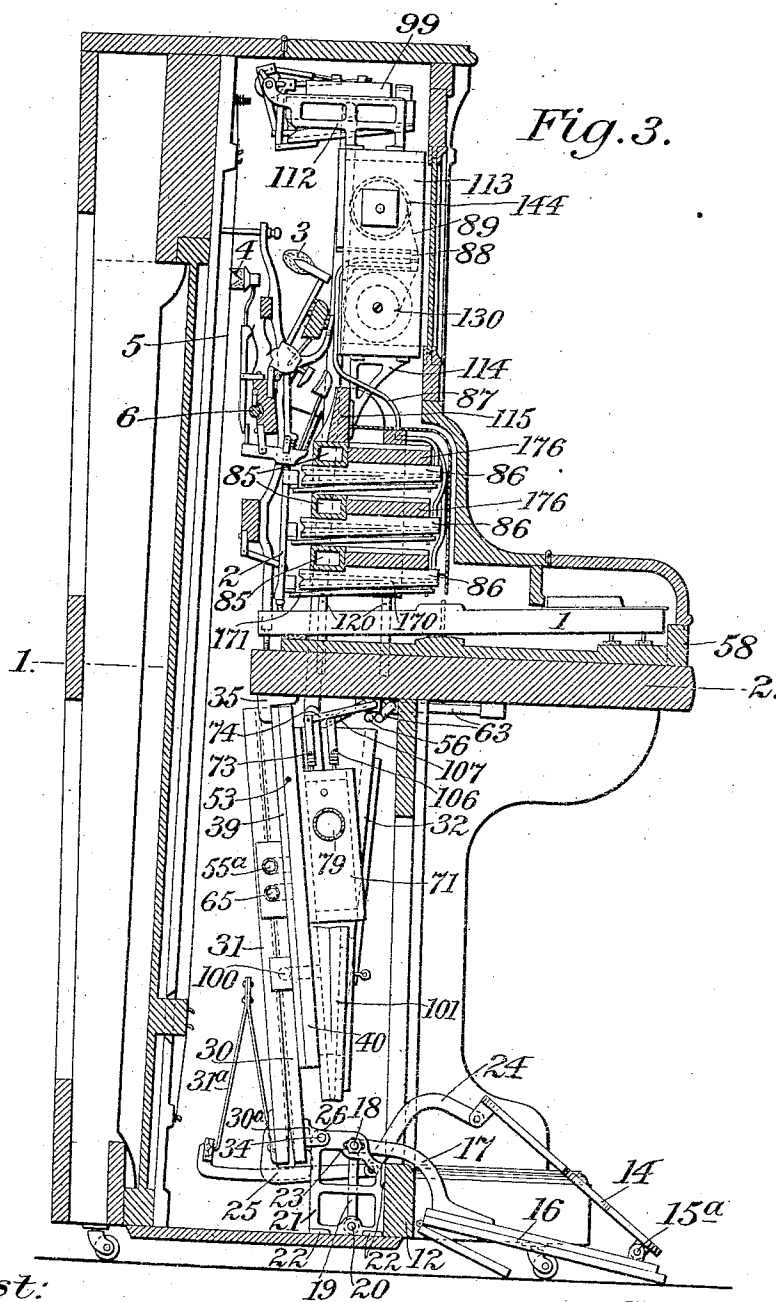
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8 SHEETS--SHEET 3.



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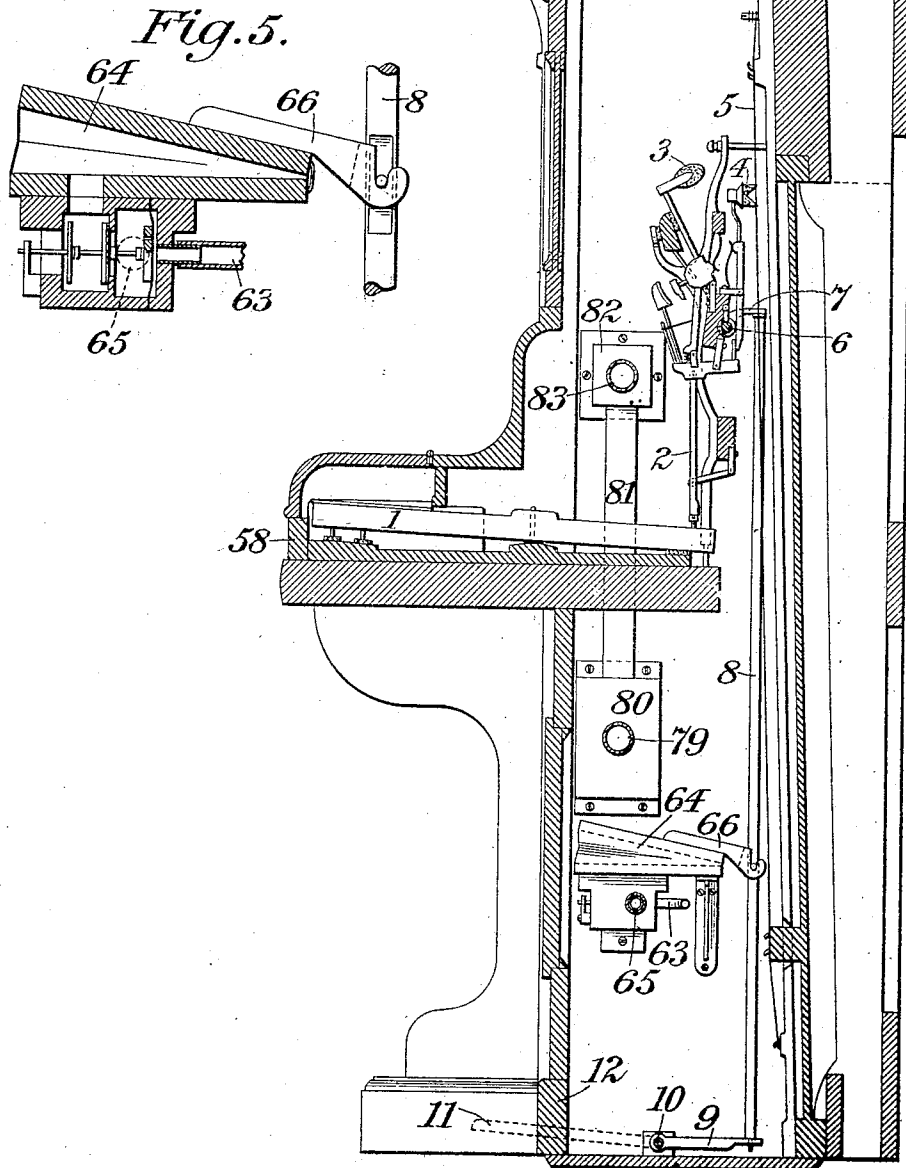
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Fig. 4.



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8 SHEETS—SHEET 5.

Fig. 6.

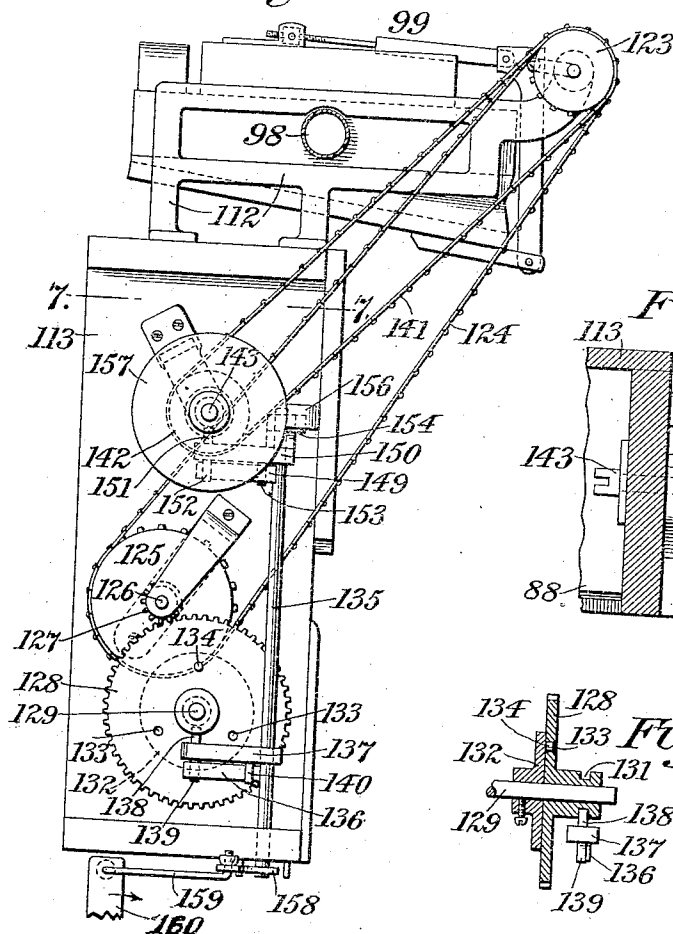


Fig. 8.

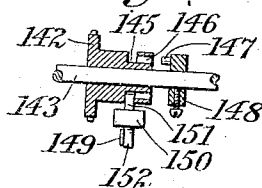


Fig. 7.

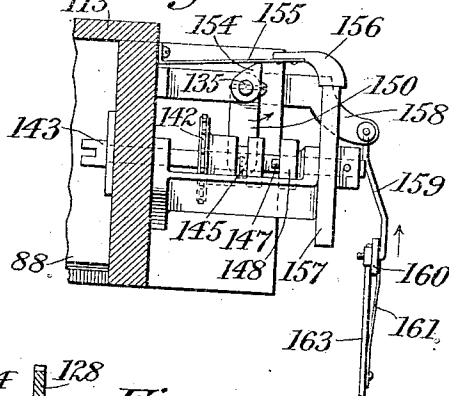


Fig. 9.

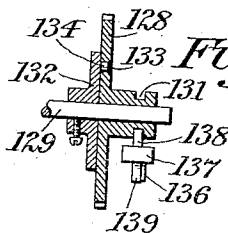
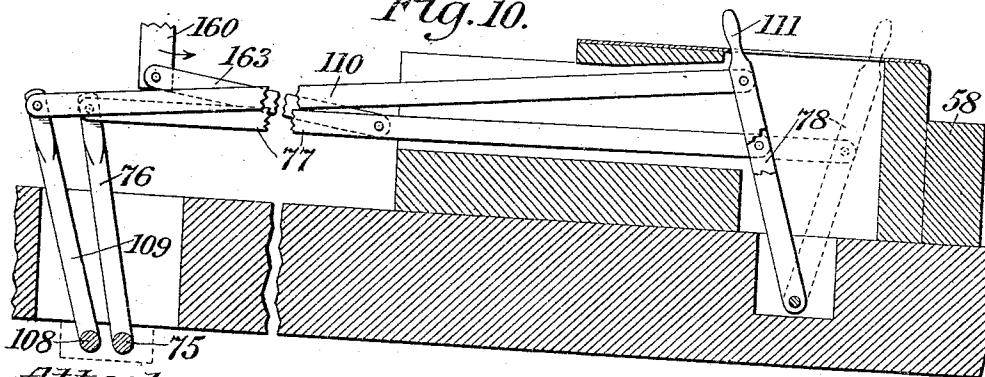


Fig. 10.



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Fig. 11.

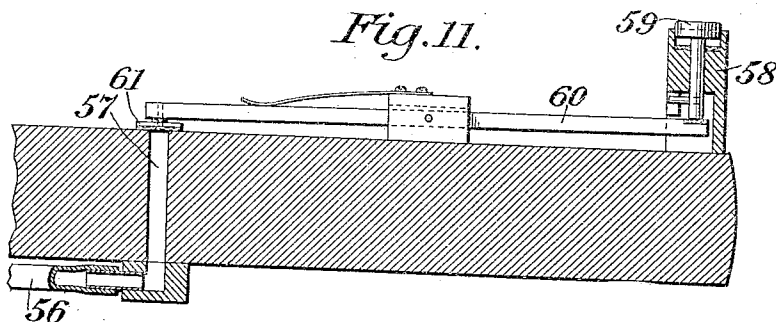
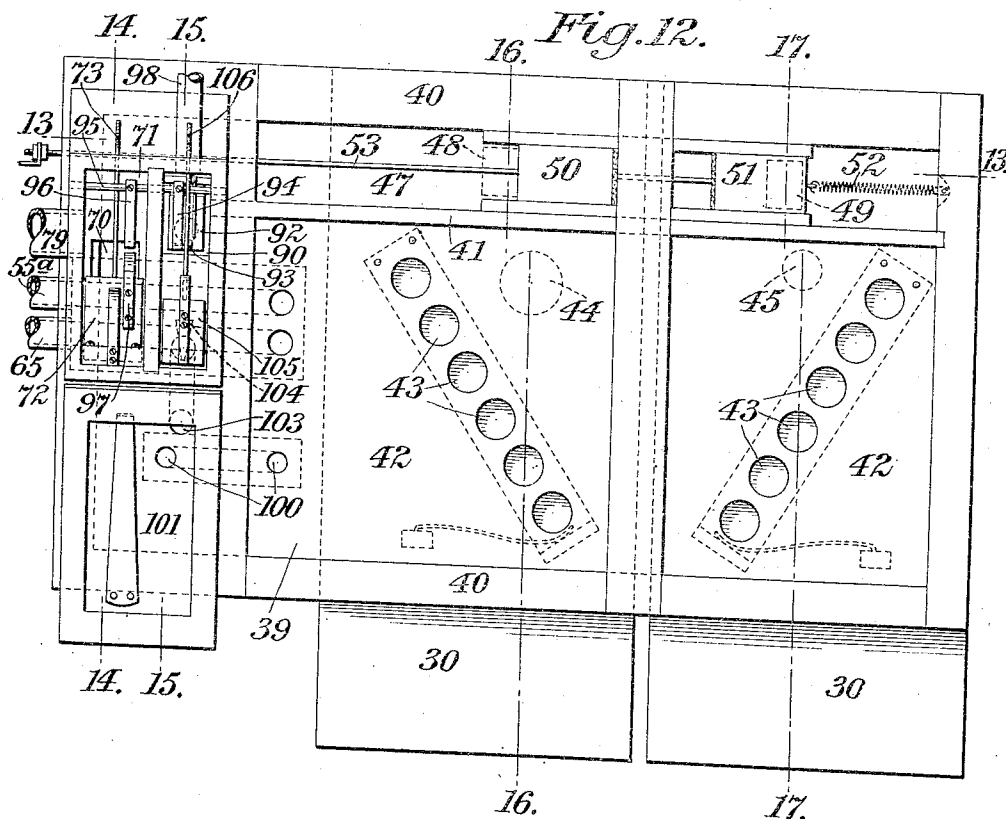


Fig. 12.



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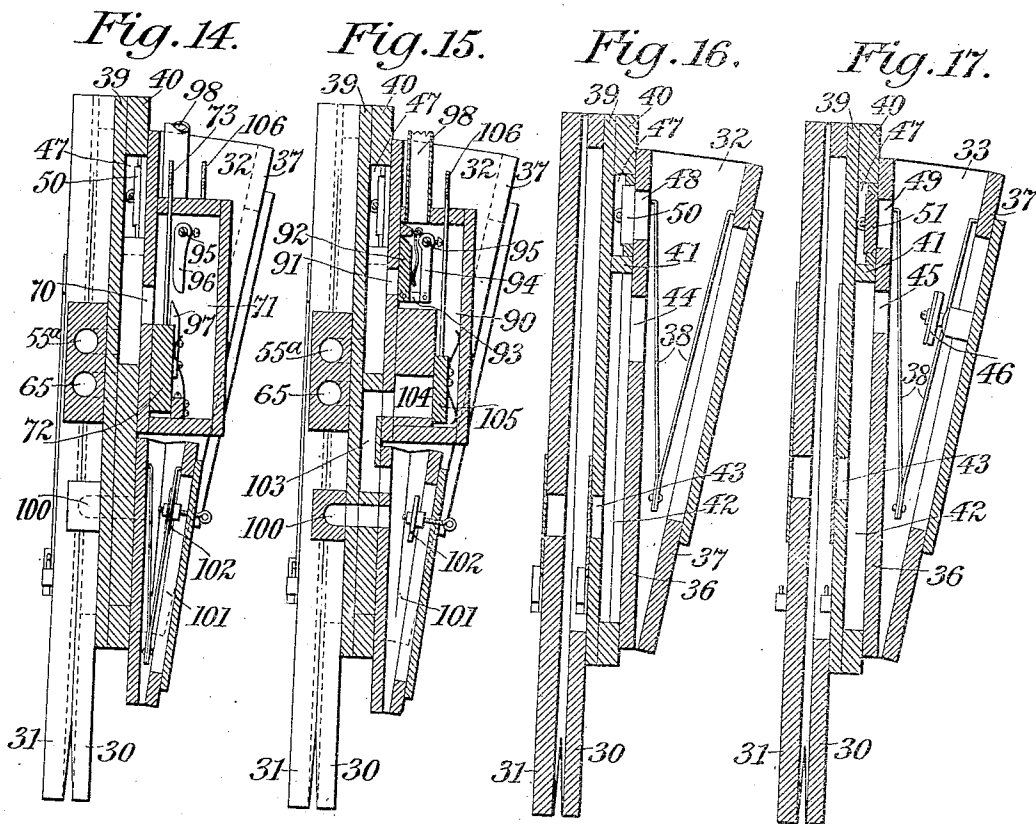
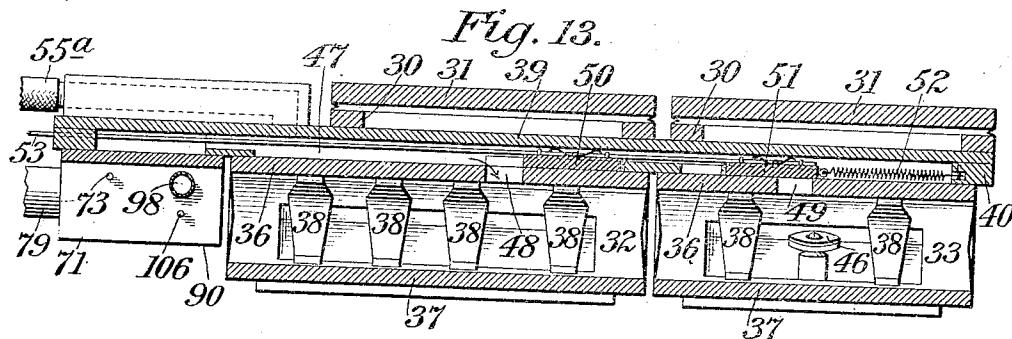
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8 SHEETS—SHEET 7.



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APPLICATION FILED JAN. 16, 1905.

8 SHEETS—SHEET 8.

Fig. 18.
20.

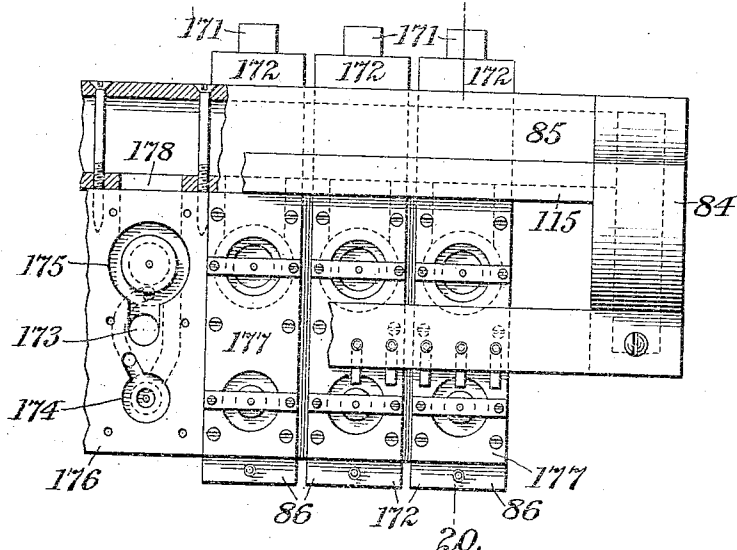


Fig. 19.

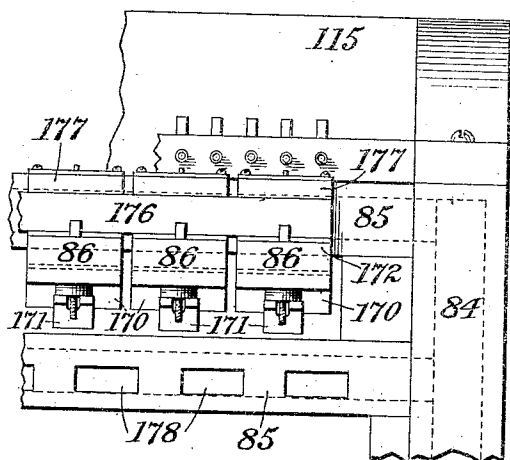
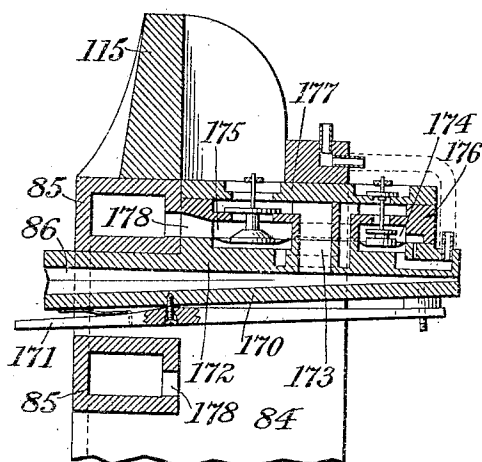


Fig. 20.



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UNITED STATES PATENT OFFICE.

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JOHN A. WESER, OF NEW YORK, N. Y.

MECHANICAL MUSICAL INSTRUMENT.

No. 817,856.

Specification of Letters Patent.

Patented April 17, 1906.

Application filed January 16, 1905. Serial No. 241,188.

To all whom it may concern:

Be it known that I, CHARLES A. KUSTER, a citizen of the United States, residing in Rutherford, in the county of Bergen, in the State of New Jersey, have invented certain new and useful Improvements in Mechanical Musical Instruments, of which the following is a specification, reference being had to the accompanying drawings, forming a part hereof.

This invention relates to musical instruments, such as pianos or organs, in which provision is made for the automatic playing of the instrument by suitable mechanism controlled by the movements of a specially prepared music-sheet.

The improvements in which the invention is embodied as described hereinafter are designed with especial reference to their application to a piano in which the automatic or mechanical playing devices are operated through the medium of air-currents and are inclosed within the casing of the piano, so that the instrument is in appearance like any ordinary piano and is capable of being played upon by hand in the same manner as an ordinary piano. It will nevertheless be observed that the several features of improvement or many of them are capable of embodiment in a mechanical piano player independent of the piano to be played upon, as well as in organs and in pianos of other types than that shown.

The object of the invention is generally to improve the construction, arrangement, and operation of piano-playing mechanism, and especially to improve the action of such mechanisms; to render all parts of the mechanism, as well as the mechanism of the piano itself, readily accessible for inspection and repair; to simplify the mechanism as far as possible; to improve the action of the air-exhausting devices and of the individual pneumatics which are directly involved in the playing of the instrument with especial reference to loud and soft playing and to variations in tempo; to provide for the location of the individual pneumatics above the keyboard and in close proximity to the piano-action; to prevent interference by the mechanical playing mechanism with the use of the piano by hand; to avoid any change in the ordinary appearance of the piano, and to effect improvements in other features which

will be more particularly referred to herein-after.

In the accompanying drawings, in which for purposes of explanation of the nature of the invention it is illustrated as embodied in a piano of the upright type, Figure 1 is a view in front elevation of the upper portion of a piano embodying the invention above the line 1 2 of Fig. 3, with the front casing partly broken away to show parts behind the same. Figure 2 is a view in front elevation of the lower portion of the piano below the line 1 2 of Fig. 3, with the front casing removed. Figure 3 is a transverse vertical section on the irregular plane indicated by the line 3 3 of Figs. 1 and 2 looking toward the right. Figure 4 is a transverse vertical section on the plane indicated by the line 4 4 of Figs. 1 and 2 looking toward the left. Figure 5 is a detail view, partly in vertical section and on an enlarged scale, of the pneumatic which operates the damper-rod. Figure 6 is a view in end elevation and on an enlarged scale of the mechanism for winding and rewinding the music-sheet and parts associated therewith. Figure 7 is a detail view, in horizontal section, on the plane indicated by the line 7 7 of Fig. 6, showing particularly the rewinding-clutch and the brake. Figs. 8 and 9 are detail views in vertical central section of the rewinding and winding clutches, respectively. Figure 10 is a detail view, partly in section, on the same scale as Fig. 6, showing the means for controlling the winding and rewinding clutches, the direction of view being opposite to that of Fig. 6. Figure 11 is a detail view showing particularly one of the buttons and its connections for controlling the loudness of the tone of the instrument. Figure 12 is a view in elevation showing the supporting-boards of the bellows-pumps and the valve-chests supported therewith, the covers of such valve-chests being removed, together with the equalizing-bellows. Figure 13 is a horizontal section on the plane indicated by the line 13 13 of Fig. 12. Figs. 14, 15, 16, and 17 are vertical sections on the planes indicated by the lines 14 14, 15 15, 16 16, and 17 17, respectively, of Fig. 12. Figure 18 is a detail plan view of a group of pneumatics, showing the common wind-trunk. Figure 19 is a detail view in elevation of the devices shown in Fig. 18. Figure 20 is a view in longitudinal vertical section through one of

the pneumatics and the wind-trunk on the plane indicated by the line 20.20 of Fig. 18.

The invention is represented in the drawings as applied to an upright piano of ordinary construction, and so far as the present invention is concerned the manual playing mechanism, including the piano-action, may be of any usual or suitable character.

As shown in Figs. 3 and 4, each finger-key 1 is pivoted, as usual, at a point between its ends and acts through an abstract 2 and the usual devices, not necessary to be described in detail herein, upon the hammer 3, while the usual dampers, one of which is shown at 4, are arranged to be thrown away from the strings 5 by a bar 6. The latter is arranged to be swung upon its pivot through the medium of an arm 7 and a rod 8, which is operated through an arm 9 of a rock-shaft 10, mounted in suitable bearings from a pedal 11. The pedal is projected as usual through the base-board 12 of the front casing of the piano and is located near the middle line of the piano, as usual. The soft pedal 13 (shown in Fig. 2) is likewise located near the middle line, as usual, and is connected, as usual, with devices whereby the blow of each hammer is modified. The pedals 11 and 13, as will be noted upon reference to Fig. 2, are located as usual in ordinary upright pianos and are not displaced nor is their usual action interfered with in any manner by the mechanical playing devices hereinafter described.

The usual pedals 14 and 15 for the application of foot-power in the operation of the mechanical playing devices are located, as clearly shown in Figs. 2 and 3, at one side of the usual loud and soft pedals 11 and 13 in order that there may be no interference with the action of such loud and soft pedals and in order that the appearance of the piano when closed may not differ from that of an ordinary piano. The pump-pedals 14 and 15 are arranged to be folded into the casing of the piano when it is not being used for mechanical playing and for this purpose are hinged or pivoted, as at 15^a, to a panel-board 16, carried by arms 17, pivoted, as at 18, within the casing of the piano and in such position that when the pedals are folded in the panel-board 16 stands flush with the front of the casing and forms a part thereof. The pivots 18, as shown in Figs. 2 and 3, are carried by links 19, which are pivoted at their lower ends, as at 20, in a suitable frame 21, generally rectangular in outline, which is secured within the casing of the piano, being provided with lugs 22 for the purpose. The upper member of the frame 21 at each end is slotted horizontally, as at 23, to receive the pivot-bolt 18 of the panel-board 16, so as to permit horizontal adjustment of the pivot for the purpose of bringing the panel-board exactly flush with the front casing when closed. Each pedal 14 and 15 is connected

by a link 24 with an arm 25, which is secured to the movable board of the bellows-pump hereinafter referred to, so that upon the usual motion of the pedals the bellows-pumps are actuated. The arrangement of the links 24 and arms 25 permits the folding of the pedals upon the panel-board when the latter is swung up to form a part of the casing. It will also be observed that by withdrawing the bolts 18 from the frame 21 and disconnecting the links 24 from the arms 25 the whole pedal mechanism may be removed in its entirety.

The bellows mechanism (shown particularly in Figs. 3 and 12 to 17) comprises, as usual, two pump-bellows having each a stationary frame 30, a movable board 31, and a returning-spring 31^a, and two equalizing-bellows 32 and 33, connected therewith, together with other parts to be referred to hereinafter. All of these parts are carried by a stationary board 39, which is common to both pump-bellows, while each frame 30 is supported at its lower end, as shown in Fig. 3, by lugs 30^a, having pins 34 arranged to enter open notches 26, formed in the upper members of the frame 21. At the upper end the stationary board 39 rests against stops 35, secured to the piano-keyboard base or to the frame of the piano or to some other part of the piano, as may be convenient. Therefore when certain air-ducts and levers are disconnected, as hereinafter described, and the holding-screws are withdrawn from the lugs 35 the whole bellows mechanism can be withdrawn as an entirety for purposes of inspection and repair.

The pump-bellows are of usual construction and need not be further described herein. The equalizing-bellows 32 and 33, however, are unequal in capacity, as clearly indicated in Fig. 13. Each, however, comprises, as usual, a stationary board 36, a movable board 37, and inflating or expanding springs 38. As clearly shown in Fig. 13, the main equalizing-bellows 32 is provided with a greater number of expanding-springs 38 than is the auxiliary or soft bellows 33, so that as the degree of exhaustion of air from the pneumatics is dependent upon the expanding power of the equalizing-bellows the action of such pneumatics, and therefore the force of the hammer-blows, will be greater when produced by the action of the main or loud bellows 32 than when produced by the action of the auxiliary or soft bellows 33. The provisions whereby one or the other of the compensating or equalizing bellows is brought into action will be fully explained hereinafter.

Secured to or forming part of the stationary frame 30 of the two pump-bellows is the supporting-board 39, having secured to its front face a strip 40, extending about its margin, and a second strip 41 a short distance below and parallel with the upper strip 40. The

stationary board 36 of both of the equalizing-bellows is secured to the strips 40 and 41, whereby there is formed between the two pump-bellows and the two equalizing-bellows a common chamber 42, which communicates with the pump-bellows through valved ports 43, as usual, and with the main compensating bellows 32 through an open port 44, and with the auxiliary or low-pressure compensating bellows 33 through an open port 45. The movable board 37 of the auxiliary bellows 33 carries on its inner face a valve-disk 46 to close the port 45 when the bellows 33 is collapsed. The strip 41 forms with the upper strip 40 an air-duct 47, which communicates with the bellows 32 through a port 48 and with the bellows 33 through a port 49. At one end the duct 47 communicates with the pneumatics, as hereinafter described. In the duct 47 is mounted a slide-valve consisting, preferably, of two members 50 and 51, which are connected together and are normally drawn by a spring 52 to close the port 49 and to open the port 48, so that under normal conditions the high-pressure bellows 32 is in communication with the pneumatics, as hereinafter described, and the low-pressure bellows is cut off, while if the valve be moved against the tension of the spring the port 48 is closed and the port 49 is opened to bring the low-pressure bellows 33 into action, with the result that the force of the blows of the piano-hammer 3 is reduced. For the movement of the valve 50 51 a rod 53 is provided, the same being connected by a link 54, as clearly shown in Fig. 2, with the movable board of a pneumatic 55. The latter is of usual construction, such as that represented in Fig. 5, which is intended more particularly to show another pneumatic hereinafter referred to, the controlling-tube 56 thereof being connected, as shown in Fig. 11, with a vent 57 in the keyboard-base beneath the keys 1. In the retaining-strip 58 is mounted a button 59, which controls a spring-pressed lever 60, pivoted beneath the keys and provided with a valve-disk 61 to cooperate with the vent 57. It will now be clear that if the button 59 be depressed the valve-disk 61 will be lifted from the vent 57, the pneumatic 55 will be collapsed, and the slide-valve 50 51 will be moved against the tension of the spring 52 to close the port 48 and open the port 49. When the button 59 is released, the pneumatic 55 will be expanded and the valves 50 51 restored to their normal position by the spring 52, thereby again bringing the high-pressure bellows into action.

The pneumatic 55 is connected by a duct 55^a to the chamber 42, as shown in Figs. 2, 12, and 13, so that the pneumatic 55 will be collapsed as soon as permitted through the venting of the tube 56 in the usual manner, which need not be described in detail herein.

The button 62 (shown in Fig. 1) by mech-

anism precisely similar to that shown in Fig. 11 controls the vent-tube 63 to a pneumatic 64, which is connected by an air-duct 65 with the chamber 42. The movable member of the pneumatic 64 is provided with an arm 66 in operative engagement with the damper-rod 8, as clearly shown in Figs. 4 and 5, and upon pressing the button 62 the pneumatic 64 is collapsed and the damper-rod 8 is raised to throw the dampers away from the strings, as hereinbefore described, to permit a freer vibration of the strings.

For the operation of the individual hammer-pneumatics the air-duct 47 is connected through a port 70 with a valve-box 71. The port is controlled by a slide-valve 72, which is operated through a rod 73, arm 74, rock-shaft 75, arm 76, and link 77 from a lever 78, mounted in the key-block at one end of the keyboard, these parts being shown more particularly in Figs. 1, 2, 3, 10, 12, and 14. The valve-box 71 is connected by horizontal duct 79 with a box 80, (see Figs. 2 and 4,) secured to the end of the piano frame or casing. The box 80 is preferably connected by a tube 81 with a box 82 above the keyboard, and the latter is connected by a pipe 83 with the vertical header 84, (see Fig. 1,) which is common to the several wind-trunks 85 of the several tiers of individual hammer-pneumatics 86, the construction and arrangement of which will be more fully described hereinafter. The controlling-tubes 87 of the pneumatics 86 lead, as usual, to the perforated tracker 88, with which the perforated music-sheet 89 cooperates in the usual and well-known manner. Thus when a perforation of the music-sheet in a predetermined position passes over a perforation of the tracker 88 the corresponding pneumatic is vented and collapses, actuating, through its movable member and the corresponding abstract 2, in the usual manner the corresponding hammer 3. The several pneumatics are collapsed by the exhaustion of air through the wind-trunks 85, header 84, tubes and boxes 83, 82, 81, 80, and 79, valve-box 71, port 70, and exhaust-air duct 47. The movement of the lever 78 to cut off the communication between the hammer-pneumatics and the air-exhausting devices also operates to shift the connections of the music-sheet motor in such manner as to rewind the music-sheet upon its spool, the instrument being mute during the rewinding by reason of the cutting off of the air connections to the hammer-pneumatics. The connections for effecting the winding or rewinding of the music-sheet will be more particularly described hereinafter; but reference will be had first to the connections for controlling the motor. As shown in Figs. 12 and 15, there is provided alongside the valve-box 71, but independent thereof, a valve-box 90, which communicates through a port 91 with the duct 47, such port being

controlled by a flap-valve 92, connected by a link 93 with an arm 94 on a rock-shaft 95, which is projected through the interposed wall into the valve-box 71, where it is provided with an arm 96, arranged to be operated by the movement of the valve 72, as by a cam 97, mounted thereon, so that when the valve 72 is moved to close the port 70 for the purpose of cutting off the hammer-pneumatics the valve 92 is also opened to establish a direct connection from the duct 47 through the valve-box 90 and a duct 98 (shown in Figs. 1, 2, and 15) to the motor 99, which may be of usual construction and may be connected to the spools of the music-sheet, as hereinafter described. As will be noted, the valve 92 is opened to its full extent and is also opened when the hammer-pneumatics are cut off and the rewinding-clutch, as hereinafter described, is in engagement. Consequently the motor is driven through the port 91 at a high speed, depending upon the degree of exhaustion, for the purpose of rewinding the music-sheet upon its original spool. For the purpose of winding the music-sheet during the playing of the instrument from its original spool to the winding-spool connection is also established between the exhausting devices (represented by the common chamber 42 and the motor) through the valve-box 90. For this purpose the chamber 42 is connected through a channel 100 (shown in Figs. 12 and 15) and a safety-pneumatic 101, the movable member of which carries a valve-disk 102, adapted to close the channel 100 when the pneumatic collapses, and a channel 103 with a port 104 in the valve-box 90. The port is controlled by a slide-valve 105, which is connected by a rod or link 106 with an arm 107 of a rock-shaft 108, (see Fig. 10,) an arm 109 of which is connected by a link 110 with a lever 111, mounted adjacent to the lever 78. Movement of the lever 111 to a greater or less extent varies the opening of the port 104, and therefore regulates the exhaust-pressure upon the motor, so that the speed thereof is increased or diminished, as required.

The motor 99 may be of ordinary construction and need not be described herein. As shown in Figs. 1, 3, and 6, its frame 112 is mounted upon the frame or case 113, which supports the music-rolls, and the latter is secured, through suitable brackets 114, upon the bar 115, forming a part of the structure which comprises the hammer-pneumatics 86. This structure has secured at each end thereof a block 116, which rests upon an adjustable block 117, to which it may be secured by a screw at 118. A guide-block 119 is secured upon the block 117 and fixes the endwise position of the structure 115. The blocks 117 receive bolts 120, which are fixed in the main frame or case of the piano and are threaded

to receive nuts 121 above and below the blocks 117. When the blocks 117 have been properly adjusted as to height, the structure 115, with its hammer-pneumatics, the music-roll case 113, and the motor 99, can be withdrawn for purposes of inspection or repair and replaced without requiring any further adjustment of any of the parts. Furthermore, all that is required to permit the removal of the several parts named as an entirety is to slip the tube 83 endwise into the box 82 until it is disengaged from the header 84, to remove the screws 118, and to disconnect the clutch-operating mechanism hereinafter described. The removal of the parts named permits free access to be had to the piano mechanism for tuning, repairs, adjustment, &c.

The shaft of the motor is mounted in suitable bearings carried by the frame 112 and has secured thereon two sprocket-wheels 122 and 123. The sprocket-wheel 122 is connected by a chain 124 with a sprocket-wheel 125 on a short shaft 126, mounted in suitable bearings carried by the frame or case 113 and having a pinion 127 secured thereto. The latter meshes with a gear 128, mounted loosely on the shaft 129, which carries the winding-on spool or roll 130. The hub of the gear 128 is grooved circumferentially, as at 131, for engagement by a gear-shifting device hereinafter referred to and is also formed as one member of a clutch to engage another member 132, which is fast on the shaft 129. As shown in the drawings, the gear 128 may be provided with holes 133 to engage pins 134, carried by the fast member 132. In suitable bearings carried by the frame or casing 113 is also mounted a vertical rock-shaft 135, which has fast thereon, near its lower end, a flat spring 136. Loosely mounted on the shaft 135 above the spring is an arm 137, having a pin 138 to engage the groove 131 in the hub of the gear 128. Said arm is also provided with pins 139 and 140, which stand on opposite sides of the spring 136. It will now be understood that if the shaft 135 be rocked in one direction the spring 136, bearing against the pin 140, will throw the arm 137 in the same direction to disengage the gear 128 or loose member of the clutch from the fast member 132. If the shaft be rocked in the opposite direction, the spring 136 will be put under tension, so that as soon as the holes 133 of the gear 128 register with the pins 134 the engagement thereof will be effected.

The sprocket-wheel 125 of the motor-shaft is connected by a chain 141 with a sprocket-wheel 142, which is mounted loosely on the shaft 143, which carries the rewinding spool or roller 144. It will be understood that the spool or roller 144 is coupled detachably to the shaft 143 in any usual manner, not nec-

essary to be explained herein. The hub of the sprocket-wheel 142 is grooved circumferentially, as shown at 145 in Fig. 8, and is likewise provided with holes 146 to engage a pin 147, carried by a disk 148, which is fast on the shaft 143, the sprocket and disk thus constituting the fast and loose members of a clutch. In convenient proximity to the shaft 143 the vertical shaft 135 has secured thereto a flat spring 149. Above the spring 149 is loosely mounted on the shaft 135 an arm 150, provided with a pin 151 to engage the groove 145 in the hub of the sprocket 142 and with pins 152 and 153, which stand on opposite sides of the spring 149. Oscillation of the shaft 135 in a direction to open the clutch 128 132 therefore puts the spring 149 under tension, so that the clutch 142 148 is closed as soon as the pin 147 registers with one of the holes 146. Oscillation of the shaft 135 in the opposite direction to close the clutch 128 132 opens the clutch 142 148.

Upon the upper end of the shaft 135 is secured a cam 154, arranged to act upon a spring-arm 155, which carries a brake 156, normally resting upon a disk 157, to give proper tension to the music-sheet, the roll 130 being at the same time driven somewhat slowly through the described gearing. When, however, the shaft 135 is oscillated to open the clutch of the roll 130 and to close the clutch of the roll 144 for the purpose of rewinding the music-sheet upon the roll 144, the brake 156 is lifted from the disk 157 by the cam 154 and the roll is driven at the full speed of the motor, so that the rewinding of the music-sheet takes place rapidly. It will be borne in mind that at this time the hammer-pneumatics are cut off from the exhausting devices, so that the instrument remains mute and the music-sheet runs loosely over the tracker 88.

For the operation of the clutches above referred to the shaft 135 is provided at its lower end with an arm 158, which is connected by a link 159 with a lever 160. The lever 160 may be pivoted to the main frame or casing of the piano, as at 162, and at its lower end is connected by a link 163 with the link 77, so that as the lever 78 is operated to close the port 70 for the purpose of cutting off the pneumatics and to open the port 91 for the purpose of connecting the motor 99 with the exhausting devices at full exhaust-pressure to rewind the music-sheet the shaft 135 is oscillated to open the clutch of the winding-on roll 130 and to close the clutch of the rewinding-roll 144. As in all lever connections of the instrument which are required to be uncoupled occasionally, the connection between the link 163 and the lever 160 is maintained by a spring 161, which is secured to the link 173 and holds the same on the end of the lever 160. When the spring

161 is pushed to one side, the lever 160 can be disengaged from the end of the link 163.

The construction of the hammer-pneumatics 86, which are shown in Figs. 1, 3, 18, 19, and 20, is generally the same as heretofore; but for convenience in manufacture and assembling, as well as in handling for purposes of repair, &c., the construction and arrangement thereof has been improved in certain particulars, as will be described. Each individual pneumatic comprises, as usual, a movable bellows member 170, arranged to engage, as by means of a projecting finger 171, the corresponding abstract 2. The stationary members 172 of the several pneumatics are likewise independent of each other, each being formed with a port 173 and with the lower portion of the corresponding primary air-chamber 174 and of the corresponding secondary air-chamber 175. To unite all of the pneumatics of a tier or series into one structure, so that they can be conveniently handled and are held firmly in position, while at the same time the parts of each pneumatic are readily accessible for repairs, &c., without requiring the dismembering of adjacent pneumatics, the board 176, to which the several bellows members 172 are secured, is extended from end to end of the series, being common to all. This board 176 has formed in its under side the upper portions of the separate primary air-chambers 174 and the separate secondary air-chambers 175, there being no direct connection between adjacent primary chambers or adjacent secondary chambers. Each pneumatic is completed by an independent top board 177, it being understood that each pneumatic is provided with ports, valves, and interconnecting channels, substantially as usual and as shown in Figs. 18 and 20, but not necessary to be described in detail herein. Outside of the board 176 is formed the wind-trunk 85, which communicates with each secondary chamber 175 through an independent port 178 and at its end or at both ends with the vertical header or headers 84, so that each pneumatic is placed in communication with the air-exhausting devices.

The operation of the mechanical playing devices herein described is in general the same as that of other mechanical playing devices of like nature, except so far as has been fully explained herein. No further explanation of the operation of such devices is therefore necessary.

It may be noted, in addition to the advantages which have already been called to attention, that the location of the buttons 59 and 62 in the key-strip 58 is not only convenient for the performer, but prevents them from being tampered with when the piano is closed, since they are then protected by the cover. Furthermore, it should be noted that

the location of the tracker-box or music-roll case 113 upon the pneumatic structure 115 makes it unnecessary to employ tracker-tubes 87 of great length, while the securing of the music-roll case upon the pneumatic-case makes it possible to remove the two together without requiring joints in such tubes. Again, the location of the motor upon the music-roll case makes it possible to employ comparatively short chains 124 and 141, and therefore to avoid the irregularity in movement which is consequent upon the vibration or swinging which is frequent in the operation of long chains.

It will be observed that the various improvements herein described tend to the perfection of the operation or the mechanism, to the simplifying of the structure consequent to the reduction in cost of manufacture, and increased facility in effecting repairs, while reducing the liability of the various parts of the apparatus to get out of order. It will further be understood that the invention is not to be restricted to the precise construction and arrangement of parts shown and described herein, since the details can be varied to suit the requirements of different uses.

I claim as my invention—

1. In a mechanical musical instrument having a horizontal keyboard, keys and playing devices operated by said keys, the combination of power-pneumatics in operative relation with said playing devices respectively, tone-regulating pedals in operative relation with said playing devices and located centrally and pump-bellows, bellows-pedals and connections located to one side of said tone-regulating pedals, substantially as described.

2. The combination of a series of pneumatics, a frame or case supporting the same, a tracker-box mounted upon said frame or case, and a motor mounted upon said tracker-box, said pneumatics, frame and tracker-box being removable together, substantially as described.

3. The combination of a main frame or case, bolts secured therein, brackets mounted adjustably on said bolts, a series of power-pneumatics and a frame or case supporting said pneumatics and arranged to rest upon said adjustable brackets, substantially as described.

4. The combination of playing devices, power-pneumatics in operative relation therewith, air-pumps connected with said pneumatics, pump-operating pedals, links connecting said pedals with said pumps, a board upon which said pedals are hinged or pivoted, arms carrying said board, and adjustable swinging arms upon which the first-named arms are pivotally supported, substantially as described.

5. The combination of a main casing, playing devices, power-pneumatics in operative

relation to said playing devices, pump-bellows connected with said pneumatics, pump-pedals, links connecting said pedals to said pump-bellows, a board upon which said pedals are hinged or pivoted, arms secured to said board, and adjustable swinging arms upon which the first-named arms are pivotally supported, substantially as described.

6. The combination of playing devices, power-pneumatics in operative relation therewith, air-exhausting devices, music-sheet-winding devices, a motor therefor, connections between said air-exhausting devices and said pneumatics including a valve-box and slide-valve, connections between said air-exhausting devices and said motor including a valve-box and valve, means to operate said slide-valve, and devices whereby said last-named valve is operated by the slide-valve when the latter moves, substantially as described.

7. The combination of playing devices, power-pneumatics in operative relation therewith, air-exhausting devices, music-sheet-winding devices, a motor therefor, connections between said air-exhausting devices and said pneumatics including a valve-box and slide-valve, connections between said air-exhausting devices and said motor including a valve-box and valve, means to operate said slide-valve, and an arm disposed in the path of movement of the slide-valve and operatively connected with the last-named valve whereby said last-named valve is operated as the slide-valve moves, substantially as described.

8. The combination of playing devices, power-pneumatics in operative relation therewith, air-exhausting devices, music-sheet-winding devices, a motor therefor, connections between said air-exhausting devices and said pneumatics including a valve-box and slide-valve, connections between said air-exhausting devices and said motor including a valve-box and a hinged valve, means to operate said slide-valve, and a shaft having an arm connected to said hinged valve and a second arm in the path of movement of the slide-valve, substantially as described.

9. The combination of a tracker-box, music-sheet winding and rewinding rolls mounted therein, a motor mounted upon said tracker-box and removable therewith, and transmission-gearing between said motor and said rolls, said transmission-gearing including clutches, substantially as described.

10. A series of pneumatics, comprising separate bellows members for each pneumatic, a board common to the series and having air-chambers formed therein, and separate top boards, substantially as described.

11. A series of pneumatics, comprising separate bellows members, a board common to all of the pneumatics of the series and hav-

ing formed therein separate air-chambers, and separate top boards, substantially as described.

12. The combination with a series of pneumatics, comprising separate bellows members, a board common to all of the pneumatics of the series and having formed therein separate air-chambers, top boards, and a wind-trunk formed independently of said

pneumatics and having independent connections with the air-chambers of the series, substantially as described.

This specification signed and witnessed this 27th day of December, A. D. 1904.

CHAS. A. KUSTER.

In presence of—

W. L. STRAUB,
HENRY FOSKEL.