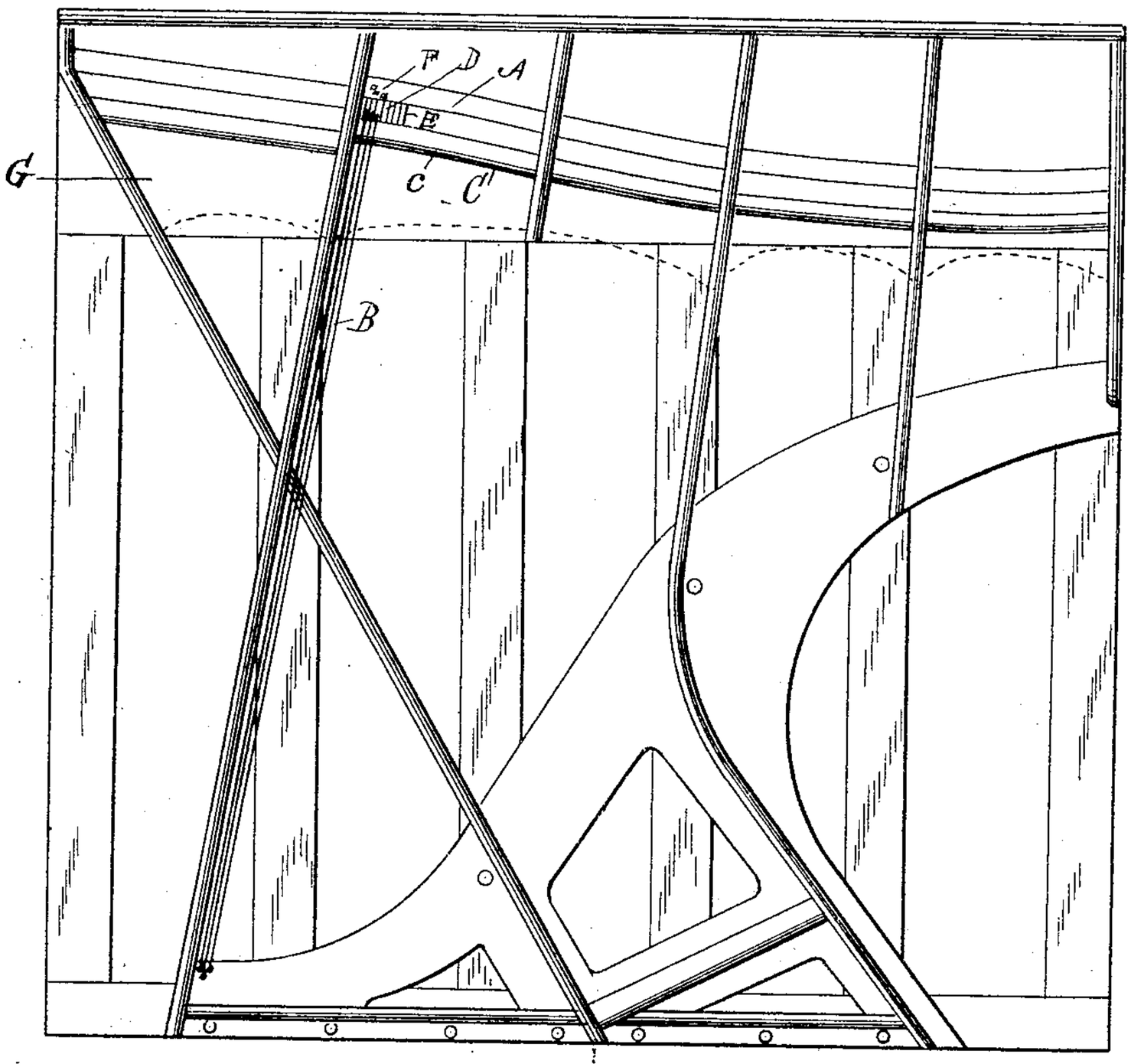
(No Model.)

T. BRETT.

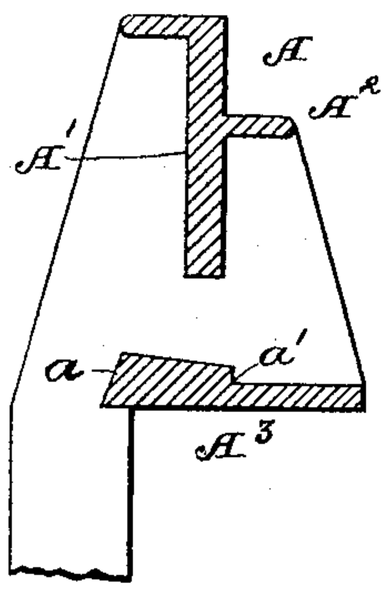
STRING INSTRUMENT.

No. 601,788. Patented Apr. 5, 1898.

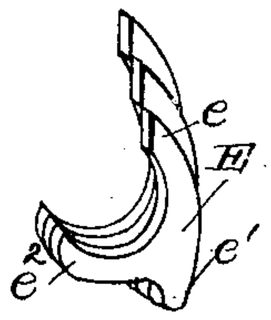
-FIG. I-



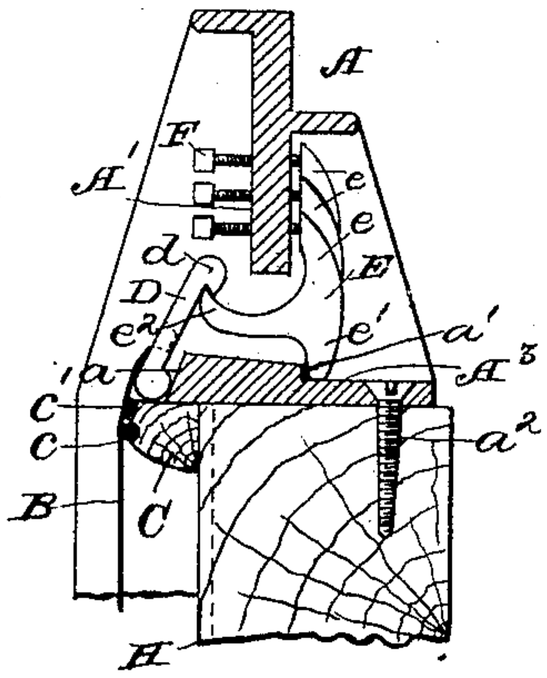
-FIG. II-



-FIG. IV



-FIG. III-



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STRING INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 601,788, dated April 5, 1898.

Application filed June 26, 1897. Serial No. 642,380. (No model.)

To all whom it may concern:

Be it known that I, THOMAS BRETT, of Geneva, Ashtabula county, 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 to pianofortes, in which one end of the string is secured to so-called "hitch-pins" and the other end is secured to an adjustable tension-bar, which is located in close proximity to the bridge, so as to prevent any material vibration of the string between the bridge and the bar or its point of attachment to the bar, and thus do away with any overtone when playing.

My invention also relates to the construction of the framework, which is of metal, in connection with the piano-bridge and sounding-board.

My invention consists in so constructing the tension or tuning devices as that the point of attaching the wire to the tension-bar is such that in the first place the distance between the bridge and the point of attachment of the wire to the bar is very short, and the direction given the wire between the bridge and its point of attachment to the bar is such as to keep the wire at all times on the bridge and at the same time allow the wire when being tightened or loosened to easily "ride" or slip on the bridge, thus making it possible to attain a more even pitch without liability of overstraining or overloosening the string, which is often the case when too much pressure is exerted upon the bridge by the string. I also in my device do away entirely with the pressure-bar usually employed for keeping the strings down upon the bridge.

In the drawings, Figure I is a view in elevation of the string-frame and wooden block or back of a piano. Fig. II is a section of the metal frame, illustrating more clearly the construction of that portion of the frame to which the tension devices are secured. Fig. III illustrates in section the portion of the metal frame illustrated in Fig. II, and also shows the mode of attaching and operating the tension devices and the mode of securing the metal frame at this part to the wooden frame of the piano, and also the manner of locating the bridge and the construction of the same. Fig. IV is a detached view illustrating a set of tension-levers which operate upon the tension-bar and engage the tension-screw.

In the drawings I have shown my invention as adapted to an upright piano, but it is obvious that it may be and is intended to be used in connection with a square or grand piano, or, in fact, a harp or other analogous instruments.

A represents what is known as the "straining-frame," to which the strings are secured at one end by means of hitch-pins, a set of which are shown to the left in Fig. 1.

B represents a set of strings, one set only being shown in the drawings.

C illustrates the bridge.

D illustrates the tension-bars.

E represents the tension-levers, which engage the tension-bars and the adjusting-screw.

F illustrates the adjusting-screw.

As shown in Figs. II and III of the drawings, that portion of the straining-frame to which the tension devices are secured and in which they are operated is provided with a ledge A′, in which the screws F operate. This ledge A′ is preferably strengthened on its back or rear side by means of a flange A^2. Another flange A^3 is also provided, the forward end of which forms a seat for the tension-bar D. This seat *a* inclines upward and rearward, thus causing the tension-bar and the string attached thereto to move in such a way when the string is tightened as to cause the said string to closely hug the bridge, and inasmuch as the levers E when in the act of tightening the string move upward and backward the tension-bars are kept snugly to their seats.

a′ illustrates a shoulder which is formed upon the flange A^3. This shoulder *a′* acts as a seat for one arm of the tension-lever E. The lever E is provided with three arms *e* *e′* e^2. The arm *e* engages and is operated by one of the screws F. The arm *e′* engages the shoulder *a′*, which acts as a fulcrum for the lever E. The arm e^2 engages the hooked end *d* of the tension-bar D. It will therefore be seen

that as one of the screws F is driven inward it will engage with and force inward the arm *e*, and the lever E being fulcrumed at *e'* the arm e^2 tends to pull the tension-bar D upward and backward, thus tightening the string and keeping it seated on the bridge. The reverse operation of this screw will reverse the action of the lever E, bar D, and string B, or, in other words, the string will be loosened and the pitch of the tone lowered.

The bridge C of my piano is located close up to the forward end of the flange A^3 at that part nearest the seat *a*. This bridge is entirely constructed of wood and is provided at its upper end with a metal bearing-bar *c*, as is usual. To the rear of the metal bar or bearing-bar *c* I prefer to locate a strip of felt or analogous material *c'*, which acts to prevent any possible vibration or overtone of the string between the bridge C and the point of attachment of the string to the tension-bar D. It will be noticed in Fig. III that bridge C is slightly forward of the forward end of the tension-bar D for the purpose, already explained, of keeping the string to its seat on said bridge.

In the usual construction of pianos one end of the string is secured to a metal framework by means of the so-called "hitch-pins." The other end of the string is wound around a tuning-pin, the latter being driven into the wood and the wood made fast in some manner to the metal frame. The objection to this mode of tuning has been that the wood would swell and shrink, according to the moisture or dryness of the atmosphere, and the result would be a change of the tone of the instrument; also, it was difficult to adjust such tuning-pins with the required nicety inasmuch as these pins after having been in use for some time would become loosened in the wood and when driven in would stick in the wood to such an extent as that upon the application of the wrench instead of attaining an equal gradual turning of the pin, and thus an equal gradual straining of the string, a jerk or sudden movement of the pin was the result, thus giving the string a higher pitch than was necessary, and upon loosening the string or turning the pin in an opposite direction the reverse was the result—the tone of the string was lowered too much. Another objectionable feature to this mode of securing and tuning the strings has been the location of the tuning-pins in relation to the bridge so that it was necessary to apply a pressure-bar between the tuning-pins and the bridge both to hold the string down upon the bridge and prevent what is known as "overtone"—that is, a vibration of the string between the bridge and tuning-pin. Other devices and arrangements have been tried to obviate the difficulties just before mentioned, but have failed to accomplish the desired result because of the fact that there was more or less friction to be overcome in connection with the strain of the string, and the greater the strain of the string the more the friction on the parts which operated to tune the instrument.

In constructing a piano according to my invention it will be seen by reference to Fig. III of the drawings that I reduce the friction to a minimum and that the only sliding friction of the parts is between the seat *a* and that part of the tension-bar bearing directly thereon. It will be noticed that my tension-lever E is free from friction at all parts excepting at its fulcrum *a'*, and inasmuch as these levers are separated so as to be free one from the other there is no side friction between them. Hence a very even and gradual tightening or loosening of the string is obtained and the tension may be increased or decreased to the smallest fraction.

In regard to the structure and location of the bridge C and its relation to the tension-head of the metal frame A it will be noticed that the head of the frame A, which contains the tension devices, is formed with a flange A^3. This flange A^3 is directly connected to the wooden block or back by means of suitable bolts or screws a^2, said bolts or screws being located at the rear of the flange A^3, passing through said flange and into the wooden framework of the back. By this construction the usual vertical flange, as illustrated by dotted lines in Fig. I and marked G, is entirely done away with, and the bridge C can thus be moved up close to the tension-bar and will rest either upon the wooden framework of the back, as shown in Fig. III, or upon an extension of the sounding-board, as shown by dotted lines in Fig. III and indicated by the letter H. By this construction the bridge rests or bears entirely upon the wood back or frame of the piano, which is a desirable feature on account of the tone imparted to the piano and doing away entirely with the necessity of having the string rest upon a metal bridge, as is usually the case where the vertical flange G extends as shown in dotted lines in Fig. I.

What I claim is—

1. In a musical string instrument, the combination with a metallic straining-frame, said straining-frame being provided with fulcrumed levers, one arm of said levers engaging and operating a straining-bar to which the strings are attached and another arm engaging a screw whereby the said levers are operated, substantially in the manner and for the purpose set forth.

2. The combination with a straining-frame, of levers mounted in said straining-frame and fulcrumed therein, said levers being operated by adjusting-screws and operating in turn to control the tension of the string by means of a straining-bar to which the strings are attached, substantially as and for the purpose shown and described.

3. The combination with a straining-frame and a series of adjusting-screws connected therewith and operating therein substantially

as indicated, of a series of three-armed levers, one of the arms of said levers operating as a fulcrum-point, and engaging in the straining-frame another arm actuated by the adjusting-screws aforesaid, and the third arm operating the straining-bar and through it controlling the tension of the string, substantially as and for the purpose shown and described.

4. The combination in a musical string instrument, of a straining-frame from whence the tension of the string is controlled, said frame being secured to the wooden frame or back of the instrument at the end of the wooden frame, and a bridge in close proximity to the straining-bars, said bridge resting directly either upon the sounding-board or upon the wooden frame of the instrument, substantially as and for the purpose shown and described.

5. The combination with the string-frame of a piano of a metallic straining-frame, provided with suitable straining devices controlling the tension of the strings, said straining-frame being provided with a flange A^3 for securing it to the string-frame, and bridge C located in close proximity to the straining-frame, substantially as and for the purpose shown and described.

In testimony whereof I sign this specification, in the presence of two witnesses, this 3d day of June, 1897.

THOMAS BRETT.

Witnesses:
W. E. DONNELLY,
ELLA E. TILDEN.