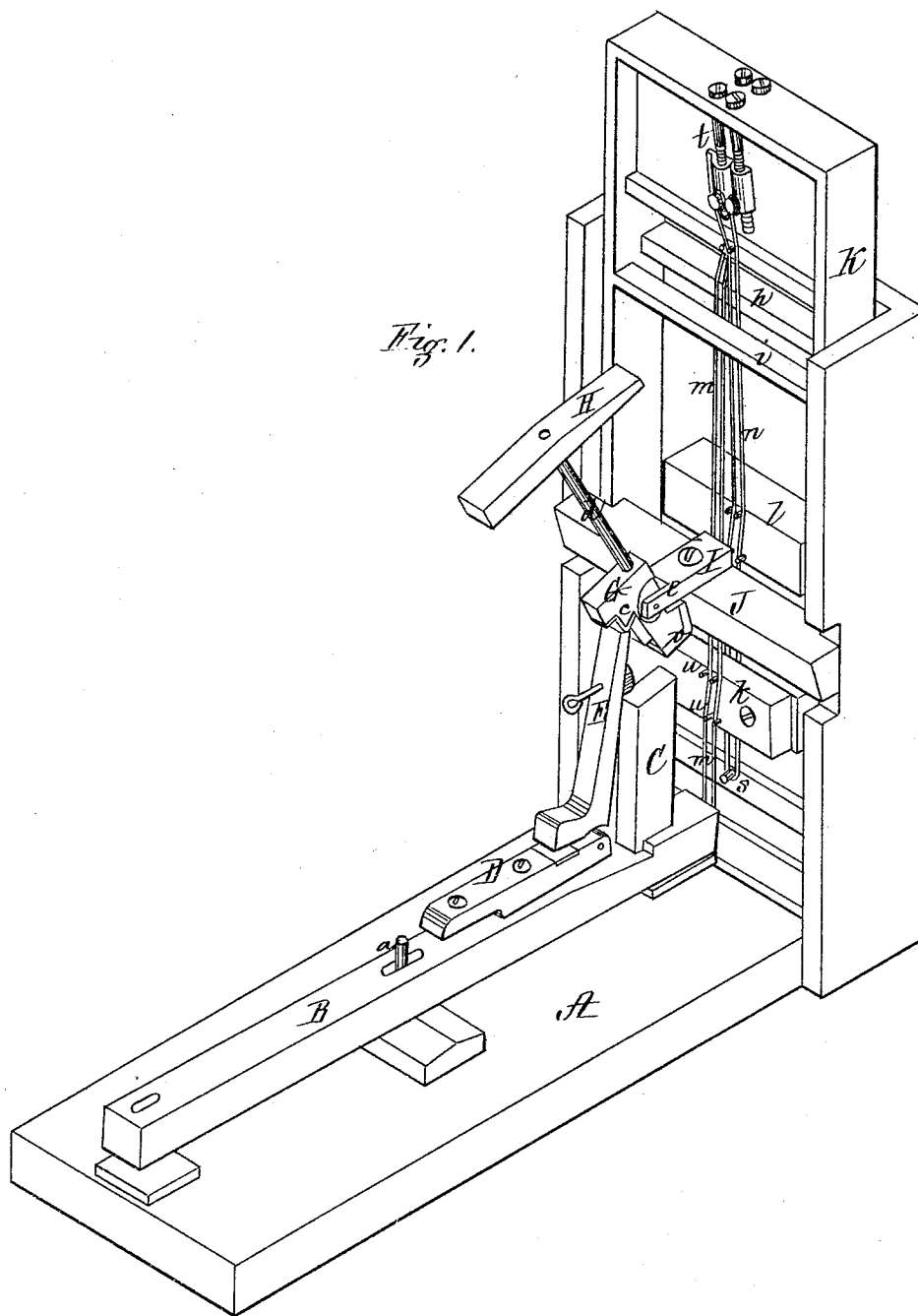


S. P. BROOKS.
PIANO-FORTE.

No. 172,244.

Patented Jan. 18, 1876.



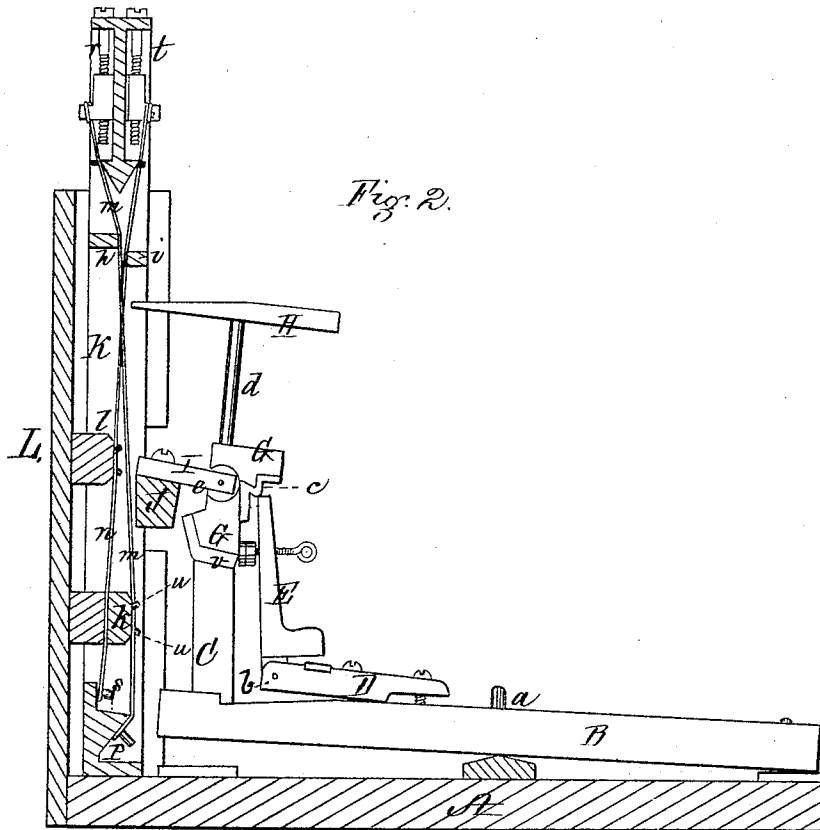
Witnesses,
Charles E. Griffin
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UNITED STATES PATENT OFFICE.

STEPHEN P. BROOKS, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN PIANO-FORTES.

Specification forming part of Letters Patent No. **172,244**, dated January 18, 1876; application filed May 25, 1875.

To all whom it may concern:

Be it known that I, STEPHEN P. BROOKS, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain Improvements in Piano-Fortes, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a perspective view of a section of a piano-forte with my improvements applied thereto, the hammer being represented in the position it occupies before the key is depressed. Fig. 2 is a vertical section through the same, representing the position of the parts immediately after the hammer has struck the strings.

My present invention consists in arranging at different angles two sets of strings—one tuned an octave above the other, the plane of one set crossing the plane of the other set at the striking-point, so as to admit of all the strings being sounded simultaneously by the same hammer, which construction enables me to place the strings at a sufficient distance apart to prevent them from interfering with each other, and thus successfully employ two sets of strings for each note, a desideratum heretofore unattained.

My invention also consists in providing each set of strings with a separate and independent bridge or rest, placed at such distance from the striking-point as to give the required tone.

My invention also consists in the arrangement of the tuning-screws of the two sets of strings upon opposite sides of the string-plate, in order to economize space.

To enable others skilled in the art to understand and use my invention I will proceed to describe the manner in which I have carried it out.

In the said drawings, A represents a portion of the key-frame, to which the key-lever B is pivoted at *a* in a well-known manner. From a point near the inner end of the lever B rises a post, C, having its top inclined slightly down toward the front of the lever. Upon the upper surface of the key-lever, and at a short distance from the post C, is secured a block, D, between ears *b*, at the outer end of which is pivoted the lower end of the "fly-

lifter" E, which extends up and bears against the notched portion or escapement *c* of the butt G, from the top of which projects the stem *d* of the hammer H, the butt G being pivoted between the bifurcations *e* of a piece, I, secured to the upper surface of the rail J. K is the string-frame, provided with two parallel bridges, *h i*, near its top, and two parallel bridges, *k l*, near its bottom, over which are drawn two sets of strings, *m n*, there being two strings in each set. The pair of strings *m* are longer than the pair *n*, and are secured at their lower ends around a pin, P, and are tightened at their upper ends by means of tuning-screws *r*, at the back of the string-frame, the strings *m* being drawn over and resting upon the front of their upper and lower bridges *h k*. The bottom of the strings *n* pass down through the bridge *k*, and are similarly secured around another pin, *s*, and tightened at their tops by a pair of tuning-screws, *t*, in front of the string-frame; but these strings *n* are drawn over and rest on the back of their upper bridge *i*, and on the front of their lower bridge *l*, by which construction sufficient room is afforded to place and operate two sets of tuning-screws. *u u* are guide-pins, by which the two pairs of strings *m n* are secured to the sound-board L, and kept at the proper distance apart, the arrangement of the bridges being such that the strings do not at any point in their entire length lie in a common plane, excepting at their striking-points, where the plane of one set intersects that of the other, at which point all four of the strings lie in one and the same plane, so that all are in a position to be struck simultaneously by the same hammer.

It will be seen that in order to tune two sets of strings so that one set will be an octave above the other, as is required to produce the proper tone, it is necessary to have the strings of the lower octave longer than those of the upper octave, and as each string must be struck by the hammer at a distance of about one-eighth of its length from its point of support, and as the striking-points of the strings of both sets must be in line so as to be struck simultaneously by the hammer, it is absolutely necessary to employ two separate and independent bridges, *h i*, at one end, (one for each set of

strings,) placed at different distances from the common striking-point, as above described, and by this construction I am enabled successfully to employ two sets of strings for each note, without any liability of their interfering with each other when vibrated, and thereby greatly improve and perfect the tone of the instrument.

When the front of the key-lever *B* is depressed the top of the fly-lifter acts upon the notched portion or escapement of the butt in such manner as to swing the hammer on its pivot, and cause its point to advance toward and strike the four strings at the same time, as desired, the lower end of the butt, with its cushion *v*, being simultaneously brought against a cushion or stop, *w*, on the end of an adjustable screw, *x*. Immediately after the hammer strikes the four strings it is relieved by means of its escapement *e* from contact therewith, and recedes a slight distance therefrom, where it is held firmly by the post *C*, which has been raised so as to bring its in-

clined top into contact with the cushion *v* on the under side of the butt, the post *C* serving as a back catch to keep the hammer in close proximity to the wires, (see Fig. 2,) so that a note may be rapidly repeated, at the will of the player, by a very slight motion of the key-lever.

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

1. In combination with the two sets of strings *m n*, arranged in different planes, the bridges *h i* and *k l*, substantially as described, for the purpose set forth.

2. In combination with two sets of strings, *m n*, and the bridges *h i* and *k l*, the hammer *H*, arranged to operate substantially as described.

Witness my hand this 20th day of May, A. D. 1875.

STEPHEN P. BROOKS.

Witnesses:

N. W. STEARNS,
W. J. CAMBRIDGE.