J. J. HULL & W. RAYNOR.

METHOD OF STRINGING PIANOS.

No. 194,151. Patented Aug. 14, 1877.

Fig. 1.

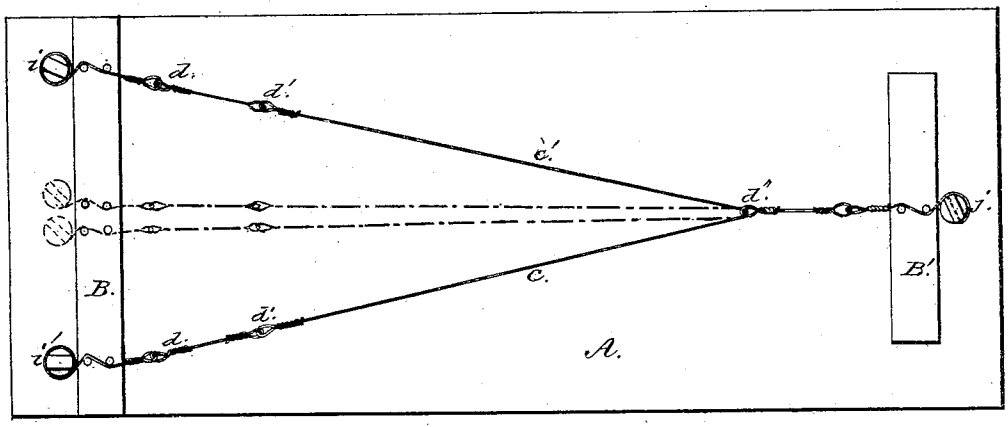


Fig. 2.

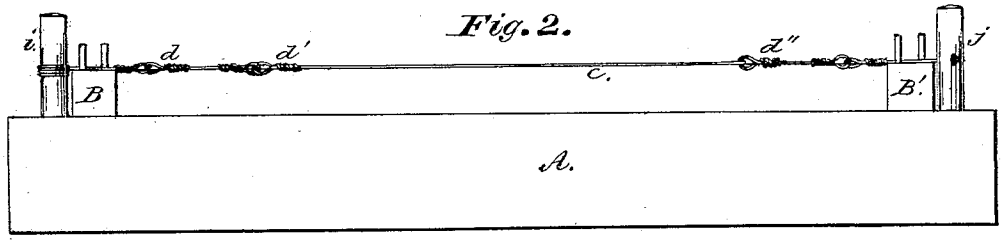
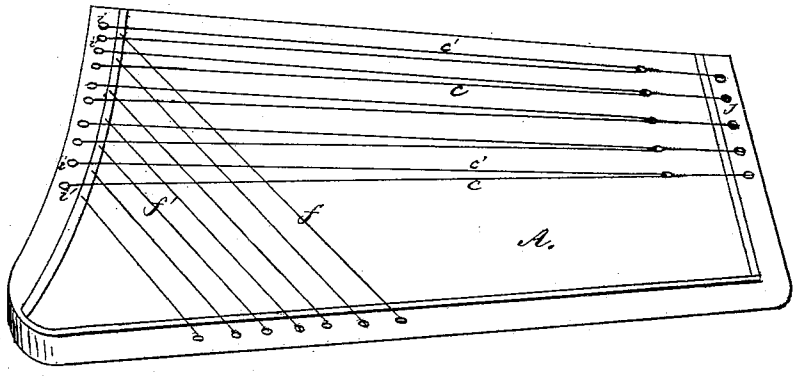


Fig. 4.



Fig. 3.



Witnesses:

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UNITED STATES PATENT OFFICE.

JAMES J. HULL AND WILLIAM RAYNOR, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN THE METHODS OF STRINGING PIANOS.

Specification forming part of Letters Patent No. **194,151**, dated August 14, 1877; application filed July 5, 1877.

To all whom it may concern:

Be it known that we, JAMES J. HULL and WILLIAM RAYNOR, of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Piano-Fortes; and we do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

Our improvement has for its object the construction of stringed instruments—such as pianos—so as to occupy less space than has hitherto been required for effecting the same or an equal tone and volume of music. This is accomplished by stretching upon a harp-shaped or other frame, over bridges, the metallic strings by means of loops, pegs, and tuning-pins, as shown in the accompanying drawings, in which—

Figures 1 and 3 are plan views of the manner or method of attaching and adjusting the strings, and Fig. 2 a side view.

A is the sounding-board; B B′, the bridges; *c c′*, a single string; *d d′ d″*, the loops; *i i′*, the anchoring or fastening pegs; *j*, the tuning-pin.

The loops are of equal lengths. The frame and bridges, in a complete instrument, accommodate the differing lengths of the strings corresponding to the vibrations required of them.

The eyes or ends of the loops immediately attached to or connected with the string may be of a vibrating wire or plate, as shown in the drawing, Fig. 1, or of an elliptical metallic plate, as shown at Fig. 4, having two apertures, *m m′*, for connecting the string with the loops *d d′ d″*.

The ends of the string *c c′* are fastened to loops *d d′*, while its center passes through the aperture of the loop *d″*. The loops *d d′* are permanently fastened and anchored to the frame by the pegs *i i′*, and the loop *d″*, at the center of the wire, is attached to the tuning-pin *j*. Thus equal tension of the two halves of the wire *c c′* is attained by turning the pin *j*.

By this arrangement and adjustment it is found, in practice, the strings may be made to vibrate in a manner producing the same strength, volume, and tone that are obtained when they are under tension in a straight line throughout their whole length, as has hitherto been the practice of arranging them in musical instruments.

The strings arranged in accordance with our system and invention may be struck by hammers moved by keys, and their vibrations or sounds stopped precisely as is now practiced in the construction of piano-fortes.

Fig. 3 shows a general plan of arranging the shorter strings, which need not be doubled or folded. The long strings are passed through loops and folded so as to occupy little more than one-half the usual length.

The short strings may be arranged in the usual way, as shown by *f f′*, *f f′*, &c.

In Fig. 2 only one side of the folded string is shown; but each of the long strings is to be arranged as shown in Fig. 1. The short strings may be arranged in any suitable way as now known.

The essential feature of our invention is the shortening of the length of the instrument as now due to the necessity of having the long strings straight.

The invention is applicable to both horizontal and upright pianos.

The parts *c c′* form but a single long string, and act as such.

We are aware that it is not new to form two strings out of a continuous length of string by doubling the same, nor to tune the two sections of such a string from one tuning-pin, and therefore we do not claim the same; but,

Having thus described our invention, what we desire to secure by Letters Patent is—

1. The method of stringing pianos, which consists in folding the long strings through a loop or its equivalent, affixed to a vibrating wire or string connected with a tuning-pin,

and confining the ends of the long strings at the opposite bridge, or at a point between the two bridges, whereby the piano can be shortened without impairing the volume of tone of the long strings, substantially as set forth.

2. The loops *d d' d''* attached to the wire *c c'*, in connection with the pegs *i i'* and tuning-pin *j*, for the purposes set forth.

In testimony that we claim the foregoing as our own we affix our signatures in presence of two witnesses.

JAMES J. HULL.
WM. RAYNOR.

Witnesses:
D. D. PARMELEE,
J. H. TAYLOR.