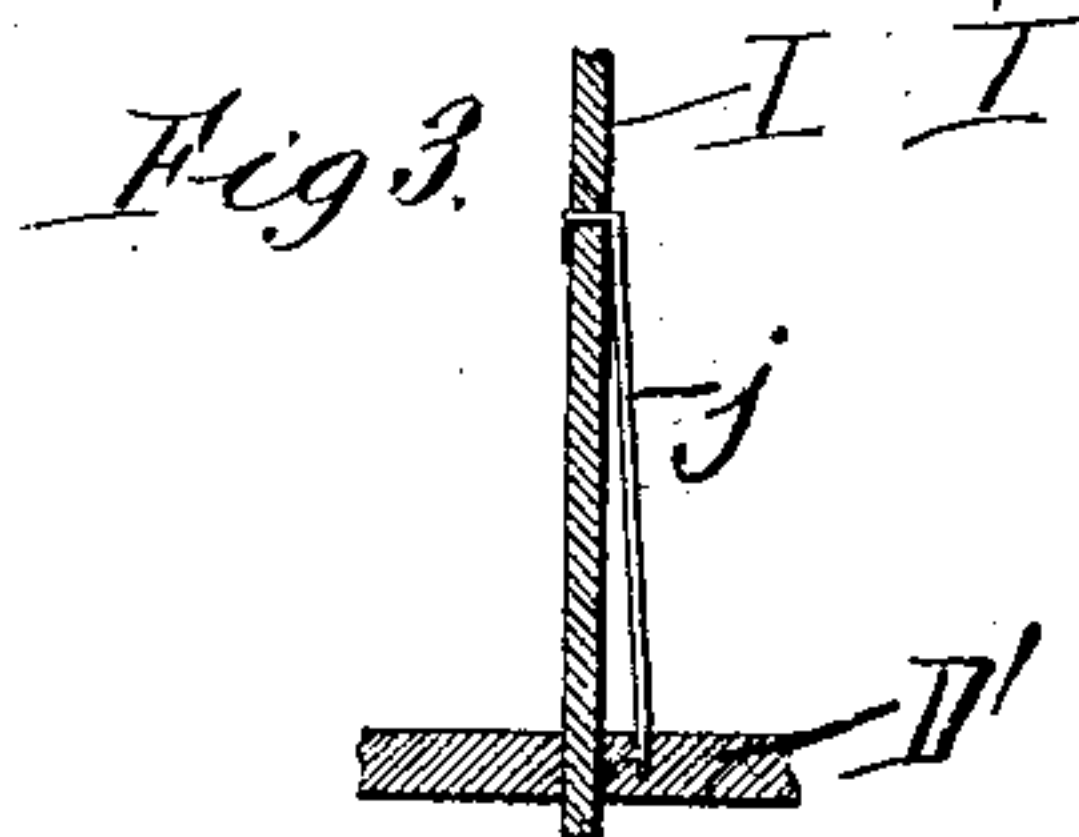
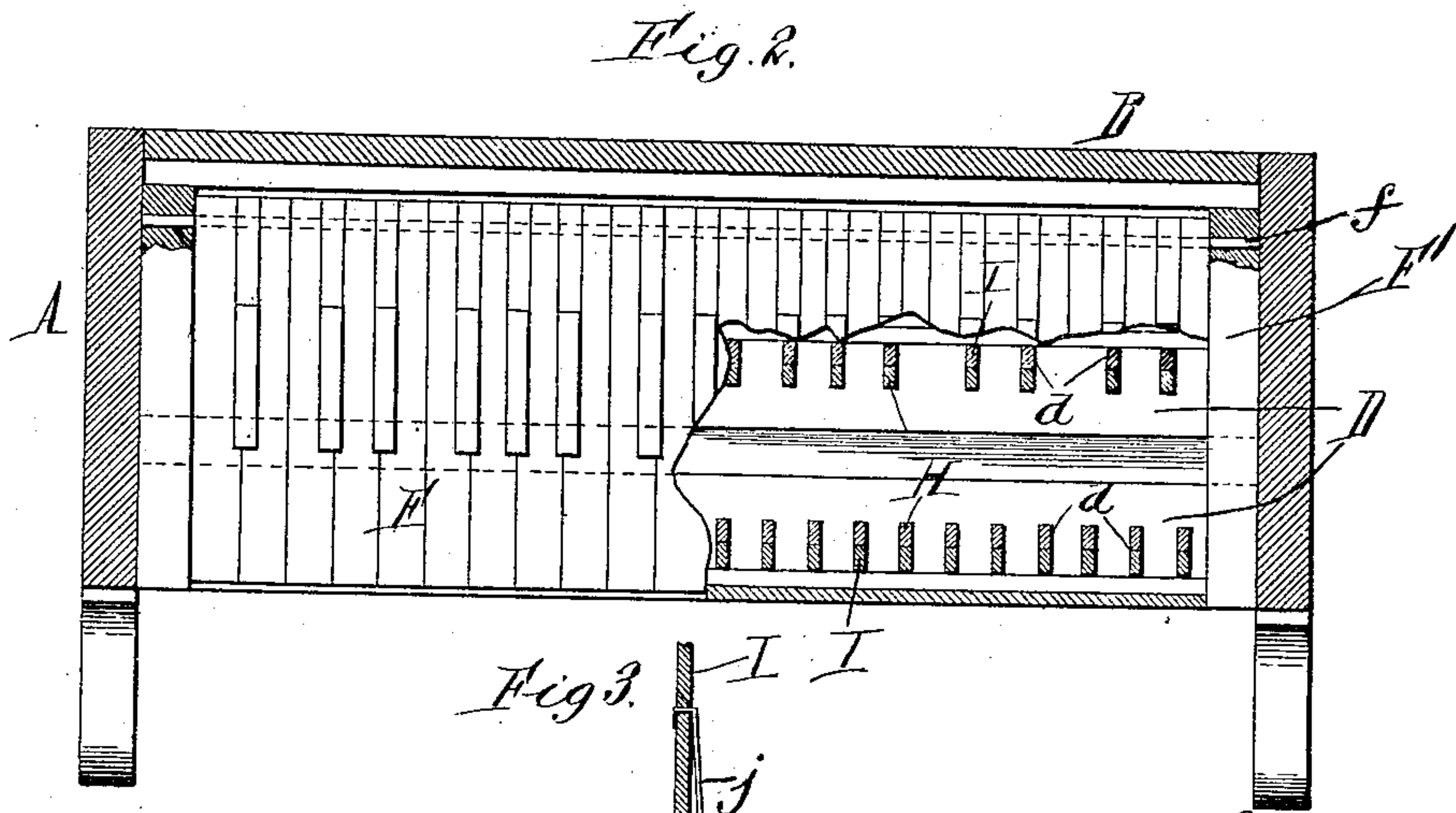
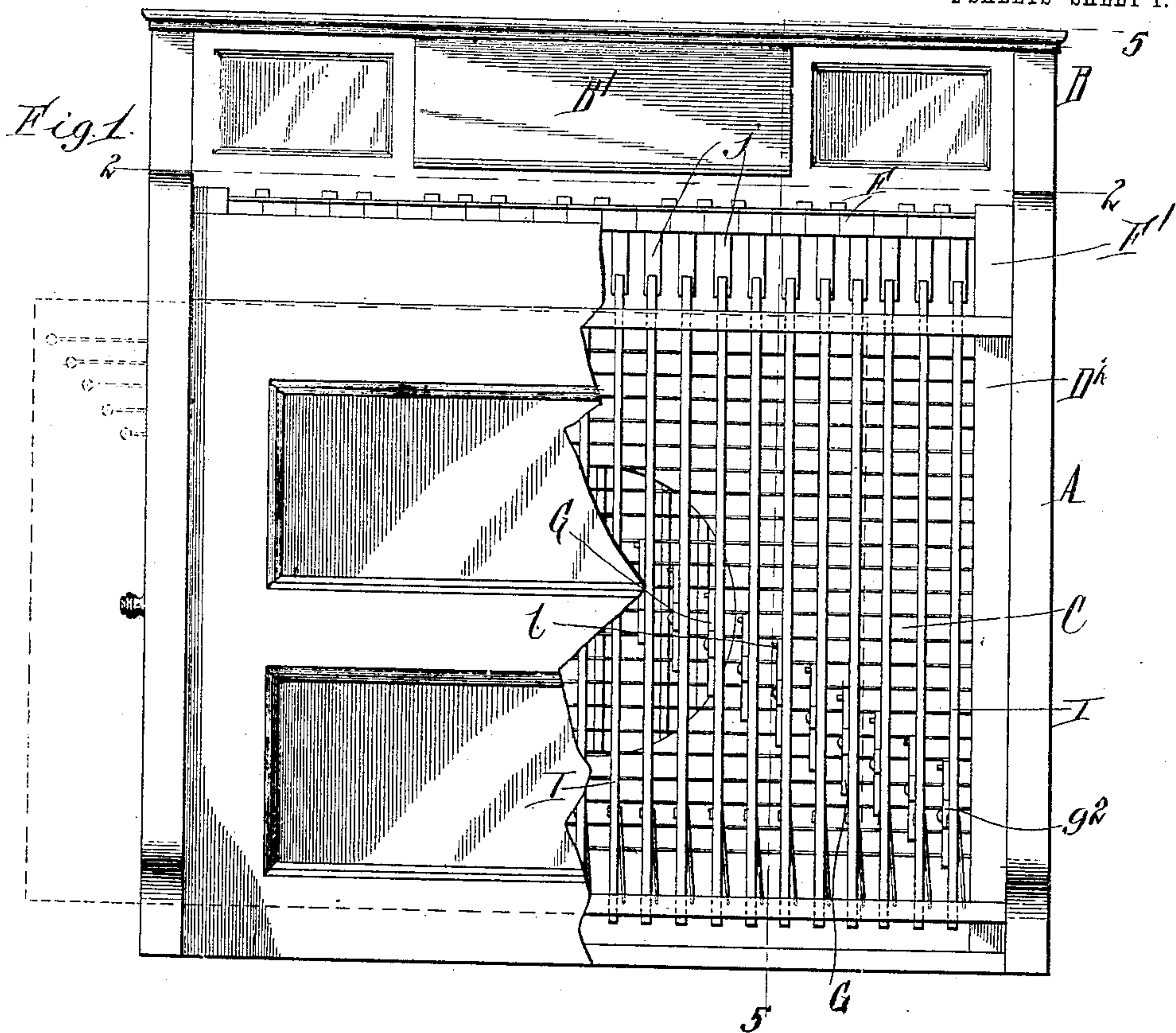


917,994.

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2 SHEETS—SHEET 1.

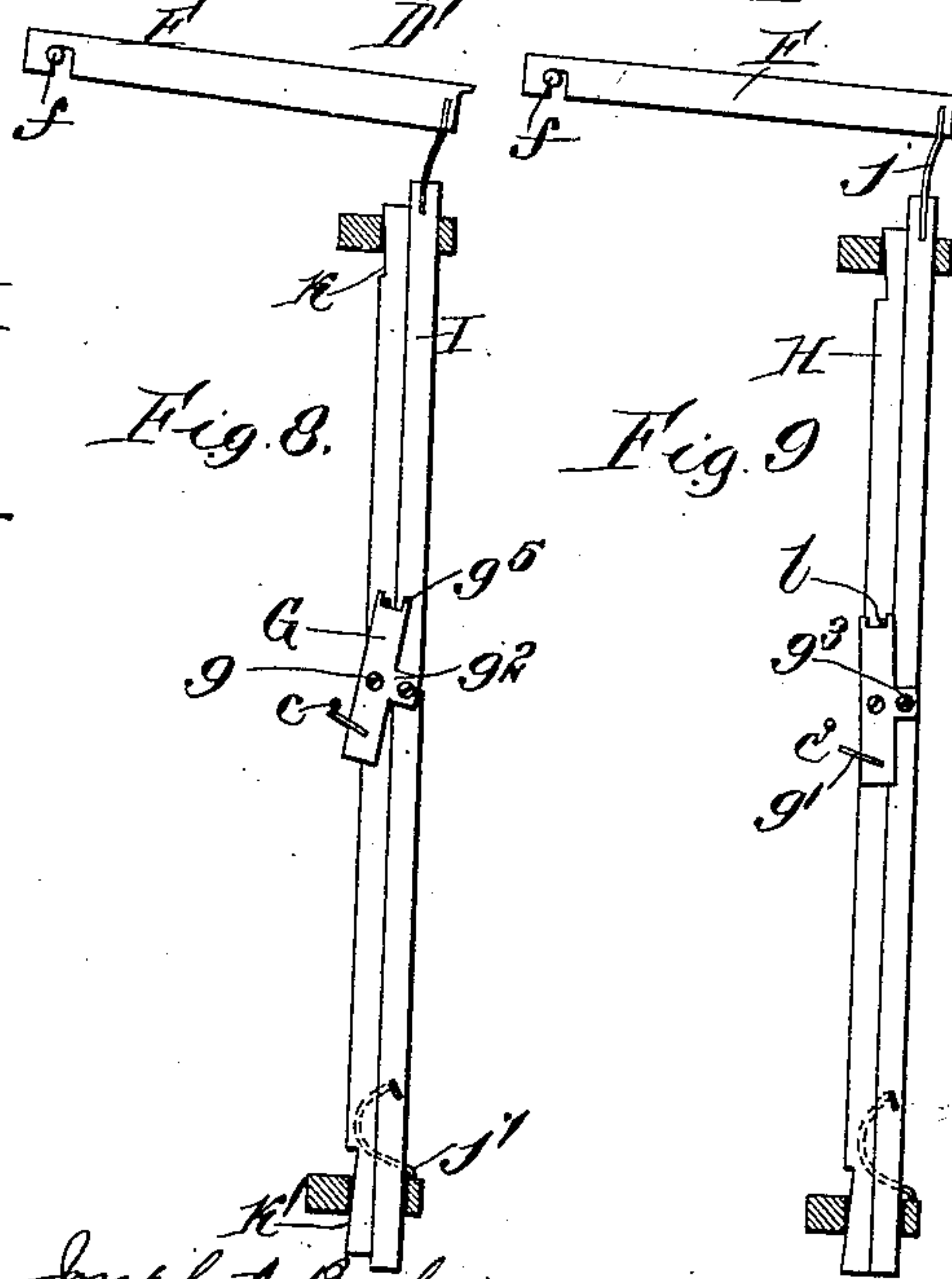
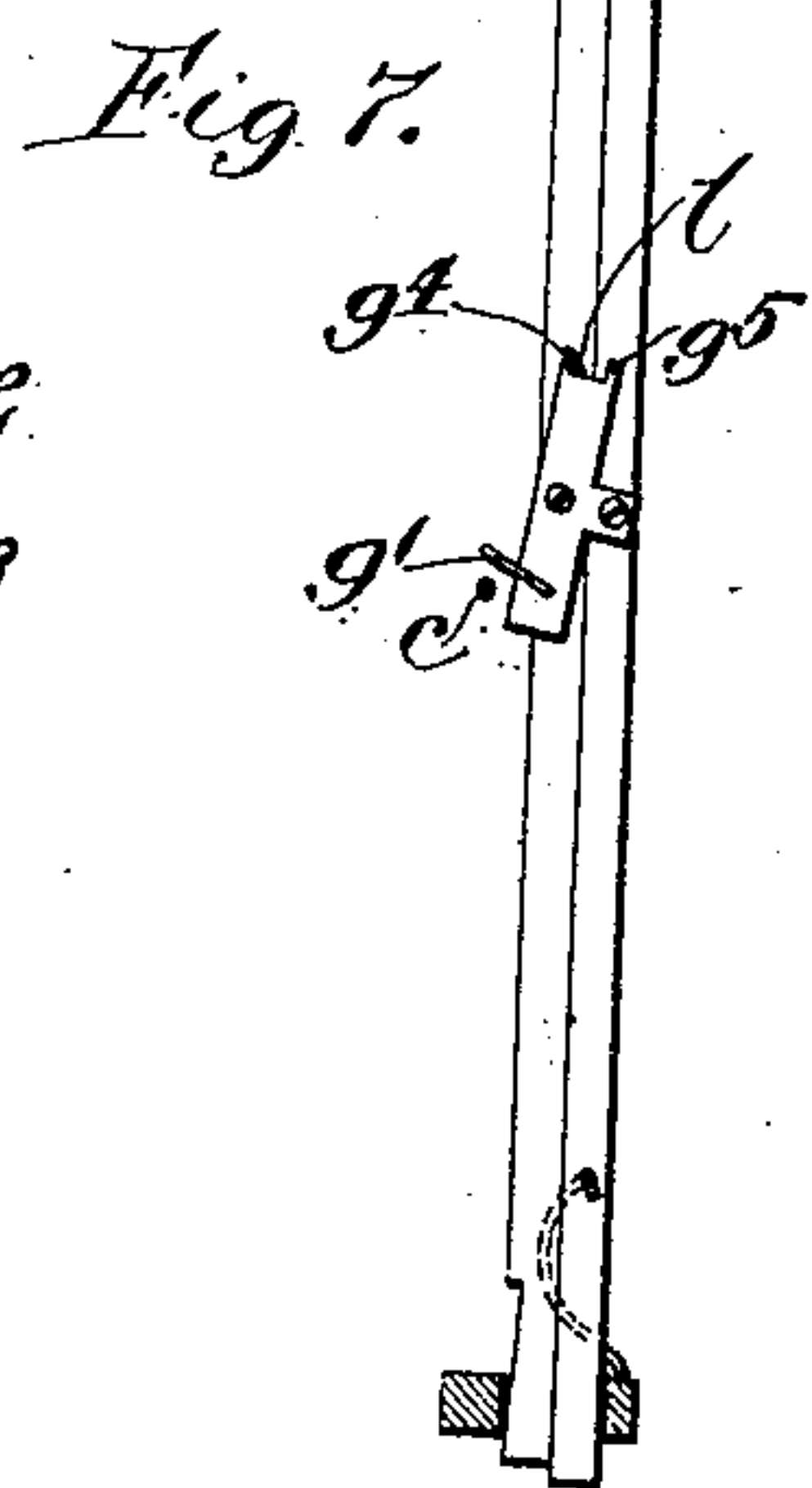
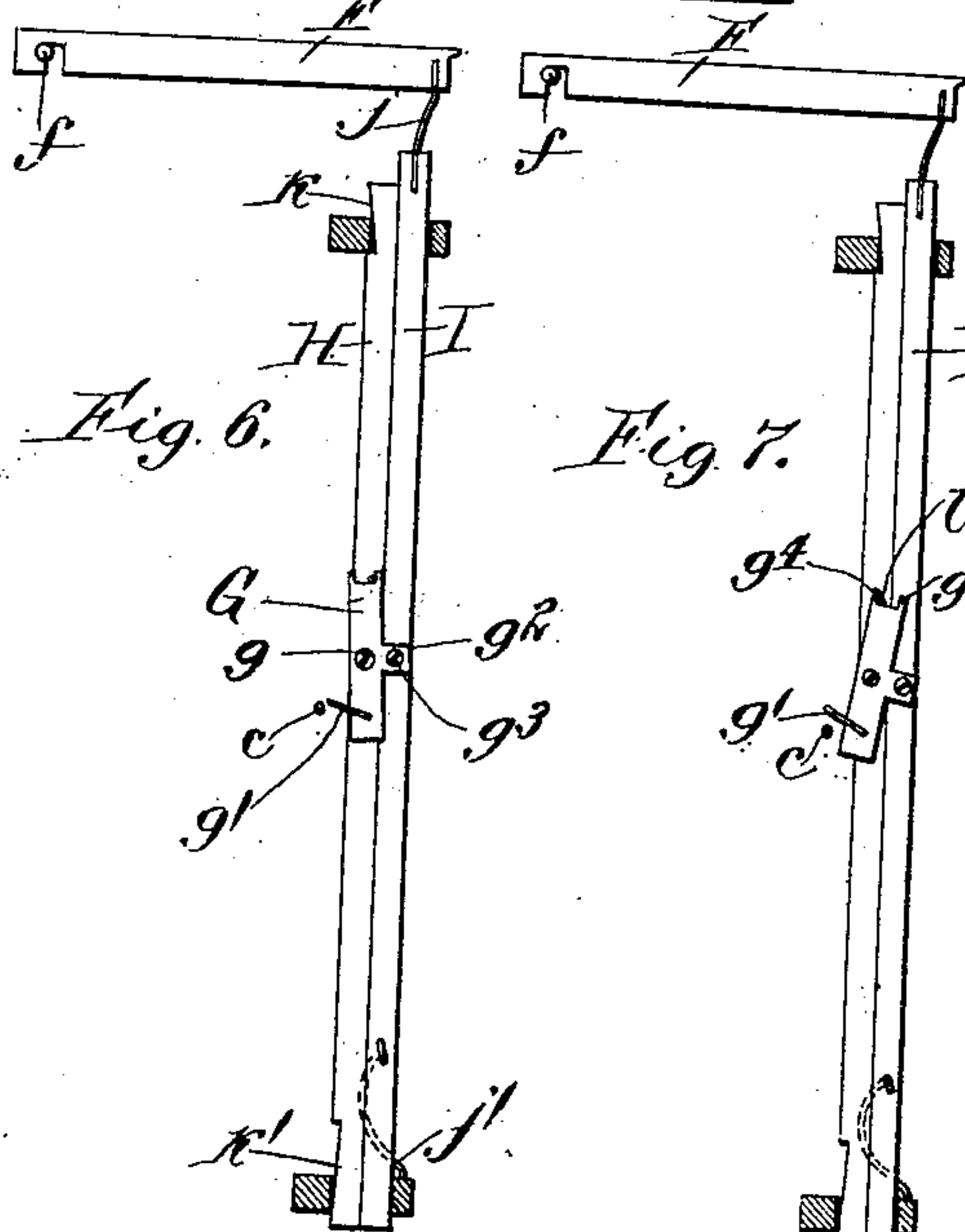
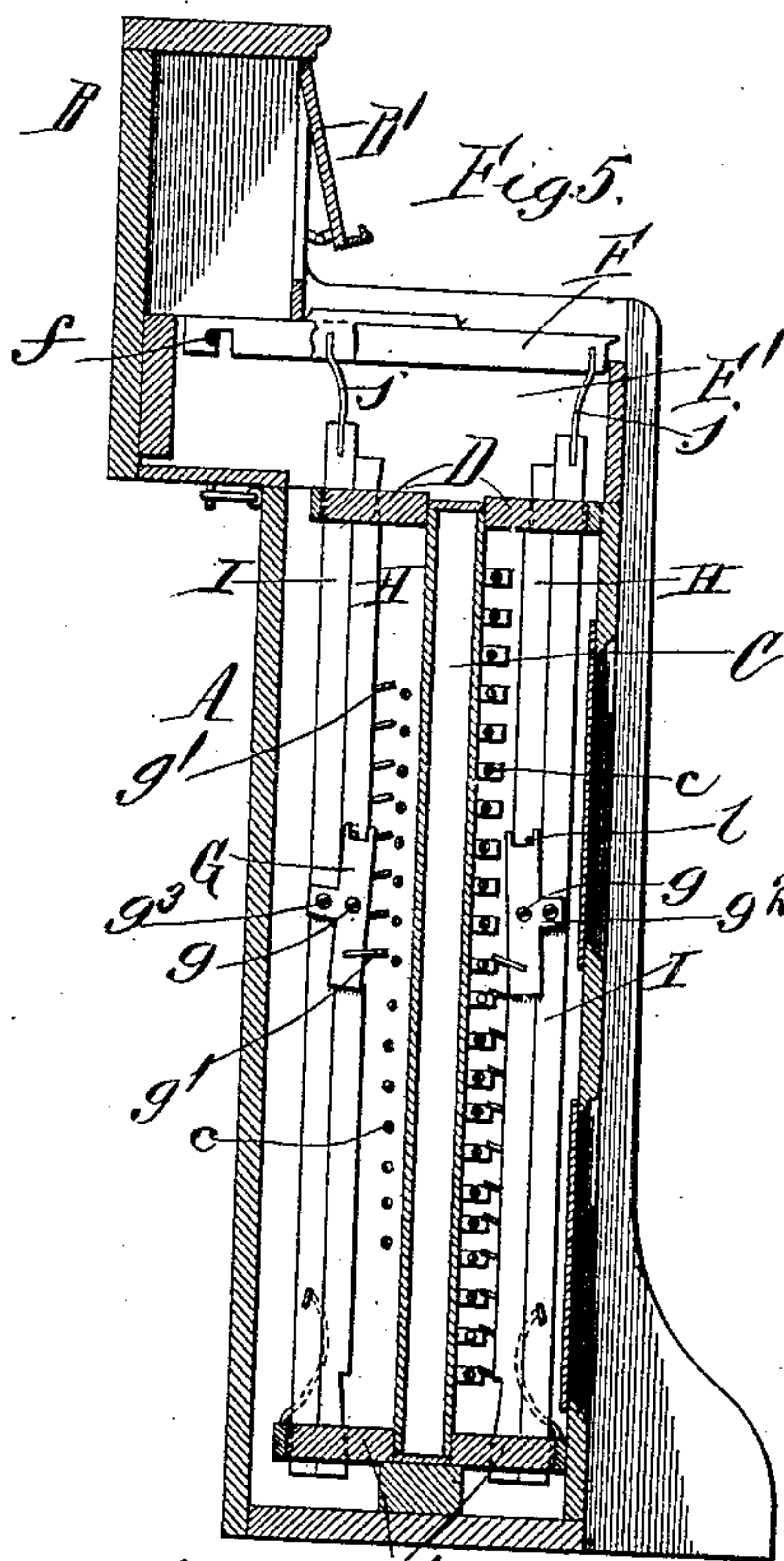


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2 SHEETS—SHEET 2.



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# UNITED STATES PATENT OFFICE.

JOSEPH A. BOEHRINGER, OF BUFFALO, NEW YORK.

## ZITHER-PIANO.

No. 917,994.

Specification of Letters Patent.

Patented April 13, 1909.

Application filed January 18, 1908. Serial No. 411,401.

*To all whom it may concern:*

Be it known that I, JOSEPH A. BOEHRINGER, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented a new and useful Improvement in Zither - Pianos, of which the following is a specification.

This invention relates to a musical instrument comprising a zither or similar stringed sound-board, mechanism for picking the strings and a key-board for operating the picker mechanism.

One of the objects of my invention is to so combine the zither with the piano-case that the zither can be readily withdrawn for conveniently tuning, re-stringing or repairing it.

A further object is to so construct the instrument as to secure simplicity and compactness.

A further object is the provision of a simple and effective picker mechanism which is not liable to get out of order.

In the accompanying drawings consisting of 2 sheets: Figure 1 is a front elevation of the instrument, with the casing partly broken away. Fig. 2 is a horizontal section in line 2—2, Fig. 1. Fig. 3 is a fragmentary vertical section of one of the shifting bars of the picker mechanism on an enlarged scale. Fig. 4 is a side elevation of the instrument. Fig. 5 is a transverse vertical section thereof in line 5—5, Fig. 1. Figs. 6, 7, 8 and 9 are side views of a pair of carrying and shifting bars, showing different positions of the same and the picker-lever.

Similar letters of reference indicate corresponding parts throughout the several views.

The instrument shown in the drawings is a comparatively small one of three octaves designed to be carried from place to place, but the invention is equally applicable to large instruments of the size of ordinary pianos.

The case A is rectangular similar to that of an ordinary upright piano and may be provided at the rear of its top with a raised portion B to which a desk B<sup>1</sup> of ordinary construction may be pivoted.

C is the sounding board or box of a zither or similar stringed instrument which is arranged in an upright position in the narrow lower portion of the case substantially parallel with the front and rear walls of the latter. The zither is preferably removable through one side of the case, and for this purpose it is guided at its top and bottom be-

tween upper and lower horizontal guide rails D, D<sup>1</sup> supported at their ends by uprights D<sup>2</sup> secured to the side walls of the case. One of said side walls is provided with a door E of any suitable construction through which the zither may be withdrawn, as shown by dotted lines in Fig. 1, to permit convenient access to it for tuning or repairing it, or renewing the strings.

In order to increase the compactness of the instrument and provide a comparatively large number of strings within a small space, the strings *c* are strung on both sides of the sound board, as shown in Fig. 5.

F indicates the keys arranged in the upper enlarged portion of the case and fulcrumed near their rear ends upon a longitudinal pivot-rod *f* supported by end-pieces F<sup>1</sup> secured to the side walls of the case, as shown in Figs. 2 and 5.

With each string of the zither, a picker-lever G coöperates which is actuated by the piano key corresponding to the string, through the medium of the following mechanism: H, I indicate a pair of upright bars arranged edge to edge and guided at their upper and lower ends in slots or combs *d* formed in the upper and lower guide-rails D, D<sup>1</sup>. A row of such twin-bars is arranged on each side of the zither and a pair of the bars is arranged under and coöperates with each piano-key. For distinction, the inner bar H of each pair will be termed the carrying bar and the outer one I the shifting bar. The shifting bar I is connected at its upper end with the corresponding key, preferably by a flat spring *j* constructed to constantly press the upper end of said bar against the companion carrying bar H and the latter against the end of the corresponding guide-slot. The lower portion of the shifting bar I is pressed against the adjacent portion of the bar H by a suitable spring *j*<sup>1</sup> preferably constructed to perform not only that function but also to elevate the bar I when the latter is depressed and released, so as to return it and the depressed piano-key to their normal position. In the preferred form shown in the drawings, the spring *j*<sup>1</sup> is bowed or C-shaped and secured at its ends to the adjacent lower guide bar D<sup>1</sup> and the shifting bar I. Each of the picker-levers G is pivoted by a pin or screw *g* to one side of the corresponding carrying bar H, and its lower arm carries a spring-finger *g*<sup>1</sup> adapted to snap over the corresponding string of the zither



for sounding the same when the picker-lever descends with the bars H and I. The pivot of the lever is preferably arranged about midway of its ends and opposite the pivot of the lever is provided with a lateral rock-arm  $g^2$  pivoted at  $g^3$  to the companion shifting bar I. At one end, the picker-lever is provided with spaced lugs or stops  $g^4$ ,  $g^5$  adapted to alternately strike a stop-pin  $l$  secured to the carrying bar H between said lugs. The carrying bar is provided with suitable means for retarding or arresting it during the initial portion of the movements of the shifting bar I when the latter is depressed or raised. For this purpose, the carrying bar H is preferably provided on its inner edge at or near its upper and lower ends with beveled or inclined faces  $k$ ,  $k^1$  which bear against the inner ends of the guide slots in the rails D, D<sup>1</sup>. In their preferred form, these beveled faces both recede toward the center of the bar, as shown in Figs. 5 to 9, inclusive. The adjoining edges of the bars of a pair are straight and bear against each other, while the beveled faces  $k$ ,  $k^1$  of the carrying bar bear against the inner ends of the guide slot  $d$  under the stress of the springs  $j$ ,  $j^1$ .

The operation of the picker-mechanism is as follows:—In the normal position of the keys, the bars H and I are elevated, as shown in Figs. 1, 5 and 6, and the outer lugs  $g^5$  of the picker-levers G bear against the stop-pins  $l$ , in which position the picker-finger  $g^1$  stands adjacent to but not over the corresponding string. Upon depressing a key, the corresponding shifting bar I descends with the key and during the initial movement of this bar, the companion carrying bar H remains stationary owing to the fact that the frictional resistance between its beveled faces  $k$ ,  $k^1$  and the guide rails D, D<sup>1</sup> is greater than that between the contiguous straight faces of the two bars. The result is that during such initial movement of the bar I, the corresponding picker-lever is rocked to the position shown in Fig. 7 by its connection with the bar I, bringing its picker-finger over the corresponding string ready to pick it. This rocking movement of the lever is limited by its inner lug  $g^4$  coming in contact with the stop-pin  $l$ , and as soon as this occurs, the lever acts as a rigid coupling for the two bars and the carrying bar H descends with the bar I during the remainder of the stroke of the latter, thereby causing the finger  $g^1$  to pick the string. Fig. 8 shows the position of the parts just after the finger has picked the string and before the key is released. Upon releasing the depressed key, the strained spring  $j^1$  reacts and raises the shifting bar I and the key to their former position. During the initial upward movement of the bar I, the ascent of the bar H is retarded or arrested by its lower be-

veled face  $k^1$  in the same manner as its downward movement was previously retarded by the upper beveled face  $k$ . By such initial upward movement of the bar I relative to the bar H, the projected picker-lever is rocked in the opposite direction in an obvious manner, thus withdrawing its picker-finger from underneath the corresponding string, as shown in Fig. 9. This reversal of the lever again brings its other lug  $g^5$  against the stop-pin  $l$  and the carrying bar H thereupon ascends with the bar I, raising the picker-lever to its former position with its finger above but clear of the string, preparatory to the next depression of the key, as shown in Fig. 6.

It will be understood from the foregoing, that the shifting bar I of each pair of bars momentarily moves independently of and in advance of the companion bar H to a sufficient extent to project the picker device to its operative position on the downward stroke of the bar I and to withdraw the picker device to its inoperative position on the return stroke of the last-named bar.

I claim as my invention:—

1. The combination of a case provided with a guide-way and a door in line with said guide-way, a stringed instrument removably arranged in said guide-way, and picker-mechanism cooperating with said instrument, substantially as set forth.

2. The combination of a case, a sound-board removably arranged in the case, strings strung on opposite sides of the sound-board, a series of pickers cooperating with each set of strings, and piano-keys for actuating said pickers, substantially as set forth.

3. In an instrument of the character described, the combination of a sound-producing part, and picker mechanism comprising a shifting bar and a cooperating carrying bar movable lengthwise to a limited extent independently of each other, a picker-lever fulcrumed on said carrying bar, connected with said shifting bar and having a pair of stops, a stop on the carrying bar cooperating with said lever-stops for limiting the swinging movement of the picker-lever, means for retarding the movement of the carrying bar, and means for actuating said shifting bar, substantially as set forth.

4. In an instrument of the character described, the combination of a sound-producing part, and picker mechanism comprising a pair of cooperating bars movable lengthwise to a limited extent independently of each other, guides for said bars, one of the bars being provided with beveled or inclined faces bearing against said guides, a spring for pressing said beveled bar against said guides, a picker-lever fulcrumed on the beveled bar and having a pivotal connection with the other bar, and means for actuating the last-named bar, substantially as set forth.

5. In an instrument of the character de-



scribed, the combination of a sound-producing part, and picker mechanism comprising a pair of cooperating bars movable lengthwise to a limited extent independently of each other, guides for said bars, one of the bars being provided with beveled or inclined faces bearing against said guides, a spring bearing against the other bar for pressing said beveled bar against said guides, a picker-lever fulcrumed on the beveled bar and having a pivotal connection with the other bar, and means for actuating the last-named bar, substantially as set forth.

6. In an instrument of the character described, the combination of a sound-producing part, and picker-mechanism comprising a shifting bar and an adjoining carrying-bar movable lengthwise to a limited extent independently of each other, guides for said bars, said carrying bar having beveled faces which recede toward the center of the bar and bear against said guides, springs acting on said shifting bar and operating to press the carrying bar against its guides, a picker-lever pivoted to the carrying bar and having a pivotal connection with the shifting bar, the lever having a pair of stop-lugs, and a stop on the carrying bar cooperating with said lugs, substantially as set forth.

7. In an instrument of the character de-

scribed, the combination of a sound-producing part, and picker-mechanism comprising a shifting bar and a cooperating carrying bar movable to a limited extent independently of each other, a picker device mounted on said carrying bar and movable thereon, means for transmitting the movement of said shifting bar to the picker device, a return-spring operating to move said shifting bar to its initial position and at the same time press the same against said carrying-bar, and means for actuating said shifting bar, substantially as set forth.

8. In an instrument of the character described, the combination of a sound-producing part, and picker-mechanism comprising a shifting bar and a cooperating carrying bar, guides for said bars, a picker device movably mounted on said carrying bar and connected with said shifting bar, a key and a spring connecting the key with said shifting bar and constructed to press the latter against said carrying bar, substantially as set forth.

Witness my hand this 15th day of January, 1908.

JOSEPH A. BOEHRINGER.

Witnesses:

C. F. GEYER,  
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