

No. 801,270.

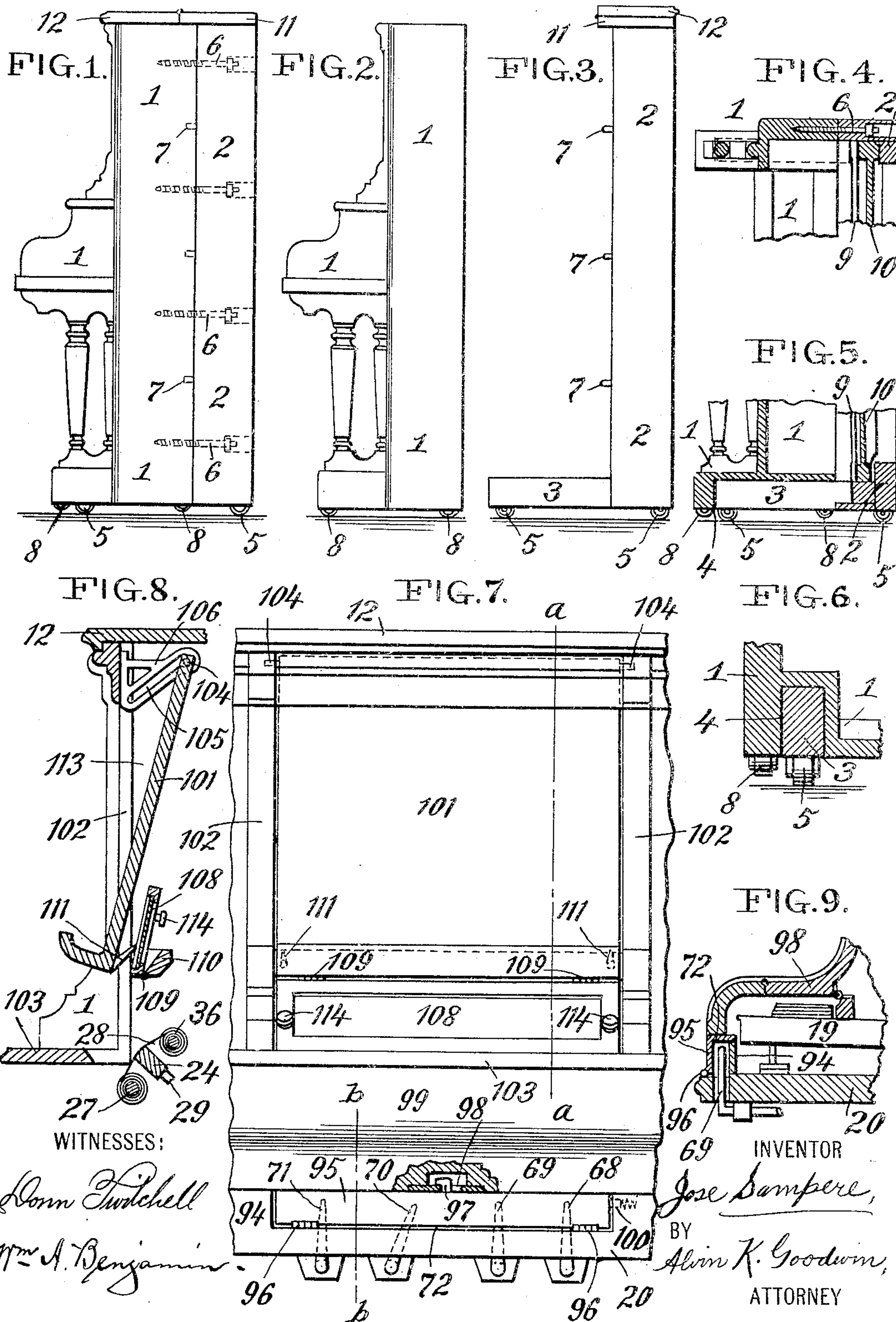
PATENTED OCT. 10, 1905.

J. SAMPERE.

MANUALLY AND MECHANICALLY OPERATIVE PIANO.

APPLICATION FILED FEB. 25, 1904.

4 SHEETS—SHEET 1.

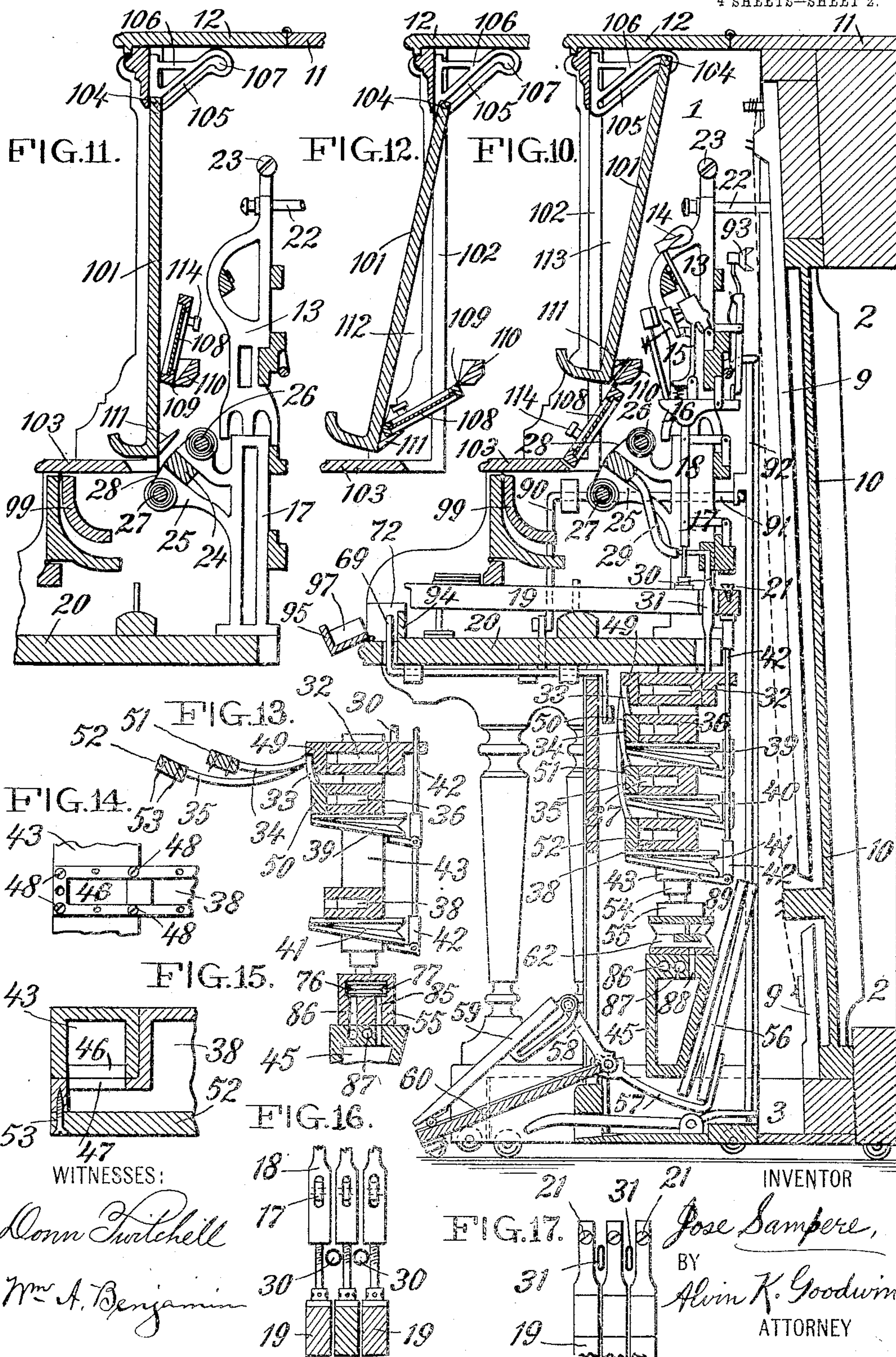


J. SAMPERE.

MANUALLY AND MECHANICALLY OPERATIVE PIANO.

APPLICATION FILED FEB. 25, 1904.

4 SHEETS—SHEET 2.



J. SAMPERE.

MANUALLY AND MECHANICALLY OPERATIVE PIANO.

APPLICATION FILED FEB. 25, 1904.

4 SHEETS—SHEET 4.

FIG. 21.

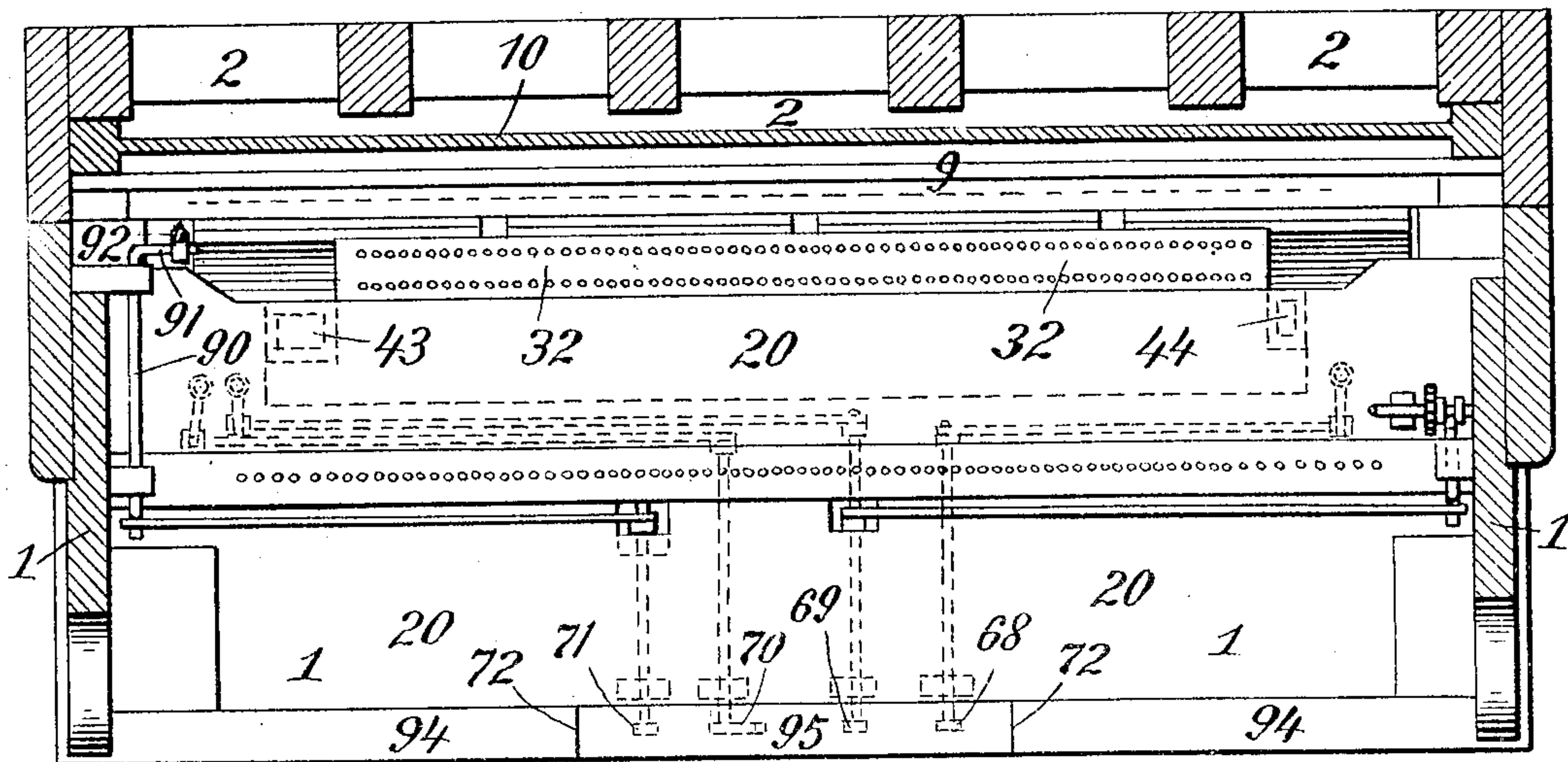


FIG. 22.

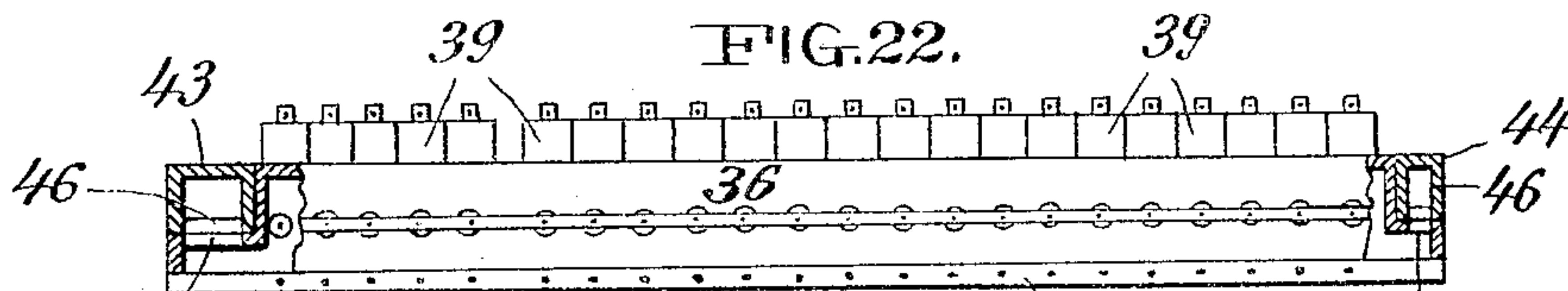


FIG. 23.

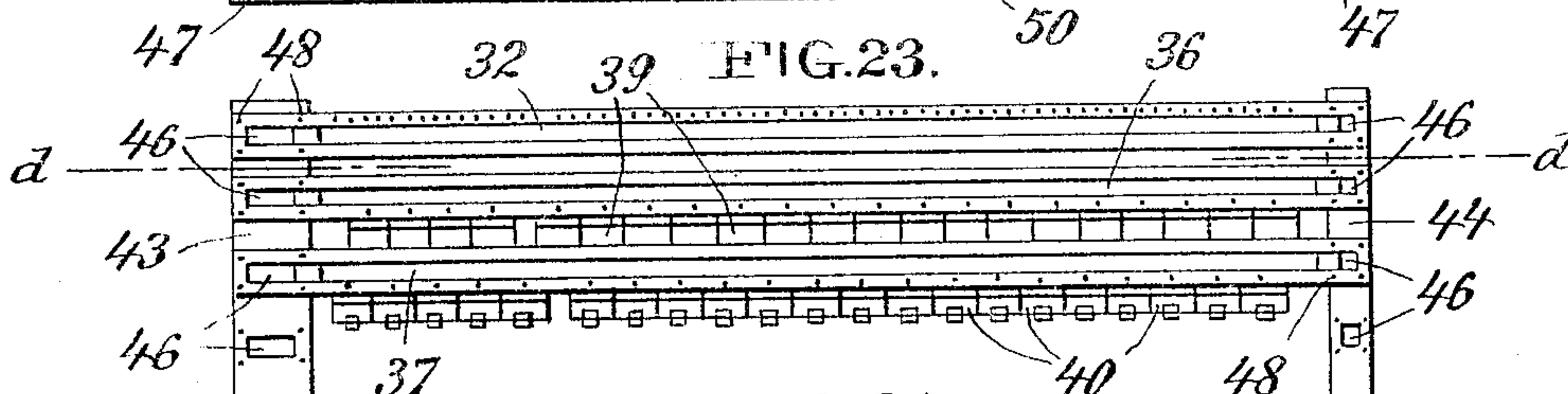
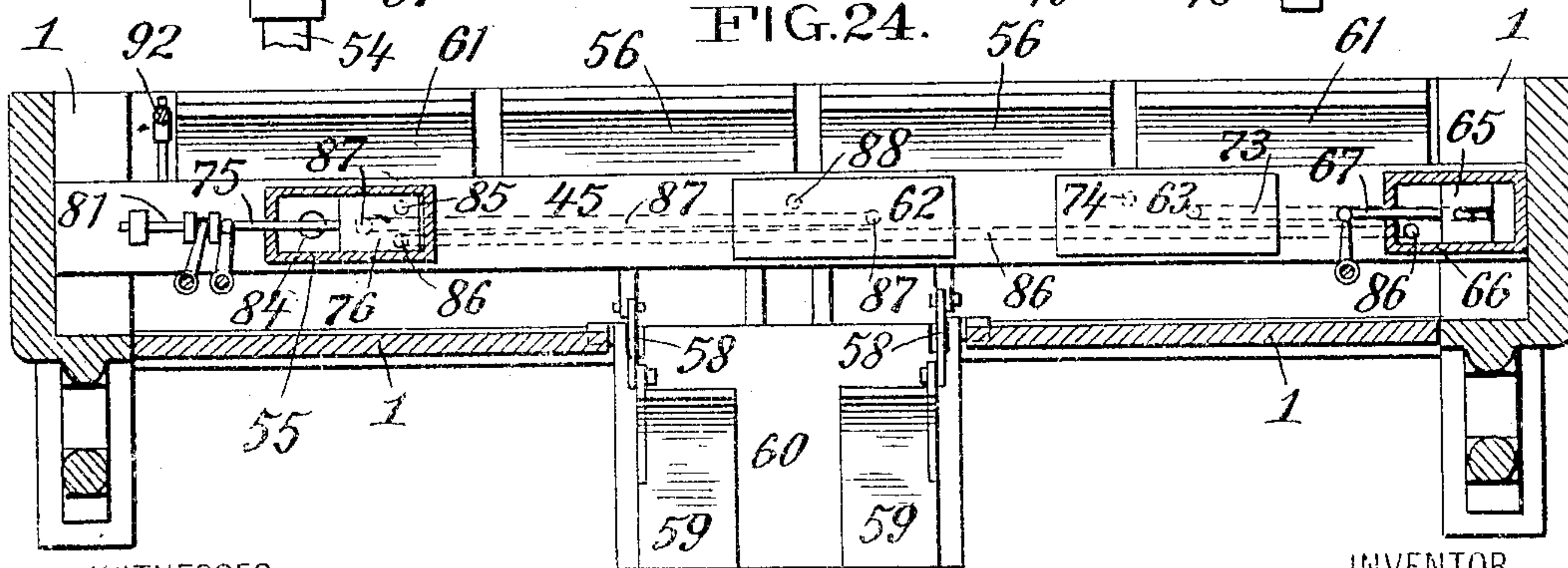


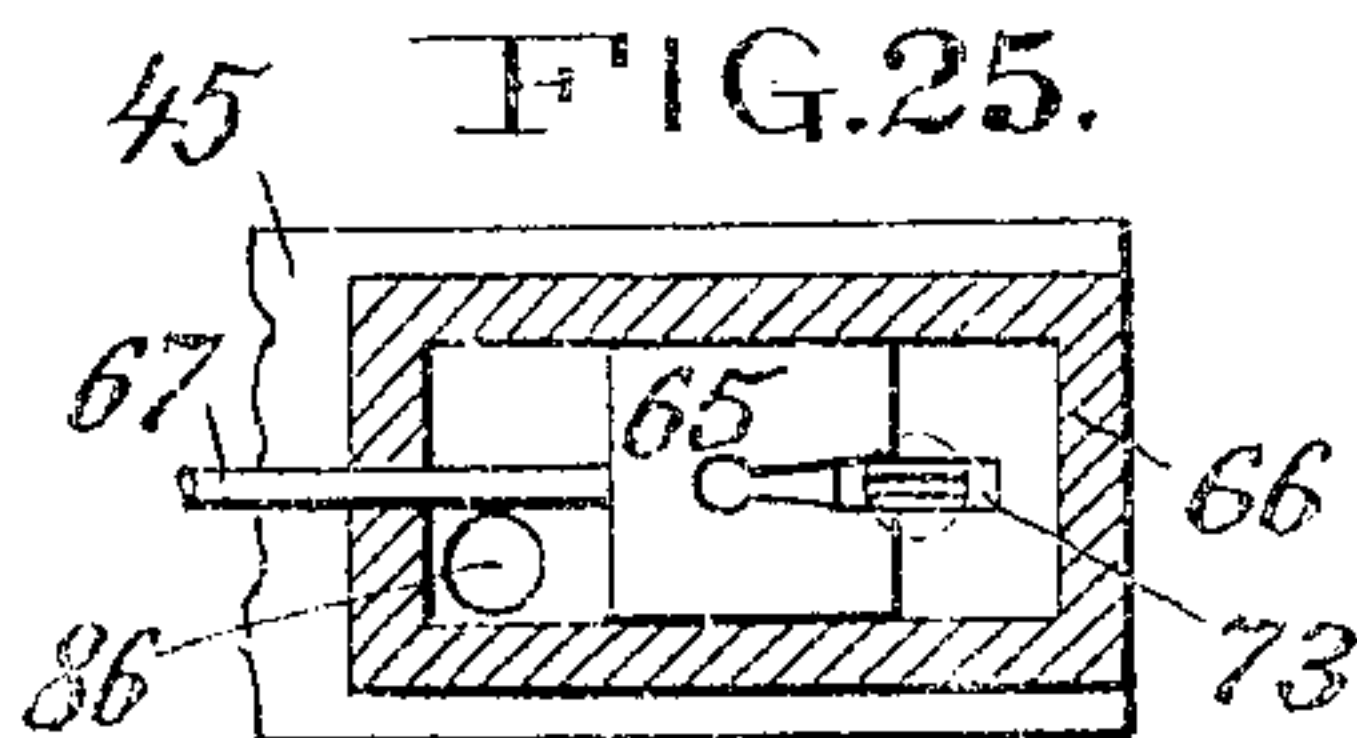
FIG. 24



WITNESSES:

Donn Twitchell
Wm A. Benjamin

FIG. 25



INVENTOR

INVENTOR
Jose Sampere,
BY
Alvin K. Goodwin,
ATTORNEY

UNITED STATES PATENT OFFICE.

JOSE SAMPERE, OF NEW YORK, N. Y., ASSIGNOR TO THE REGINA COMPANY, OF RAHWAY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

MANUALLY AND MECHANICALLY OPERATIVE PIANO.

No. 801,270.

Specification of Letters Patent.

Patented Oct. 10, 1905.

Application filed February 25, 1904. Serial No. 195,216.

To all whom it may concern:

Be it known that I, JOSE SAMPERE, a subject of the King of Spain, residing in the borough of Manhattan, city of New York, State of New York, have invented certain new and useful Improvements in Manually and Mechanically Operative Pianos, of which the following is a specification.

This invention relates more especially to pianos of that class adapted to be played either manually or mechanically, and has for its object to provide free access to all parts of the instrument for examination, regulation, or repairs with the least possible expenditure of time and labor and to facilitate transportation of the instrument and to simplify the construction of parts and their necessary adjustments for either manual or mechanical playing while maintaining the most artistic and attractive appearance of the instrument.

The invention will first be described and then will be particularly defined in claims hereinafter set forth.

In the accompanying drawings, Figure 1 is an end view of my improved piano. Figs. 2 and 3 show how the front action-section may be withdrawn from the rear string-frame section. Figs. 4, 5, and 6 are detail sectional views illustrating the two-part construction of the piano-case. Fig. 7 is a front view of upper central portions of the case with the fall-board partly in section. Fig. 8 is a detail vertical section taken on the line *a a* in Fig. 7, but with the hinged transparent plate opened. Fig. 9 is a detail vertical section taken on the line *b b* in Fig. 7. Fig. 10 is a central vertical sectional view of the piano as adjusted for mechanical playing. Fig. 11 is a detail vertical section illustrating the divided or two-part action and the closed music-rest. Fig. 12 is a detail section showing another adjustment of the music-rest. Fig. 13 is an enlarged detail vertical section taken on the line *c c* in Fig. 18 and illustrates the removability of separate tiers of action-operating pneumatics. Figs. 14 and 15 are details of these pneumatics and connecting wind-trunks. Figs. 16 and 17 are detail sections illustrating passage of the pneumatic air-tubes between the piano keys and abstracts. Fig. 18 is a partly-sectional elevation of the front piano-section with parts of the case removed. Fig. 19 is a longitudinal vertical section of the main wind-chest and attached bellows and

valve-chests. Fig. 20 is an enlarged section of the reroll and expression valve box of Fig. 19. Fig. 21 is a sectional plan view of the piano, taken just above the key-table, with the key-levers removed. Fig. 22 is a partly-sectional plan view taken on the line *d d* in Fig. 23, which is a front view of the pneumatics, wind-chests, and valve-chests, with the lower tier of pneumatics removed and the front covers removed from the remaining valve-chests. Fig. 24 is a plan view of the front portion of the piano with parts in horizontal section on the line *e e* in Fig. 18. Fig. 25 is a sectional plan view of the music-sheet motor-valve chest.

This improved piano is preferably made in two main vertically-divided sections comprising a front case-section 1, containing the keyboard and the piano-action and the mechanical playing mechanism, and a rear case-section 2, containing the heavy string-frame and the sounding-board. The rear-section base has forward end extensions 3, forming tongues having a sliding fit within grooves 4, made within end-base portions of the front section 1. The rear section has casters 5, which sustain the whole piano when the two sections 1 and 2 are secured together by end series of bolts 6, dowels 7 being preferably used at the vertical joint. The front section 1 also preferably has rollers 8 supporting it when it is bodily withdrawn from the unfastened rear section, and these rollers are clear above the floor when the two sections are united and rest on the casters 5. Sustaining substantially all of the manual and mechanical playing mechanism, excepting the string-frame 9 and sounding-board 10, within the front removable piano-section 1 is an important feature, as it gives quick and easy access to all parts of these mechanisms for inspection or repairs. Another special feature consists in inclosing the base-tongues 3 of the rear section 2 invisibly within the side base portions of the front section 1, thus permitting said tongues 3 and the grooves 4, receiving them, to remain wholly free from varnish or other expensive finish and wholly avoiding scratching or marring of the final case finish of either section of the piano when separating or uniting the sections, which may quickly and easily be done by one man. This invisible inclosure of the rear-section tongues 3 also permits economical, convenient, and uniform

color or varnish finish of all visible portions of the piano-case, and especially of its front ornamental section. The base tongue-and-groove construction also favors elegance of design and wholly avoids unsightly gaping joints at the side or pedestal or bottom rail portions of the piano-case. One top lid portion 11 is fixed to the rear case-section 2, and the other lid portion 12 is hinged to part 11 and may be closed upon the front piano-section 1. When the piano-sections 1 2 are separated, they are each very much narrower and lighter than the two connected sections, thereby facilitating transportation of the instrument along narrow halls or stairways.

It is not essential that the rear piano-section have forwardly-projecting base-tongues fitting at three sides within grooves of the front piano-section, as these tongues or any equivalent projecting slides of the rear section may be fitted in any way to base-slides of the front section, so as to permit easy disconnection of the unfastened front section from the rear section and also allow reuniting of the two sections by one and the same man who is to repair the instrument, while assuring constant stable support of the rear section by its forwardly-projecting slides, the latter being preferably arranged to sustain the weight of the connected front section to prevent overstrain of the bolts 6 or equivalent fastenings of the two united piano-sections.

The piano-action, which is operative both manually and mechanically, is specially made in two sections, these being an upper removable section 13, supporting the hammers 14, jacks 15, and wippens 16, and a lower fixed section 17, which has links supporting the stems 18, which move the wippens and hammers from the keys 19. The action-section 17 is supported, preferably, by the key bottom 20, having a fixed rail provided with pins, on which the keys 19 are fulcrumed to overbalance slightly at their inner ends. Each key has at its inner end an adjustable device, such as a screw 21, which strikes a superposed stop, which may be a felt strip on a cross-rail of the fixed action-section 17 for regulating tone quality and note repetition during mechanical playing and substantially as these results are obtained for manual playing by placing one or more washers on guide-pins under the front ends of the keys. The upper action-section 13 rests upon the lower action-section 17 and is further supported by bolts or screws 22 23. The bolts 22 hold middle parts of the upper action-section 13 to the string-frame 9 in the piano-section 2, and the two end bolts 23 hold opposite ends of said action-section 13 to opposite ends of the piano-case section 1. When the bolts 22 are removed prior to separation of the piano-sections 1 2, the end bolts 23 will safely hold the upper action-section 13 to the ends of the case-section 1 ready for reinsertion of the bolts 22 when the piano-

sections 1 2 are reunited. The intermediate bolts 22 may be omitted; but they are preferably used to prevent excessive vibration of central portions of the upper removable action-section 13.

The tracker-range 24 is fastened by brackets 25 to the fixed lower action-section 17, thus permitting lifting out of the unbolted upper action-section 13 for inspection or repair of its parts without disturbing the tracker-range 24 or the rolls 26 27, which are sustained by the brackets 25 and carry the perforated music-sheet 28, which runs over the tracker. Flexible tubes 29 connect air-passages of the tracker with angular metal tubes 30, the upper parts of which pass horizontally between adjustable feet of the hammer-actuating stems 18, and the vertical portions of tubes 30, which lie behind the stems 18, are preferably flattened laterally at 31, so as to pass between cut-away portions of the inner ends of the piano-keys. The air tubes or conduits 30 31 are specially arranged relatively to the fulcrums and front guide-pins of the keys 19 to permit removal and replacement of the individual keys from the front for adjusting their inner stops 21 or for other purpose without disturbing said air-conduits and as will be understood from Figs. 10, 16, and 17 of the drawings.

As herein shown the lower ends of the tubes 30 open into a primary valve chest or shelf 32, from which three independent series of flexible air-tubes 33 34 35 lead to secondary valve chests or shelves 36 37 38, which fixedly carry respective tiers of striking pneumatics 39 40 41. These pneumatics are suitably coupled to abstracts 42, which as the pneumatics are collapsed by the air-exhaust lift the rear ends of the keys 19 to play the piano mechanically. The abstracts 42 are specially arranged behind the air-conduits 30 31 to give said abstracts leverage advantage in acting upon the keys 19 during mechanical playing and also to economize depth space in the instrument while locating them relatively to the air-conduits and the key-fulcrum and guide-pins to permit the above-named endwise removal and replacement of the keys without detaching or removing the action-stems 18, the air-conduits 30 31, or the abstracts 42. Arranging the pneumatics below the keyboard gives more easy access to all parts of the piano-action for inspection and quick repairs and also promotes freer escape of tone from the instrument than is possible when the sound-wave absorbing or obstructing pneumatics are arranged above the keyboard directly in front of the action.

It is common to make all the valve chests or shelves and the striking pneumatics in one self-contained structure, which is removable from the case of a self-playing piano or of a piano-player for inspection and repair of any of the parts. For like purposes the individual

pneumatics, with their valves, also have been made removable from their valve-chests. This invention includes a special arrangement of parts whereby the primary valve-chest 32 and the secondary valve-chests 36 37 38, with their respective rows of pneumatics 39 40 41, are made separately removable from the air-conduits which connect them to the main wind chest and bellows. To accomplish this in a preferred manner, while keeping in view the desirability of having free end-to-end air circulation through the chests 32 36 37 38, the opposite ends of these chests are fastened to two vertical wind-trunks 43 44, which have closed tops, and the trunk 43 communicates with the subjacent main wind-chest 45. As best shown in Figs. 14, 15, 22, and 23 of the drawings, the opposite ends of the chests 32 36 37 38 have rear recesses, making them fit between opposing sides and at the fronts of the two wind-trunks 43 44, which have openings 46, coinciding with openings 47 of the chests. Each chest may be removably fastened to the wind-trunks by screws 48 or otherwise. The front covers 49 50 51 52 of the respective chests 32 36 37 38 may be fastened to them by screws 53 or otherwise to permit separate removal of the covers. All of the flexible air-tubes 33 34 35 are fastened at one end to the front cover 49 of the primary valve-chest 32.

Should repair of one or more pneumatics of the lower tier or row 41 be necessary, the cover 52 of chest 38 is unfastened and turned or swung upward with its attached tubes 35 to allow unfastening of the screws 48, holding said chest 38 to the wind-trunks 43 44, the abstracts 42 being uncoupled from the pneumatics 41. The chest 38 and attached pneumatics 41 may now be removed, as shown in Fig. 23 of the drawings. After repairs are made the chest is replaced and is fastened by its screws 48 to the wind-trunks 43 44, and the chest-cover 52 then is swung down and is fastened to it by the screws 53. Should it be necessary to repair one or more of the pneumatics 40 on the chest 37, the covers 51 52 of both lower chests 37 38 are unfastened and, with their tubes 34 35, are turned upward out of the way, and the chest 37 then is unfastened from the trunks 43 44 after uncoupling of the abstracts from its pneumatics. The chest 37 and its attached row of pneumatics 40 now may be removed, as shown in Fig. 13 of the drawings, and may later be replaced and fastened to the wind-trunks, and the covers 51 52 are then fastened to said chests 37 38 by the screws 53 or otherwise. Should it be necessary to remove the valve-chest 36 and its row of pneumatics 39, the covers 50 51 52 of the chests 36 37 38 are unfastened and are swung upward with their attached tubes 33 34 35, which permits the chest 36 to be unfastened and removed with its pneumatics 39 without disturbing the other chests 32 37 38

or their front covers. Should it be necessary to remove the upper chest 32, its cover 49 will be unfastened and swung downward with all the attached tubes 33 34 35 to permit unfastening of said chest 32 from the wind-trunks 43 44, and the chest may later be replaced and its cover again applied to it without disturbing any of the lower chests 36 37 38 or their connections. These chests 32 36 37 38 may communicate only with the larger left-hand wind-trunk 43, and the part 44 (shown as a wind-trunk) may be a solid block or strip simply giving support to the right-hand ends of the valve-chests; but the two wind-trunks are preferred in practice.

A prior piano-player has a series of detachable valve chests or shelves carrying striking pneumatics and secured to communicating end wind-trunks by screws passed laterally through the trunks into the ends of the shelves, the trunks being fastened to and within the instrument-case. In this prior construction the valve chests or shelves can be removed individually only after the wind-trunks and shelves are bodily removed from the instrument-case, as the end screw-fastenings of the shelves are only then accessible. This entails disconnection of many parts and requires considerable time and labor to reassemble them after repairs have been made. The herein-described invention materially differs from said prior construction, as it embraces a mechanical musical instrument, either a self-playing piano or a piano-player, having interior air-circulating means and detachable valve chests or shelves normally communicating with said means and carrying striking pneumatics, each valve chest or shelf being removable without unfastening or removing the others and without requiring unfastening or removal of the air-circulating means from the instrument-case. This principle of construction may be embodied in mechanical musical instruments made with the primary and secondary valves arranged in the same chests or shelves which also carry the striking pneumatics, as well as with the herein-described arrangement of a separate chest or shelf containing all the primary valves and connecting by conduits with all the secondary valve chests or shelves which carry the striking pneumatics.

Another prior piano-player has chests or shelves containing both primary and secondary valve actions and communicating with end wind-trunks. Each of these chests or shelves is independently removable, but the striking-pneumatics are connected to horizontal partitions fastened to a main vertical board to which the chests are detachably held. My invention differs from this prior construction by having the striking pneumatics fastened to and removable with the secondary valve chests or shelves, which makes these pneumatics as easily accessible as the valve-chests

for inspection and repairs without dismantling other parts of the instrument.

The air-circulating means may be the preferred vertical end wind-trunks or other conduits with which the valve chests or shelves are detachably connected. The tube connections 33 34 35 between the primary and secondary valve-chest covers may be detachable rigid pipe connections; but the flexible tubes are preferred, as they never need be disconnected from the covers when any one or more of the valve chests or shelves are to be removed, thereby preventing breaking of many air-tight joints and materially lessening the chances of wasteful and harmful air-leakage in instruments of this class.

The wind-trunk 43 has a separable connection by a proper tube 54 with a valve-box 55, which opens into the main wind-chest 45 by direct and indirect passages, presently explained. To the wind-chest 45 are fixed the main feeder-bellows 56 56, having arms 57, operative by links 58 from folding pedals 59, preferably pivoted to a hinged panel 60, forming when closed a part of the piano-case front. To the chest 45 also are fixed the equalizer-bellows 61 61, an expression-bellows 62, and a regulating-bellows 63, controlling any desired speed of the pneumatic music-sheet motor 64. This motor, through interposed shafts, pulleys, and belts, rotates the rolls 26 27 to wind the music-sheet 28 from the delivery-roll 26 upon the take-up roll 27 during mechanical playing and also rewinds the sheet from roll 27 upon roll 26 at completion of a musical selection. The bellows 62 63 have usual internal automatic valves, and the motor 64 is stopped and started and is changed in speed to control the tempo of the music by a valve 65, working in a chest 66 and having a stem 67, which is coupled by suitable rods and shafts with a preferred "tempo" lever-stop 68. This stop and others (marked 69 70 71) are all preferably grouped together at the front of the piano-case and preferably in a recess 72 thereof. By adjusting the stop 68 the valve 65 is moved to control volume of air-exhaust through the motor 64 via the passage 73 between the chest 66 and the regulating-bellows 63, which connects with the main wind-chest 45 by the valve-controlled passage 74.

The "reroll" lever-stop 69 connects by suitable rods and shafts with the stem 75 of a novel double-acting valve 76, placed in an upper chamber 77 of the valve-box 55. This valve 76 is preferably made with upper and lower plates 78 78, connected at the edges by flexible material 79 and having springs 80 between the plates forcing them apart and to opposing upper and lower walls of the valve-chamber 77. The "expression" lever-stop 70 is suitably connected with the stem 81 of a valve 82 in the lower chamber 83 of the box 55. The upper, middle, and lower walls of

this box have openings 84, giving direct communication between the pneumatic wind-trunk 43 and the main wind-chest 45. When the valve 76 is adjusted by the stop 69 to the right hand, as shown in Figs. 19, 20, and 24 of the drawings, it allows free air-current through the openings 84 to permit operation of the pneumatics 39 40 41, and the lower valve-plate 78 then closes two passages 85 86, the one, 85, leading directly from the upper valve-box chamber 77 to the wind-chest 45 and the other one, 86, leading from said chamber, preferably into and along the wall of the wind-chest 45 and opening finally into the motor-valve chest 66, as shown in Figs. 18, 19, 20, 24, and 25 of the drawings. As the valve 76 closes both passages 85 86 during mechanical playing, there then is no exhaust from the motor-valve chest 66 through the passage 86; but when the valve 76 is moved by the stop 69 to the left-hand end of the valve-box chamber 77 it closes the upper passage 84, thereby cutting off exhaust from the pneumatic wind-trunks and preventing operation of the pneumatics and the piano-action, and the valve then also opens the passages 85 86. This allows powerful air-exhaust through the motor 64 via the valve-chest 65, passage 86, valve-box chamber 77, and passage 85 to the main wind-chest 45, thus causing high speed of the motor for quickly rewinding the music-sheet from roll 27 to roll 26. This special arrangement of air-passages 85 86 with but one reroll-valve 76, coupled with the stop 69, makes it unnecessary to use a second valve in the motor-valve chest for getting increased air-current to assure high speed of the motor during rewinding of the music-sheet and also avoids multiplication of parts, such as exposed dust-collecting and delicate valve-stems and their connections for such second valve. The passage 86 may be a pipe outside or inside the wind-chest 45, but forming said passage within the wall of said chest is preferred in practice. When the valve 76 is at the right-hand position and closes the reroll-motor passages 85 86, the valve 82 may be adjusted to more or less close the direct air-passage 84 through the box 55 and gradually lessen the volume of air exhausted through the pneumatics 39 40 41, thus proportionately lessening their collapsing power and graduating their striking force upon the piano-action to modulate the mechanical playing. When the inner passage 84 of valve-box 55 is wholly closed by moving the valve 82 by the stop 70, the exhaust occurs wholly through the always-open passage 87, and the valved expression-bellows 62 of limited capacity having direct connection by passage 88, controlled by valve 89, with the wind-chest 45. This assures very light blows of the pneumatics on the piano-action to obtain the softest tones.

The "forte" lever-stop 71 is coupled by

suitable rods and shafts to a rocking shaft 90, having an arm 91 engaging a shoulder on the loud foot-pedal rod 92, so that as said stop 71 is operated it throws the dampers 93 from the piano-strings to assure the loudest tones during mechanical playing.

In piano-player attachments the invisibility of the stops controlling the piano-playing would be a disadvantage; but in self-contained pianos, operative both manually and mechanically, it is very desirable to have the mechanical-playing stops and other parts operating the self-playing mechanism concealed from view during manual playing, so that the instrument then has no appearance of a playing-machine, which would mar the pleasure of many expert manual players who have no desire to play the instrument mechanically. It also is desirable to have the stops arranged in a recess of the piano-case front and preferably below the keyboard, whether the stops be concealed or not, provided the stops be accessible from above and be operative by most natural and easy movements of the hands and fingers for regulating the mechanical playing. The arrangement of the stops 68 69 70 71 in a recess 72 of the piano-case front and preferably below the keyboard and at a lower level than the depressed keys 19, to prevent interference of the stops with the keys during manual playing, is well calculated to meet above-named reasonable conditions of use.

It is preferred to make the stop-receiving recess in the piano-case lock-rail 94, or in the front of the key-table 20, or in both parts 94 20, and to conceal the stops by a cover 95, preferably hinged at 96 at its lower edge, so as to open downward, and preferably having a lock 97 engaging a catch 98 on the fall-board 99 to hold the stop-cover and fall-board closed by one and the same lock or latch device, as shown in Figs. 7 and 9 of the drawings. A spring-pressed latch 100 also is preferably used at one end of the stop-recess 72 to automatically engage the stop-cover 95 and positively hold it noiselessly closed over the stops during heavy manual playing. The stop-cover also is specially shaped to conform substantially to the outward contour of adjacent portions of the piano-case, so that when the cover is closed to conceal the stops said cover forms practically a part of the piano-case and is scarcely noticeable, and thus does not mar the artistic appearance or finish of the case. It is not essential that the stop-cover be hinged to open downward or that the cover be hinged at all, provided it is fitted to the piano-case front and is openable or removable to uncover the stops during mechanical playing. The stops may be levers or push or pull buttons or other devices. It is immaterial whether the stops and their cover be arranged at the piano-case front below or above the keyboard, provided the cover may be opened for access to the stops during mechanical playing and

may be closed to hide the stops during manual playing and so far as possible conceal the fact that the piano may be played mechanically.

The vertically-movable music-rest 101 forms part of the upper case-front 102 above the case-shelf 103. The rest 101 is preferably pivoted at its upper end to the front 102 by pins 104, fixed to the rest and entering, preferably, inclined slots 105 of brackets 106, fixed to the case-front. The slots 105 have at their upper ends offset portions 107. The rest 101 is adjustable relatively to a transparent plate 108, comprising a pane of glass or celluloid fitted in a frame, which is preferably hinged at its upper edge at 109 to a cross-bar 110, secured in the piano-case. When the piano is out of use, the plate 108 is swung fully upward on its hinges, and the music-rest 101 then hangs by its pivots 104 from the lower ends of the bracket-slots 105 and in line with the case-front 102 to close it, as shown in Fig. 11 of the drawings. During manual playing the music-rest is held in lower inclined position to support sheet or book music by engagement of the hinged plate 108 with the back of the rest 101 and preferably over shoulders or studs 111, fixed to it, as shown in Fig. 12 of the drawings. The acute-angle case-openings 112, then provided at opposite side edges of the inclined music-rest, promote free escape of tone during manual playing. To adjust or substitute sheet 28 for mechanical playing, the music-rest 101 is bodily raised, while its pivot-pins 104 slide upward in the inclined bracket-slots 105 until they lodge in the slot-offsets 107, and the hinged transparent plate 108 will be swung upward behind the rest 101 and will be held by it out of the way, as shown in Fig. 8 of the drawings, while the music-sheet roll 26 is removed or reapplied through the opening thus provided in the case-front below the raised music-rest. During mechanical playing the transparent plate 108 will be swung down to close this opening, while the music-rest remains raised to give full view of the traveling music-sheet through the closed plate 108, which then deafens or prevents escape of hissing sounds, due to passage of the music-sheet perforations over openings of the tracker 24. This relative adjustment of parts 101 108 is shown in Figs. 7 and 10 of the drawings. If desired, the acute-angle openings 113 at opposite side edges of the raised music-rest may be closed by correspondingly-shaped plates fixed to the inner face of the case-front 102; but it is not deemed necessary to close said openings 113, as their distance from the tracker avoids escape of annoying hissing sounds, and said openings are desirable because they give freer outlet of tone from a top-closed piano-case during mechanical playing. Knobs 114 may be fixed to the frame of the plate 108 to facilitate the above-named adjustments of it. Said plate also may be hinged

at its lower edge to the case-shelf 103 or the plate may remain unhinged; but hinging it at its upper edge is preferred, as this permits convenient invisible disposal of it behind the closed music-rest and promotes convenient adjustment of parts while changing the music-roll. The slotted brackets 106 may be substituted by any suitable tracks having upper shoulders adapted to retain the pivots 104 for holding the music-rest raised.

I claim as my invention—

1. A manually and mechanically operative piano having above the keyboard a two-part action the lower portion of which is fixed, and a tracker and music-roll carriers sustained from said lower fixed portion of the action, the upper portion of the action being removable to facilitate adjustments or repairs without disturbing the mechanical-playing mechanism.

2. A manually and mechanically operative piano having the tracker and music-rolls above the keyboard and the key-operating pneumatics below the keyboard, and air-conduits from the tracker to the pneumatics passed between inner ends of adjacent keys and arranged relatively to the key-fulcrum and guide-pins to permit removal and replacement of the keys without disturbing said air-conduits.

3. A manually and mechanically operative piano having the tracker and music-rolls above the keyboard and the key-operating pneumatics below the keyboard, and air-conduits from the tracker to the pneumatics having flattened portions passed between inner ends of adjacent keys and arranged relatively to the key-fulcrum and guide-pins to permit removal and replacement of the keys without disturbing said air-conduits.

4. A manually and mechanically operative piano having the tracker and music-rolls above the keyboard and the key-operating pneumatics below the keyboard, the action-operating stems working above the keys and the pneumatic-abstracts working below the keys, and air-conduits leading from the tracker to the pneumatics and passed between inner ends of adjacent keys; said action-operating stems and abstracts being arranged relatively to the key-fulcrum and guide-pins to permit removal and replacement of the keys without detaching or removing said stems, abstracts, and air-conduits.

5. A manually and mechanically operative piano having the tracker and music-rolls above the keyboard and the key-operating pneumatics below the keyboard, the action-operating stems working above the keys and the pneumatic-abstracts working below the keys, and air-conduits leading from the tracker to the pneumatics and passed between inner ends of adjacent keys and in a plane between the planes of the upper action-operating stems and the lower pneumatic-abstracts and with

the latter rearmost to give them leverage advantage during mechanical playing and to economize depth space in the instrument.

6. A manually and mechanically operative piano having a keyboard, means for mechanically actuating the keys, and a stop above the keyboard; said keyboard comprising individually-removable key-levers each provided at its inner end with an adjustable device adapted to the aforesaid stop for regulating tone quality and note repetition during mechanical playing.

7. A manually and mechanically operative piano having the action and its operating-stems and a stop above the keyboard, and the pneumatics and their abstracts below the keyboard, each key-lever being removable and having at its inner end a vertically-adjustable device coming in contact with the aforesaid stop for regulating tone quality and note repetition during mechanical playing.

8. A manually and mechanically operative piano having the action and its operating-stems and a stop above the keyboard, and the pneumatics and their abstracts below the keyboard, each key-lever being removable and having at its inner end a vertically-adjustable screw coming in contact with the aforesaid stop for regulating tone quality and note repetition during mechanical playing.

9. A mechanical musical instrument having interior air-circulating means, and detachable valve chests or shelves normally communicating with said means and carrying striking pneumatics; each valve chest or shelf being removable without unfastening or removing the others and without requiring unfastening or removal of the air-circulating means from the instrument-case.

10. A mechanical musical instrument having interior air-circulating means, and detachable valve chests or shelves including a primary valve-chest, and one or more secondary valve-chests carrying striking pneumatics, and detachable air-conduits connecting the primary valve-chest with all the secondary valve-chests; each of said valve-chests normally communicating with said air-circulating means, and each chest being removable without unfastening or removing the others and without requiring unfastening or removal of the air-circulating means from the instrument-case.

11. A mechanical musical instrument having interior wind-inducing devices including a wind-chest and one or more communicating wind-trunks, and valve chests or shelves carrying striking pneumatics and detachably secured to said wind-trunks by joints and fastenings permitting removal of any valve chest or shelf without unfastening or removing the others and without requiring unfastening or removal of the wind-trunks from the instrument-case.

12. A mechanical musical instrument hav-

ing interior wind-inducing devices including a wind-chest and one or more communicating wind-trunks, a primary valve chest or shelf, and one or more secondary valve chests or shelves carrying striking pneumatics, and detachable air-conduits connecting the primary valve-chest with all the secondary valve-chests; all of said valve chests or shelves being secured to the wind-trunks by joints and fastenings permitting removal of any valve chest or shelf without unfastening or removing the others and without requiring unfastening or removal of the wind-trunks from the instrument-case.

13. A mechanical musical instrument having interior wind-inducing devices including a wind-chest and one or more communicating wind-trunks, a primary valve chest or shelf, and one or more secondary valve chests or shelves carrying striking pneumatics; all of said valve chests or shelves having detachable covers; and air-conduits connecting the primary-chest cover with the covers of all the secondary chests or shelves; all of said valve chests or shelves being secured to the wind-trunks by joints and fastenings permitting removal of any valve chest or shelf without unfastening or removing the others from the wind-trunks and without requiring unfastening or removal of said trunks from the instrument-case.

14. A mechanical musical instrument having a series of detachable valve-chests each carrying pneumatics and having a separable cover, and air-supply tubes for the pneumatics connected to said covers.

15. A mechanical musical instrument having a series of detachable valve-chests each carrying pneumatics and having a separable cover, and flexible air-supply tubes connected to said covers, whereby each valve-chest with its pneumatics may be removed without detaching the others and without disconnecting the tubes from the covers.

16. A mechanical musical instrument having a primary valve-chest, and one or more secondary valve-chests each carrying pneumatics, each of said valve-chests being independently detachable and having a removable cover; and air-supply tubes for the valve-chests and pneumatics connected to said covers.

17. A mechanical instrument having a primary valve-chest, and one or more secondary valve-chests, each carrying pneumatics, each of said valve-chests being independently detachable and having a removable cover; and flexible air-supply tubes connected to said covers and permitting removal of any one of said valve-chests without detaching the others and without disconnecting the tubes from the covers.

18. A mechanical musical instrument having air-current inducing-bellows and wind-chest, one or more wind-trunks communicating therewith, two or more detachable valve-chests respectively carrying valves and pneu-

matics and communicating with said trunk or trunks, each of said valve-chests having a removable cover, and air-supply tubes for the pneumatics connected to said covers.

19. A mechanical musical instrument having air-current-inducing bellows and wind-chest, one or more wind-trunks communicating therewith, two or more detachable valve-chests respectively carrying valves and pneumatics and communicating with said trunk or trunks, each of said valve-chests having a removable cover, and flexible air-supply tubes connected to said covers and permitting removal of any one of said valve-chests without disturbing the others and without disconnecting the tubes from the covers.

20. A mechanical musical instrument having wind-inducing apparatus, pneumatics communicating therewith and adapted to operate sound-producing devices, a music-sheet motor, a reroll-valve, and a passage connecting the motor-windway with the reroll valve-box, substantially as described, whereby when the reroll-valve is adjusted to cut off communication between the pneumatics and the wind-inducing apparatus said valve opens said passage and gives full air-current through the motor for quickly rewinding the music-sheet.

21. A mechanical musical instrument having a main wind-chest, a music-sheet-motor valve-chest or windway, a reroll valve-box and valve, and pneumatics adapted to operate sound-producing devices; said motor valve-chest, reroll valve-box and pneumatics communicating with the main wind-chest, and an air conduit or passage connecting the reroll valve-box with the motor valve-chest or windway.

22. A mechanical musical instrument having a main wind-chest, a music-sheet-motor valve-chest or windway, pneumatics adapted to operate sound-producing devices and having valved communication with said wind-chest, a two-chambered valve-box having in one chamber a valve controlling direct communication between the pneumatics and said wind-chest, an independent passage connecting the other chamber of said valve-box with the motor valve-chest or windway, and a valve in said other passage-connected chamber adapted to cut off direct communication between the pneumatics and the main wind-chest and simultaneously open to said wind-chest the independent passage between said chamber and the motor valve-chest or windway.

23. In a mechanical musical instrument, the combination with the main wind-chest and communicating wind-inducing apparatus, of pneumatics adapted to operate sound-producing devices, a music-sheet-motor windway a valve-box having a chamber and passages giving communication between the main wind-chest and the pneumatics, said valve-box having a direct passage between its chamber and the main wind-chest; a passage be-

tween said motor-windway 66 and the valve-box chamber 77, and a valve in said chamber normally closing the passages 85, 86 during mechanical playing, and opening said passages when it is adjusted to cut off communication between the pneumatics and the main wind-chest and assure quick rewinding of the music-sheet.

24. In a mechanical musical instrument, the combination with the main wind-chest and communicating wind-inducing apparatus, of pneumatics adapted to operate sound-producing devices, a music-sheet-motor windway 66, a valve-box having two chambers 77, 83 and passages 84, a valve in the chamber 83 controlling the passages 84 for regulating expression during mechanical playing, said valve-box having a direct passage 85 between its chamber 77 and the main wind-chest; a passage 86 between the motor-windway 66 and the valve-box chamber 77, and a valve in said chamber 77 normally closing the passages 85, 86 during mechanical playing and opening said passages when it is adjusted to cut off communication between the pneumatics and the main wind-chest and assure quick rewinding of the music-sheet.

25. In a mechanical musical instrument, the combination with the main wind-chest and communicating wind-inducing apparatus, of pneumatics adapted to operate sound-producing devices, a music-sheet-motor windway 66, a valve-box having two chambers 77, 83 and passages 84, a valve in the chamber 83 controlling the passages 84 for regulating expression during mechanical playing; said valve-box having a direct passage 85 between its chamber 77 and the main wind-chest, a passage 86 between the motor-windway 66 and the valve-box chamber 77, a valve in said chamber 77 normally closing the passages 85, 86 during mechanical playing and opening said passages when it is adjusted to cut off communication between the pneumatics and the main wind-chest, an auxiliary expression-bellows 62, a passage 88 between the bellows 62 and the main wind-chest, a valve controlling said passage 88, and a passage 87 connecting said bellows 62 with the valve-box chamber 83, all arranged for operation substantially as shown and described.

26. A manually and mechanically operative piano having a fall-board and one or more stops controlling the mechanical playing located at the case-front and provided with a cover openable for access to the stops during mechanical playing and adapted to be closed to conceal the stops during manual playing, and a fastening device adapted to secure the closed fall-board and the stop-cover to each other.

27. A manually and mechanically operative piano having a fall-board and a recess in its case-front below the keyboard, one or more stops controlling the mechanical playing lo-

cated in said recess, a hinged cover openable for access to the stops during mechanical playing and adapted to be closed to conceal the stops during manual playing, and a lock applied to the stop-cover and adapted to engage the fall-board and secure both fall-board and stop-cover closed.

28. A manually and mechanically operative piano having an opening in its case-front, and a vertically-adjustable music-rest sustained by bearings adapted to hold it raised to give view of and access to the tracker and music-rolls through said opening, and also permitting it to be lowered to close said opening and conceal the tracker and music-rolls.

29. A manually and mechanically operative piano having an opening in its case-front, and a vertically-adjustable music-rest sustained by bearings adapted to hold it raised to give view of and access to the tracker and music-rolls through said opening, and also permitting it to be lowered to close said opening and conceal the tracker and music-rolls, and also adapting it to be swung outward at its lower adjustment to hold sheet or book music.

30. A manually and mechanically operative piano having an opening in its case-front, guides on the case including slots with an offset at their upper end, a music-rest having pins adapted to rock and slide in said slots and to rest in their upper offsets to hold the music-rest above the case-front opening to give view of and access to the tracker and music-rolls during mechanical playing, the music-rest bearings also permitting it to be swung outward at its lower adjustment to hold sheet or book music during manual playing.

31. A manually and mechanically operative piano having an opening in its case-front, guides on the case including parts having upwardly and rearwardly ranging portions with an offset or shoulder at their upper ends, a music-rest having pins adapted to rock and slide in the inclined guides and to rest in their upper offsets to hold the music-rest above the case-front opening to give view of and access to the tracker and music-rolls and also sustain the raised music-rest in an inclined position to permit tone-outlet from case-openings at opposite edges of it during mechanical playing, said music-rest bearings also permitting it to be swung outward at its lower adjustment to hold sheet or book music and facilitate tone-outlet during manual playing, and to be also swung inward to close the case-front opening and conceal the tracker and music-rolls.

32. A manually and mechanically operative piano having an upper front case-opening and a vertically-adjustable music-rest adapted to close said opening, combined with a transparent plate movably fitted at the lower part of said case-opening and adapted, when the music-rest is raised, to give access to the tracker and music-rolls and when closed giving view of the traveling music-sheet while

deafening hissing sounds from the tracker during mechanical playing.

33. A manually and mechanically operative piano having an upper front case-opening and
5 a pivoted vertically-adjustable music-rest adapted to close said opening, combined with a hinged transparent plate which when the music-rest is raised is adapted to give access
10 to the tracker and music-rolls and when closed gives view of the traveling music-sheet while deafening hissing sounds from the tracker during mechanical playing.

34. A manually and mechanically operative piano having an upper front case-opening and
15 a pivoted vertically-adjustable music-rest adapted to close said opening, combined with a hinged transparent plate which when the music-rest is raised is adapted to give access to the tracker and music-rolls and when closed
20 gives view of the traveling music-sheet while deafening hissing sounds from the tracker during mechanical playing, said transparent plate also being adapted to support the lowered music-rest in forwardly-inclined position
25 for holding sheet or book music during manual playing.

35. A manually and mechanically operative piano having an upper front case-opening, a
30 vertically-adjustable music-rest pivotally supported at the upper part of said opening and a cross-bar at the lower part of the opening, combined with a transparent plate hinged at the upper edge to said cross-bar and openable fully upward behind the lowered or raised
35 music-rest, and also adapted to sustain the

lowered rest in forwardly-inclined position for holding sheet or book music; said transparent plate, when closed below the raised music-rest, giving view of the traveling music-sheet while deafening hissing sounds from the
40 tracker during mechanical playing.

36. A manually and mechanically operative piano having an upper front case-opening, guides on the case including upwardly and
45 rearwardly ranging parts with an offset or shoulder at their inner end, a vertically-adjustable music-rest pivotally supported in said inclined guides, and a cross-bar at the lower part of said case-opening, combined with a
50 transparent plate hinged at its upper edge to said cross-bar and openable fully upward behind the raised music-rest to give access to the tracker and music-rolls; said cross-bar being adapted to hold the raised music-rest in
55 inclined position to permit tone-outlet from case-openings at opposite edges of it during mechanical playing, said transparent plate being also adapted to sustain the lowered music-rest in forwardly-inclined position to hold
60 sheet or book music and facilitate tone-outlet during manual playing, said transparent plate when closed below the raised music-rest giving view of the traveling music-sheet while deafening sounds from the tracker during mechanical playing.

JOSE SAMPERE.

Witnesses:

JACOB APPELL,
WM. A. BENJAMIN.