

(No Model.)

3 Sheets—Sheet 1.

J. S. BACK.
AUTOHARP.

No. 559,764.

Patented May 5, 1896.

Fig. 1.

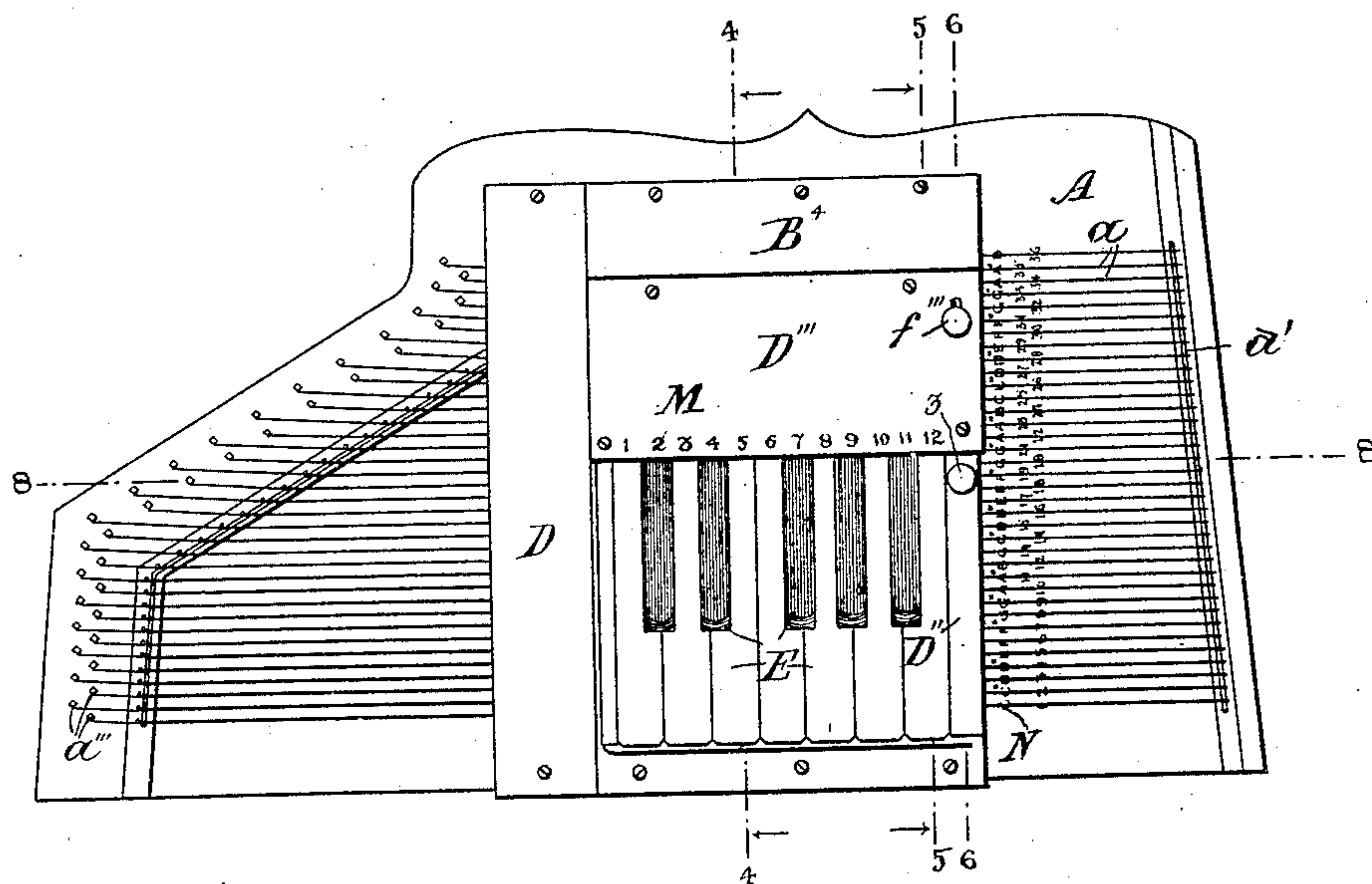


Fig. 2.

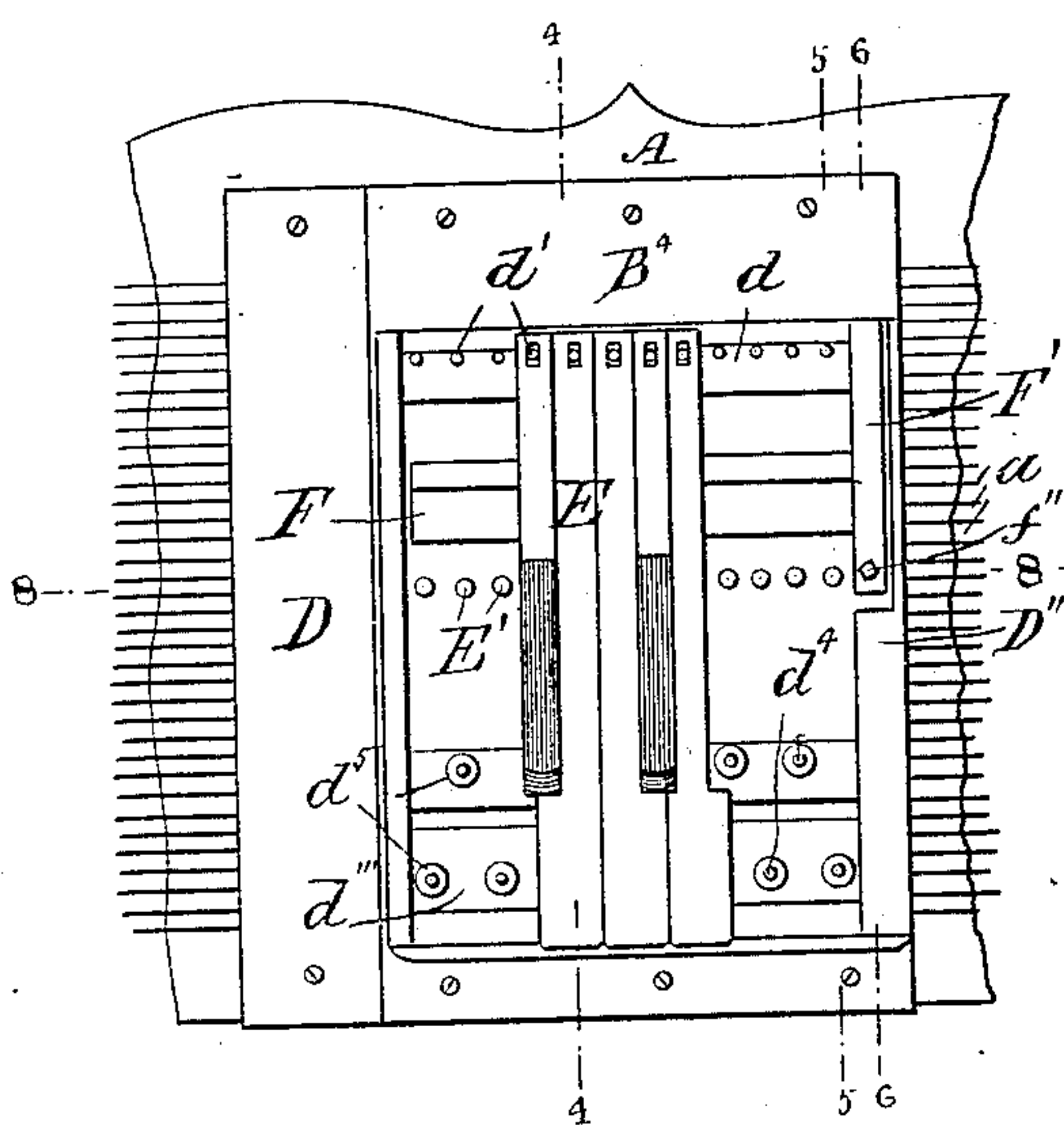
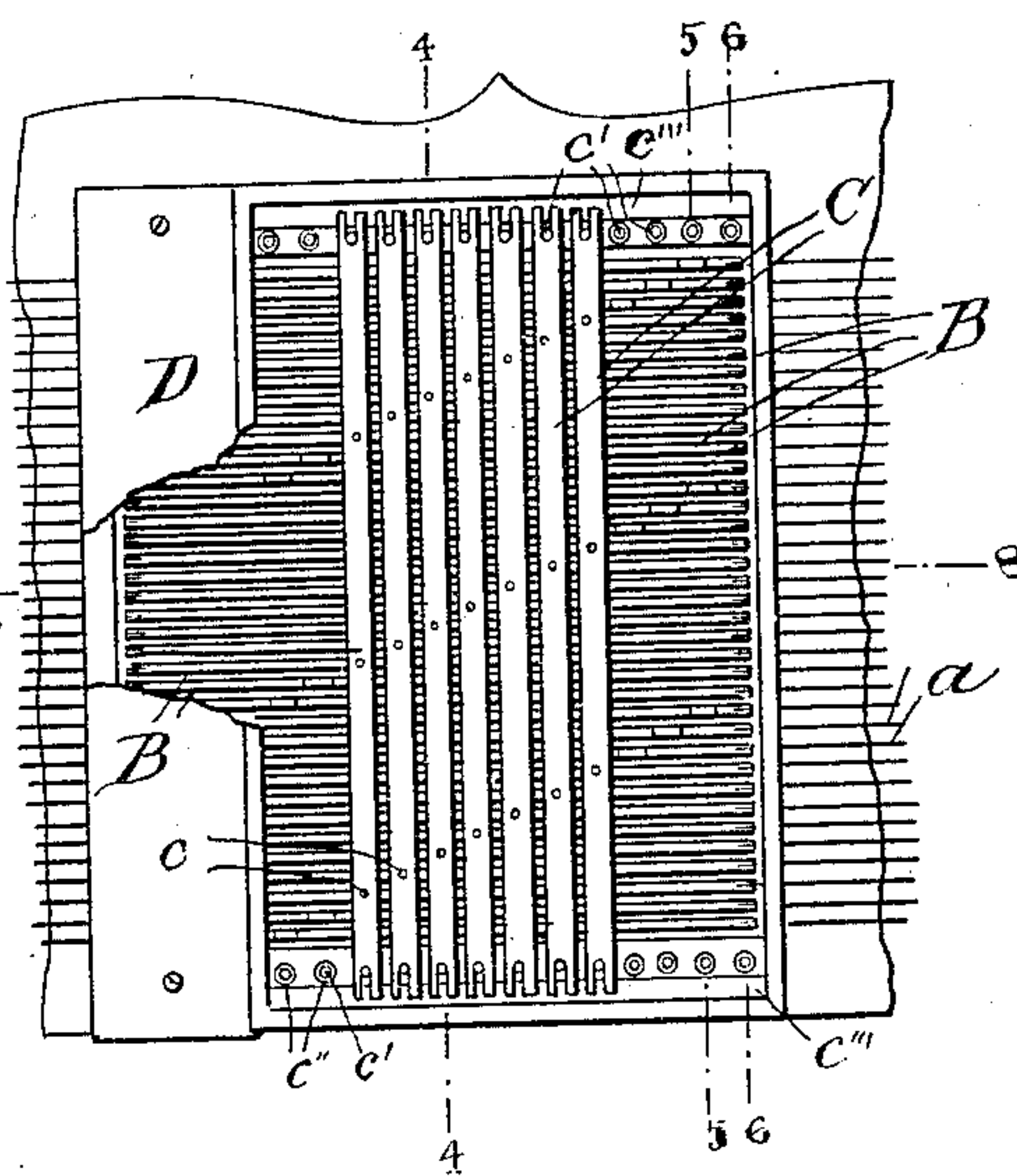


Fig. 3.



Witnesses:

Chas. V.aley.

W. Hoffke.

James S. Back
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by A. Hurney
his Attorney

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Fig. 4.

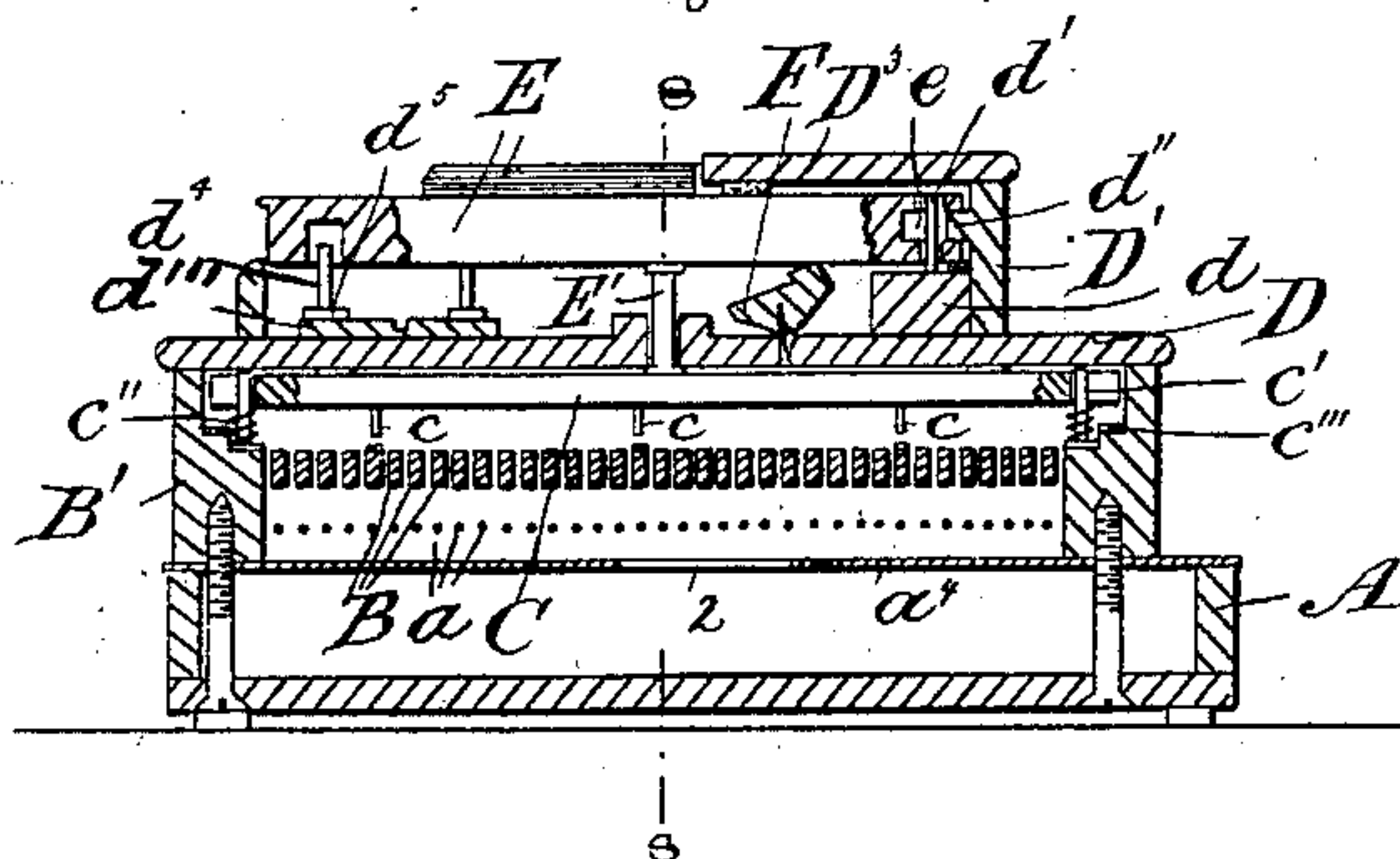


Fig. 6.

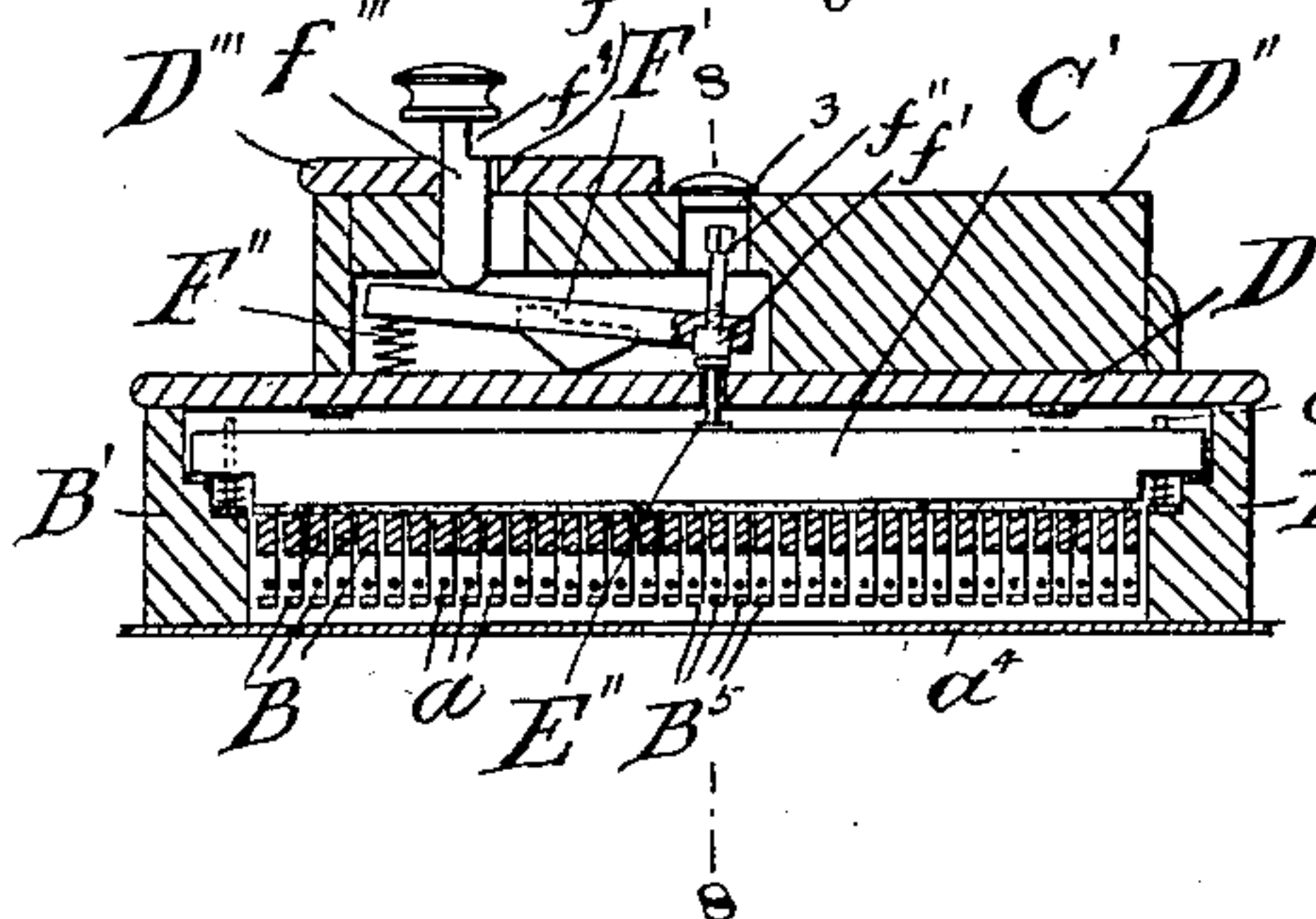


Fig. 7.

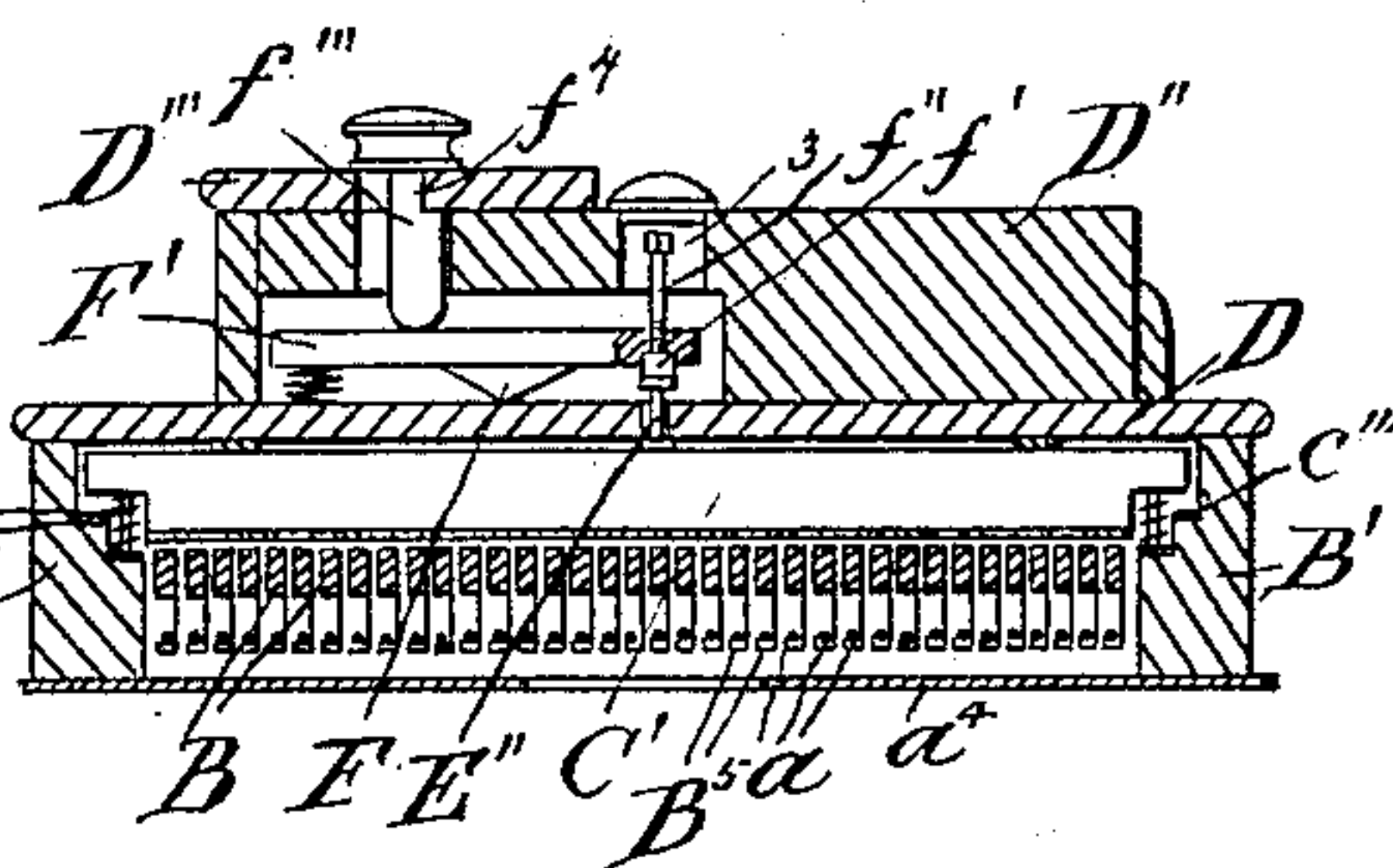
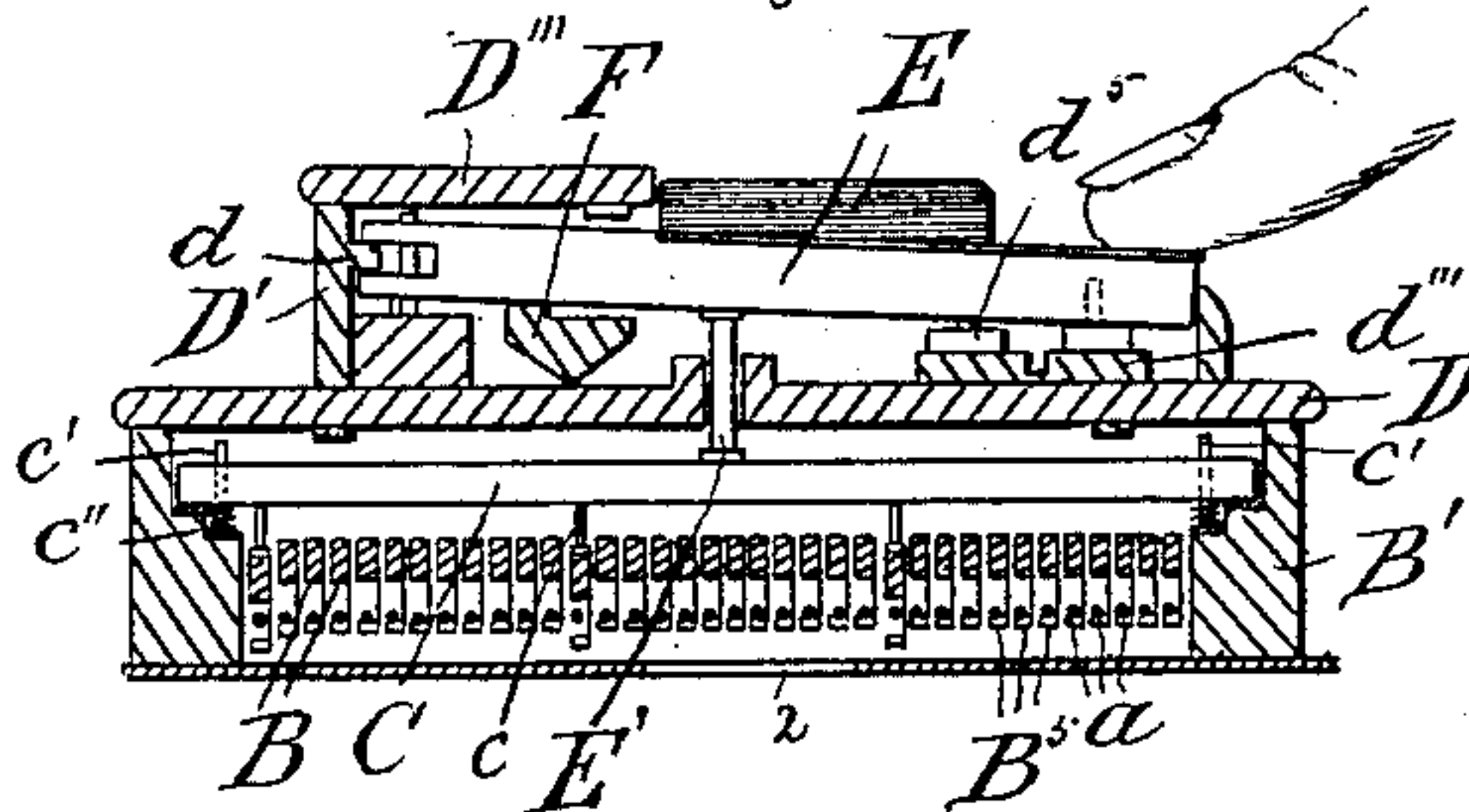


Fig. 5.



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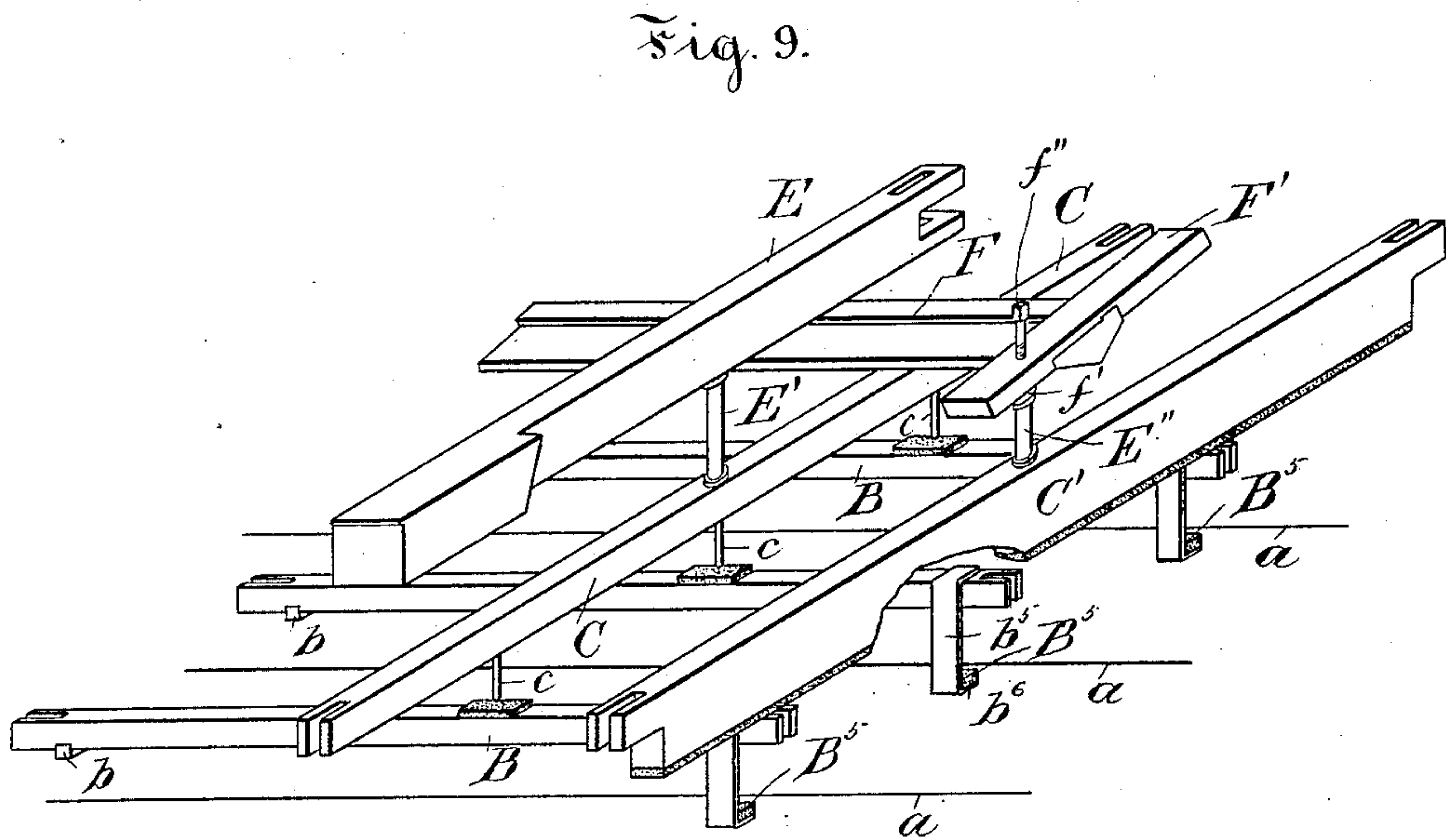
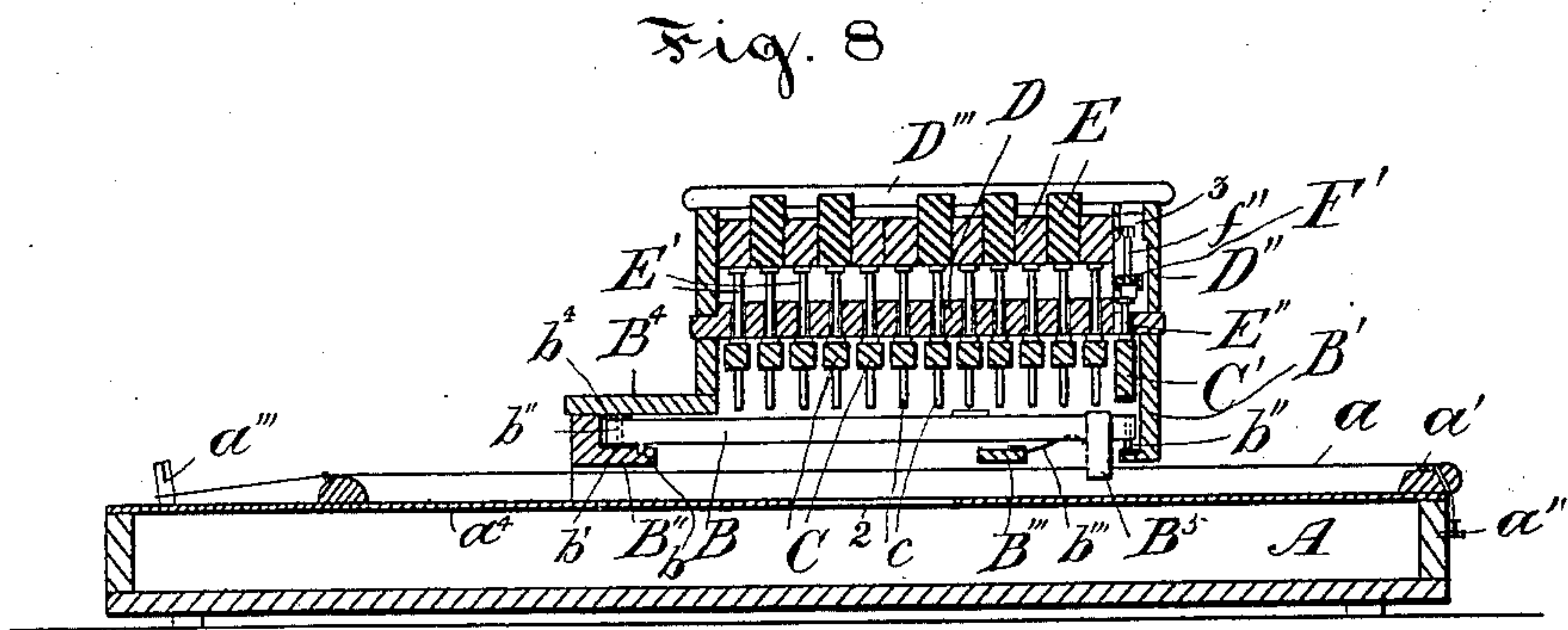
(No Model.)

3 Sheets—Sheet 3.

J. S. BACK.
AUTOHARP.

No. 559,764.

Patented May 5, 1896.



Witnesses:
 Jas. Raley.
 W. Hoffke.

James S. Back
Inventor
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UNITED STATES PATENT OFFICE.

JAMES S. BACK, OF OTTAWA, CANADA, ASSIGNOR OF ONE-HALF TO
GEORGE LEWIS ORME, OF SAME PLACE.

AUTOHARP.

SPECIFICATION forming part of Letters Patent No. 559,764, dated May 5, 1896.

Application filed September 27, 1895. Serial No. 563,836. (No model.)

To all whom it may concern:

Be it known that I, JAMES S. BACK, of the city of Ottawa, in the county of Carleton and Province of Ontario, in the Dominion of Canada, have invented certain new and useful Improvements in Autoharps; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part hereof.

My invention, which will be hereinafter fully set forth and claimed, relates to that class of musical instruments of the harp description resembling the cithern and commonly known as "autoharps."

The object of my invention is an instrument of the autoharp description on which every chord in the musical scale or any single note with its octaves can be played by sliding over all the strings, that permits of legato and staccato sounds by previous instant adjustment, and on which any single string can be picked without previous adjustment.

My improved autoharp is provided with mechanism which by means of a piano-keyboard (or, more strictly, an organ-keyboard) permits any chord in any key or the octaves of any single note to be sounded; also with a stop capable of instant adjustment by which the strings are either sounded legato or staccato.

Figure 1 is a top view of my improved instrument. Fig. 2 is a top view of a part of the same having the board covering the rear of the keys and some of the keys removed and part of the top side piece broken out. Fig. 3 is a top view of a part of the same with the keyboard removed entirely and also some of the presser-bars removed, also a piece of the board broken out which covers the pivot end of the damper-bars. Fig. 4 is a vertical transverse section of the same on line 4 4, Figs. 1, 2, and 3. Fig. 5 is a transverse section on line 5 5, Figs. 1, 2, and 3, similar in all respects to Fig. 4, but seen from the other side and showing the key depressed. Fig. 6 is a transverse section of the same on line 6 6, Figs. 1, 2, and 3, showing the muffler-bar down, depressing all the damper-bars and the dampers free of the strings. Fig. 7 is a similar section, but showing the muffler clamped

and all the strings muffled. Fig. 8 is a longitudinal section on line 8 8, Figs. 1, 2, 3, 4, and 6. Fig. 9 is a perspective view of one key with presser-bar and the three damper-bars upon which it acts, also the muffler.

A is the body of the autoharp, having strings *a* passing over the bridge *a'* and strung on hitch-pins *a''* and tuning-pins *a'''*, the body being provided with the usual sound-hole in the sound-board *a⁴*. In this example there are thirty-six strings, though there may be more or less, being just three octaves, so that each key controls three strings. The strings, as in all instruments of this class, are vibrated with a plectrum, and it is usual to run the latter across all the strings, so that the open ones will be sounded while the damped or muffled ones will be mute.

Over each string is disposed a damper-bar B, the series being contained in a casing B', which is secured upon the front and rear edges of the body A by screws or in some other convenient manner. The pivot end of each damper-bar is supported upon a grooved cross-rail B'', lined with a strip of cloth *b'* and having a vertical pin *b''*, which passes through a slot in the end, and a small lug *b* at the lower surface engaging the groove in the rail, a cover-board B⁴, lined at the lower surface near the inner edge with a cushion-strip *b⁴* of thick cloth or thin felt, keeping the pivot ends from rising and from displacement. Medially in the casing is another cloth-lined cross-rail B''', which serves as a stop and support for the bars when depressed and which carries for each bar a wire spring *b'''*, which bears in a groove on the under side of each bar at the free end and holds it up. At the free end of each bar, also guided by a pin *b''*, secured to a cross-rail and passing in the slotted end, is secured a damper B⁵, having a flat shank *b⁵*, adapted to pass freely between a pair of strings and having a crook or foot *b⁶* extending across under the string and suitably lined with damper-felt.

The spring B''' presses the bar B upward, so that the top surface of the crook *b⁶* presses against the bottom of the string *a*, thus damping or muffling it at the end nearest the bridge *a'*. The length of said damper-bars which projects from under the cover-board B⁴ is such

that there is sufficient room above them for the transverse presser-bars C.

There is a presser-bar C for each key and an extra one, C', for the muffler, each extending across all the damper-bars, being contained in the upper part of the same casing B', Figs. 4, 5, 6, 7, and 8. The front and rear rails of said casing are rabbeted at the top, or the lower part thickened by the addition of a rail, so as to form a ledge or shoulder, which is provided with a vertical pin *c'* for each end of each presser-bar, said pin passing through a vertical slot in the end of the bar and having a spring *c''* coiled upon it, which holds the bar up. Upon each pin and under the spring is placed a cloth washer and at the rear of the spring the rabbet is raised a little to form a shoulder *c'''*, lined with cloth, to form a rest or stop for the bars. The slots in the ends of the bars are of such a length that the ends of the slots bear more or less snugly on the pins, so as to give a suitable vertical motion to said bars. Each of said bars is provided at its lower side with three pins *c*, spaced one octave—i. e., twelve damper-bars—apart and the distance of the pins from the ends of the bar being different in each, so that the pins of each presser-bar operate on three different damper-bars. Thus, for instance, if the first string be C, as is usual, the thirteenth and twenty-fifth will also be C, and the first presser-bar will have a pin *c* over the first, thirteenth, and twenty-fifth damper-bars; the second presser-bar C₂ will have pins over the second, fourteenth, and twenty-sixth damper-bars; the third, over the third, fifteenth, and twenty-seventh, and so on. The damper-bar is padded with cloth or the like in the place where the pins touch it, to soften the touch and deaden the sound that might be occasioned by the contact. The presser or muffler bar C', (shown in Figs. 6 and 7,) being the last in the series and occupying the position on the extreme right, is not provided with pins *c*, but is deeper and adapted to rest bodily upon the ends of the damper-bars. In other respects it is the same as the other presser-bars, being guided in pins *c'* and carried upon springs *c''*. Above these presser-bars C and C' is a board or false bottom D, Figs. 4, 5, 6, 7, and 8, upon which the piano-keyboard is supported in a suitable casing D', having an extra thick side piece D'', which extends over the muffler-bar C' and has its inner rear portion recessed to contain part of the mechanism for operating the muffler. In this casing is contained an octave of keys E, supported at the rear upon a cloth-lined rail *d*, having vertical pins *d'* passing into perforations in the end of the keys, which are slotted at the top, and a tongue *d''* on the back piece of the casing, which engages notches *e* in the ends of the keys. At the front is a rail *d'''*, carrying upright pins *d⁴* with felt washers *d⁵*, which said pins enter slotted holes in the bottom of the keys. Each of these keys is adapted to operate one of the presser-bars by means of

a pin E', set over the center of the presser-bar and under the key in the board D, which is thickened at that part and perforated to form a suitable guide for said pin to have a free vertical motion therein. Said pins may be provided with collars and cushions at the ends.

If one of the keys E is depressed, it presses down the corresponding presser-bars C through the medium of the pin E' against the pressure of a pair of springs *c''*, which in turn depresses three damper-bars B against the pressure of their springs *b'''*, thus releasing the corresponding strings from the dampers. Between said pins and the rear ends of the keys is a rocking bar F, Figs. 2, 4, 5, and 9, hinged to the board D and having rigidly secured to it at the end above the presser-bar C' an arm or lever F', which is contained in the recess of the side piece D'', as shown in Figs. 6 and 7. A spring F'' holds up the rearward end of said arm or lever F', thus raising the rear edge of the rocking bar, so that it touches the under side of the keys and depresses the forward end of said arm or lever and causing it to press upon the pin E'', which bears upon the muffler-bar C'. Said pin E'' is similar in every way to the pins E', but shorter, and is held in the bottom D in the same manner. For the purpose of adjusting the bearing-surface upon said pin E'' a regulating-button *f'*, bearing upon said pin, is secured to a regulating-screw *f''*, passing upward through said lever in a recess 3 in the side piece D'', which is open at the top, making said screw accessible from the top for adjustment. Above the rear end of the lever F', inserted in the slot in the piece D'', is a clamp-pin *f'''*, adapted to push down the end of said lever and to be locked into this position by means of a notch *f⁴*, engaging a projection *f⁵*, which is readily provided by making the slot in the board D'', covering the rear end of the keys, somewhat shorter than the slot in the piece D''.

It will be observed that in depressing a key two things occur. One of the presser-bars C is pressed down and depresses three damper-bars, thereby effectually clearing three strings already open and thus setting them free to vibrate and sound if struck. At the same time the rocking bar is declined rearwardly, together with the arm or lever F', against the pressure of the spring F'', thus raising the forward end of said arm or lever and setting free the pin E'' and with it the muffler-bar C', which is raised by the springs *c''*. As soon as the muffler-bar C' ceases to press on the forward ends of the damper-bars B all except those depressed by the presser-bar C rise by the action of the springs *b'''* and the dampers *b⁶* press upward on the strings, thus muffling or damping all except those affected by the action of the key or keys. As soon as the pressure on one or more of the keys ceases all the damper-bars resume their normal position, leaving all the strings open, thus permitting the strings which have been open to

continue to vibrate. By clamping down the lever F' by means of the clamp-pin f''' the presser-bar C' is allowed to rise, muffling or damping all the strings. If now one or more
 5 keys are depressed, the corresponding presser-bars C go down and depress the corresponding damper-bars, setting free the corresponding strings and leaving them free to vibrate and sound if struck, and as soon as the pressure on the key or keys ceases all the strings
 10 are immediately damped, thus stopping their vibration and producing a short sound.

A scale M, consisting of letters or a series of numbers, may be placed upon the cover-board D''', corresponding to the keys. Another scale N also consisting of letters or numbers, with or without the imitation of a piano-keyboard and corresponding to the strings, may be placed upon the sound-board
 20 a⁴ near the bridge.

It is of course self-evident that the number of strings and keys and their combinations may be varied.

I claim as my invention—

25 1. In an autoharp, the combination with the body of a casing secured above the sound-board, of a series of damper-bars pivoted in said casing at one end above and parallel to the strings and each carrying a damper at the other or free end each adapted to press
 30 upward against one of the strings, a cross-bar in said casing carrying a series of springs each holding up one of said bars, a series of presser-bars placed transversely above said damper-bars and provided with pins each
 35 adapted to bear upon one of the damper-bars, a spring at each end of each of said presser-bars holding the same up, a board above said bars provided with guides for vertical pins and forming the bottom of a keyboard, a series of pins in said bottom adapted to move
 40 vertically and each in contact with one of the presser-bars, a series of keys arranged in the manner of an organ-keyboard suitably pivoted and each bearing upon one of the afore-
 45 said pins, a muffler-bar similar to the presser-bars but without pins and bearing bodily upon the free ends of the damper-bars, a rocking bar pivoted to the bottom of the keyboard
 50 under the rear end of the keys and adapted to have its rear edge depressed by the keys, an arm or lever at one end of said rocking bar bearing with its forward end upon one of the vertical pins which move in said bot-
 55 tom and which is in contact with said muffler-bar and a spring holding up the rear end of said arm or lever, substantially as set forth.

2. In an autoharp, the combination with the body of a casing secured thereto above the
 60 sound-board, a damper-bar for each string pivoted in said casing above and parallel to the string so as to have its free end toward the bridge and having its pivoted end held down by a cover-board, a damper at the free
 65 end of each damper-bar having a shank passing between a pair of strings and a crook passing under one of the strings and adapted to

bear on said string when pressed upward, a cross-rail under said damper-bars limiting their downward movement, a spring for each
 70 damper-bar secured to said rail and bearing on the under side of said damper-bar and pressing it upward, substantially as set forth.

3. In an autoharp, the combination with the body of a casing secured thereto above the
 75 sound-board, a series of damper-bars parallel to the strings pivoted in said casing and carrying dampers adapted to muffle the strings, a series of presser-bars disposed transversely above said damper-bars and having down-
 80 wardly-projecting pins adapted to come into contact with a limited series of said damper-bars so as to depress them, a spring-rail under each end of said presser-bars and secured to said casing, a series of vertical guide-pins in
 85 each of said rails one for each presser-bar and passing through the latter near the end, a spring upon each pin between said rail and bar end holding up the latter, substantially as set forth.
 90

4. In an autoharp, the combination with the body of a casing secured thereto above the sound-board, a series of damper-bars pivoted in said casing at one end and carrying dampers at the other and held up by springs, a
 95 series of presser-bars disposed transversely above said damper-bars and provided with pins adapted to depress some of the said damper-bars and suitably guided and held up by a spring at each end, a board covering said
 100 casing adapted to hold a series of pins slidingly, a series of vertical pins adapted to move vertically in said board and depress said presser-bars, and a series of keys pivotally supported upon said board and adapted to de-
 105 press said presser-bars by means of said pins, substantially as set forth.

5. In an autoharp, the combination with the body of a casing secured thereto above the sound-board, a board or false bottom cover-
 110 ing said casing provided with perforations or guides for a series of vertical pins, an organ-keyboard arranged upon said false bottom, a series of pins having a vertical motion in said false bottom and adapted to be depressed
 115 by said keys, a series of presser-bars under said bottom corresponding to said keys and pins held up by springs and adapted to be depressed by said keys and pins, a rocking bar pivoted to said bottom adapted to have
 120 one edge depressed by the keys and having at one end an arm or lever, a spring holding up the rear end of said arm or lever, a vertical pin under the forward end of said arm or lever held vertically sliding in said false bot-
 125 tom, a muffler-bar under said pin guided and supported at each end by pins and springs and a series of damper-bars disposed transversely to said muffler-bar and parallel to the strings of the instrument and upon which said
 130 muffler-bar bears bodily so that the spring supporting the arm or lever depresses said muffler-bar and with it all the damper-bars, substantially as set forth.

6. In an autoharp, the combination of a casing secured above the sound-board, an organ-keyboard disposed upon a false bottom in said casing, a rocking bar pivoted upon said
5 bottom transversely under said keys and adapted to have its rear edge depressed by any one or more of said keys, an arm or lever at the end of said rocking bar bearing with its forward end upon the pin and depressing
10 a presser-bar which depresses the free end of a series of dampers, a spring under the rear

end of said arm or lever holding the same up and a clamp-pin by which the spring-actuated end of said arm or lever may be held depressed, substantially as set forth. 15

In testimony whereof I have signed my name in the presence of the undersigned witnesses.

JAS. S. BACK.

Witnesses:

A. HARVEY,

A. TROWSSE.