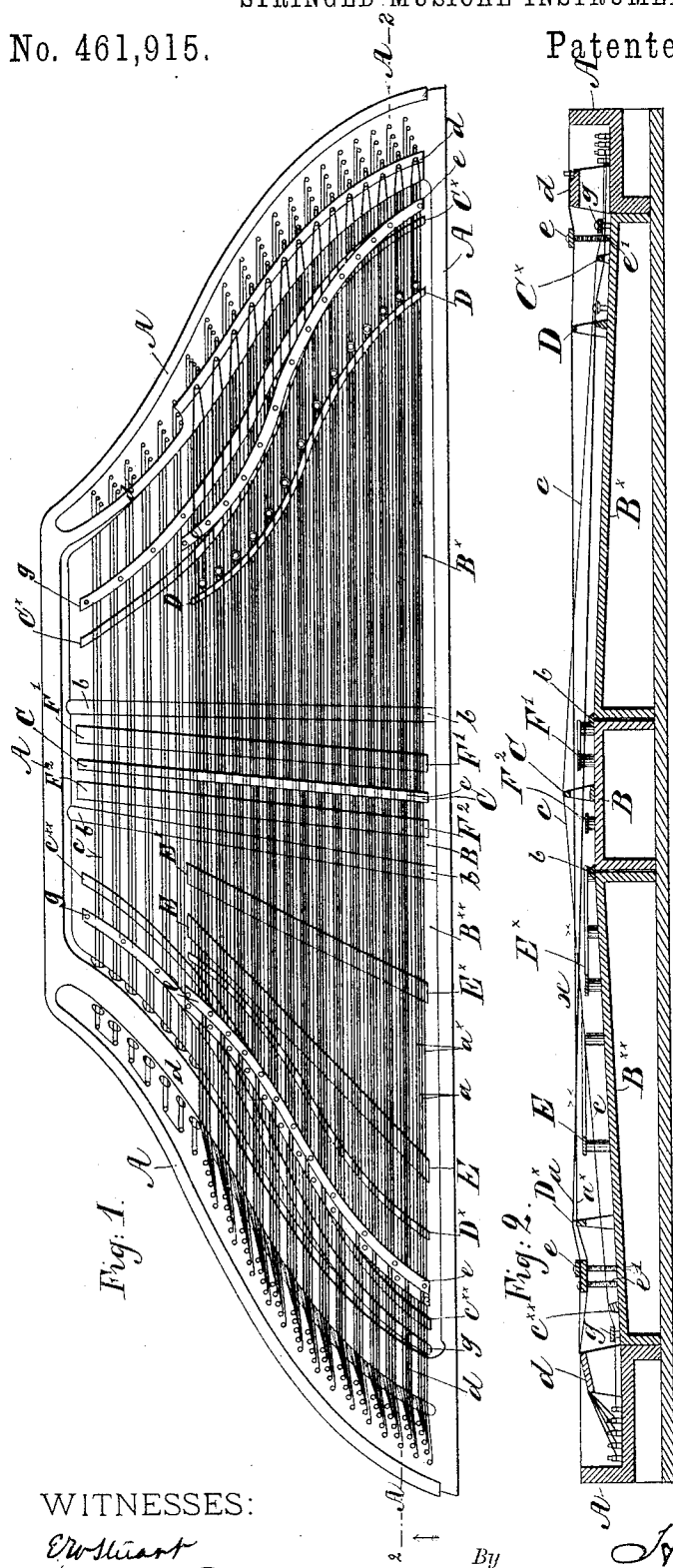


J. A. MACKENZIE.
STRINGED MUSICAL INSTRUMENT.

No. 461,915.

Patented Oct. 27, 1891.



WITNESSES:

Ernst
Mayro Goldmann

By

INVENTOR:

James A. Mackenzie
Henry Cornett
Attorney.

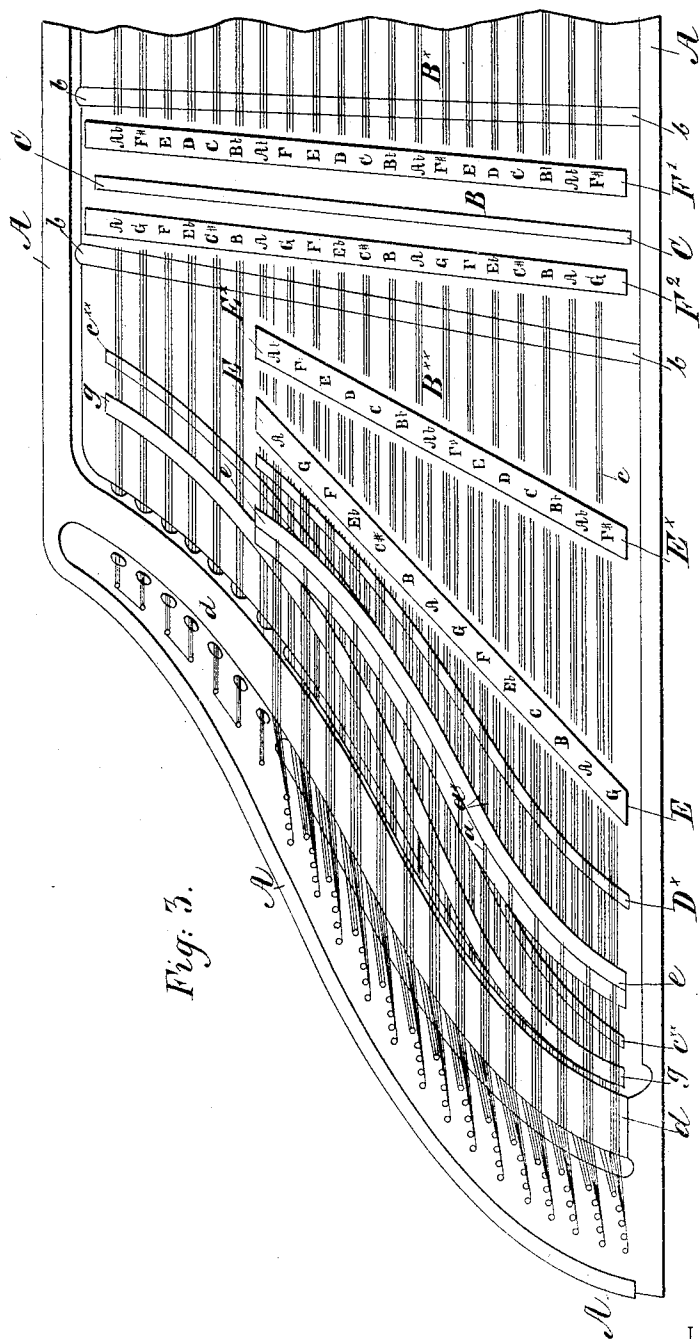
(No Model.)

3 Sheets—Sheet 2.

J. A. MACKENZIE.
STRINGED MUSICAL INSTRUMENT.

No. 461,915.

Patented Oct. 27, 1891.



WITNESSES:

Ernest
Mayro C. Goldman.

INVENTOR:

James A. Mackenzie

By

Henry Bennett
Attorney.

Attorney.

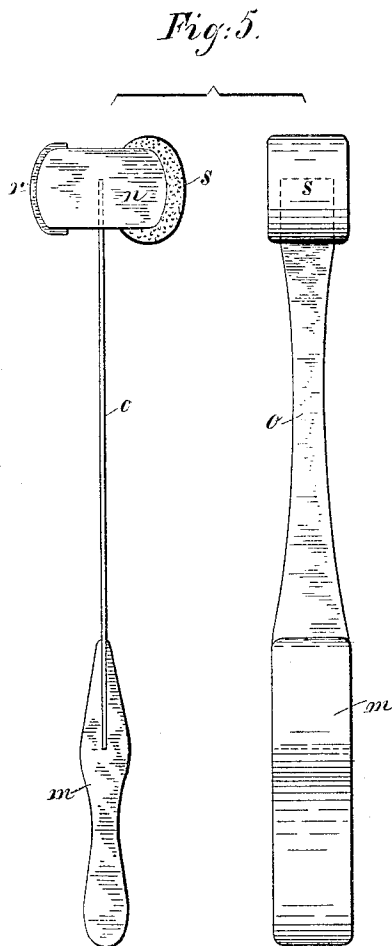
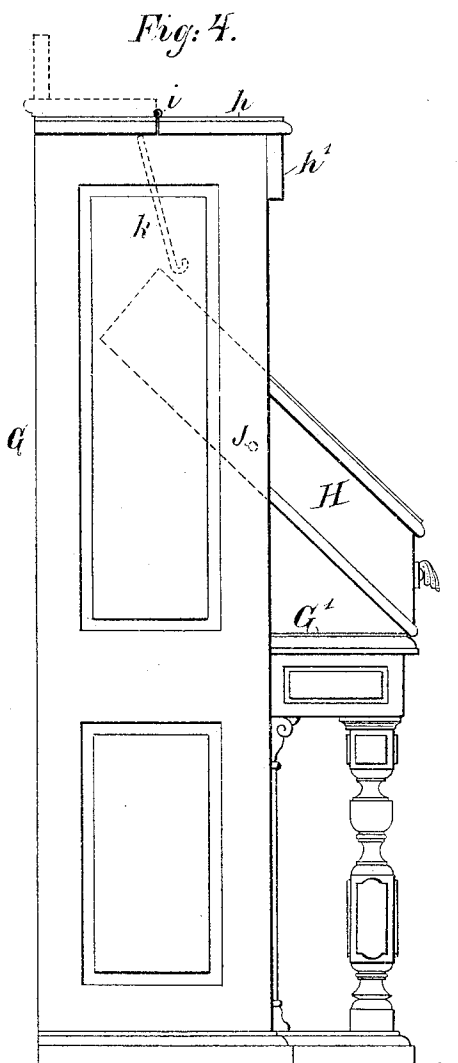
(No Model.)

3 Sheets—Sheet 3.

J. A. MACKENZIE.
STRINGED MUSICAL INSTRUMENT.

No. 461,915.

Patented Oct. 27, 1891.



WITNESSES:

Ernest Stuart
Mayro Goldman

INVENTOR:

James A. Mackenzie

By *Henry Bonnet*
Attorney.

UNITED STATES PATENT OFFICE.

JAMES A. MACKENZIE, OF MINNEAPOLIS, MINNESOTA.

STRINGED MUSICAL INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 461,915, dated October 27, 1891.

Application filed October 22, 1890. Serial No. 368,903. (No model.)

To all whom it may concern:

Be it known that I, JAMES A. MACKENZIE, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain Improvements in Stringed Musical Instruments, of which the following is a specification.

My invention relates to the class of stringed musical instruments of which that described in my application Serial No. 360,398 is a type; and the object of the present invention is in part to provide an instrument of this character having a full chromatic scale, and in part to improve the construction of the instrument, its case, and hammer, all as will be hereinafter described, and its novel features carefully defined in the claims.

In the accompanying drawings, which serve to illustrate my invention, Figure 1 is a plan of an instrument embodying my improvements; and Fig. 2 is a vertical section of the same, taken in the plane indicated by the line 2 2 in Fig. 1. Fig. 3 is an enlarged plan view of a part of the instrument as it appears when the strings are partly broken away. Fig. 4 is a side elevation of the case in which the instrument is mounted, and Fig. 5 illustrates the construction of the hammer.

A is the recessed cast-metal frame of the instrument, of a double harp-like contour, and within the hollow of said frame and fitting it are sounding-boxes, over which the strings pass.

B is the treble sounding-box, and B^x B^{xx} are the two bass sounding-boxes. The bass sounding-boxes do not quite touch the treble box at their adjacent edges in order that each may be free to vibrate independently. The crevices between the adjacent boxes may be covered by thin strips *b*, as seen in Fig. 2. The treble box B is nearly in the center of the instrument and extends from front to back of the same. The front of the instrument is below in Figs. 1 and 3.

C is the higher treble bridge near the center of and resting on the treble box B, and C^x C^{xx} are the lower treble bridges at the right and left sides of the instrument, respectively.

D is the bass bridge at the right, and D^x is the bass bridge at the left.

Fig. 2 illustrates clearly the arrangement

of the two sets of strings and the set of treble strings at the front or longer side of the instrument. The purpose in the arrangement of the strings, as shown and as will be described, is to give access to them for picking or playing. To effect this the strings are elevated at certain points, so that they may be played upon, and depressed at other points, so as to be out of the way. The strings of the two bass sets alternate with each other and are oppositely inclined in a vertical direction, being at the same level along a certain line, whereby one set is elevated at one side of said line and the other set is elevated at the other side of said line. The treble strings are elevated above the bass strings at both sides of the higher treble bridge and are inclined so as to pass below the bass strings and be out of the way. The treble strings also alternate in position with the bass strings. Thus the treble strings may be played at either side of the main bridge C, the tone at the right being half a tone lower than that at the left.

a are the strings constituting one bass set, and *a*^x are those constituting the other set. Both of these sets pass over the bass bridge D^x, (at the left;) but the strings *a* rest on the crown of said bridge and are raised at this point about one-fourth of an inch above the strings *a*^x of the other set, which latter rest in recesses in said bridge. This enables the strings *a* to be played upon near and at the right of bridge D^x without interfering with the other strings *a*^x; but the latter strings rise above the level of the strings *a* at the point *x* in Fig. 2 and pass over the crown of the bass bridge D at the right, the strings passing over a lower portion of said bridge. This enables the player to play on the strings *a*^x at the point *x* without interfering with the strings *a*. The treble strings *c* pass below both sets of bass strings at a point between bridge C and the point *x*.

At the proper place for playing the bass strings *a* I mount on the sounding-box B^{xx}, under the bass strings, a narrow plate E, preferably white or silvered and having marked on it, as seen in Fig. 3, the letters used in musical notation corresponding to the respective strings *a*—namely, G, A, B, C, E_b, F, &c. A similar plate E^x is mounted on the box B^{xx}

under the bass strings at or near the point x , where the bass strings a^x are played, and on this plate are marked the letters used in musical notation corresponding to the respective strings a^x —namely, F $\sharp$, A $\flat$, B $\flat$, C, D, E, &c.

Thus taking into account the alternate arrangement of the strings a and a^x of the two sets the scales on the two plates E and E ^{x} will read: G, F $\sharp$, A, A $\flat$, B, B $\flat$, C, &c.

On the treble sounding-box B are mounted under the strings the two plates F' and F ^{2} on the right and left sides of the treble bridge C, respectively. These plates bear the letters used in musical notation corresponding to the treble strings above them. The letters on plate F ^{2} are G, A, B, C, E $\flat$, F, &c., the same as those on plate E, and those on plate F' are F $\sharp$, A $\flat$, B $\flat$, C, D, E, &c., the same as those on plate E ^{x} .

To produce a chromatic scale of tones on the treble strings, if the right hand commences with F $\sharp$ at the front of the instrument, the left hand would take G, the lowest at the left, it being a half-tone higher than F $\sharp$ on the right. Next the right hand would take A $\flat$ on the right a half tone higher than G on the left, and next A on the left is played. Thus each succeeding note played is a half-tone higher than that last played, the play alternating from side to side of the treble-bridge. The two sets of bass strings may be played upon in the same manner, thus producing a chromatic scale of tones on the bass-strings. The bass strings are "two-string unison"—that is, there are two strings in each group played upon together—and there are two of these groups or double strings between each group of the treble strings, which are "three-string unison." The bass strings are played only on the left, as in a piano. The bass strings give tones an octave below the treble strings of the same letter. Both sets of bass strings pass under the higher treble bridge C, and the treble strings pass under the bass bridges.

On the frame A are raised supports d , over which the bass strings pass. These elevate said strings to nearly the same level as the bass bridges, so that in straining the strings the pressure on the bridges, which is transmitted to the light sounding-boxes, will be inconsiderable. The strings are kept down to the bridges by fret-bars e , supported by screws e' , which screw down into the sounding-boxes. Thus the strain or pressure on said boxes by the pressure of the bridges is counterbalanced by the lifting strain due to the upward pressure of the strings on said bars e , which is transmitted to the boxes through the medium of the screws. This is very important, as the sounding-boxes will be light and thin.

The treble strings will be provided with similar fret-bars g .

Fig. 4 illustrates the form of upright case in which the instrument is mounted. In this view G, is the case, provided with a projecting part or shelf G', The front half of the

cover h is hinged to the fixed half at i , so that it may be turned back thereon, as indicated in dotted lines. H is a box in which the instrument is set and fixed. This box is pivotally mounted in the case G at j , so that it may be let down and rest on the projecting part G' in position for playing, as seen in full lines in the drawings, or turned up and back into the case, so that its bottom, which may be of ornamented wood-work, will form a front to the case above the part G'. There is a music-rack k in the upper part of the case G, secured at its upper edge to the fixed part of the cover thereof. This rack is represented in dotted lines in the figure.

The advantages I claim for my improved instrument are these: It is, so far as I am aware, the first of its class having a full chromatic scale, whereby it is adapted for playing classical music as well as ordinary simple music, such as ballad music, waltzes, &c. The three independent sounding-boxes made from thin material, similar to that employed in violins and violoncellos, impart a full tone not attainable in these instruments as ordinarily constructed. The mode of stringing described brings each string into position at the proper point to be played upon. The manner of straining the strings over the bridges with the aid of the fret-bars relieves the thin sounding-boxes of undue strain and compression.

Fig. 5 illustrates the hammer I prefer to employ for playing the instrument, the views being elevations taken at right angles to each other. The handle m , which is gripped by the fingers, may be of any suitable material, as wood, ivory, &c. The head n may also be of similar material. The handle m and head n are united by a flat elastic stem o , made, by preference, of whalebone. It may be made, however, with good results from steel, bamboo, &c. This stem should have a cross-section sufficient to impart the necessary stiffness and yet have enough elasticity to enable the user to closely imitate the trills produced by the fingers of a trained player upon a keyboard. The stem o will be fixed rigidly and securely in the handle and head of the hammer. The two faces of the hammer-head n are furnished with cushions or pads r and s , the former being, by preference, of calf-skin or similar leather nicely dressed, and the latter of soft buckskin, chamois, felt, or the like, so put on as to form a rather thick pad. Thus the hammer is capable of producing very soft or very loud tones. If the player applies the pad r to the strings, he will produce a loud tone, and if he applies the thicker and softer pad s thereto he will produce soft tones. The hammer may be turned readily by the player, so as to apply either padded face thereof to the strings while he is playing.

I am well aware that it is not new to provide the hammers used in pianos with two or even three felt-covered surfaces; but these are not detached hammers for manual use, and of

course they cannot be quickly turned by the player in order to play soft or loud at will; nor is this the main object. It is intended that they shall be turned when one face becomes worn.

I am also aware that the hammers of some keyed instruments have wire stems; but these differ from mine in not being adapted for hand use and in not having flat thin stems. In playing with a hammer held in the hand it is important that its stem should be quite stiff laterally, in order that the player's rapid strokes may be sure and exact. Hence I make the stem of my hammer quite broad, as seen at the right in Fig. 5, and quite thin, as seen at the left in that figure.

Having thus described my invention, I claim—

1. In a stringed instrument, the combination, with a metal frame and strings strained thereon, of a sounding-box of thin material having top, sides, and ends set in said frame, and a bridge under said strings and resting on said box, substantially as set forth.

2. In a stringed instrument, the combination, with a metal frame, of two or more independent sounding-boxes set in said frame, two or more sets of strings strained on said frame over said boxes, and bridges under said sets of strings and resting on the respective boxes, substantially as set forth.

3. In a stringed instrument, the combination, with a metal frame A, of the three independent sounding-boxes B, B^x, and B^{xx}, set in said frame, the two sets of bass strings *a* and *a*^x and treble strings *c*, strained on said frame, and the bridges under said strings and resting on said boxes, substantially as set forth.

4. In a stringed instrument, the combination, with a metal frame and strings strained thereon, of the narrow sounding-box under the middle part of the treble strings, the bridge on said box supporting said strings, the wide sounding-boxes at the respective sides of the narrow box, and the bridges on said boxes supporting the respective sets of bass strings, substantially as set forth.

5. In a stringed instrument, the combination, with a metal frame, a thin wooden sounding-box set in said frame, a set of strings strained on said frame, and a bridge under said strings, of a fret-bar mounted on said strings between the bridge and the point of attachment of the strings to the frame, and screws extending through said fret-bar down into the sounding-box, whereby the said bar depresses said strings onto the bridge, as set forth.

6. In a stringed instrument, the combina-

tion, with a metal frame A, having elevated supports *d* for the strings, independent sounding-boxes of wood set in said frame, and strings strained on said frame, of bridges under said strings, which rest on said sounding-boxes and rise to about the same level as the supports *d*, and fret-bars *e*, which rest on the strings between said bridges and the adjacent supports *d*, said bars being secured to the sounding-boxes on which the respective bridges rest, substantially as set forth.

7. In a stringed musical instrument, the combination, with the frame and the sounding-boxes set therein, of the two sets of bass strings *a* and *a*^x, the strings of one set being arranged to alternate with those of the other, and the strings of one set inclining in an opposite direction to those of the other, whereby both sets of strings may be played upon conveniently with one hand, substantially as set forth.

8. In a stringed musical instrument, the combination, with the frame and the sounding-boxes set therein, of the set of treble strings *a*, strained on the frame, the bridge C under the same near the center of the instrument, whereby the strings are inclined or sloped, and the two sets of bass strings *a* and *a*^x and their bridges, the said bass strings alternating with the treble strings, and the strings of one bass set alternating with those of the other, substantially as and for the purpose set forth.

9. The combination, with the case G, of the box H, containing the instrument pivotally mounted therein and adapted to be turned upon its pivots into said case, as set forth.

10. A detached hammer for manual use in playing a musical instrument, the handle of which is springy and elastic, and the respective faces of its head provided with pads, one of said pads being softer and more yielding than the other, whereby the player may turn the hammer and play with either of its faces at will, substantially as set forth.

11. A detached hammer for manual use in playing a musical instrument, consisting of a handle *m*, a head *n*, and a thin flat stem *o*, connecting the head and handle, the said stem being of flexible elastic material, as whalebone, substantially as and for the purposes set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JAMES A. MACKENZIE.

Witnesses:

HENRY CONNETT,
E. W. STUART.