No. 649,174. Patented May 8, 1900.

L. W. NORCROSS.

PIANO.

(Application filed Sept. 7, 1899.)

(No Model.) 4 Sheets—Sheet 1.

Fig. 1.

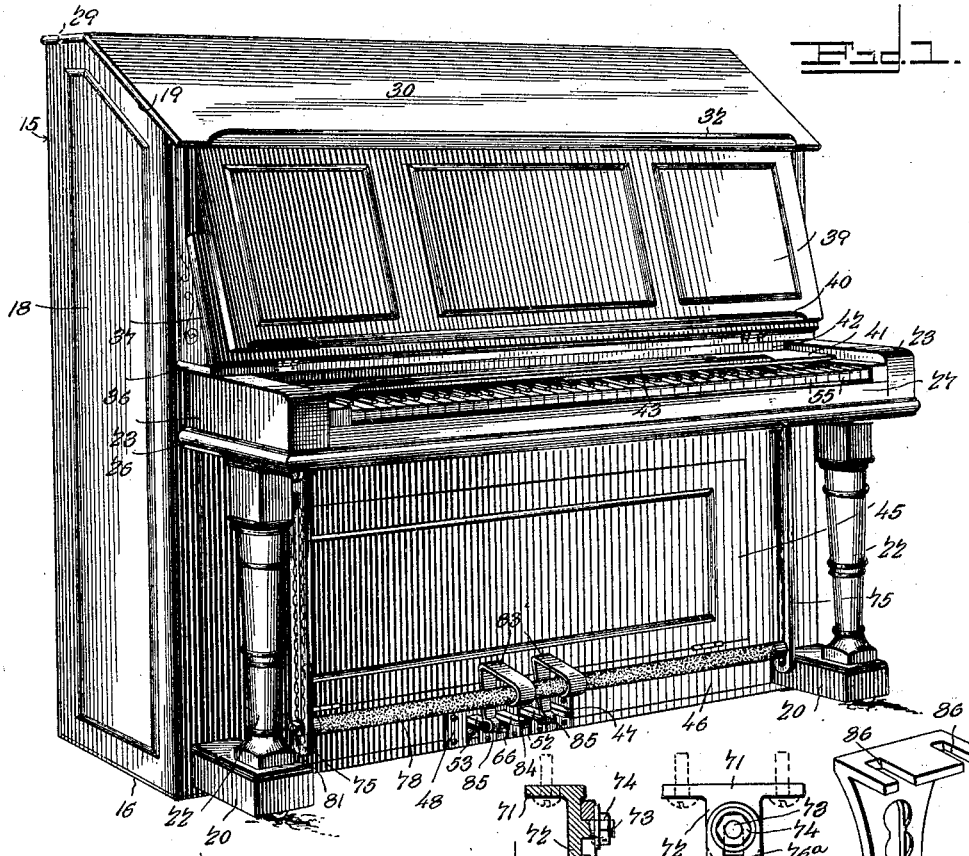


Fig. 2.

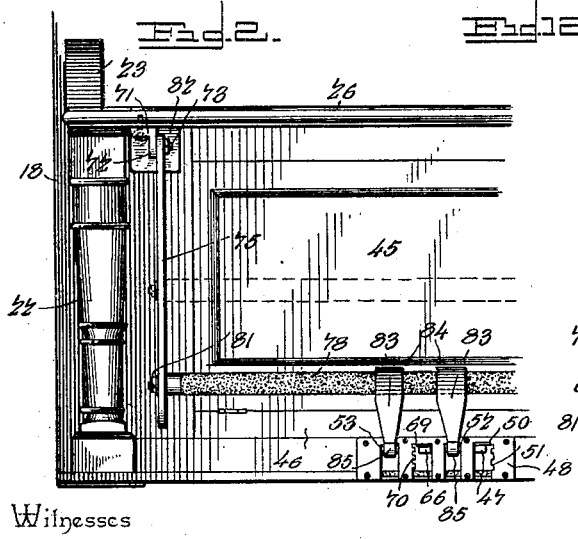


Fig. 12.

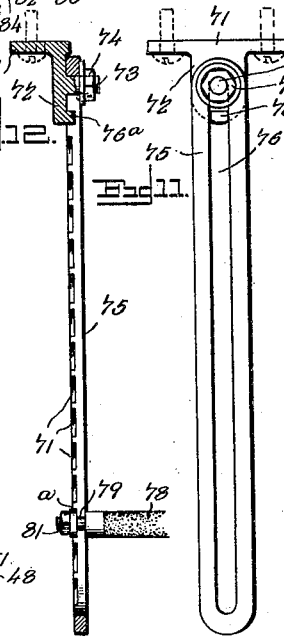
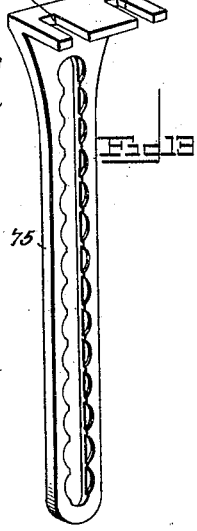


Fig. 11.

Fig. 13.



Witnesses

E. F. Stewart.

Geo. H. Chandlee.

By his Attorneys.

C. A. Snow & Co.

Inventor

L. W. Norcross

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(No Model.) 4 Sheets—Sheet 2.

Fig. 4.

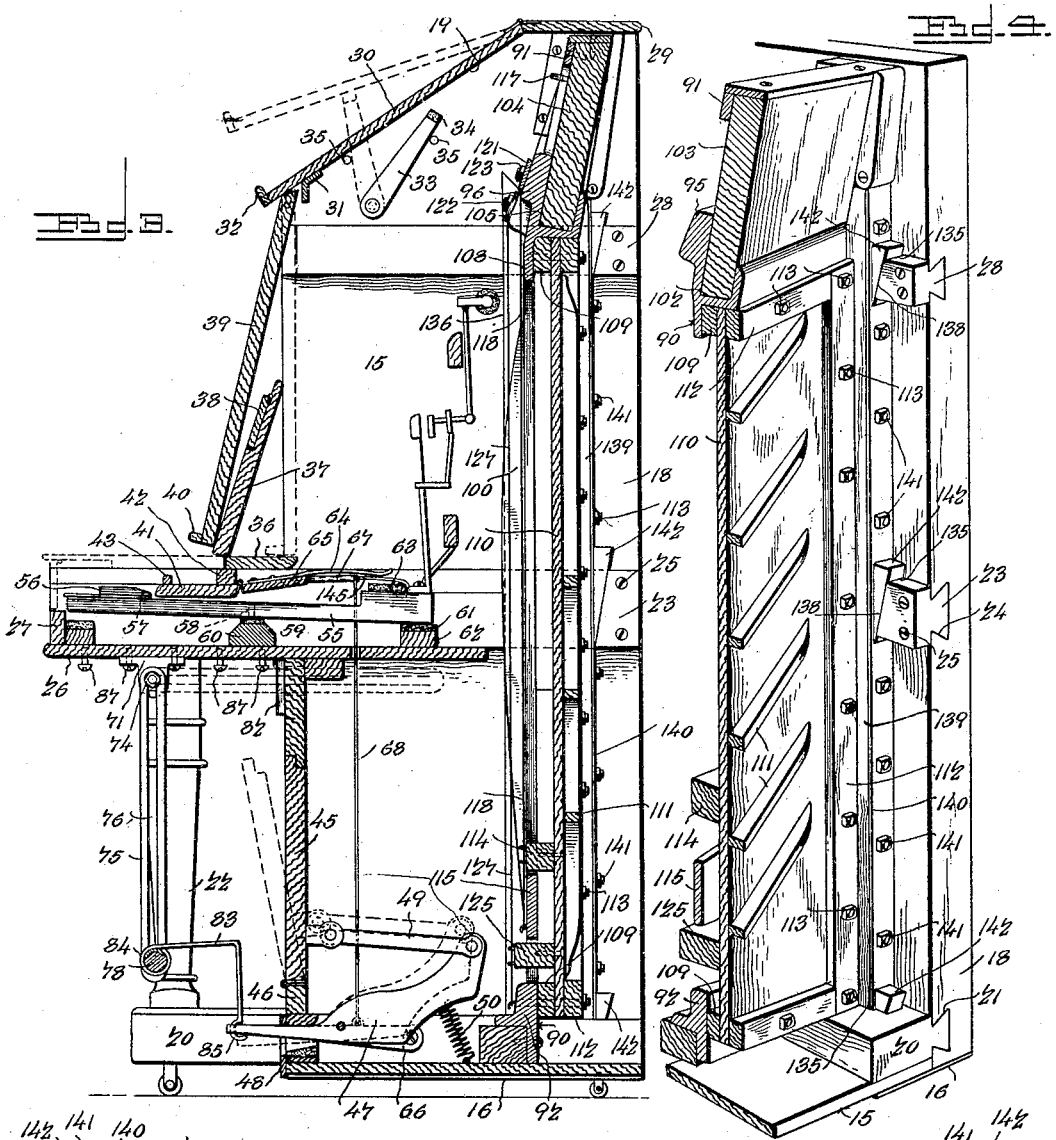
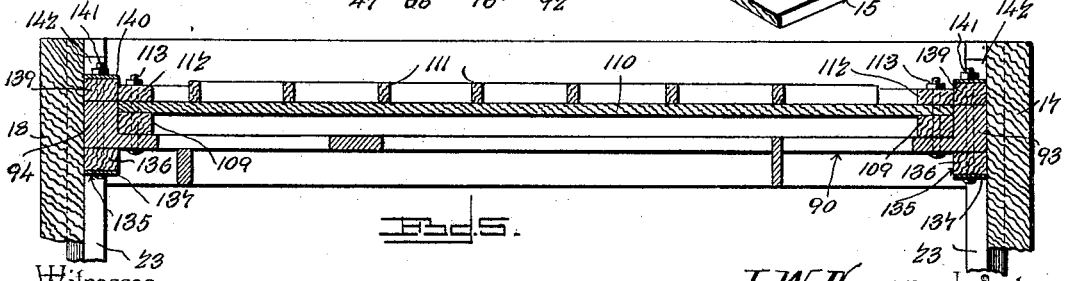


Fig. 5.



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Geo. H. Chandlee.

L. W. Norcross Inventor

By his Attorneys,

C. A. Snow & Co.

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(No Model.) 4 Sheets—Sheet 3.

Fig. 8.

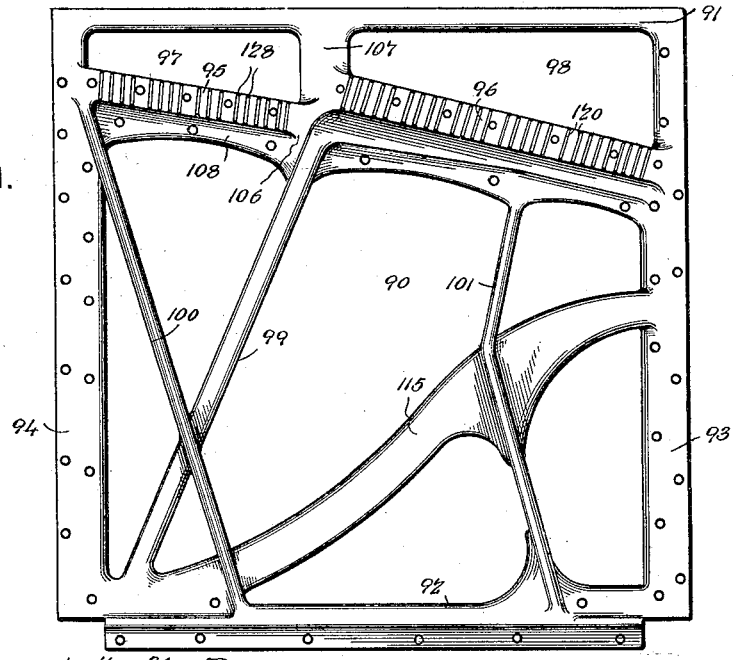


Fig. 6.

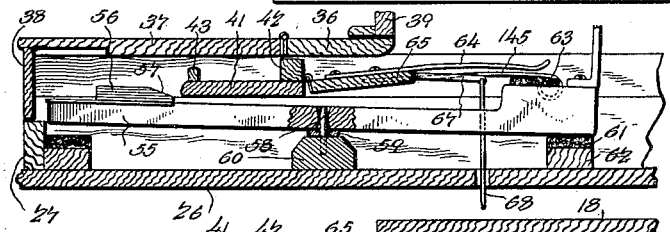
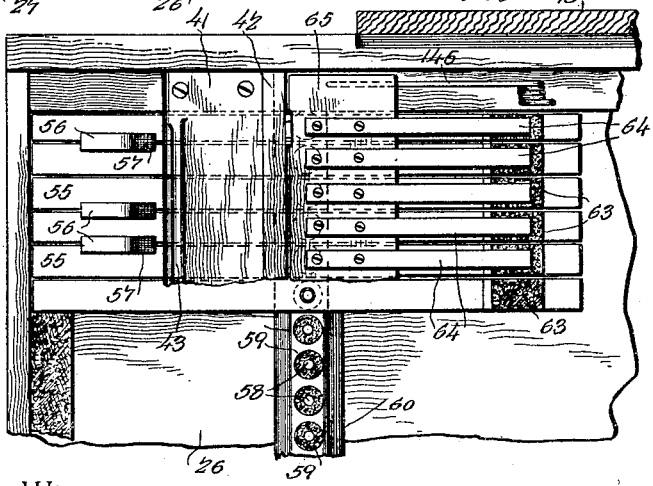


Fig. 7.



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E. K. Stewart.

Geo. H. Chandlee.

L. W. Norcross Inventor

By Wis Attorneys,

C. A. Snow & Co.

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Fig. 9.

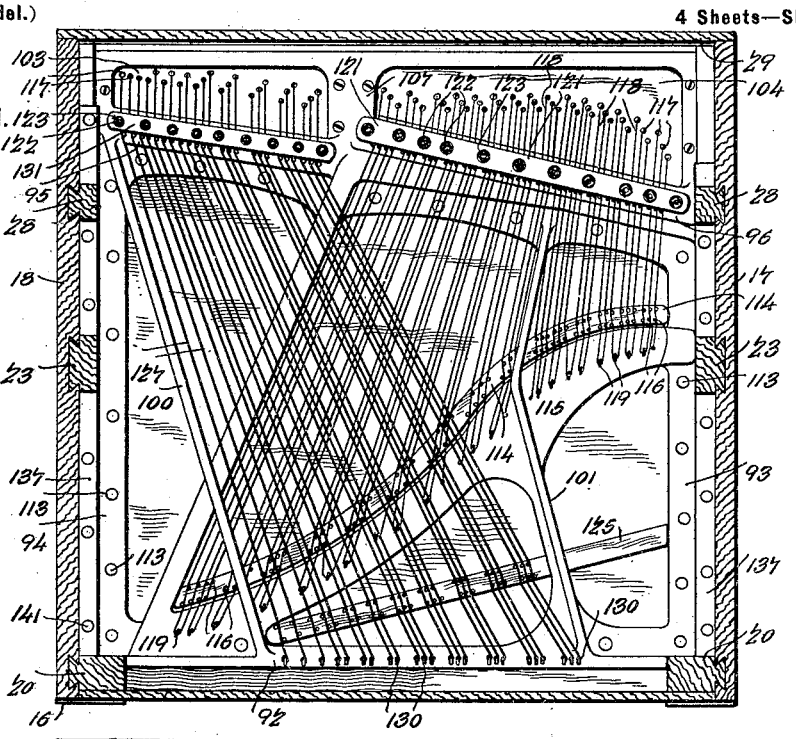
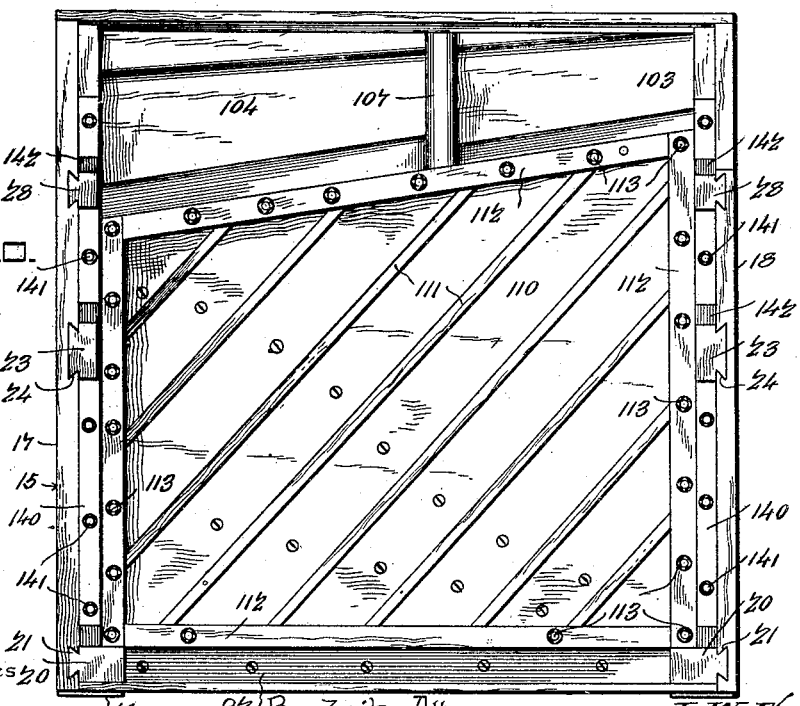


Fig. 10.



Witnesses
E. F. Stewart.
Geo. H. Chandlee.

Inventor
L. W. Norcross

By his Attorneys,
C. A. Snow & Co.

UNITED STATES PATENT OFFICE.

LEVI WATSON NORCROSS, OF PARIS, TEXAS.

PIANO.

SPECIFICATION forming part of Letters Patent No. 649,174, dated May 8, 1900.

Application filed September 7, 1899. Serial No. 729,764. (No model.

To all whom it may concern:

Be it known that I, LEVI WATSON NORCROSS, a citizen of the United States, residing at Paris, in the county of Lamar and State of Texas, have invented a new and useful Piano, of which the following is a specification.

This invention relates to pianos in general, and more particularly to that style known as "upright" pianos, although numerous features of the construction might be applied to the square piano; and the object of the invention is, first, to provide a construction of case in which warping of the sides and finger-board support will be prevented, in which convenient racks for holding music in use may be provided, in which the music to be used may be continuously arranged, so as to be readily accessible, and in which the sounding-board and string-carrying frame may be readily inserted and removed and may be held firmly in place.

A second object of the invention is to produce a string-supporting frame in which the strings will be held against slipping, in which a greater percentage of the strings may be comprised in the overstringing, and in which the pin-blocks for the tuning-pins may be readily applied and removed.

A third object of the invention is to provide means for varying the tension of the keys to better exercise the fingers of a student or to compensate for the excessive strength of touch of the musician.

A fourth object of the invention is to provide a system of pedals which may be manipulated to operate the tension apparatus, to move the dampers, and to open and close a portion of the casing to increase the loudness or diminish it.

An additional object of the invention is to provide adjustable means for enabling a child to operate the pedals and for moving this operating mechanism out of the way when desired.

Other objects of the invention will be evident from the following description.

In the drawings forming a part of this specification, and in which like letters and numerals of reference indicate similar parts in the several views, Figure 1 is a perspective view showing the complete instrument with the keyboard-cover raised and the swinging front in position to receive the music. It further shows the location and arrangement of the means for permitting a child operating the pedals. Fig. 2 is a detail front elevation of a portion of the front of the instrument below the keyboard. Fig. 3 is a vertical section of the complete instrument from front to back and taken at a point to the right of the pedals in Fig. 1. Fig. 4 is a detail perspective of a portion of the rear of the instrument, the sounding-board and string-frame with their attached parts being in section. Fig. 5 is a transverse section of the sounding-board and its mountings, together with the string-supporting frame and the adjacent portions of the sides of the casing. Fig. 6 is a detail transverse section of the keyboard-frame and keyboard-cover, showing the arrangement of a key and the location of the tension devices. Fig. 7 is a plan view of Fig. 6. Fig. 8 is a front elevation of the string-supporting frame. Fig. 9 is a vertical section of a piano, taken directly in front of the strings and showing in elevation the string-supporting frame and the strings thereon. Fig. 10 is a rear elevation of the piano, showing the battens upon the rear of the sounding-board and the location and arrangement of the clamping-strips which hold the latter against the string-frame. Fig. 11 is an elevation showing the foot-rest support and its attaching-bracket. Fig. 12 is a central vertical section of Fig. 11. Fig. 13 is a perspective view showing a rigid foot-rest support.

Referring now to the drawings, and more particularly to Figs. 1, 2, 3, 4, and 5, the casing of the piano consists of a body 15, to the ends of which and at the under sides are fixed metallic plates 16, extending beyond the bottom to lie upon the lower ends of the side pieces 17 and 18 of the frame. These side pieces are continued upwardly to the usual height, and the front upper corners are cut away, as shown at 19, for a purpose to be presently explained.

Slidably connected with the side pieces 17 and 18 are bottom sills 20 through the medium of dovetail joints 21, and which sills extend forwardly beyond the front edges of the sides

and receive upon their upper surfaces the pillars or supports 22, which act to support the keyboard-frame. This keyboard-frame is fixed to sills 23, slidably connected with the sides through the medium of dovetailed joints 24 and are held against accidental displacement by means of screws 25, as shown. These sills, as also the sills 20, extend throughout the inner faces of the sides, and the sills 23 project over and beyond the forwardly-protruding portions of the sills 20 and have fixed thereto the usual keyboard-boxing, including a bottom 26 and front 27. A third set of transverse sills 28 have a dovetailed connection with the sides and are disposed upon the inner faces thereof just below the lower ends of the cut-away portions 19, the effect of these sills in their dovetailed connections and in their extensions entirely across the inner faces of the sides being to effectively prevent warping of the sides and consequent displacement of the keyboard-frame with the well-known objectionable results.

Upon the upper horizontal ends of the sides is fixed a top 29, which extends forwardly to the cut-away portion 19 and has hinged to its forward edge a lid 30, adapted to lie upon the side pieces at their cut-away portions and also to rest upon a transverse angle-iron 31, the ends of which are let into slots in the sides of the casing, one member of the angle-iron lying flush with the cut-away portions. The front edge of the hinged lid 30 is provided with an upwardly-directed rib or bead 32, extending throughout its length and which acts to prevent music from sliding from the lid, and thus to enable the music to be used to be placed upon the lid in a position to be readily accessible to the performer and also where it may be readily inspected to permit selection. When desired, the lid may be supported in a raised position by means of props 33, one of which is pivoted upon the inner face of each side 17 and 18 in a position to be rotated to project beyond the cut-away portion and having felts 34 at their outer ends for direct contact with the lid. When in their inoperative positions, these props rest against stop-pins 35.

Upon the sills 23 and projecting slightly inwardly beyond the front edges of the sides 17 and 18 is fixed a transverse board 36, to which is hinged a fall-board or lid 37, adapted to lie upon the upper edges of the sills and to extend slightly beyond their outer ends, this lid having a supplemental closure 38 hinged thereto and which is adapted to close the front end of the keyboard-boxing and to rest upon the upper surface of the front piece 27 of the latter. When this fall-board or lid 37 is raised, it may rest against the front edges of the sides or it may rest against the front face of the swinging front board 39, which latter is pivotally connected at its ends adjacent the upper side to the sides 17 and 18 and between them, this front board being adapted to swing and to be moved to lie either in front or behind the lid 37 when the latter is in its raised position. This front 39 has a music-supporting strip or rest 40 adjacent its lower edge and upon which the music to be played may be placed when the lid 37 is disposed behind the front. When the lid is raised to lie against the front, the music is disposed against the under surface of the lid, with its lower edge resting against a board 41, attached transversely of and intermediate the sills 23 and in a plane below the board 36, with which it is connected by means of a strip 42. This board 41 has a bead 43 at its outer edge to prevent the music sliding therefrom.

The front of the piano-casing below the keyboard comprises a vertically-swinging door 45, pivoted at its lower edge to a cross-piece 46. This door is adapted to be opened and closed by means of a pedal 47, pivotally mounted in the casing and extending outwardly through an opening in a plate 48 upon the front thereof, this pedal having angular form and being connected at its upper end with the door 45 through the medium of a link 49. A return-spring 50 is connected with the pedal and the bottom of the casing and holds the pedal normally in a position to close the door. In order to hold this pedal in a position with the door open, said pedal is provided with a knife-edge 50, adapted to engage the teeth of a rack 51, forming one side of the opening in the plate 48, through which the pedal is passed. The pedal has more or less lateral movement at its outer end, and thus may be moved downwardly and pressed laterally to engage the knife-edge with the rack. In addition to the pedal 47 are employed the usual soft and loud pedals 52 and 53 and which have the usual connections with a common form of damper mechanism. Within the keyboard-boxing is arranged a series of keys comprising white keys 55 and black keys 56, the inner ends of the black keys being sloped, as shown at 57, to facilitate the sliding of the fingers of the operator from one set of keys to the other. These keys are each provided with a slot for the reception of a pin 58 and rest directly upon washers 59, disposed upon the pins, said pins and washers being carried by a metallic bar 60, fastened to the bottom 26 and secured at its ends to the sills 23. This bar being of metal, it is not susceptible to warping, and the keys are thus held at all times in their proper position.

The keys 56 form elements of any desired construction of piano-action, and beneath their ends are arranged stop-pads 61, carried by blocks 62. Each key, at the inner end thereof and upon its upper surface, is provided with a pad or cushion 63, adapted to engage spring-fingers 64, carried by a plate or board 65, hinged to the inner edge of the board 41. These fingers 64 equal in number the keys, and the outer or free end of each finger is disposed above the cushion or pad of its respective key. These fingers are

adapted to be raised and lowered to release or lie upon the keys, and thus resist the operation of the latter to increase the tension of the keys and form a means for exercising the fingers of the student and to counteract the effect of excessive strength of touch of the musician. In order to move the spring-fingers 64 into and out of operative relation to the keys, a pedal 66, pivoted adjacent the pedals 52 and 53 and between them, is connected with an arm or plate 67, carried by the plate 65, and which connection is made through the medium of a rod 68. The pedal 66 projects through a slot in the plate 48 and has a knife-edge 69, adapted for engagement with a rack 70, forming one side of said slot. The pedal 66 is adapted for engagement by the foot of the musician and has sufficient lateral play to permit the engagement and disengagement of the knife-edge 69 with the rack 70. With this construction it will be seen that not only may the usual dampers be operated to vary the loudness of the instrument, but that the front of the piano-casing may be opened with the foot and that the tension of the keys may be varied in the same manner when desired.

Referring now to Figs. 1, 2, 3, 11, and 12, in order to provide a foot-rest for the feet of a child and to permit the adjustment of this rest for different conditions, a bracket 71 is fixed to the under side of the bottom of the keyboard-boxing and at each end thereof, and each of which brackets comprises an ear 72, having a stud 73, provided with threads for the reception of a clamping-nut 74. In connection with this bracket is employed a hanger 75, having a longitudinal slot 76, which is disposed to receive the stud 73, so that the hanger may be clamped against the ear 72 by means of the nut 74. A lug 76^a upon the lower end of the ear 72 is adapted to enter and fit the slot 76 when the hanger is in its vertical position. In the outer surface of each hanger 75 and communicating with the slot 76 is formed a plurality of arc-shaped recesses 77, lying upon the opposite sides of the slot 76 and disposed in pairs, the curvilinear outlines of these recesses coinciding with circles of which they are the arcs. In connection with these hangers is employed a transverse bar 78, having a suitable covering—such as rubber, corduroy, &c.—and at the ends of which are secured studs 79, lying in the slots of their respective hangers. Upon each stud is disposed a washer *a*, adapted to lie in the elements of any pair of recesses 77, to hold the stud and the rest at a corresponding elevation, the washers being held in this position by means of clamping-nuts 81. When it is desired to throw the foot-rest out of its operative position, the nuts 74 are loosened and the upper ends of the hangers are moved from engagement with the lugs 76^a, after which the foot-rest and hangers are swung outwardly to a horizontal position and are then pushed inwardly, at which time the hangers travel along the upper faces of the said lugs and between them and the studs 73 and enter suitable openings in the front of the piano-casing, these openings being normally closed by means of doors 82.

It is sometimes desired to permit a child to operate the pedals 52 and 53, and to enable this there are provided pedal attachments consisting of plates 83, comprising each two elements lying at right angles to each other, the end of one element being formed into a clip 84, which fits over the foot-rest and may have pivotal movement with respect thereto, the other element having a clip 85 at its end, which clamps said element to the end of its respective pedal. The elements connected with the foot-rest lie substantially horizontal and are in a position to be engaged by the feet of a child with the usual result.

In Fig. 13 of the drawings is shown a modification of hanger having the bracket formed integral therewith and having slots 86 therein adapted to receive screws 87 in the under side of the bottom 26 of the keyboard-boxing, this construction permitting the ready engagement and disengagement of the bracket with the screws to permit adjustment of the foot-rest inwardly and outwardly. Similar slots are formed in the brackets 71 for a like purpose.

The stringing of the piano is carried by a frame 90, which is rectangular in outline and comprises a top 91, a bottom 92, and sides 93 and 94. Upon reference to Figs. 8 and 9 it will be seen that transversely of the upper portion of the frame are formed two bridges 95 and 96, disposed slantingly and parallel, the wrest-plate bridge 96 being somewhat longer than the bridge 95 and likewise lower, the upper end of the bridge 96 lying somewhat higher on the frame than lower end of the bridge 95. Between the bridge 95 and the upper side 19 of the frame is a recess in the form of a truncated triangle and which recess is shown at 97. A similar and larger recess 98 lies intermediate the wrest-plate bridge 96 and the upper side of the frame, the wrest-plate bridge 96 being known as the "upper" treble-bridge and the wrest-plate bridge 95 as the "upper" bass-bridge. A hitch-pin plate 115 extends in a compound curve from the lower corner of the frame adjacent the side 94 to a point substantially midway of the ends of the side 93, the lower end of this plate being curved downwardly and the upper end curved upwardly. A brace 99 extends from the lower end of the hitch-pin plate to a point substantially intermediate the bridges 95 and 96, a second brace 100 crossing the brace 99 and extending from the upper end of the bridge 95 to a point about one-fourth the distance from the side 94 to the side 93 of the frame and upon the bottom 92. A third brace 101 extends substantially parallel with the last-named brace from a

point adjacent the lower end of the side 93 and upon the bottom 92 across the upper surface of the hitch-pin plate and thence upwardly to the bridge 96. In the upper edge of the wrest-plate bridge 95 is formed a channel 102, in which is seated a tuning-pin board 103, a second tuning-pin board 104 being disposed in a channel 105 in the upper edge of the bridge 96, these boards being separated by the cross-piece 107, connecting the plate upon which the bridges 95 and 96 are formed with the upper end 91 of the frame. This plate 106, upon which the bridges are formed, is provided with a downwardly-extending flange 108, and which flange is continued around the sides 93 and 94 and along the bottom 92. Against these flanges or continuous flange is disposed a wooden frame 109, it being understood that the frame comprising the sides 93 and 94 is of iron or other suitable metal. Against the frame 109 is disposed a sounding-board 110, having the usual battens 111 to prevent warping, a second frame 112, of wood, being disposed upon the rear surface of the sounding-board. Bolts 113 are passed through the frames 109 and 112, the sounding-board 110, and the flange 108, and thus act to clamp the parts securely together. A treble sound-board bridge 114 is disposed above the hitch-pin plate 115 and conforms to the curvature of the upper edge thereof and has the usual guide-pins 116. Tuning-pins 117 are inserted in the block 104 in accordance with any desired system of stringing, and to them are connected strings 118, extending to hitch-pins 119 upon the hitch-pin plate. Grooves 120 are formed in the wrest-plate bridge 96 to receive the strings 118 and are grouped to conform to the system of stringing. In order to prevent slipping of the strings through the grooves 120, a clamping-plate 121 is arranged above the bridge and has perforations therein for the reception of threaded studs 122, adapted to receive clamping-nuts 123, through the medium of which the plate is clamped upon the wires to hold them against the bridge. The lower or bass sound-board bridge 125 is disposed below the hitch-pin plate 115 and has guide-pins 126 thereon, with which are engaged the overstrings 127. These strings pass through grooves 128 in the wrest-plate bridge 95 and are attached to tuning-pins 129 in the pin-block 103, the opposite ends of the strings being engaged with hitch-pins 130, engaging perforations in the lower side 92 of the string-supporting frame and intermediate the braces 100 and 101, the brace 100 lying substantially parallel with the overstringing. A clamp-plate 131, corresponding to the plate 121, is correspondingly arranged with respect to the bridge 95 to clamp the overstrings thereagainst and prevent slipping.

From the above it will be seen that the string-supporting frame is so braced as to effectively resist the strain upon the strings, while at the same time the usual braces between the lower strings and the upper strings are omitted, giving ready access to the strings and permitting a greater percentage of the entire stringing to be included in the overstringing.

In placing the string-supporting frame, with the sounding-board and other connected parts, into the piano-casing said frame is disposed in vertical slots 135, formed in the sills 20, 23, and 28, and the bottom walls of which slots lie flush with the inner faces of the sides of the piano-casing. Intermediate the string-supporting frame and the front sides of these slots are uprights 136, having metallic facings 137, which directly engage said front walls, and against the rear faces of said uprights the string-supporting frame lies. The rear walls of these slots 135 are sloped inwardly and downwardly, as shown at 138, and intermediate said rear walls and the rear side of the string-supporting frame are disposed additional uprights 139, having metallic facings 140 at their rear surfaces. The uprights 136 and 139 are clamped upon the string-supporting frame through the medium of bolts 141, the entire structure being forced and held against the front walls of the slots 135 through the medium of wedges 142, disposed between the facing-plates 140 and the inclined rear walls 142 of the slots. With this structure it will be readily seen that the employment of the wedges 142 permits the string-supporting frame and sounding-board being held firmly in place, and at the same time said wedges may be readily removed to permit withdrawal of the sounding-board and string-supporting frame, facilitating both the building of the piano and the repairing of it.

As shown in Figs. 6 and 7 of the drawings, a spring 145 is arranged to normally hold the spring-fingers from engagement with the keys.

It will of course be understood that in practice any specific system of stringing may be employed and that the proportions and materials of the various parts, as also their specific structure, may be varied without departing from the spirit of the invention.

It will be noted upon reference to Figs. 3 and 4 of the drawings that the pin-blocks are slanted rearwardly and that the locations of the pins in the pin-blocks are such that the wires pass outwardly to the bridges and then downwardly, so that the desired downward pull across the bridge is secured and the usual wedge-blocks are not necessary.

What I claim is—

1. A piano-casing comprising a bottom and sides, a bottom sill let into the surface of each side and extending forwardly beyond the side, a keyboard-sill let into the surface of each side and extending beyond the front edge of the side, and a top sill let into the surface of each side, said sills extending entirely across their respective sides.

2. A piano-casing comprising a bottom and sides, and top, bottom, and keyboard sills

having dovetail connections with each side and extending entirely across their respective sides.

3. A piano-casing comprising a bottom and sides, the upper front corners of the sides being cut away, a top fixed to the upper ends of the sides, and a lid hinged to said top and adapted to rest upon the cut-away portions and having a bead at its front edge.

4. A piano-casing comprising a bottom and sides, the upper front corners of the sides being cut away, a top fixed to the upper ends of the sides, a lid hinged to the top and having a bead at its front edge, said lid being adapted to lie upon the edges of the cut-away portions, and a support adapted to hold the lid above said edges.

5. A piano-casing comprising a bottom and sides, a keyboard-boxing comprising a music-rest, a lid for the boxing adapted to coöperate with said rest to support the music, and a swinging front pivotally connected with the sides and having a music-supporting bead at its lower edge, said front being adapted to lie at either side of the said lid.

6. A piano-casing comprising a swinging door, a pedal pivoted in the casing and projecting therefrom, a link pivoted to the door and to the pedal, a spring connected with the pedal and the casing and adapted to hold the door normally closed, and a rack adapted for engagement by the pedal to hold the door against the tendency of the spring.

7. The combination with a piano and the keyboard thereof, of brackets connected to the keyboard and comprising each a central threaded stud and a lug, slotted hangers slidably mounted upon the studs and adapted to receive the lugs in their slots to hold the hangers against pivotal movement, and a foot-rest adjustably connected with the hangers.

8. In a piano, the combination with the keyboard-boxing, of brackets connected therewith, hangers pivotally and slidably connected with the brackets, recesses in the hangers, and a foot-rest slidably engaged with the hangers and having nuts adapted to enter the recesses thereof to hold the foot-rest at different points of its slidable movements.

9. The combination with a piano having openings below the keyboard, and the sills thereof, of screws engaging the sills, brackets having slots adapted to interchangeably receive the screws, whereby the brackets may be adjusted with respect to the keyboard-sills, and hangers pivotally and slidably connected with the brackets and adapted to enter the said openings of the piano.

10. In a piano, the combination with the pedals and a foot-rest, of supplemental pedals connected with the first-named pedals and foot-rest and comprising tread portions lying above the planes of their respective pedals and pivotally connected with the pedals.

11. In a piano, the combination with the pedals, of supplemental pedals comprising clips engaging the pedals and tread portions pivoted with respect to the piano and lying in planes above their respective pedals.

12. The combination with a piano and the keyboard-sills, of brackets secured to the sills, hangers pivotally and slidably connected with the brackets, a foot-rest adjustably connected with the hangers, pedals, and supplemental pedals connected with the main pedals and with the foot-rest.

13. In a piano, the combination with the keyboard-sills, of screws in the under side thereof, brackets having slots adapted to interchangeably receive the screws to adjust the brackets along the sills, hangers pivotally connected with the brackets, and a foot-rest adjustably connected with the hangers.

14. In a piano, the combination with the keys, of a board hinged adjacent thereto, spring-fingers fixed to the board and adapted for engagement with the keys, means for holding the fingers normally out of engagement with the keys, a pedal connected with the board and adapted to move the fingers into and out of engagement with the keys, and a rack adapted for engagement by the pedal to hold the fingers in a predetermined position.

15. In a piano, the combination with the sides thereof having sills provided with alining slots, of a string-supporting frame disposed in said slots, and means for holding said frame against displacement.

16. In a piano, the combination with the sides having sills provided with alining slots, of uprights within the slots, a string-supporting frame intermediate the uprights of each series of slots, means for clamping the uprights to the frame, and means for holding the uprights and frame against displacement in the slots.

17. The combination with a piano-casing comprising sides having transverse sills provided with alining slots, one side of each slot lying at an angle to the opposite side, of a string-supporting frame disposed in said slots, and a wedge in each slot intermediate a wall of the slot and the string-supporting frame, and adapted to hold the latter against displacement.

18. The combination with a piano-casing comprising sides having sills provided with slots, the slots at each side being alined vertically, and one side of each slot being slanted in the direction of the opposite side, of a string-supporting frame disposed in said slots, and a wedge driven intermediate the slanting side of each slot and the string-supporting frame.

19. A string-supporting frame comprising a treble wrest-plate bridge, a treble hitch-pin plate at an angle to said bridge, a brace connecting the remote end of the hitch-pin plate with the bridge, pin-block openings having a separating-web in line with said brace, a bass hitch-pin plate at the opposite side of the treble hitch-pin plate from the bass wrest-plate bridge, and a brace crossing the first-named brace connecting the outer ends of the

bass wrest-plate bridge and the bass hitch-pin plate.

20. The combination with a string-supporting frame having its upper portion bent rearwardly and provided with pin-block openings having a separating-web, of bass and treble wrest-plate bridges, each lying at an angle to the upper side of the frame and separated therefrom by the pin-block openings, said bridges having grooves in their upper edges, pin-blocks within the openings and lying upon the rear face of the frame, a treble hitch-pin plate, a brace extending from one end of said hitch-pin plate to the web between the pin-block openings, a bass hitch-pin plate, a brace extending from one end of the bass hitch-pin plate to the treble hitch-pin plate and then to the treble wrest-plate bridge at a point between the ends of the latter, and a third brace extending from the outer end of the bass wrest-plate bridge to the adjacent end of the bass hitch-pin plate and crossing the first-named brace.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

LEVI WATSON NORCROSS.

Witnesses:

O. B. DICKEY,

B. BOOTH.