

No. 617,514.

Patented Jan. 10, 1899.

R. ROBBINS.
HARP.

(Application filed Aug. 4, 1898.)

(No Model.)

2 Sheets—Sheet 1.

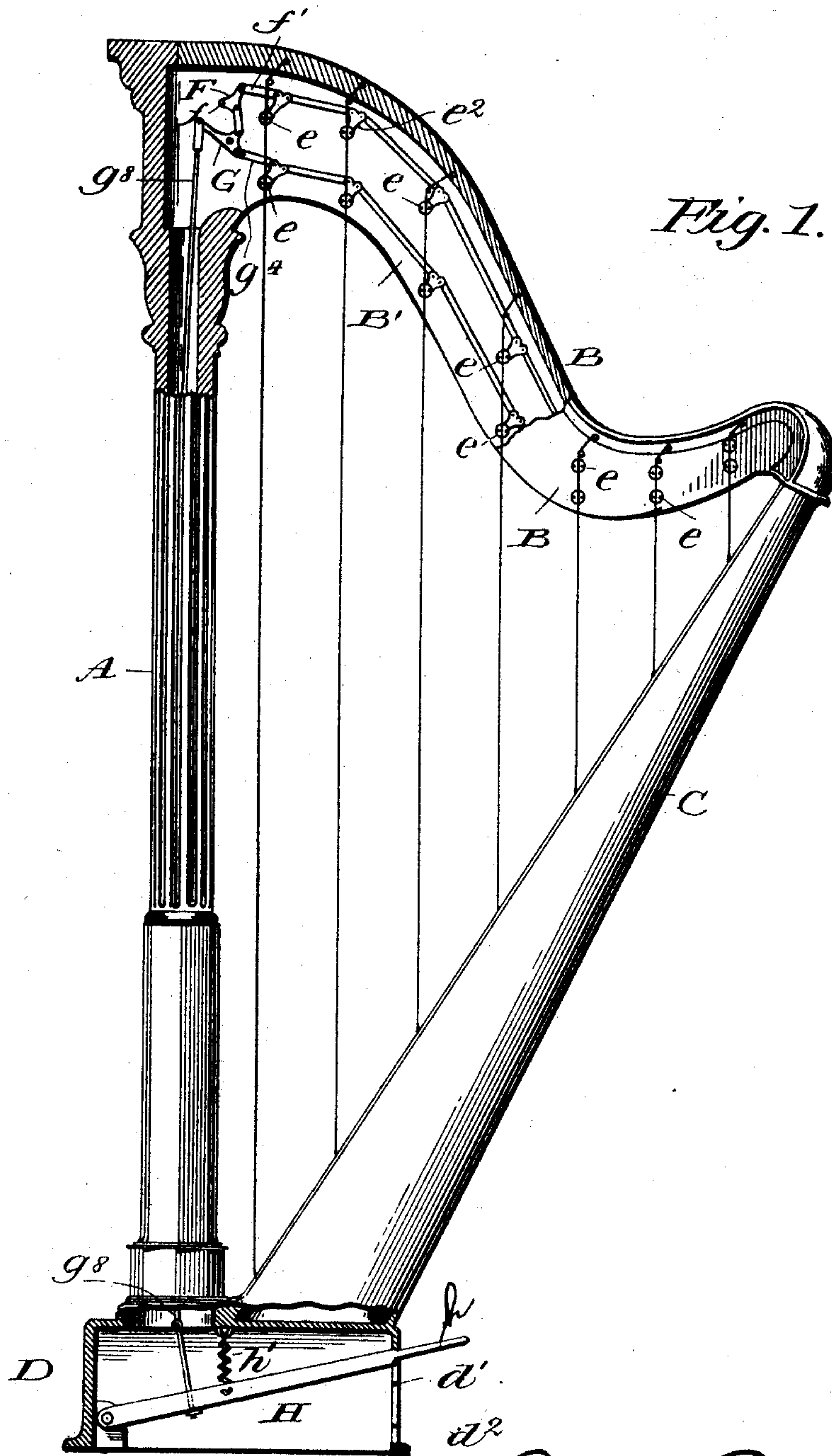


Fig. 1.

Witnesses:
L. C. Mills.
J. D. Kingberry.

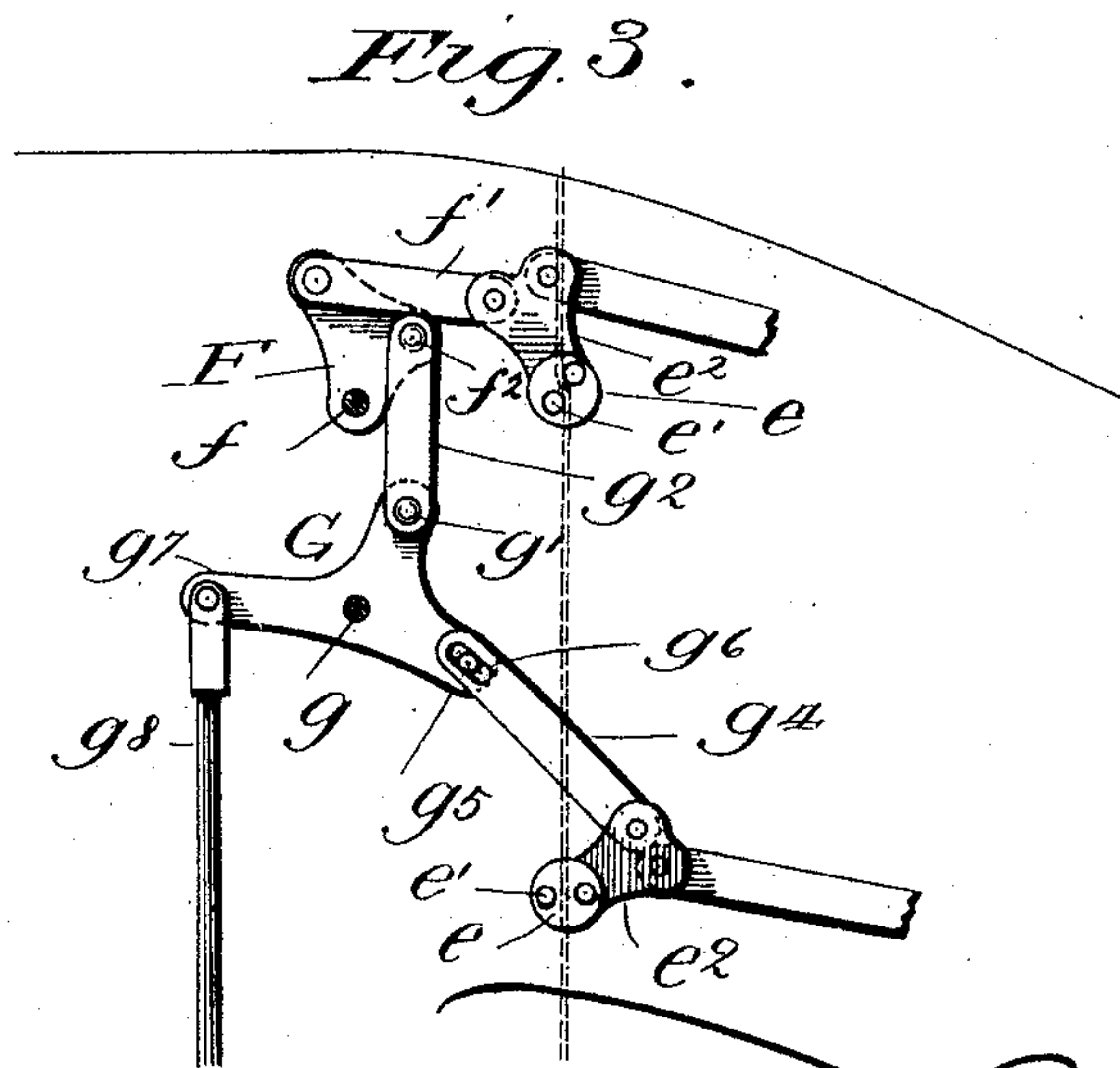
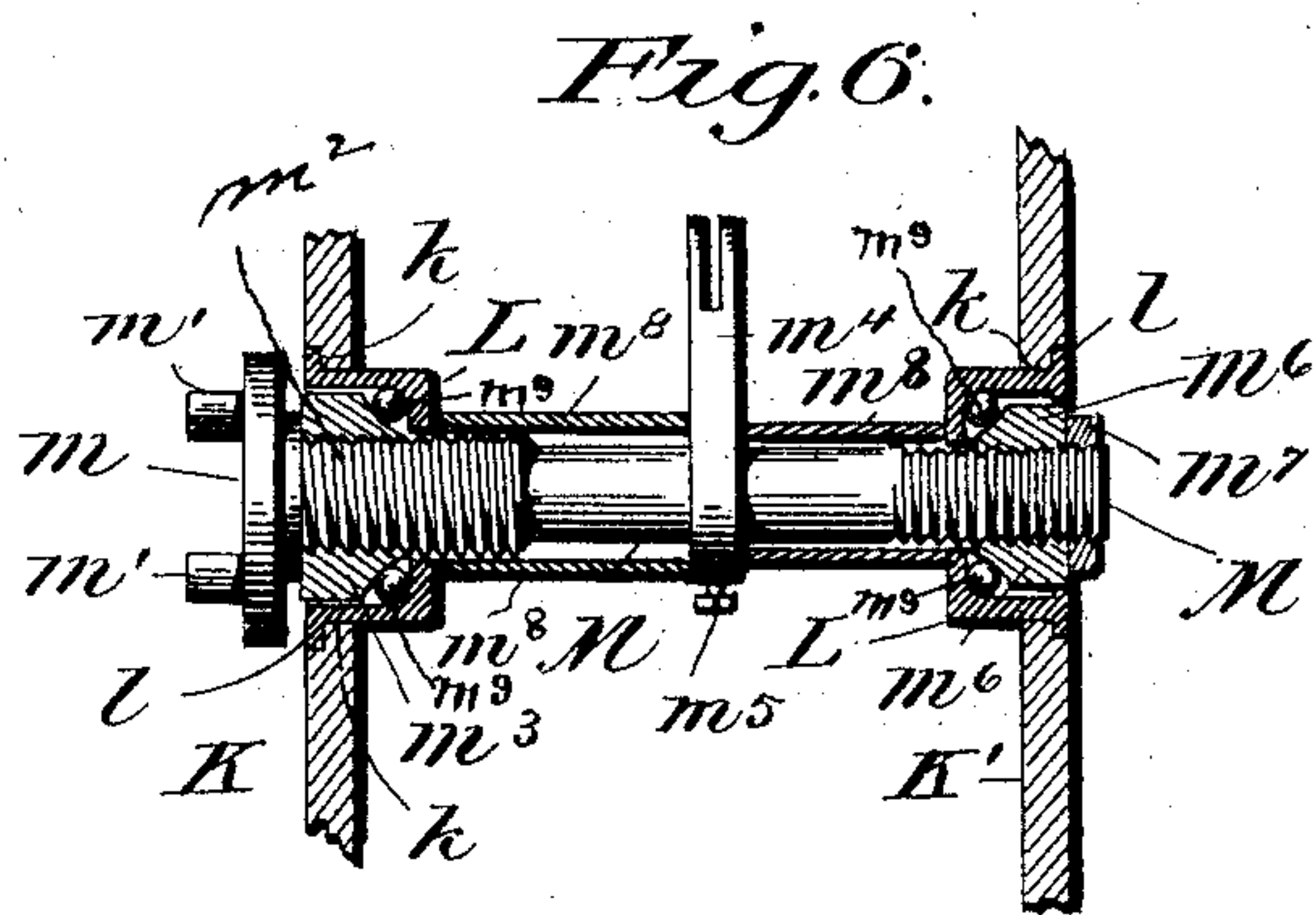
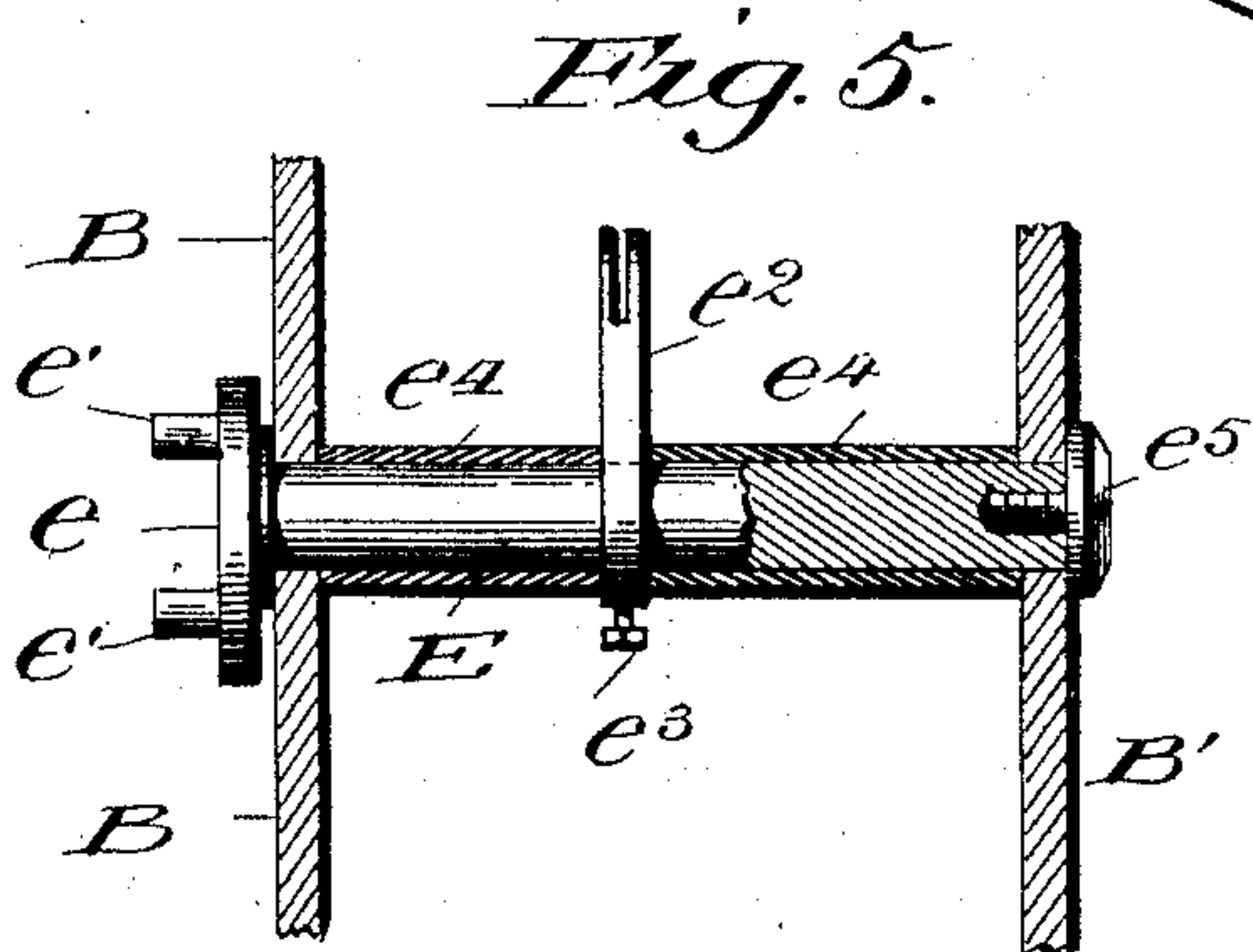
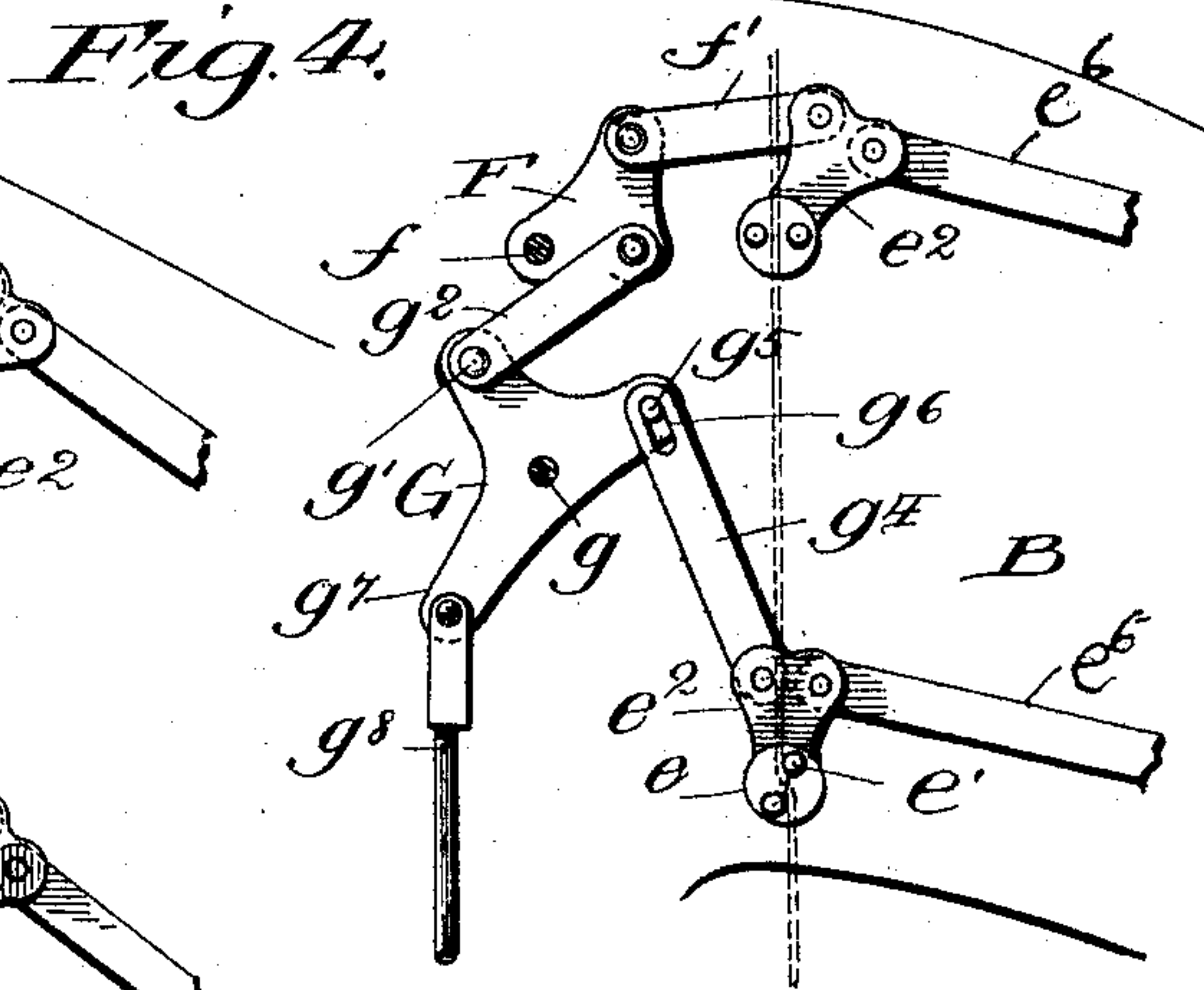
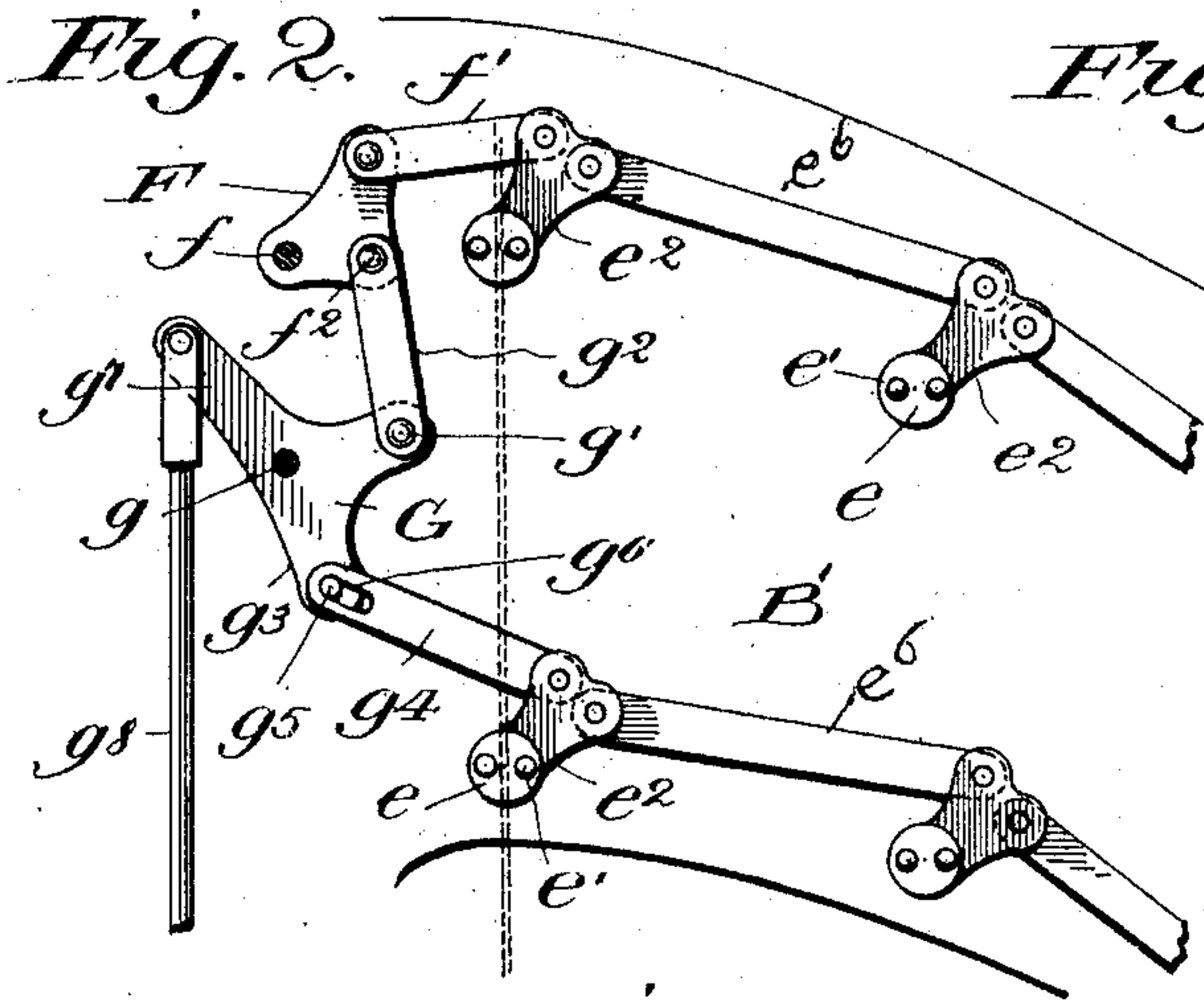
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2 Sheets—Sheet 2.



Witnesses

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UNITED STATES PATENT OFFICE.

RAYMOND ROBBINS, OF RICHMOND, INDIANA, ASSIGNOR OF ONE-HALF TO
PEARL B. KLECKNER, OF SAME PLACE.

HARP.

SPECIFICATION forming part of Letters Patent No. 617,514, dated January 10, 1899.

Application filed August 4, 1898. Serial No. 687,721. (No model.)

To all whom it may concern:

Be it known that I, RAYMOND ROBBINS, a citizen of the United States, residing at Richmond, in the county of Wayne and State of Indiana, have invented certain new and useful Improvements in Harps; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention is an improvement in harps; and it consists in the novel features hereinafter described, reference being had to the accompanying drawings, which illustrate my invention; and said invention is fully disclosed in the following description and claims.

Referring to the drawings, Figure 1 represents a side view of a double-action harp embodying my invention, portions of the structure being broken away to show parts located beneath and only one string of each octave and the mechanism cooperating therewith being shown. Fig. 2 is a view of the trigger-work for operating the sharpening-fingers for one string in each octave, showing the parts in normal position. Fig. 3 is a similar view showing the parts in position to cause the upper sharpening-fingers to engage their respective strings. Fig. 4 is a similar view showing the lower sharpening-fingers engaging the strings and the upper fingers returned to normal position. Fig. 5 is a detail sectional view showing the manner of mounting the spindles and of attaching the arms thereto. Fig. 6 is a similar view of a modified construction.

In double-action harps as at present constructed it is customary to tune the strings of each octave flat and to provide two sets of sharpening-fingers for each string, the sharpening-fingers for each note in the several octaves being connected together and the two sets of fingers for each note being operated by suitable mechanism called "trigger-work" through the instrumentality of a pedal. When the pedal is pushed part way down, the upper fingers are made to engage the strings, and the pitch thereof is raised to natural, and upon pushing the pedal farther down the lower set of fingers are also made to engage the strings, thereby sharpening them.

The gripping of the strings in the last-mentioned case by the two sets of fingers at two separate points on each string simultaneously has the effect of deadening the tone of the string, and one of the objects of my invention is to provide a construction by means of which only one set of fingers will be permitted to touch the strings at a time, thus entirely preventing the deadening effect referred to.

In the drawings, Fig. 1 shows a double-action harp embodying my invention, in which A represents the column, B the neck, C the body, and D the base. B' B' represent the parallel plates, to which the upper ends of the strings are secured by any usual form of tightening means.

E, Fig. 5, represents one of the spindles, of which there are two for each string—the upper and the lower spindle. On one end of the spindle E is formed the integral disk or plate e , to which the parallel sharpening pins or fingers e' e' are secured in any desired manner. Upon each spindle E is an operating-arm e^2 , which is attached adjustably to the spindle—in this instance by means of a set-screw e^3 —so that the position of the arm with respect to the spindle can be changed. This is important for the reason that in the use of harps it frequently happens that by reason of wear or otherwise one or more of the sharpening-fingers of a series operating on a string in each octave fails to clamp the string properly, so that the string rattles between the fingers and is not raised in pitch. This necessarily produces a discord. If such a condition arises in using my improved harp, it is only necessary to identify the string which rattles and by loosening the set-screw of the arm on the corresponding spindle and turning the sharpening-fingers and spindle slightly and then again tightening the set-screw the difficulty will be obviated without interfering with the adjustments of any of the other spindles.

In order to prevent any lateral movement of the plates B' B', I prefer to employ on each spindle sleeves e^4 e^4 of exactly the required length to extend from the arm to the plates, as shown in Fig. 5, and the spindle is preferably passed through bearing-apertures in

the plates B' B' and secured in position by means of a machine-screw e^5 , tapped into the end of the spindle and having a head of larger diameter than the bearing-aperture in the adjacent plate, as shown. This makes a very firm and substantial construction, and the sleeves e^4 e^4 also tend to steady the arm e^2 and prevent any lateral movement of the same. In some instances I may dispense with one or both of the sleeves e^4 , but I prefer to use them. It will be apparent that the arms of spindles corresponding to each string of the same denomination in each octave must be in line with each other, and by employing these sleeves e^4 e^4 of the required lengths for the spindles of the strings of each note the position of the arms e^2 longitudinally of their spindles can be determined with great accuracy in assembling the parts of the harp. The arms e^2 of the spindles for the same note in each octave are connected by means of the links e^6 , as shown in Figs. 1 to 4.

In Figs. 1 to 4, inclusive, I have shown the trigger-work for one complete set of sharpening-fingers for controlling the strings of the same note in each octave, and as the trigger-work for all the other notes is of the same structure it will be sufficient to describe this.

F represents what I term the "upper" bell-crank lever, pivoted at f to the plates B' B' and having its upper end connected by a link f' with the first of its series of arms e^2 .

G represents the lower bell-crank lever, pivoted at g to the plates B' B', the upper arm of said lever being pivotally connected at g' with a link g^2 , the other end of which is pivoted at f^2 to the upper bell-crank F. The lower arm g^3 of the bell-crank G is connected to a link g^4 , the other end of which is connected with the first arm of the lower series of spindles in such a way as to allow for a certain amount of lost motion. In this instance the bell-crank lever G is provided with a pin g^5 , which engages a slot g^6 in the link g^4 . The bell-crank lever G is also provided with an arm g^7 , connected by a link g^8 to one of the pedals H, pivoted in the base of the harp and having a foot-piece h extending out through a vertical slot in the said base, as usual, the side wall of said slot being provided with two shoulders or notches d' d^2 for holding the pedal in different positions to which it may be moved, and a spring h' serves to hold the pedal normally in elevated position. The operation of the trigger-work is as follows, it being understood that the strings are tuned flat:

Fig. 2 represents the normal position of the parts, the upper and lower sharpening-fingers being both out of engagement with the strings. When the pedal is pressed down to the first notch, the parts will assume the positions shown in Fig. 3 and the upper fingers will be caused to grip their respective strings and thereby raise their pitch to natural. Upon pressing the pedal down to the second notch the parts will assume the positions

shown in Fig. 4, the upper bell-crank being moved back to its normal position and thereby disengaging all the upper fingers from the strings, while the lower fingers will engage the strings at points farther from their ends and raise them in pitch to the sharp. When the pedal is released, the parts will be restored to their normal positions, as shown in Fig. 2.

In Fig. 6 I have shown a modified form of the spindle and its supports which I find it advantageous to use for the purpose of reducing the friction of the spindles in their bearings and rendering the action of the harp easier. In this figure, K K' represent the parallel plates, which are provided with opposite apertures k k , in which are placed bearing-cups L, provided with flanges l , which engage the exterior faces of said plates. M represents the spindle, provided at one end with the integral disk m and sharpening-fingers m' m' , said spindle having a threaded portion m^2 adjacent to the disk m to receive the cone m^3 . The portion of the spindle from said threaded part m^2 to the other end is of slightly-reduced diameter, and upon it is placed the arm m^4 , secured adjustably thereto by a set-screw m^5 . The outer end of the said reduced portion is also threaded to receive a cone m^6 , which is adjustable upon said threads and is held in position by a jam-nut m^7 . m^8 represents the balls which are placed between the cones m^3 and m^6 and their respective bearing-cups. This construction reduces the friction of the spindle in its bearings to a minimum and materially lightens the action of the harp. I also employ spacing-sleeves m^8 m^8 , interposed between the arms m^4 and the parallel plates K K', as shown, for the same purposes as described in reference to the sleeves e^4 e^4 . (Shown in Fig. 5.) These sleeves may, however, be omitted in some cases.

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

1. In a double-action harp the combination with the upper and lower sharpening-fingers, of means for moving the upper set of fingers into engagement with the strings and means for moving the lower fingers into engagement with the strings and simultaneously restoring the upper fingers to their normal positions, substantially as described.

2. In a double-action harp, the combination with the upper and lower sets of sharpening-fingers, of means for moving each set of fingers into engagement with the strings and simultaneously holding the set not in use out of engagement with the strings, substantially as described.

3. In a double-action harp, the combination with the upper and lower sets of sharpening-fingers, of an operating device for moving both sets of fingers into engagement with the strings, connections between said device and the upper fingers and connections providing for lost motion between said device and the lower fingers, whereby a partial movement of said operating device will move the upper fin-

gers into engagement with the strings without moving the lower fingers, and a further movement of the said device will move the lower fingers into engagement with the strings and restore the upper fingers to normal position, substantially as described.

4. In a double-action harp, the combination with the upper and lower fingers, of a bell-crank operatively connected with the upper fingers, an operating-lever connected with the bell-crank lever, and a connection providing for lost motion between said operating device and the lower fingers whereby a partial movement of the operating-lever will move the upper fingers into engagement with the strings without moving the lower fingers, and a further movement of the lever will move the lower fingers into engagement with the strings and restore the upper fingers to normal position, substantially as described.

5. In a harp, the combination with the upper and lower sets of sharpening-fingers, a bell-crank lever connected to the upper set of fingers, an operating-lever having an arm connected with said bell-crank lever, and a second arm provided with a stud, a link having one end connected with the lower set of fingers, and its other end provided with a slot engaging said stud, the pedal and an operative connection between said pedal and the said operating-lever, substantially as described.

6. In a harp, the combination with the parallel plates, of a spindle mounted therein and provided with sharpening-fingers rigidly secured thereto, an operating-arm mounted on said spindle, and movable longitudinally of

the spindle and also around the same and means for securing said arm adjustably to said spindle, substantially as described.

7. In a harp, the combination with the parallel plates, of a spindle mounted therein, provided with sharpening-fingers rigidly secured thereto, an operating-arm mounted on said spindle movable longitudinally of the spindle, and also movable around the same, means for adjustably securing said arm to the spindle and sleeves on said spindle interposed between said arm and said side plates for determining the position of said arm longitudinally of the spindle, substantially as described.

8. In a harp, the combination with the parallel plates provided with registering apertures, of a pair of bearing-cups, each engaging one of said apertures, said cups having flanges to engage the outer faces of said plates, a spindle passing through said cups and provided with sharpening-fingers rigidly secured thereto, cones adjustably mounted on said spindle, balls interposed between said cones and cups, an operating-arm mounted on said spindle, and movable longitudinally of the spindle and also around the same and means for securing said arm rigidly to the spindle, substantially as described.

In testimony whereof I affix my signature in the presence of two witnesses.

RAYMOND ROBBINS.

Witnesses:

FRANCIS L. FOX,
JOHN F. ROBBINS.