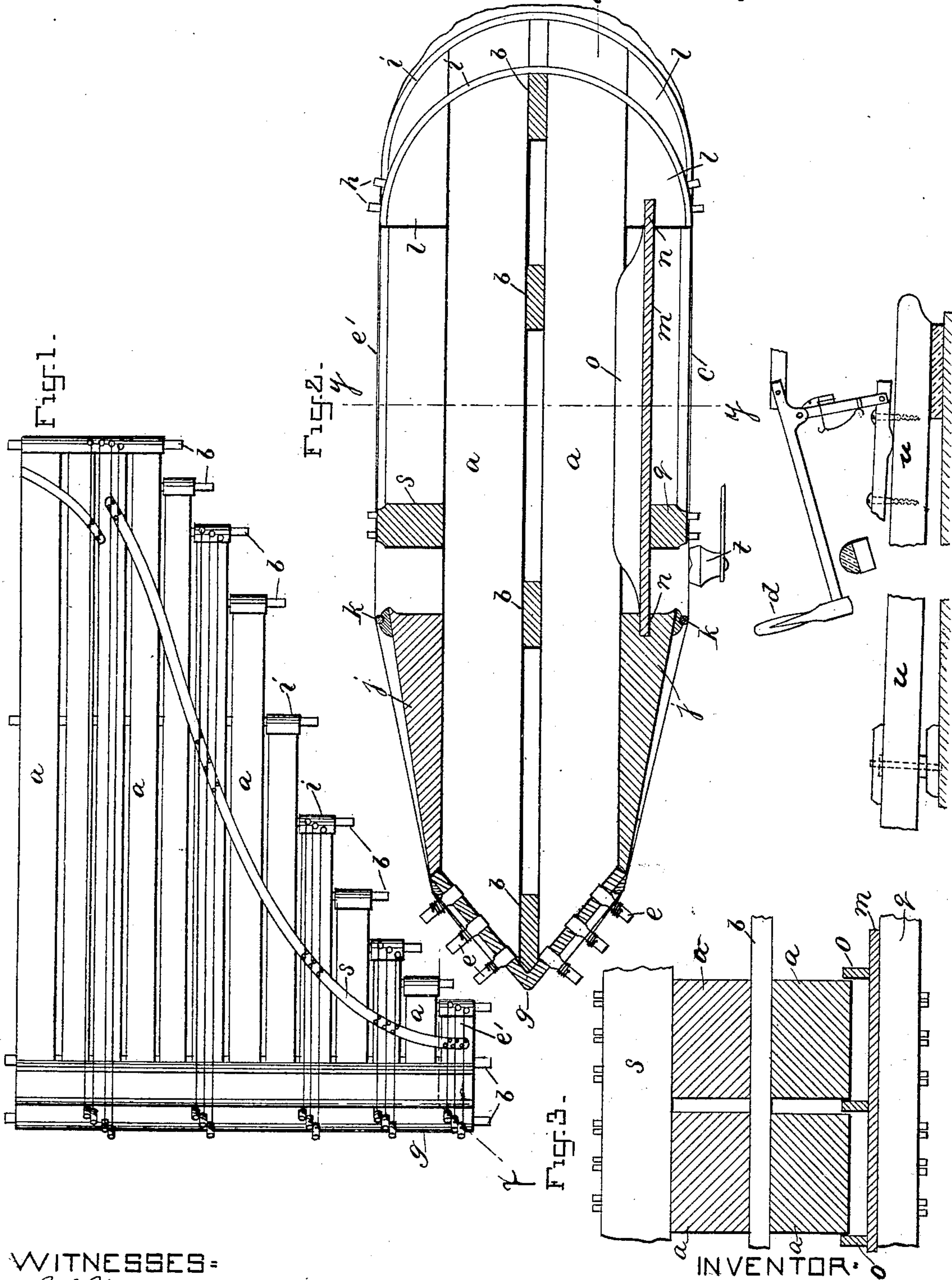


(No Model.)

A. FELL DIN.  
PIANO.

No. 520,139.

Patented May 22, 1894.



WITNESSES:

*C. E. Whitney*  
*O. J. Morgan*

*Abraham Fell Din*  
*By A. P. Thayer*  
*Atty.*



# UNITED STATES PATENT OFFICE.

ABRAHAM FELLIDIN, OF AUBURN, NEW YORK.

## PIANO.

SPECIFICATION forming part of Letters Patent No. 520,139, dated May 22, 1894.

Application filed March 22, 1893. Serial No. 467,152. (No model.)

*To all whom it may concern:*

Be it known that I, ABRAHAM FELLIDIN, a citizen of the United States, and a resident of Auburn, in the county of Cayuga and State of New York, have invented certain new and useful Improvements in Pianos, of which the following is a specification.

My invention consists in improvements in the relative arrangements of the strings, string frame and the hammer actions in a piano whereby more powerful and clearer and better tones are produced, and it also consists in improvements in the construction of the string frame and arrangement of the sounding board therewith all as hereinafter fully described reference being made to the accompanying drawings, in which—

Figure 1, is a plan view of a string frame constructed and having the strings in part applied according to my invention. Fig. 2, is a longitudinal section of the same on the line  $x x$ , Fig. 1, with parts of a hammer key and a damper indicating the relative arrangements of the string frame, strings and the actions according to my invention, and Fig. 3, is a detail in transverse section on line  $y y$ , of Fig. 2.

The metallic string frames commonly used for holding the strings are objectionable to some extent on account of weight, changes by variations of temperature and certain modifications of a metallic character which they impart to the tones all of which I seek to avoid by substituting wood frames constructed, arranged and combined with the strings in a way for greater stability and also for having to a considerable degree the qualities of a sounding board. To this end I construct the string frame of two series of wood bars  $a$ , placed side by side preferably a little apart from each other, the two series being joined by intermediate bars  $b$ , arranged transversely the lengthwise direction of the bars  $a$ , being that in which the strings are to be stretched so that the stress of the strings is opposed by compression of the wood, and there is preferably one pair of bars, that is, one of each series  $a$ , to each group of three strings, the bars of the two series being in coincident pairs respectively; the cross bars  $b$ , project suitably at each side of the frame for mounting the frame in the case.

On the under side of the frame thus con-

structed and adapted on each side for a string bed and placed horizontally I arrange the normal strings  $c$ , on which the hammers  $d$ , act, with other opposing strings on the other side to balance the stress of the strings  $c$ , both sets of strings having adjusting pins  $e$ , to equalize the tension.

For securing the pins  $e$  at the front end of the frame I apply the V shaped metallic cap  $g$ , to the said end of the frame, said cap having two sides respectively adapted for the two sets of pins, and said cap extending the whole width of the frame, and for securing the hitching pins  $h$ , at the other end of the frame I provide metallic caps  $i$ , using separate caps for the different sections of the frame made in different lengths as the different lengths of the strings demand, said caps also holding the pins for the strings of the opposite sides to balance the tension.

Back of the front pin holding cap  $g$ , I apply the transverse bars  $j$ , to the outsides of the frame which diverge from front to rear nearly to about the plane of the active portions of the strings and thereat support the agraffe or other device  $k$ , over which the strings are stretched. The other end of the frame is likewise reinforced with short transverse pieces  $l$ , applied to the sides of the several sections to mount the hitching pins to hold the strings the proper distance from the sides of the frame.

The sounding board  $m$ , is mounted under the lower side of string frame by inserting the ends in grooves in the edges of these transverse pieces  $j$  and  $l$ , as shown at  $n$ , with the stiffening ribs  $o$ , on its back projecting into the spaces  $p$ , between the longitudinal bars of the frame, this arrangement enabling wider ribs to be used in a string frame of a given thickness.

The bridge  $q$  for the operative strings is mounted on the sounding board, but the bridge  $s$ , for the opposing strings is mounted directly on the bars of the string frame as shown in the drawings, no sounding board being represented on that side, but a sounding board may be used on that side also with good results if desired, in which case the bridge will be mounted the same as for the operative strings. Part of a damper is represented at  $t$  and part of a key at  $u$ , which together with



the part of the hammer *d*, before mentioned show the relative arrangement of the frame and strings with the actions.

I claim—

- 5 1. In a piano the string frame placed above the hammer actions with the sounding board under the said frame and the strings applied under the sounding board substantially as described.
- 10 2. The string frame composed of the bars arranged in the lines of the strings and having lengthwise resistance to the pull of the strings, said bars arranged with spaces between them, and the sounding board ribs arranged in said
- 15 spaces substantially as described.
3. The string frame composed of two sets of parallel bars arranged in the lengthwise di-

rection of the strings with intermediate cross bars and having metallic pin holding caps at the ends substantially as described. 20

4. In a piano a string frame composed of bars arranged in the lines of the strings and in sections of different lengths for the groups of strings of different lengths with pin holding caps at the ends, each section having a 25 separate cap at the rear end of the frame substantially as described.

Signed at New York city, in the county and State of New York, this 4th day of February, A. D. 1893.

ABRAHAM FELL DIN.

Witnesses:

W. J. MORGAN,  
C. E. WHITNEY.