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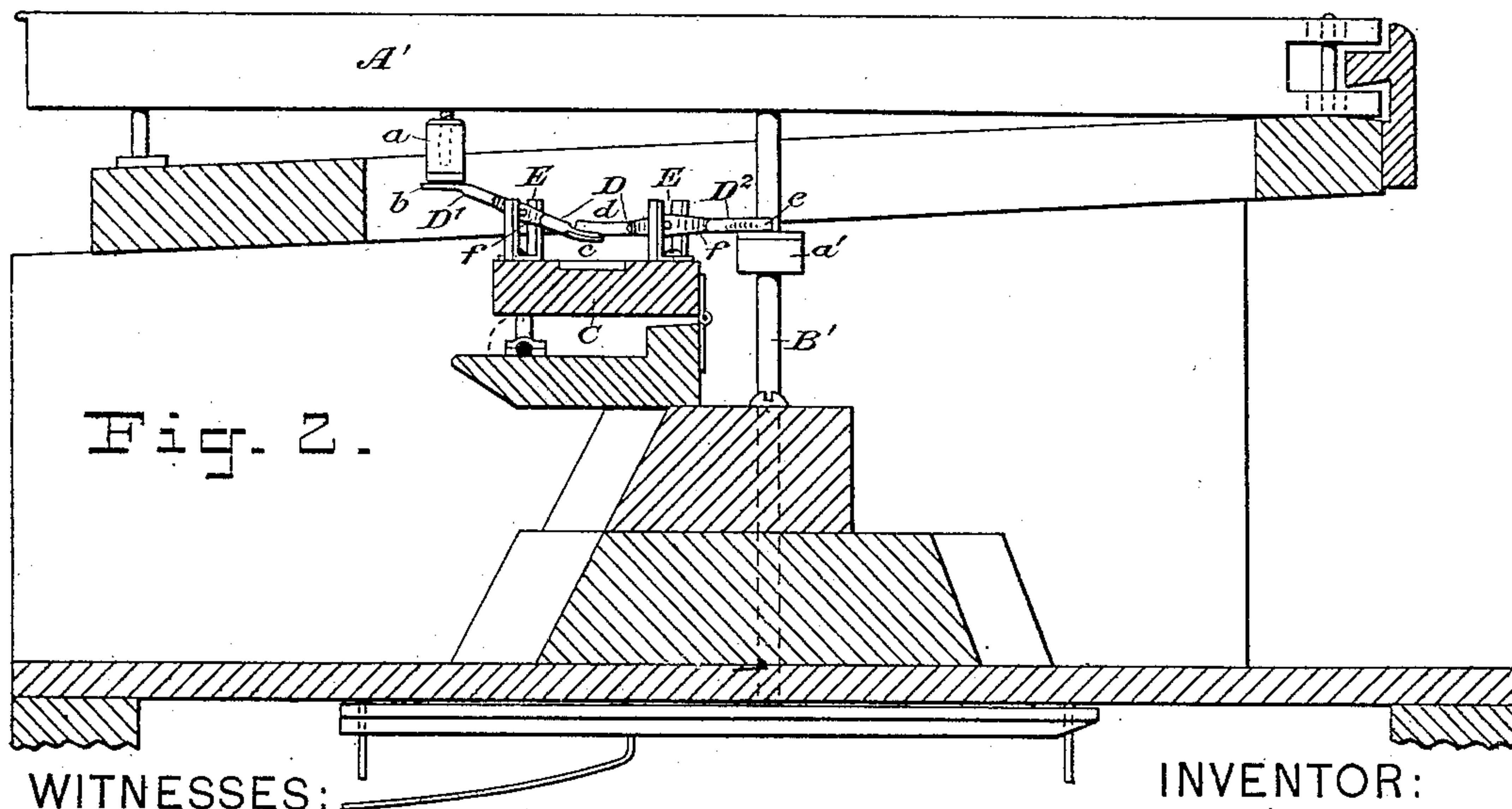
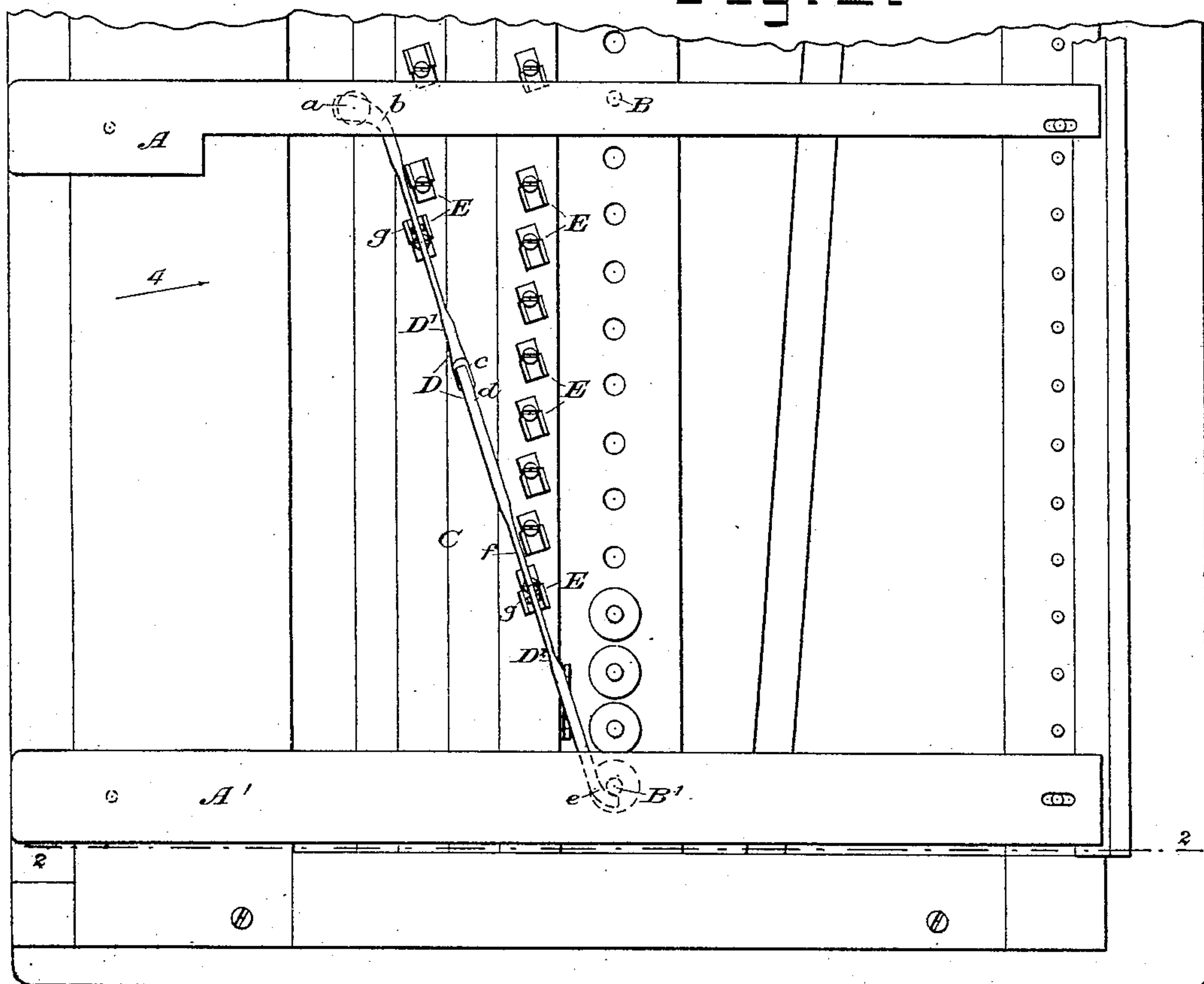
L. K. FULLER.

HARMONIC COUPLER FOR MUSICAL INSTRUMENTS.

No. 290,984.

Patented Dec. 25, 1883.

Fig. 1.



WITNESSES:

*Geo. H. Spiller.*  
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INVENTOR:

*L. K. Fuller*  
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(No Model.)

2 Sheets—Sheet 2.

L. K. FULLER.

HARMONIC COUPLER FOR MUSICAL INSTRUMENTS.

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Fig. 3.

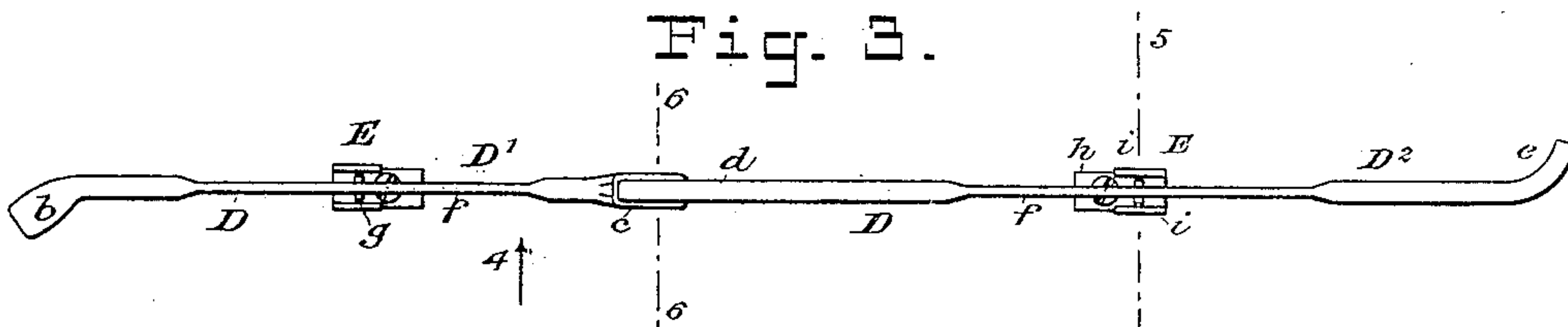


Fig. 4.

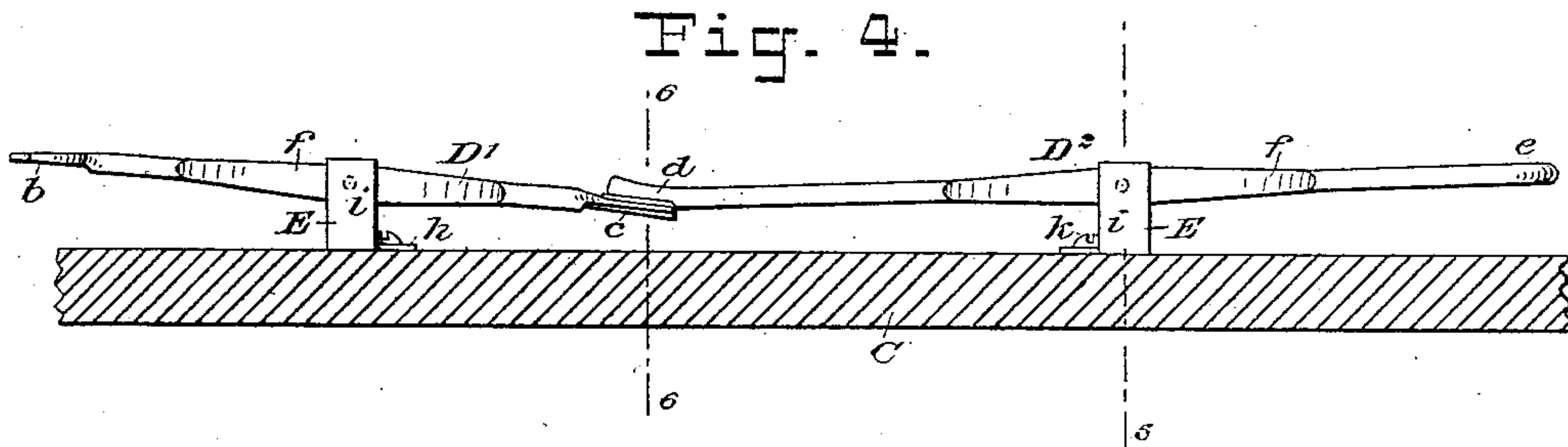


Fig. 5.

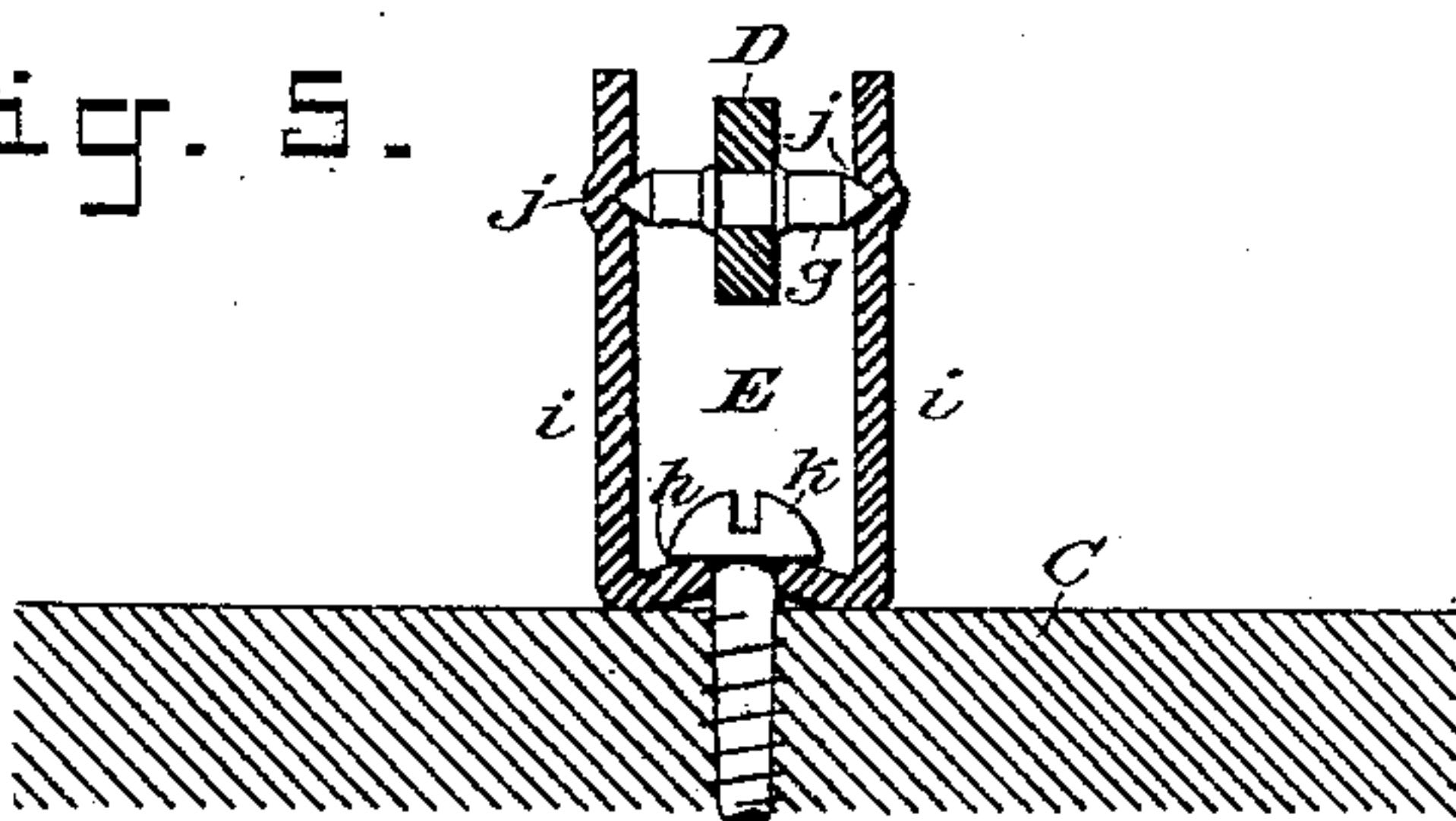


Fig. 6.

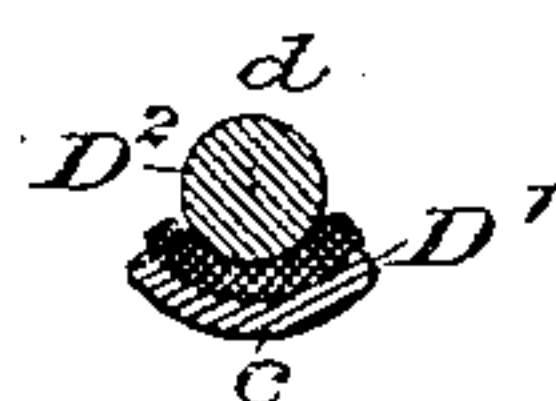
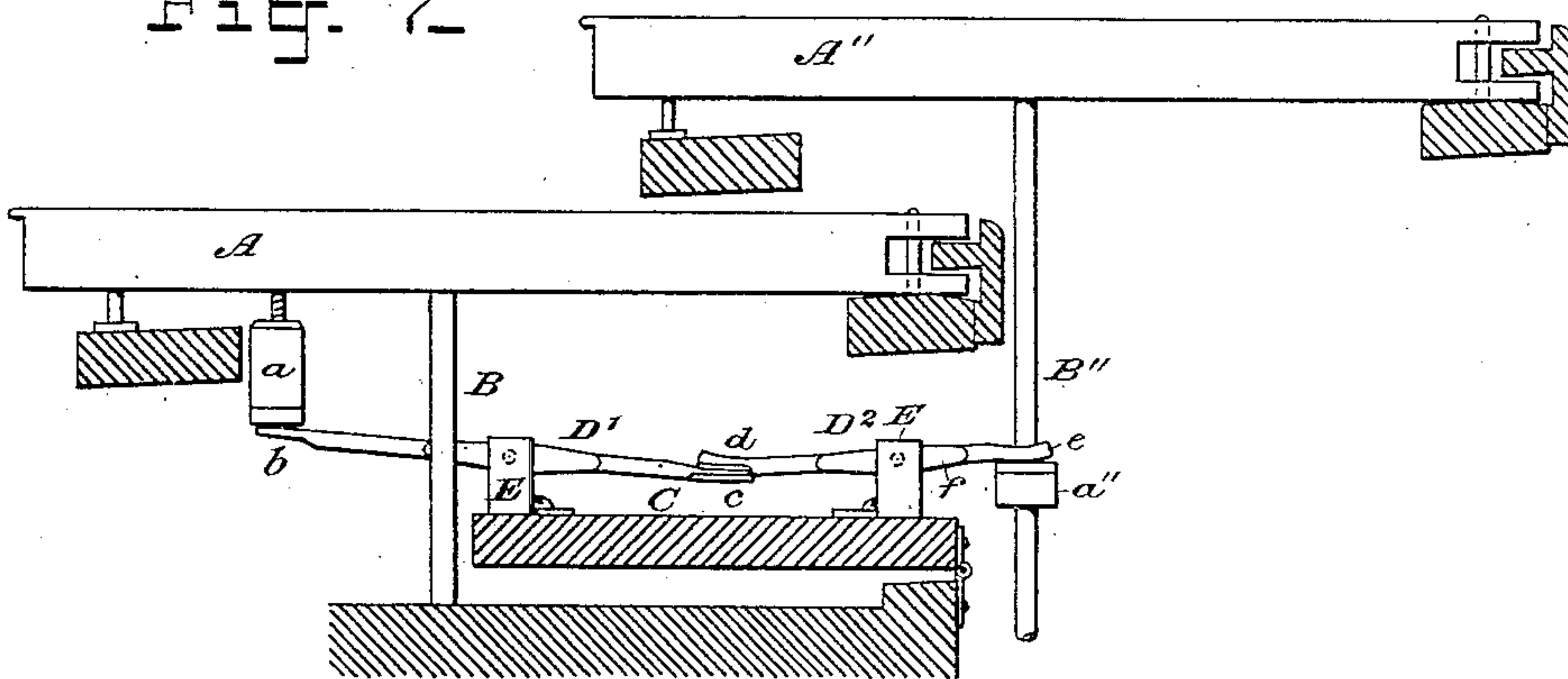


Fig. 7.



WITNESSES:

Geo. H. Fraser,  
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INVENTOR:

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# UNITED STATES PATENT OFFICE.

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## HARMONIC COUPLER FOR MUSICAL INSTRUMENTS.

SPECIFICATION forming part of Letters Patent No. 290,984, dated December 25, 1888.

Application filed February 19, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, LEVI K. FULLER, a citizen of the United States, residing at Brattleborough, in the county of Windham and State of Vermont, have invented certain Improvements in Harmonic Couplers for the Key-Boards of Musical Instruments, of which the following is a specification.

This invention relates, principally, to octave-couplers for organs of that character wherein two oblique levers are interposed between the key of one note and the tracker-pin of another note, in such manner that when the coupler is "on," or in position for action, the depression of that key will not only sound its own note, but will also, through the levers, cause the depression of the tracker-pin of the other note, and thereby simultaneously sound the latter also.

The invention consists in the construction of the coupler-levers and in the means for mounting or fulcruming them.

In the accompanying drawings, Figure 1 is a plan view of a portion of an organ-action, showing the application of my invention. Fig. 2 is a vertical cross-section thereof cut in the plane of the line 2 2 in Fig. 1. Fig. 3 is a plan on a larger scale of the coupling-levers alone. Fig. 4 is an elevation thereof looking in the direction of arrows 4 in Figs. 1 and 3. Fig. 5 is a cross-section on a still larger scale of a lever bearing or fulcrum cut in the plane of the lines 5 5 in Figs. 3 and 4. Fig. 6 is an enlarged cross-section cut on the line 6 6 in Figs. 3 and 4; and Fig. 7 is a fragmentary cross-section of a double-bank organ-action, showing my invention applied as a manual coupler.

Referring to Fig. 1, let A and A' designate two keys, an octave apart, all the other keys of the key-board being omitted.

B and B' are the tracker-pins of these keys, which extend down to and operate their valves, as usual, the pin B' being alone shown in Fig. 2.

C is the coupler-board, hinged at the back and raised or lowered to throw the coupler on or "off" by any suitable or ordinary means.

D' D<sup>2</sup> are the diagonal coupler-levers, fulcrumed in bearings E E, which are fixed to the board C. The free end *b* of the primary lever D' comes under an adjustable pad, *a*, on

the under side of the key A, and its other end, *c*, takes under the front end, *d*, of the secondary lever D<sup>2</sup>, which extends thence to the tracker-pin B', where its rear end, *e*, takes over a block or collar, *a'*, fixed to said pin. When the board C is lowered the end *b* of lever D' stands so low that it is not pressed upon by the button or pad *a* when the key A is depressed, the coupler being then inoperative, or off; but when the board is elevated, as shown in Fig. 2, the end *b* is raised close beneath the button or pad, so that when the key is depressed both levers D' D<sup>2</sup> are tilted, thereby forcing down the tracker-pin B' and sounding the note of key A' coincidently with that of key A. So far as already described these parts are all of the ordinary construction.

My invention relates to the novel construction and mode of mounting of the levers D' D<sup>2</sup>. These levers are made from round wire, brass wire being well suited to the purpose. The middle portion, *f*, of each lever is flattened laterally by pressure, as best shown in Figs. 3 and 4, thereby giving it greater vertical width, and consequently greater stiffness to resist the strains which come upon it in use. This flattened portion extends for some distance each side of the fulcrum, and a hole is bored or punched through it in horizontal direction at the fulcrum. In this hole is inserted a short pointed pin, *g*, of hard metal, which is retained therein in any suitable manner, as by swaging the metal around the hole or by soldering, but preferably by upsetting, as shown in Fig. 5, thereby raising a slight rib on the pin against each side of the lever, so that the latter is embraced between the two ribs and the escape of the pin is thereby prevented. This method is preferable for its cheapness and the strength of the connection thereby made.

Each bearing E is stamped out of stiff sheet metal—such as brass—being formed with a base-plate, *h*, and two wings or plates, *i i*, extending vertically from opposite sides thereof, whereby a forked bearing is formed. Instead of making holes through these wings *i i* to receive the ends of the pins *g*, as has heretofore been customary in making pivotal connections of this character, I merely form on the inside surface of each wing a sharp, smooth indenta-



tion, *j*, and into these two opposite indentations the pointed ends of the pin project. The pin should be elastically embraced between the two wings; or, in other words, the wings should be sprung slightly apart in inserting the pin, so that when it is in place they will tend to spring back and approach each other. In this way is formed a joint that is smooth and comparatively frictionless in its movement, but by which the lever is held with just sufficient firmness to cause it to remain in any position in which it may be left, thus preventing rattling. The forked bearing *E* is fastened to the board *C* by a wood-screw, *k*, driven through a hole in the base-plate *h*. This base-plate is made in convex form, being the segment of a cylinder, so that the crown or center of the plate beneath the screw-head is elevated above the board. If the wings *i i* do not spring toward each other with sufficient tension, the screw *k* should be tightened slightly, thereby somewhat flattening the plate *h* and deflecting the wings toward each other. In this way the tensions on the fulcrums of the several levers may be easily adjusted and made uniform while fitting the levers in place. The adjoining ends *c* and *d* of the two levers are of peculiar construction. The end *d* is left round, being merely curved slightly upward, and the end *c* is pressed or swaged into spoon shape or dished form, as best shown in Fig. 6, receiving the end *d* in the hollow on its upper side. A strip of felt is interposed to render their contact noiseless. The end *d* might be made of inverted spoon shape, if preferred, and the end *c* be left cylindrical. The flattening of the levers at *f f* is of advantage in setting them, as, if the ends *c d* do not quite coincide, either lever can be easily bent laterally with the fingers at its flattened portion. The end *b* of lever *D'* is bent forward and flattened horizontally where it comes under the pad *a*; and the end *e* of lever *D''* is curved backward slightly where it comes over the block *a'*. This formation of the remote ends of the two levers affords a broad and secure bearing for the blocks *a* and *a'*.

Fig. 7 shows my construction of levers adapted to a manual coupler. *A* is a key of the lower bank, and *A''* a key of the upper bank, *B* and *B''* being their respective tracker-pins, and *a''* a block or collar on the pin *B''*. The levers *D' D''*, instead of being arranged

diagonally, extend backward in a straight line and the end *e* of the lever *D''* rests on the block *a''*. When the board *C* is elevated the depression of the key *A* depresses both tracker-pins *B* and *B''*.

I am aware that coupling-levers have been made of sheet metal, arranged in a vertical plane, with their ends bent or twisted, and fulcrumed by means of a transverse pivot-pin working in a forked bearing, and I make no claim to such construction; but

What I do claim is—

1. In a harmonic coupler for musical instruments, a coupler-lever formed of wire flattened vertically in the middle from the fulcrum-point toward the ends by lateral compression, and flattened horizontally at one end by vertical compression, substantially as and for the purposes set forth.

2. In a harmonic coupler, the combination of two coupler-levers, each formed of wire flattened vertically in the middle from the fulcrum-point toward the ends by lateral compression, their adjoining ends conformed to each other, and their remote ends bent to one side, substantially as and for the purposes set forth.

3. In a harmonic coupler for musical instruments, a forked bearing for a coupling-lever, consisting, essentially, of a plate of sheet metal formed with its base portion convex, and with two wings extending upwardly from opposite sides thereof, substantially as set forth.

4. In a harmonic coupler for musical instruments, the combination of lever *D*, pin *g*, bearing *E*, consisting of convex base-plate *h* and wings *i*, having indentations *j*, and screw *k*, passing through said plate, substantially as set forth.

5. In a harmonic coupler for musical instruments, the combination of two coupling-levers connecting end to end, the end of one being round and that of the other concave or substantially spoon-shaped, as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

LEVI K. FULLER.

Witnesses:

LUTHER W. HAWLEY,  
J. EDWARD HALL.