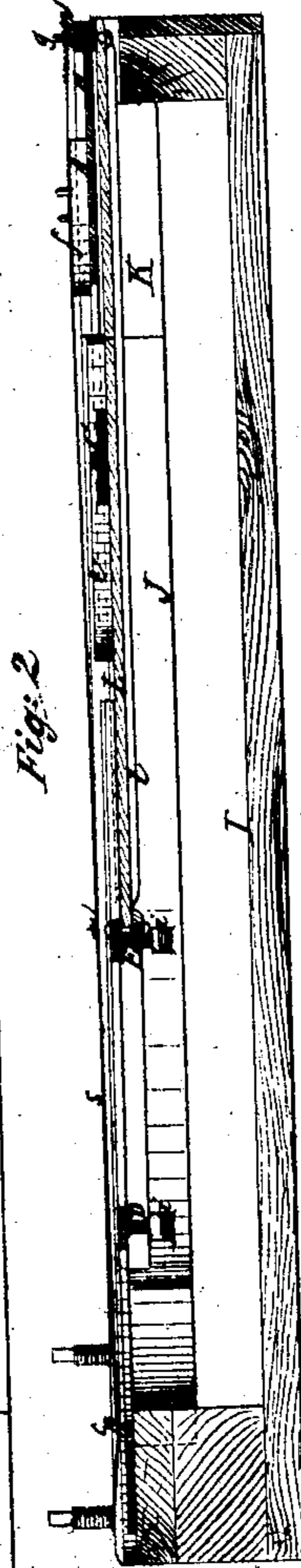
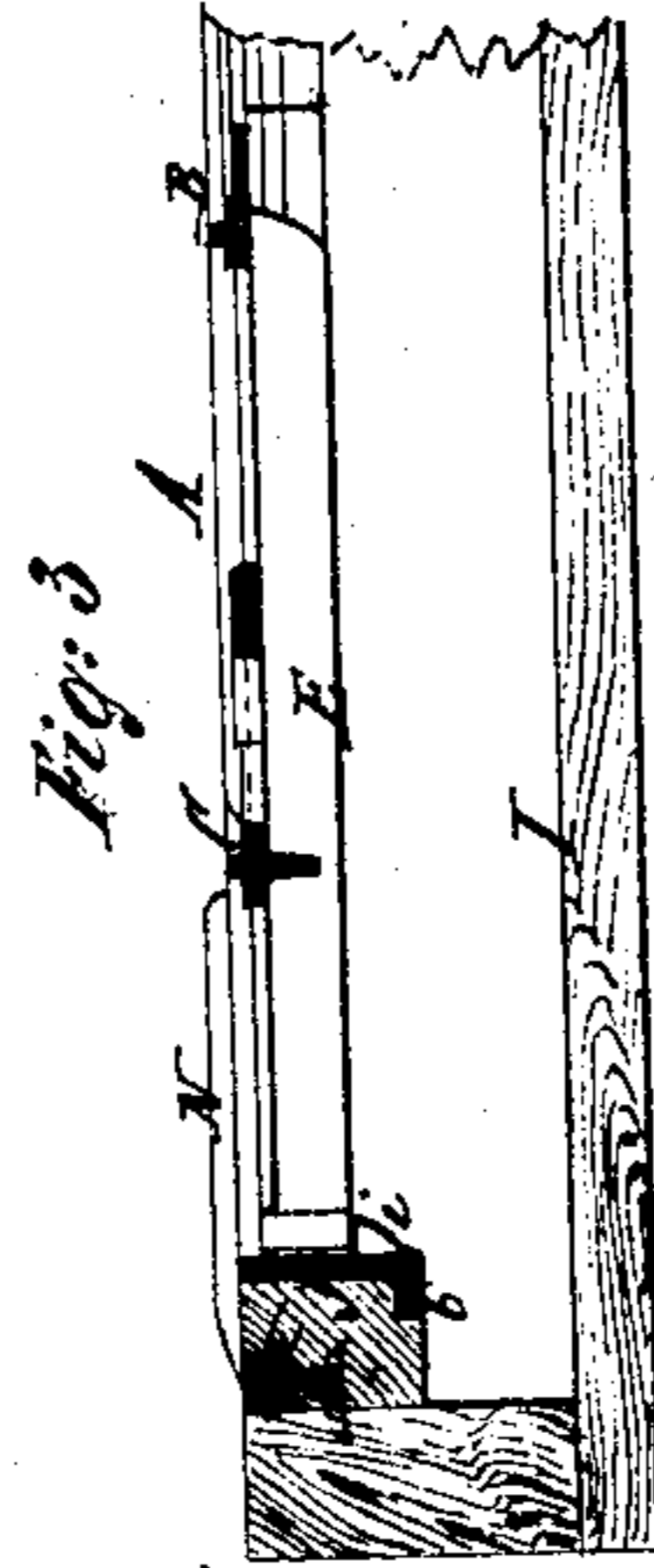
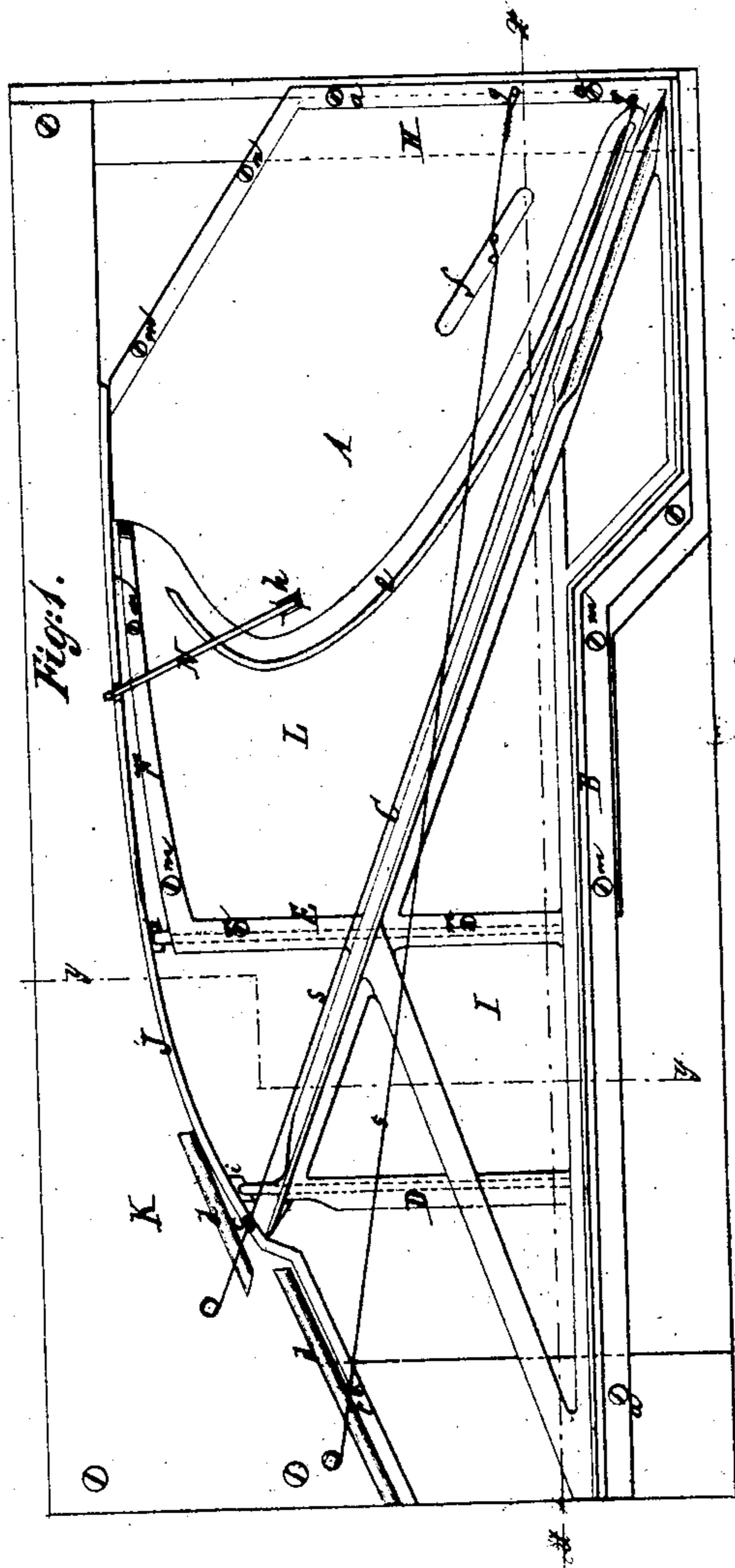


G. Ely,

Piano.

No. 102668.

Patented May 3. 1870.



Inventor.  
G. Ely  
Per Santowick's Hand  
2000

Witnessed.  
E. T. Hantenhuber  
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# United States Patent Office.

GEORGE ELY, OF NEW YORK, N. Y.

Letters Patent No. 102,668, dated May 3, 1870.

## IMPROVEMENT IN PIANO-FORTES.

The Schedule referred to in these Letters Patent and making part of the same

To all whom it may concern:

Be it known that I, GEORGE ELY, of the city, county, and State of New York, have invented a new and useful Improvement in Piano-Fortes; and I do hereby declare the following to be a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawing forming part of this specification, in which drawing—

Figure 1 represents a plan or top view of this invention.

Figure 2 is a longitudinal vertical section of the same.

Figure 3 is a transverse vertical section of the same.

Similar letters indicate corresponding parts.

This invention relates to an improved agraffe-bar, which is provided with a lip catching under the bottom edge of the tuning-block, and which is retained in position by the strain of the strings, the upward strain of the strings pressing the lips of the agraffe-bar up against the bottom surface of the tuning-block, while the longitudinal strain of said strings is counteracted by a series of bearing points of the metal frame, whereby the agraffe-bar is firmly pressed against the inner surface of the tuning-block, and by these means all parts of my instrument are enabled to resist the strain of the strings, and an instrument is obtained which is not liable to get out of tune for a long time, and the tone of which is rich and strong.

The invention relates also to a transverse bar in the metal frame, which serves to support the inner end of the sounding-board, and which also may form one of the bearing-points for the agraffe-bar, said sounding-board being made to extend from the hitch-pin end of the metal frame only to the transverse bar, and being secured to said transverse bar and to the side bars and hitch-pin plate of the metal frame by means of screws, so that the inherent tension of the sounding-board is preserved, and the quality of the tone of the instrument is materially improved.

In the drawing—

The letter A designates a metal frame, which is composed of a longitudinal bar, B, an oblique bar, C, two transverse bars, D, E, the inner edge bar F, and the hitch-pin plate H.

Said metal frame is fastened to the case I by means of screws *a*, as shown in fig. 1 of the drawing, and the inner ends of the bars C, D, and E and the inner edge of the hitch-pin plate H bear against the surface of the agraffe-bar J.

This agraffe-bar is cast or otherwise produced independent, with a lip, *b*, (see fig. 3,) which catches under the lower edge of the tuning-block K.

The top edge of said agraffe-bar is flush with the

upper surface of the tuning-block, and the agraffes *c* are inserted therein, as shown in the drawing.

The strings *s* extend from the tuning-pins over bridges *d*, secured to the edge of the tuning-block, thence down through the agraffes and over the sounding-board bridges *e f* to the hitch-pins *g*. If the strings are tightened, they exert an upward strain on the agraffes, and also a strain in the direction of their length.

By the upward strain of the strings, the lip *b* of the agraffe-bar J is drawn up tight against the bottom surface of the tuning-block, while the longitudinal strain of the strings is counteracted by the ends of the bars C, D, and E, and the edge of the hitch-pin plate H, which bear against the surface of the agraffe-bar and hold the same firmly in contact with the inner surface of the tuning-block.

If desired, an additional brace, N, may be used between the bearing-points of the transverse bar E and of the hitch-pin plate H, said brace being made to bear at one end against a lug, *h*, cast on the hitch-pin plate, and, at its opposite end, against the edge of the agraffe-bar.

The agraffe-bar is provided with projecting lugs, *i*, (see fig. 3,) for the ends of the bars D and E to rest upon, so as to support the free end of the metal frame.

By this arrangement of the metal frame in relation to the agraffe-bar and tuning-block, the immense strain of the strings is counteracted, and an instrument is obtained which retains its tune for a long time.

To the metal frame A is secured the sounding-board L.

In constructing my sounding-board I proceed as follows:

After the wood is perfectly dry, I cut the sounding-board to the required length, which, in an ordinary square piano-forte, is equal to about three and one-half feet. I then either compress the board, or allow it to shrink, so as to reduce its length about one and one-fourth inch, and then, before the board has time to recover its original state, I quickly glue to its under surface the ribs or bars *l*, and thereby the bottom surface of the board is prevented from recovering its original or normal state. After the glue has set and dried, and the clamping-screws (which are used in gluing the ribs to the board) have been removed, the upper surface of the board recovers its original or normal state, and, in consequence thereof, the board curves upward two or more inches. This curved board is secured to the bars B, E, F by screws *m*, and to the edge of the hitch-pin plate H by screws *a*, and, by drawing these screws up tight, the board is forced back into a flat state and it remains compressed in itself, whereby the strength and brilliancy of tone are materially improved.

In order to carry out this invention successfully, it is essential that the said sounding-board shall be shortened or compressed as much as possible, and the transverse bar E of the metal frame, which supports one edge of the sounding-board, is therefore of the greatest importance.

It is obvious that this transverse bar may be so placed that the sounding-board will rest on its upper instead of against its lower surface, or the screws which fasten the sounding-board to the metal frame might be inserted from below instead of from above, or they may pass horizontally through the said bar into the sounding-board.

It is also obvious that this invention is applicable to grand piano-fortes and partially to upright piano-fortes, as well as to square piano-fortes.

Having thus described my invention,

What I claim as new, and desire to secure by Letters Patent, is—

1. The agraffe-bar J, provided with a lip underlapping the bottom edge of the tuning-blocks, in combination with the several bearing-points of the metal frame A, which press the agraffe-bar up against the tuning-block by the tension of the strings, substantially as described.

2. The transverse bar E, cast with the metal frame and forming a support for one edge of the sounding-board, substantially as set forth.

3. The method herein described of constructing and attaching the sounding-board by introducing the same in a curved state, caused by previous compression, and setting it straight by means of screws passing through the bars B E F and the edge of the hitch-pin plate H, all as set forth.

GEORGE ELY.

Witnesses:

E. F. KASTENHUBER,  
JOHN A. WIEDERSHEIM.