(No Model.) 2 Sheets—Sheet 1.

M. J. CHRISTIE.

IRON FRAME PIANOFORTE.

No. 594,325. Patented Nov. 23, 1897.

Fig. 1.

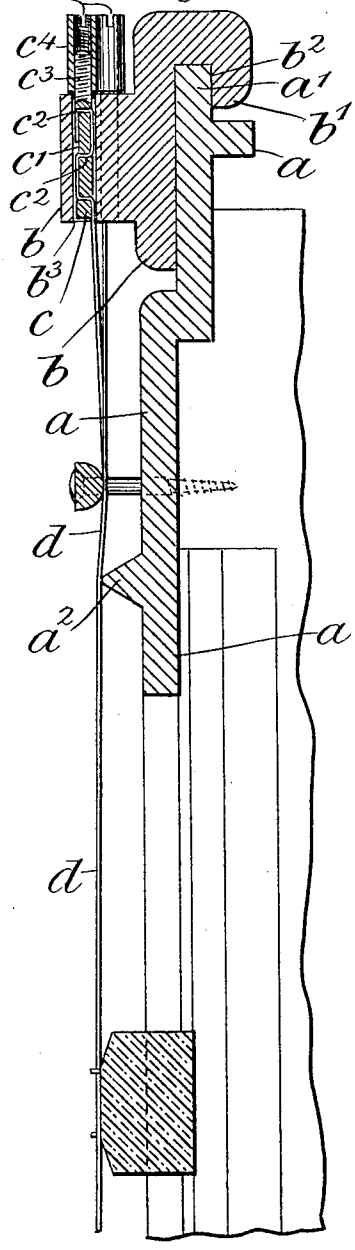


Fig. 2.

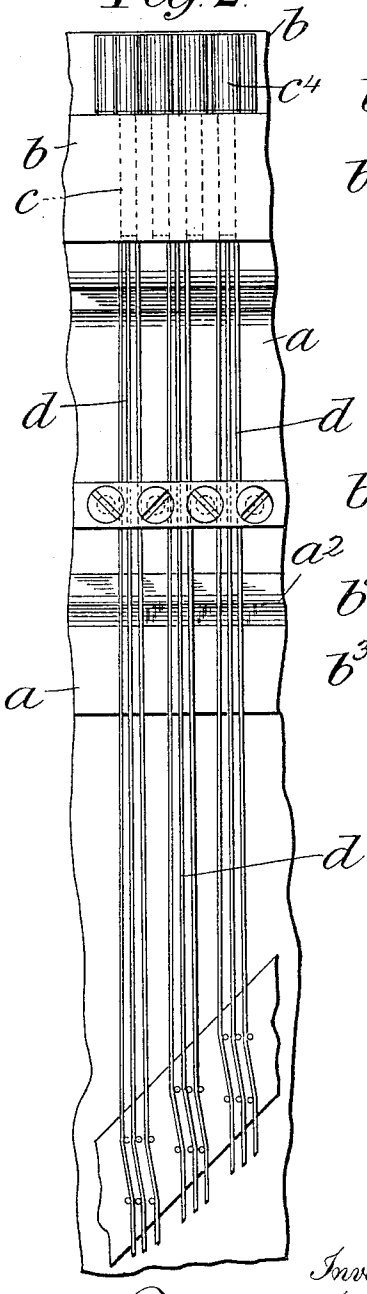


Fig. 5.

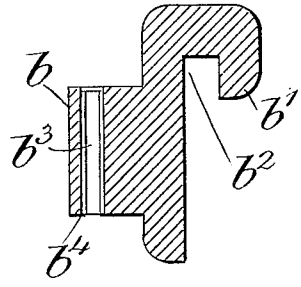
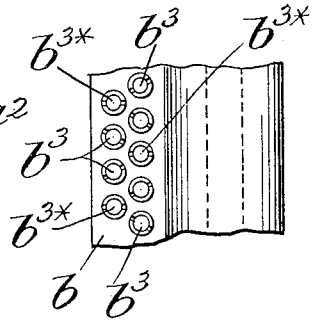


Fig. 6.



Attest.
W. Ellwood Allen.
M. E. Allen

Inventor.
Meldrum James Christie.
By Knight Bros
Attys.

THE NATIONAL PETERS CO. PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

M. J. CHRISTIE.

IRON FRAME PIANOFORTE.

No. 594,325. Patented Nov. 23, 1897.

Fig: 3.

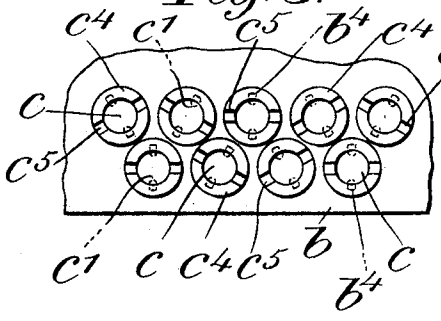


Fig: 9. Fig: 11.

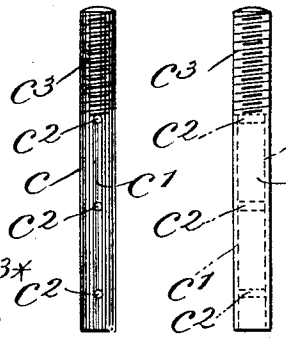


Fig: 13.

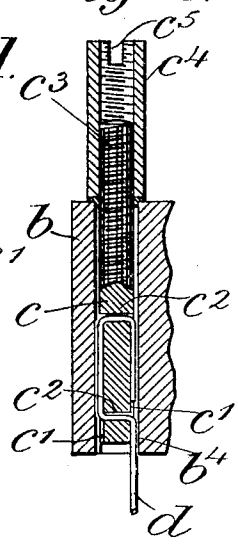


Fig: 4.

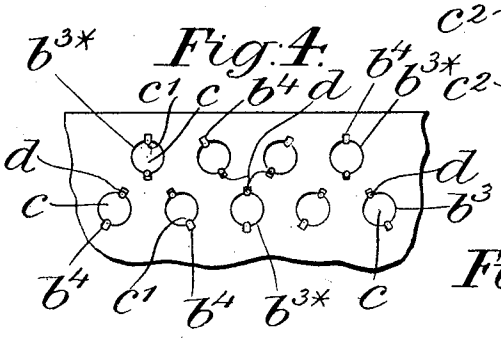


Fig: 10.

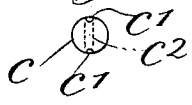


Fig: 12.

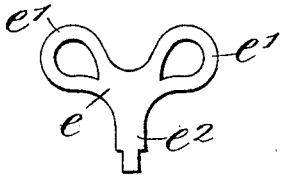
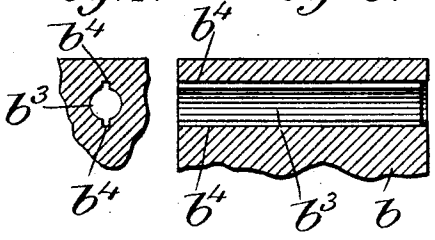


Fig: 7. Fig: 8.



Attest.
Dr. Ellwood Allen.
M. E. Allen

Inventor.
Meldrum James Christie.
By Knight Bros
Attys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

MELDRUM JAMES CHRISTIE, OF LONDON, ENGLAND.

IRON-FRAME PIANOFORTE.

SPECIFICATION forming part of Letters Patent No. 594,325, dated November 23, 1897.

Application filed May 9, 1896. Serial No. 590,866. (No model.) Patented in England October 18, 1894, No. 19,890, and in France August 17, 1895, No. 249,681.

To all whom it may concern:

Be it known that I, MELDRUM JAMES CHRISTIE, pianoforte-maker, a subject of the Queen of Great Britain, residing at 29 Hornsey Park Road, London, in the county of Middlesex, England, have invented certain new and useful Improvements in Iron-Frame Pianofortes, (for which I have obtained Letters Patent of the United Kingdom of Great Britain, dated the 18th day of October, 1894, No. 19,890, and of the Republic of France, dated the 17th day of August, 1895, No. 249,681,) of which the following is a specification.

The invention relates to improvements in iron-frame pianofortes, and has for its object to obtain a more reliable means than heretofore employed for sustaining the strain of the strings and regulating the tension thereof; and the invention comprises various details of arrangement of the parts, as hereinafter described and claimed.

Iron frames of pianofortes, owing to the unequal cooling of the metal in casting such a large surface, are commonly of unequal texture throughout their body, and therefore liable to fracture, and the strain of the strings, which is also more or less unequal throughout the entire compass, is borne directly by the top bar or "wrest-plank" of the frame, and these causes commonly result in the fracture of the frame, which is thereby rendered wholly useless, necessitating its removal and replacing by a new frame.

Now according to the present invention instead of mounting the "wrest-pins" or regulating-pins in a bar made integral with the frame they are mounted in a separate bar of malleable cast-iron or other metal which is hung on the top of the frame, by which means the strain of the wires is equally distributed throughout the frame, and there is consequently little or no liability for it to break, while the hanging bar can be formed of such material and proportions as to render the fracture thereof a practical impossibility. The hanging bar, which may be in one length or in sections, is at its rear formed with an overhang having a groove in its under side, and the frame is formed to more or less fit the groove, while the hanging bar is extended downward beyond the front side of the groove in order to afford a good bearing upon the frame; and the invention also relates to novel means for regulating the tension of the strings, as hereinafter more fully described, and in order that the said invention may be clearly understood and readily carried into effect I will proceed, aided by the accompanying drawings, fully to describe the same.

In the drawings, Figure 1 is a vertical section representing a portion of a pianoforte having the present invention applied thereto. Fig. 2 is a front elevation thereof. Fig. 3 is a plan thereof. Fig. 4 is an under side view of a portion of the hanging bar or wrest-plank. Fig. 5 is a vertical section of the hanging bar or wrest-plank. Fig. 6 is a plan thereof. Fig. 7 is a horizontal section of a portion of the hanging bar or wrest-plank, showing the form of the slotted hole therein and taken transversely thereof; and Fig. 8 is a vertical section thereof. Fig. 9 is an elevation of one of the wrest-pins. Fig. 10 is an under side view thereof. Fig. 11 is a similar view to Fig. 9, but taken at right angles thereto. Fig. 12 is an elevation of the tuning-key. Fig. 13 is a vertical transverse section taken through the hanging bar or wrest-plank and connected parts, illustrating a slight modification.

In the several figures, in which like parts are indicated by similar letters of reference, Figs. 3 and 4, 7 to 11, and 13 are drawn to an increased scale with respect to Figs. 1, 2, 5, 6, and 12.

Referring to Figs. 1 to 12, *a* represents the cast-iron frame of the instrument. *b* represents the hanging bar, and *c* represents the wrest-pins or regulating-pins.

The wrest-pins or regulating-pins *c*, instead of being mounted in a bar made integral with the frame *a*, as heretofore, are according to the present invention mounted in the bar *b*, which is a separate bar of malleable cast-iron or other suitable metal hung on the top of the frame *a*, by which means the strain of the wires is equally distributed throughout the frame *a*, and there is consequently little or no liability for such frame to break, while the hanging bar *b* can be formed of such material and proportions as to render the fracture thereof a practical impossibility.

The hanging bar b, which may be in one length or in sections, as may be found most convenient in practice, is at its rear formed with an overhang or hook b', having a groove b^2 in its under side, and the frame a is at a' formed to more or less fit the groove b^2, while the hanging bar b is extended downward beyond the front side of the groove b^2 in order to afford a good bearing upon the frame a.

The front part of the hanging bar b is provided with groups of vertical holes b^3 therethrough to receive the strings d and regulating-pins c, and each group, which consists of three holes b^3, is arranged somewhat in the form of a pyramid—thus $\overset{\circ}{\circ}\overset{\circ}{\circ}$—and as shown more particularly at Fig. 6, but every alternate pyramid is inverted—thus $\overset{\circ}{\circ}\overset{\circ}{\circ}$—and these groups are produced by two parallel rows of holes, the holes of one row being arranged intermediate of those of the other row—thus $\overset{\circ}{\circ}\overset{\circ}{\circ}\overset{\circ}{\circ}$ $\overset{\circ}{\circ}\overset{\circ}{\circ}$. This peculiar arrangement of the holes b^3 is designed for a trichord pianoforte, each group of three holes (that is, three strings) constituting a note, and the object of the arrangement is, inasmuch as the regulating-pins c are arranged all on the same horizontal plane, to afford accommodation therefor and for the strings d and to cause the latter to occupy their proper position in the same vertical plane at the top bridge a^2, the hole b^3 representing the apex of each pyramid, whether inverted or not, being that which receives the central string of each note.

The strings d are connected with and held by the regulating-pins c in the following manner: The regulating-pins c are formed with a vertical groove c' in each side thereof and with three transverse holes c^2 entering the grooves c', and the string d is laid in the vertical groove c' below the lowest hole c^2. It is then passed through such hole c^2. It is then laid in and carried upward in the vertical groove c' on the other side of the pin c and passed through the second hole c^2. It is then laid in and carried upward in the groove c' on the first side of the pin c, then passed through the top hole c^2, and the end is then turned down, so as to lie in the groove c' on that side of the pin c, and a tight connection is thus made between the string d and the regulating-pin c.

The grooves c' in the regulating-pins c are formed of a depth to receive about half the diameter of the wire d, and corresponding grooves b^4 are formed in the walls of the vertical holes b^3 in the hanging bar b to receive the projecting wire d, which thus constitutes a key or feather to prevent the regulating-pin c turning under the influence of the tuning-key.

The grooves b^4 in the holes of the hanging bar b are formed at the front and back of each apex-hole or intermediate hole b^{3*} of the groups of holes b^3—that is to say, such grooves b^4 are formed upon a horizontal line drawn transversely of the hanging bar b and passing through the center of each apex-hole b^{3*}, while in the other holes b^3, constituting the base of the pyramid, the grooves b^4 are arranged upon lines drawn at an angle of about thirty degrees to the horizontal line above mentioned and intersecting or passing through the centers or axes of the base-holes b^3, and the regulating-pins c are placed in the vertical holes b^3 of the hanging bar b in such manner that each string d below the lowest transverse hole c^2 of the pin c occupies the inside groove b^4 or that which is nearest to the center of the pyramid, and by these means the strings d are mechanically brought into the required position to fall into their place upon the upper bridge a^2.

Each regulating-pin c is at its upper end formed with a screw-thread c^3 to receive a tubular nut c^4, which at its lower end takes a bearing upon the top of the hanging bar b in order to strain the strings d, and at the other end is horizontally slotted at c^5 to act in conjunction with a simple, flat, portable, and inexpensive form of key e, as represented at Fig. 12, and which is formed of metal by stamping or otherwise and provided with a butter-fly top e' and feathers or projections e^2 at the bottom to act in conjunction with the slots c^5 of the tubular nut c^4 and by the aid of which the strings d may be regulated as desired.

In the example given at Fig. 13 the device is slightly modified—that is to say, instead of forming the hole b^3 in the hanging bar b of the same diameter from end to end, as represented in the previous figures, the lower part thereof is in the present example formed of smaller diameter than the upper part, and the grooves b^4 are only coextensive with the lower part, by which means the labor of cutting the grooves b^4 is materially reduced. Furthermore, the string d, after it has passed through the second transverse hole c^2 of the regulating-pin c, instead of being carried upward, as represented at Fig. 1, is turned down into the groove c', and by this arrangement the third transverse hole c^2 is dispensed with, while in practice it is found that this fastening of the string is sufficient for all practical purposes.

By the arrangement of parts hereinbefore described iron-frame pianofortes are rendered much more durable and easy to repair than heretofore, while the tuning is more readily effected and there is no possibility of the strings running back.

Having now particularly described and ascertained the nature of the said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In an iron-frame pianoforte a "wrest-plank" of suitable metal formed separate from the iron frame and in one or more lengths formed with an overhang to hook the iron frame substantially as herein shown and described.

2. In an iron-frame pianoforte the combination of a "wrest-plank" of suitable metal

formed separate from the iron frame in one or more lengths at the rear provided with an overhang, and an iron frame shaped to fit such overhang and support the "wrest-plank" substantially as herein shown and described.

3. In an iron-frame pianoforte the combination of a "wrest-plank" formed with a number of vertical holes therethrough "wrest-pins" adapted to loosely fit such holes longitudinal half-round grooves in the sides of the "wrest-pins" corresponding grooves in the walls of the holes of the "wrest-plank" two transverse holes in the "wrest-pins" communicating with the grooves the wire being passed up one side groove then through the upper transverse hole then down the other side groove and having its end turned into and concealed in the lower transverse hole and means for moving the "wrest-pins" endwise to regulate the tension of the wires substantially as herein shown and described.

4. In an iron-frame pianoforte the combination of a separate "wrest-plank" formed with an overhang to hook onto the frame a number of vertical holes through the "wrest-plank," "wrest-pins" to fit such holes, longitudinal half-round grooves in the "wrest-pins" corresponding grooves in the walls of the holes of the "wrest-plank" so arranged that the wire will lie in straight lines partly in the grooves of the "wrest-plank" and partly in those of the "wrest-pins" two transverse holes in the pins through one of which the wire is passed and into the other of which the end of the wire is turned and fixed, screw-threads upon the "wrest-pins," corresponding tubular nuts engaging such threads and taking a bearing upon the top of the "wrest-plank," and a slit or notch in the top of each nut adapted to engage a flat strip of metal for tuning purposes substantially as herein shown and described.

MELDRUM JAMES CHRISTIE.

Witnesses:

V. MELBOURN WHITE,

C. H. WHITE.