(No Model.)

T. BRETT.

STRING INSTRUMENT.

No. 363,720. Patented May 24, 1887.

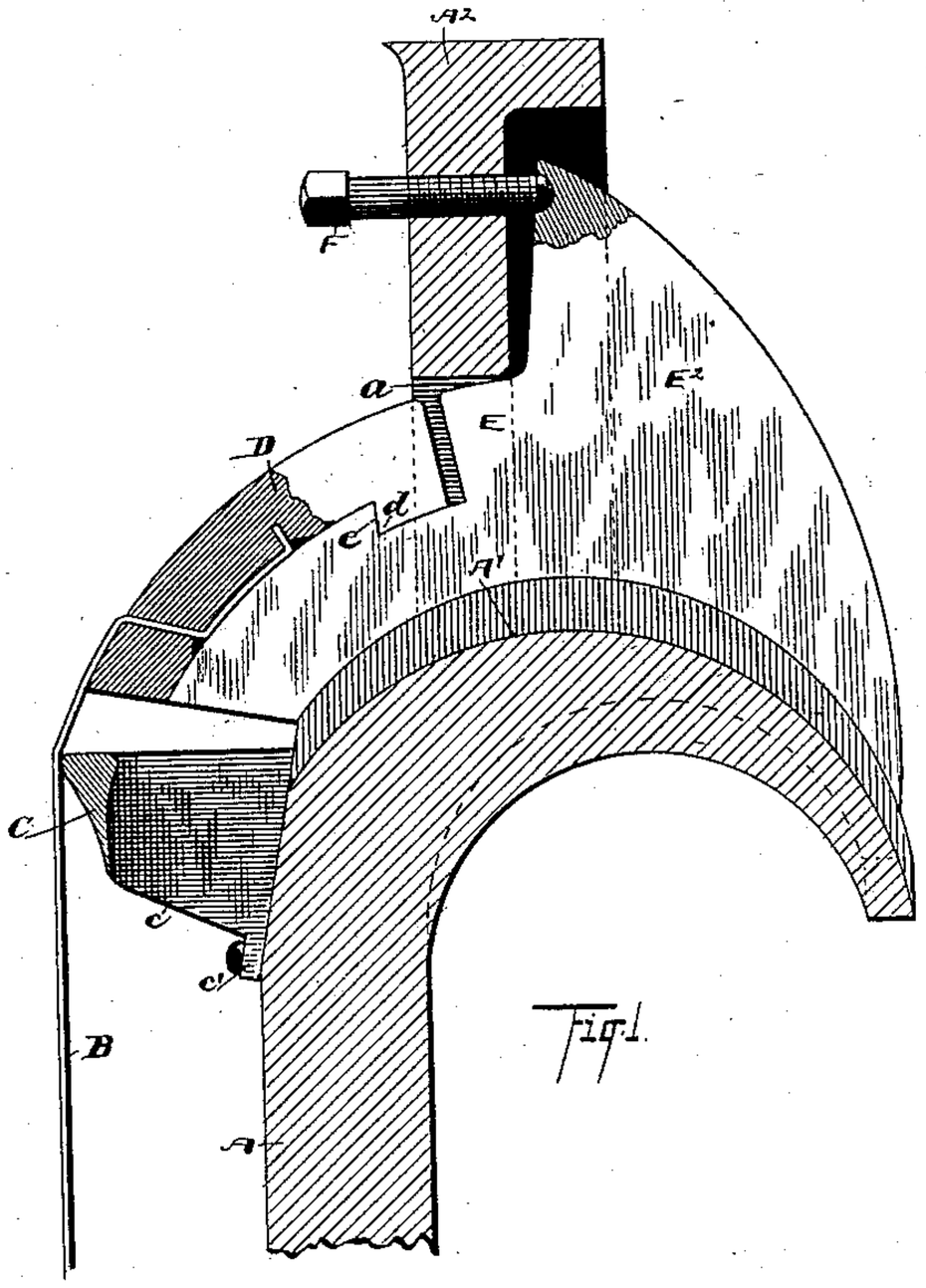

Fig. 1.

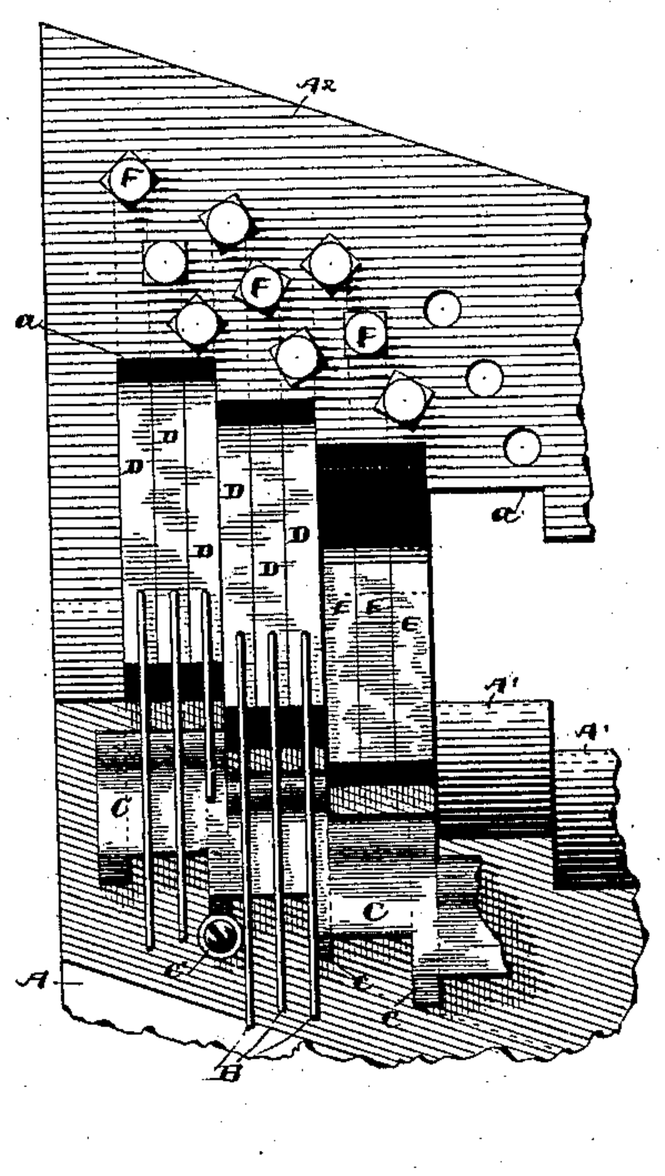

Fig. 2.

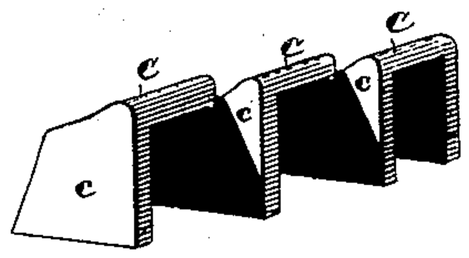

Fig. 3.

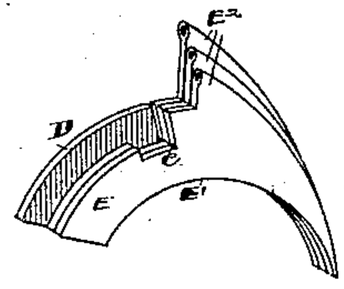

Fig. 4.

WITNESSES

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UNITED STATES PATENT OFFICE.

THOMAS BRETT, OF CLEVELAND, OHIO.

STRING-INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 363,720, dated May 24, 1887.

Application filed March 28, 1887. Serial No. 232,799. (No model.)

To all whom it may concern:

Be it known that I, THOMAS BRETT, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in String-Instruments; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

My invention relates to improvements in string-instruments, more especially pianofortes, in which mechanism at the one end of the strings for holding and tightening the latter and the fastenings for such mechanism are wholly of metal, to the end that the tone of the instrument is not materially affected by moist or dry atmosphere. The member of a respective adjustable fastening for tuning to which the string is attached consists, essentially, of a tension-hook located in such close proximity to the bridge as will prevent material vibration of the string between the bridge and tension-hook, to the end that so-called "overtone" is not produced. The tension-hooks are respectively connected with carriers, and the latter are adjusted and held in adjustment in tuning the strings by adjusting-screws, to the end that the tuning is more easily, quickly, and accurately done, and the adjustment held more permanently than with the devices heretofore in use. The location and action of the tension-hooks are such as to draw the strings down upon the bridge, so that the pressure-bar usually employed for this purpose is dispensed with, to the end that the extra strain given to the tuning-pin to overcome the friction on the string in passing the pressure-bar is not required. The bridge next the tuning mechanism is preferably of bell metal or other sonorous metal, and is elevated on legs, to separate the bridge from the frame of the machine, to the end that with such construction a more brilliant tone is produced. In pianofortes as usually constructed the one end of a string is secured to a metal frame-work by means of so-called "hitching-pins," and heretofore the other end of the string has been wound around a tuning-pin, the latter being driven into the wood, and the wood made fast to a part of the metal frame. This wood would swell and shrink with moist and dry atmospheres, the result of which was a change of tone in the instrument with such climatic changes. Such tuning-pins were somewhat difficult to adjust with the nicety required, and these pins, after having been in use a long time, sometimes become loosened in the wood, so that they cannot be depended on to hold the tension of the strings. The tuning-pins were located so far from the bridge that it was considered necessary to apply a pressure-bar between the tuning-pins and bridge to hold the strings down on the bridge and to prevent what is known as "overtone"—that is, a vibration of the strings between the bridge and tuning-pin. By reason of the friction of the string on the pressure-bar, considerable more tension had to be given to the string at or near the tuning-pin than was required on the vibrating part of the string, and in tuning the piano this extra tension was left, so to speak, stored on this part of the string. In playing the instrument the vibration of each particular string and of the instrument in general had a tendency to work this extra tension past the pressure-bar, thereby affecting the tension of the vibrating part of the string and affecting the pitch of the string.

In view of these difficulties I have devised the mechanism illustrated in the accompanying drawings.

Figure 1 is a side elevation, partly in section, of a portion of the metal frame of a piano and attached mechanism embodying my invention. Fig. 2 is a front elevation of the same. Fig. 3 is a view in perspective of a portion of a bridge. Fig. 4 is a reduced perspective of a set of tension-hook bearers with only one hook in position.

In the drawings my improvements are shown in connection with an upright piano; but they are equally well adapted to square and grand pianos and to harps and various string instruments.

A represents the metal straining-frame, to which the strings are at one end attached in the usual manner by means of hitching-pins. (Not shown.) In fact, the entire instrument, except such parts thereof as are connected with my improvements, is omitted.

B represents the strings, C the bridge, D the tension-hooks, and E the tension-hook carriers. The string may be single, double, tre-

ble, &c., as with ordinary instruments, and the other mechanism is correspondingly arranged, three constituting a set, as illustrated in the drawings.

The bridge may be of ordinary construction; but better results are had if the bridge is constructed substantially as follows: Instead of making a rib on the frame A to serve as a bridge, I make a detachable bridge of bell metal or other sonorous metal. The bridge proper is a continuous bar, C, with the outer surface rounded for the strings to rest on. This bar is supported on legs or ribs *c*, running crosswise of the bridge, the legs resting on the frame A, to which latter the bridge is secured at suitable intervals, as shown at *c'*. There are, therefore, open spaces underneath the bridge between the legs *c*. With this construction the resonance of the bridge adds to the brilliancy of tone, whereas a solid bridge, and more especially of baser metal, deadens or deteriorates the quality of tone. The strings are of course successively shortened from the lower to the higher toned strings, and consequently the bridge and hitching-pins are made correspondingly to approach each other, so that the direction of the bridge in the main is somewhat oblique to the line of the strings. To allow the strings to cross the bridge at right angles to the latter, the bridge is preferably offset between the different strings or sets of strings, as shown more clearly in Figs. 2 and 3.

In Fig. 2 the strings are shown arranged in sets of three; but it will be understood that the strings may be single, double, triple, &c., on the same instrument, the base-string being usually single. Each string after passing the bridge is fastened to a tension-hook, D, by passing the string through a hole made in the hook, substantially as shown in Fig. 1. The location and action of these hooks are such as to draw the respective strings firmly down upon the bridge, and the foot of each tension-hook is so close to the corresponding step of the bridge that no pressure-bar is required either to hold down the string or to prevent overtone, the length of string between the bridge and tension-hook being too short to produce overtone. The tension-hooks are metal plates, substantially as shown in Fig. 1, with a toe or hook, *d*, that engages a corresponding notch, *e*, made in the respective tension-hook carriers E. The carriers are metal plates shaped substantially as shown in Figs. 1 and 4, each carrier having a seat, E', (preferably curved,) that engages a corresponding seat or way, A', made on the frame A. This frame has an opening, *a*, as shown in Figs. 1 and 2, through which the carriers extend. A member, A^2, of the frame spans this opening, and a series of adjusting-screws, F, pass through this member of the frame, and the point of each screw engages the opposing arm E^2 of the carrier E at *e'*. By tightening a screw, F, the co-operating carrier is moved on its seat, carrying with it the attached tension-hook and moving in the direction to tighten the string. The radial distance from the axis of a carrier to the periphery of the tension-hook mounted thereon where the wire is attached is considerably less than the distance from such axis to the apex of the bridge where such string rests.

The string is bent over the apex of the bridge, as shown in Fig. 1, and consequently is held in firm contact with the bridge. In tightening a string with the ordinary tuning-pin, the string would be drawn perhaps three-quarters of an inch, more or less, with each revolution of such tuning-pin, whereas, the screws F having fine threads, a revolution of the screw would draw the string perhaps a twentieth or twenty-fourth of an inch, from which it will be readily understood that with my improved device much more delicate and accurate adjustment may be had. Tuning-pins frequently become set—that is, rusted into the wood—so that it is difficult to move them only the limited distance required, and after long use such tuning-pins frequently become loosened in the wood, so that they will not hold the tension of the string for any considerable length of time. With my improvement these difficulties are entirely overcome, the tension of the string being quickly and accurately adjusted and such adjustment being rigidly held for an indefinite length of time. There being no wood connected with the straining mechanism, the instrument is not materially affected by climatic changes. It is true that changes of temperature will affect the tension of the strings; but such changes will also affect the frame in a corresponding degree, so that the tone of the instrument remains substantially the same.

What I claim is—

1. In a musical string-instrument, the combination, with a straining-frame having curved bearings at one end thereof, the said curved bearings starting from the front face of the frame and projecting inwardly, of tuning-plates mounted on the curved bearings and adjusting-screws for moving the tuning-plates, substantially as set forth.

2. The combination, with a straining-frame and longitudinally-movable tuning-plates mounted on bearings integral with the straining-frame, said frame having an opening for receiving the tuning-plates, of a series of adjusting-screws for moving and holding the respective tuning-plates, substantially as set forth.

3. The combination, with a straining-frame and series of adjusting-screws connected therewith, substantially as indicated, of a series of tuning-plates, each plate consisting of two members—to wit, a tension-hook adapted to be hooked into the carrier and having attached a string and a tension-hook carrier, the latter being made to engage the straining-frame and having an arm or shoulder for receiving the thrust of the adjusting-screw—substantially as set forth.

4. The combination, with tension-hooks adapted to be hooked to the carriers, the latter having curved seats and adapted to be moved longitudinally, substantially as indicated, of a straining-frame having seats to correspond, respectively, with the seats of the carriers, and adjusting-screws connected with the members of the straining-frame and made, respectively, to engage and actuate the carriers, substantially as set forth.

5. The combination, with a metal straining-frame having a series of curved seats made thereon, of carriers mounted, respectively, on such curved seats and adapted to be moved longitudinally, tension-hooks connected with the respective carriers, and adjusting-screws connected with a member of the straining-frame and made to engage and move the carriers in the direction to tighten the string, substantially as set forth.

6. The straining-frame having an opening through which the tuning-plates may be inserted from the rear thereof, said tuning-plates resting on and moving longitudinally upon bearings integral with the straining-frame, substantially as set forth.

7. The combination, with a carrier having a notch in one face thereof, of a tension-hook having a hole for the passage of the string, and also provided with a toe or hook to enter the notch in the carrier, substantially as set forth.

In testimony whereof I sign this specification in the presence of two witnesses this 16th day of March, 1887.

THOMAS BRETT.

Witnesses:
CHAS. H. DORER,
ALBERT E. LYNCH.