A. K. HEBARD.

Stringing Piano Fortes.

No. 237,528. Patented Feb. 8, 1881.

Fig:1.

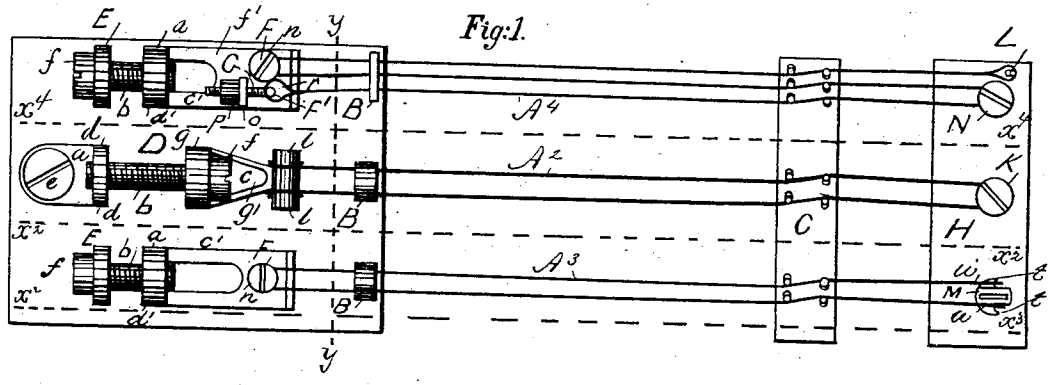


Fig:2.

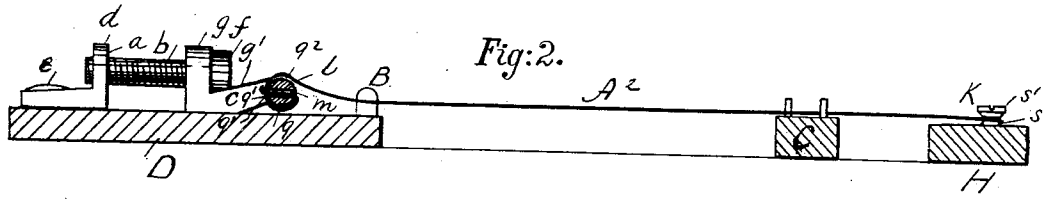


Fig:3.

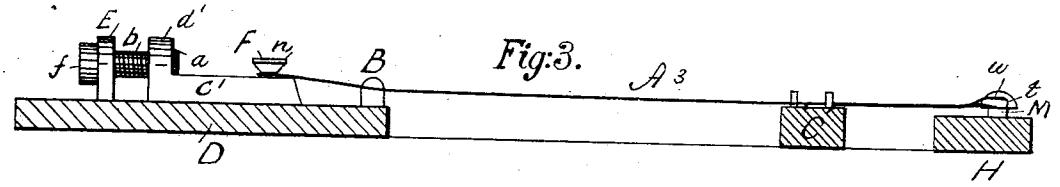


Fig:4.

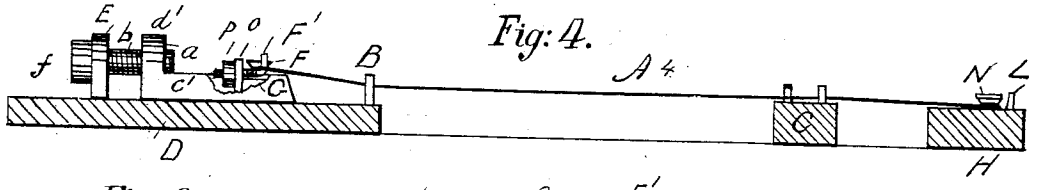


Fig:6.

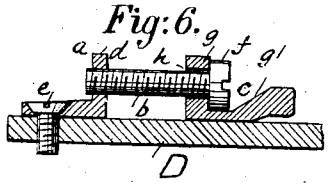


Fig:5.

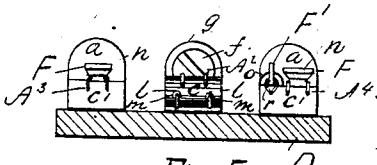


Fig: 7.

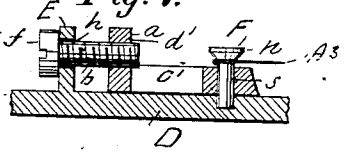
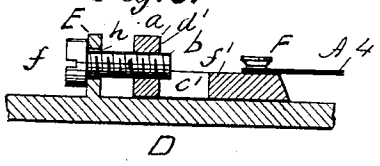


Fig:8.



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UNITED STATES PATENT OFFICE.

ALBERT K. HEBARD, OF CAMBRIDGE, MASSACHUSETTS.

STRINGING PIANO-FORTES.

SPECIFICATION forming part of Letters Patent No. 237,528, dated February 8, 1881.

Application filed January 30, 1880.

To all whom it may concern:

Be it known that I, ALBERT K. HEBARD, of Cambridge, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Stringing Piano-Fortes, of which the following is a full, clear, and exact description.

In stringing piano-fortes, as well known, the separate strings or wires are, in parallel lengths, stretched between and over bridges, and at one end either looped around or hung to hitch-pins, and at the other end connected to and wound about separate wrest-pins, which are driven into holes of the iron plate and contiguous holes in the common wrest block or plank, and by the turning of these wrest-pins in their wrest-block the strings are tuned, brought to pitch, and the separate strings of each note put in unison. Under this method the retention of the strings in tune and at pitch, and, as to those of the separate notes, in unison, depends wholly upon the frictional hold between the wrest-pins and the wrest-block, and the greater or lesser amount of frictional bearing or contact which the wrest-pins have with the holes in the iron plate through which they are driven, caused by the tension or pull of the strings upon the wrest-pins, and, as a consequence, it is impossible for the strings to remain in tune or otherwise in proper condition for any length of time.

This invention relates to improvements upon that class of devices for stringing pianos such as is shown and described in Letters Patent to G. L. Wild, No. 11,655, dated September 5, 1854; and the invention has for its object to improve that class of inventions.

The present invention is illustrated in the accompanying drawings, in which Figure 1 is a plan view, showing the strings to three separate notes, as it were, of a piano-forte; Figs. 2, 3, and 4, sectional views in the direction of the length of the strings, and on lines x^2 x^2, x^3 x^3, and x^4 x^4 of Fig. 1; Fig. 5, a cross-section on line y y, Fig. 1; Figs. 6, 7, and 8, longitudinal vertical sections of the lugs, with their screw-bolts and nuts, shown in Fig. 1.

In the drawings, A^2, A^3, and A^4 represent, respectively, the strings to three separate notes of a piano-forte. These strings run between and over a bridge or agraffe, B, of the iron frame and a bridge, C, on the sounding-board, all as usual, and beyond each bridge they are secured to the iron frame, as follows:

First, as to the portion of the iron frame covering the wrest plank or block (shown at D) by means of a screw-nut, screw-bolt, and block or lug, which are constructed, the lug to receive such end or ends of the strings, and the screw-bolt and nut to enter the one into the other, and arranged together and applied to and placed upon the iron frame in such manner that the lug can be made to draw the strings connected to it to any desired tension, and to release or reduce such tension, if so desired. The drawings show these several parts—screw-nut, screw-bolt, and block or lug—in two different forms; but each form, as will appear hereinafter, is the same in principle and operation.

In the form shown in connection with the strings A^2, a is the screw-nut, b the screw-bolt, and c the block or lug. The screw-nut a is in and through the thickness of a vertical flange, d, which is secured to the iron frame by a screw, e, or in any other suitable manner; or it may be made in one piece with the iron frame. The screw-bolt b is threaded to screw into this screw-nut a, and it has a head, f, suitably slitted to be conveniently turned; or it may be otherwise adapted for the same purpose in many obvious ways. The lug or block c is of right-angular shape, and one, g, of its arms g g' has a hole, h, through its thickness, suitable for the free passage of the bolt, and the other, g', of its arms has a projection, l, at each side, each of which projections has a hole, m, through it of suitable size to receive a string.

In the form shown in connection with the strings A^3 and A^4, the screw-nut a is in one arm, d', of the lug or block c', instead of being in a flange secured to the iron frame, as before described for the strings A^2, and the hole h, for the loose passage of the screw-bolt b, which, as before described, was in one arm, g, of the block or lug c, is, in lieu thereof, in the flange E of the iron frame D.

For the holes m in the arm g' of block or lug c to receive the strings, pins F F′ are substituted, which pins are shown in two forms—the one pin, F, as provided with a head, n,

and driven into the block or lug c', which is suitably drilled to receive it, and for it to be turned after such insertion, and the other pin, F′, as at the end of a screw-bolt, G, arranged to pass loosely through a raised flange, o, of the arm f' to block or lug c', and to receive on the other side of such flange o a screw-nut, p. The lug or block c' rests, by its arms f', upon the iron frame, and is between the agraffe or bridge B and the fixed flange E of such frame, and the screw-bolt b connects the arm d' of the block or lug c' to the said raised flange.

The ends of the two lengths of strings making string A^2 are put through the holes m of the side projection, l, of the arm, g', to lug or block c, and are bent about such projection l, and the two lengths of strings between such bent ends and the agraffe B run inside of said bent ends, around the lower sides, q, and rear side, q', and thence over the upper side, q^2, of such projections to the agraffe or bridge B.

The ends of the two lengths of strings making string A^3 are looped around the pin F of the lug or block c' to such string A^3, and lie under the head n of said pin.

The ends of two of the lengths of string making string A^4 loop around the headed pin F of the lug or block c' to such string A^4, and lie under the head of said pin, and the remaining end is hitched, by its eye r, to the pin F′ of said lug or block c', described as at one end of a screw-bolt, G, which is arranged upon said block.

Second, as to the portion of the iron frame making the string-plate, (shown at H,) the separate lengths of strings making the strings A^2, A^3, and A^4 are secured to said string-plate by means of a hitch pin or pins.

The drawings show these hitch-pins in different forms.

The hitch-pin K (shown in connection with the strings A^2) has a shank or stem, s, and a head, s'. The shank s enters the string-plate and is susceptible of being turned therein, and the head s' is slitted for convenience in turning the pin; or it may be otherwise adapted in obvious ways for the pin to be turned.

The string A^2 loops around the stem of the pin and lies between its head s' and the string-plate.

The hitch-pin M (shown in connection with the string A^3) differs in construction from the hitch-pin K, described in connection with string A^2, in that it has side arms, t, upon which to hook or hang the eyes u, which are at the two ends of the lengths making the string A^3.

The hitch-pin N for the string A^4 is in one case the same as the hitch-pin K, described for the string A^2, and has the string similarly looped about it, and in the other case it is a pin, L, of the ordinary kind of hitch-pins, without a head or other construction and arrangements such as herein described.

The headed pin N receives the looped end of the two lengths of the string which pass, the one length from the pin F′ of screw-bolt G on the block or lug c' for such string A^4, and the other length from one side of the headed pin of such block, and the ordinary pin, L, receives the end of the length of the string which passes from the side of the headed pin on block c' opposite to that from which the length of string passes to the headed pin N of string-plate, as aforesaid.

Under the several arrangements of connection between the strings A^2, A^3, and A^4 and the lug or block $c\,c'$ to such strings, in connection with a screw-bolt and nut applied thereto and to the iron frame, it is plain that the strings to each note can be brought to pitch and put under any desired amount of tension, and that in so doing the strings of each note are simultaneously and similarly so drawn; and, again, after such strings have been so put under the desired tension, and at the desired pitch, should it be found that the strings to a note are not in unison, such unison can be obtained by turning the pin to which the strings are hitched or looped—as, for instance, the hitch-pins K N at the string-plate H, or the hitch-pin F at the lug or block c'—which turning of such pins, because of the friction between them and the strings and otherwise, as is obvious, plainly serves to raise the pitch of the string from the location of which it moves in such turning, and to lower the pitch of the string toward the location of which it moves in such turning.

The present improved arrangement of stringing piano-fortes, while obviating the disadvantages hereinbefore enumerated as belonging to the usual method of stringing piano-fortes, possesses the following advantages:

First, it is entirely free from all influence of the wood, as it is directly attached and applied to the iron frame.

Second, it secures, to a great degree, a perfect unison of the strings to a note, for the reason that the separate lengths of each string are attached to one and the same block or lug, rendered adjustable by screw and nut, by which the several strings are simultaneously drawn to the same tension, and are there held without the possibility of variation.

Third, it enables, by and through the hitch-pins herein described, an absolute perfect unison of the strings to a note to be secured, for the reason that under any and all possible causes of variation of the tension—as, for instance, either by the settling, as it were, of the strings after being drawn to pitch, or by the difference in tone of the strings after being drawn to pitch—the tension on each string can be adjusted, as desired, independent of the devices by which the several strings are simultaneously drawn to pitch, as aforesaid, or are otherwise drawn to pitch.

Fourth, it is accurate to such degree that it is possible to determine the average stretch of the strings and yield of the iron frame, as represented by a given turn of the screw, and thus the screw can be turned just sufficiently beyond the proper pitch of the string as is necessary to leave the strings at the proper pitch after they have settled in position.

In the use of a block or lug, *c*, having the side projections, *l*, and holes *m* through them for the reception of the ends to the strings, the strings are attached thereto in the following manner:

First, secure the lug or block firmly to the nut by a short screw or clamp; then pass one end of the string through the hole in one of the side projections, and, having drawn the string straight, loop it around the hitch-pin and return it to the lug *c*, cut it and pass its end through the hole of the other projection, and turn it up as before. Now, detach the lug from the nut and turn it once over between the lengths of string, which brings the draw of the string over the top of the side projections, and then apply the screw-bolt *b* to the lug or block *c* and enter it into the screw-nut, and the parts are ready for bringing the string carried by the block or lug up to pitch by the joint operation of the screw and nut applied thereto.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A double-strand piano-string tension device, consisting of the block *c*, with side projections, *l l*, formed with holes *m*, to receive the ends of the strings, which are passed through the said holes and wound round the projections, and a screw-bolt passed through the block, and through a vertical flange upon the frame, covering the wrest-block, substantially as specified.

2. The method of bringing the strands of a double-strand piano-string to unison, substantially as herein described, the same consisting in looping the bend of the string at the junction of the two strands around its hitch-pin and turning said pin as required, substantially as specified.

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W. S. BELLOWS.