

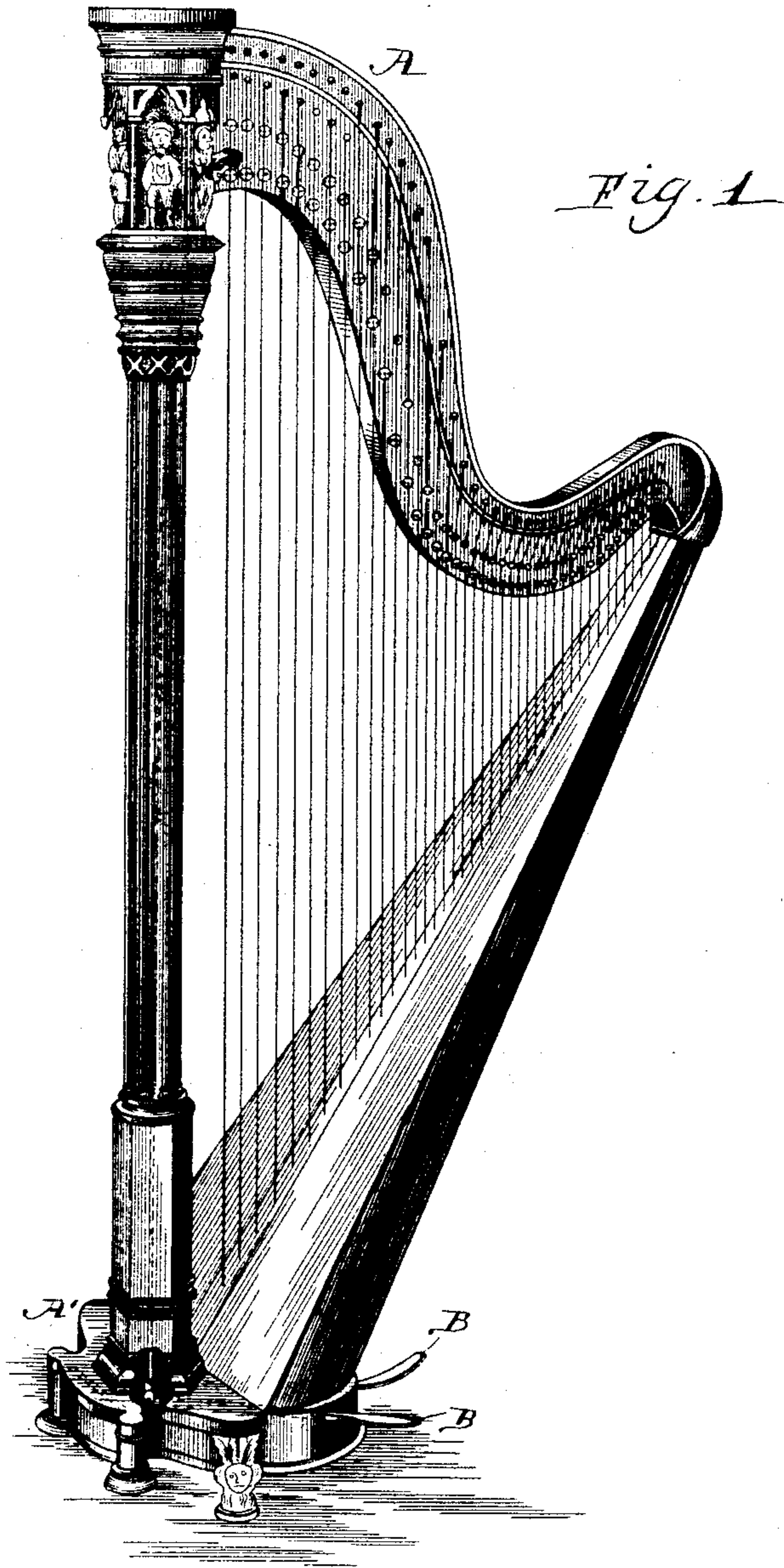
(No Model.)

G. B. DURKEE.
HARP.

3 Sheets—Sheet 1.

No. 437,917.

Patented Oct. 7, 1890.



Witnesses

W. Foster
Frederic H. Mill

Inventor
George B. Durkee
By *Chas. G. Page*
Atty.

(No Model.)

G. B. DURKEE.
HARP.

3 Sheets—Sheet 2.

No. 437,917.

Patented Oct. 7, 1890.

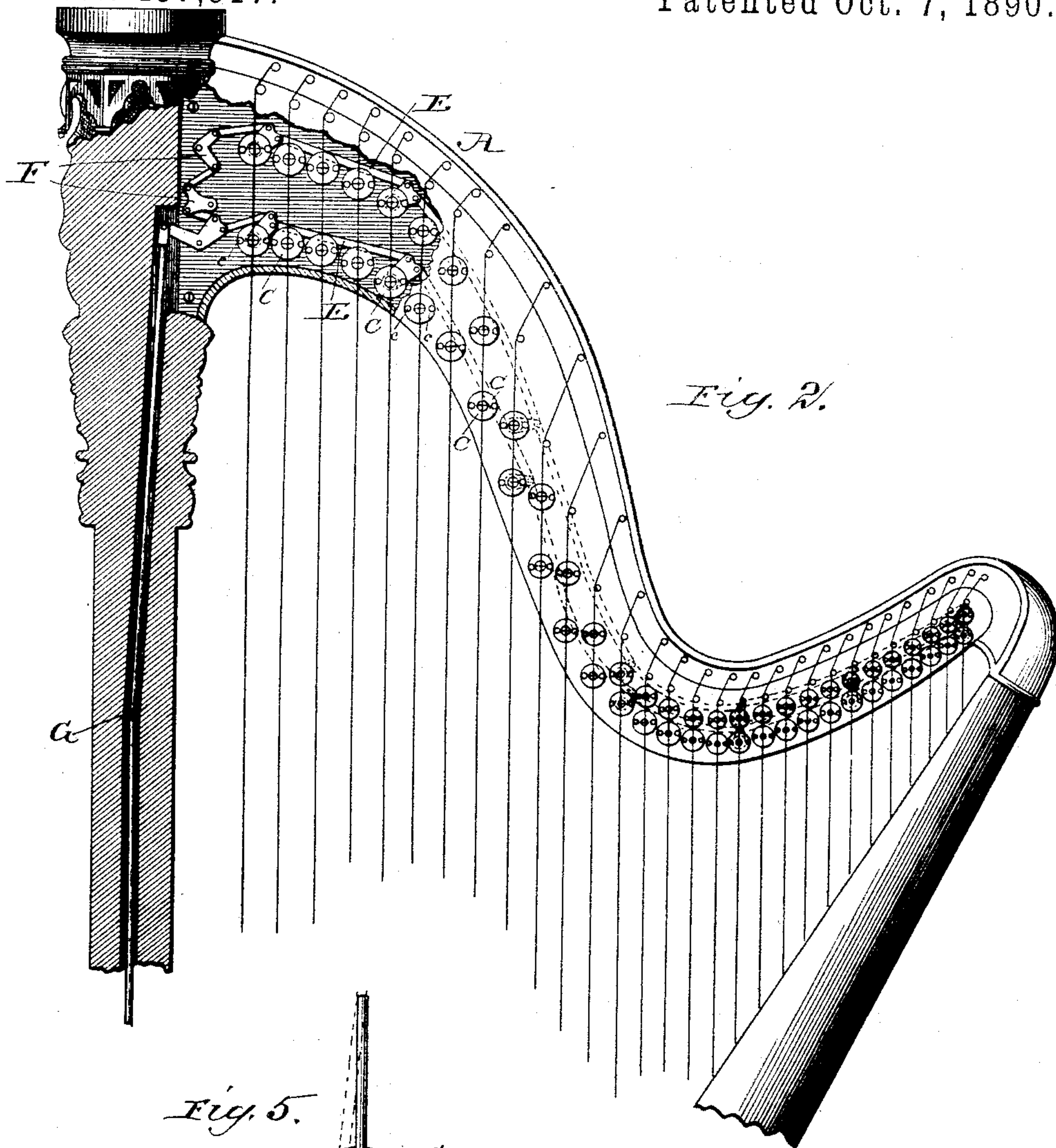


Fig. 5.

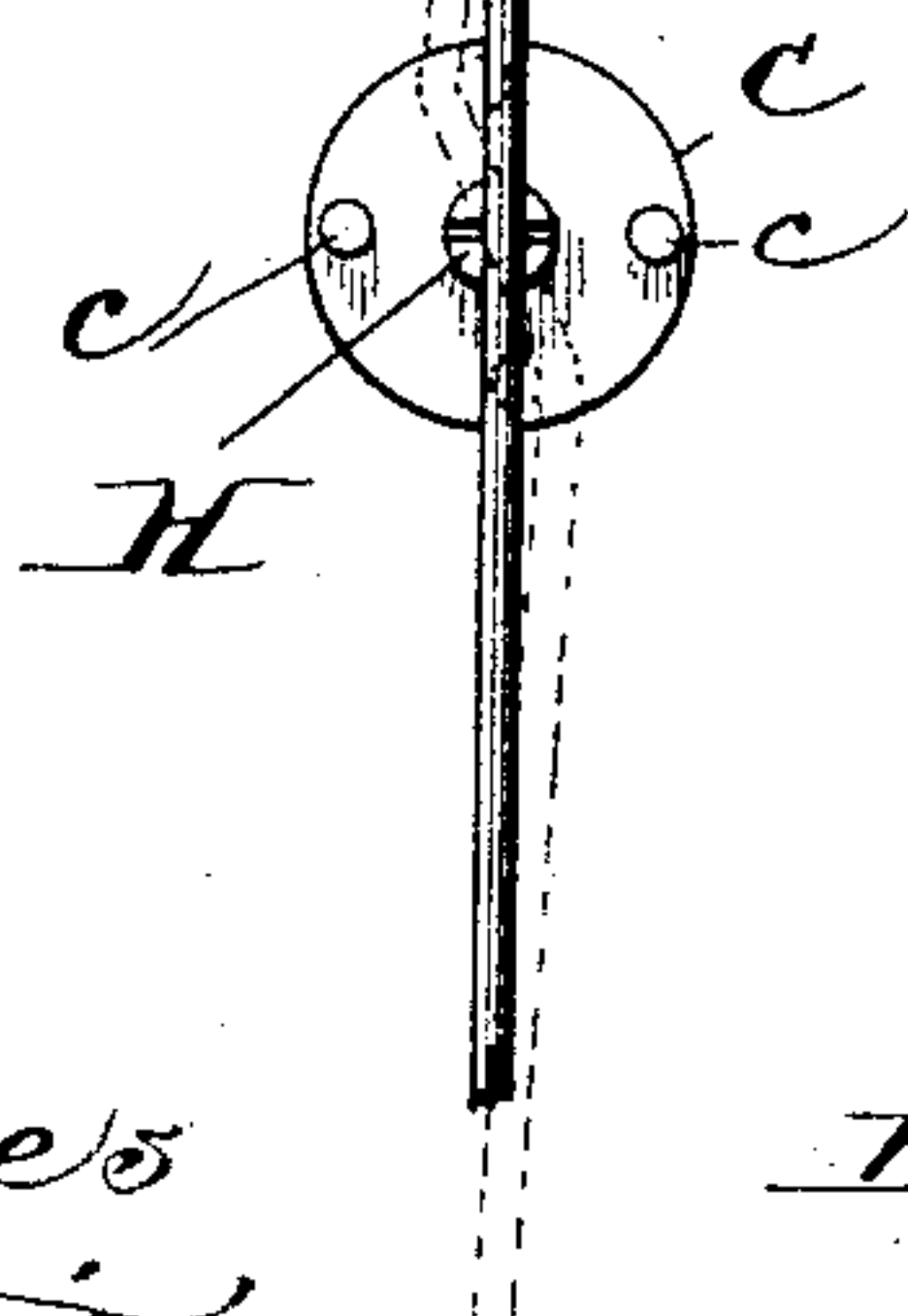


Fig. 3.

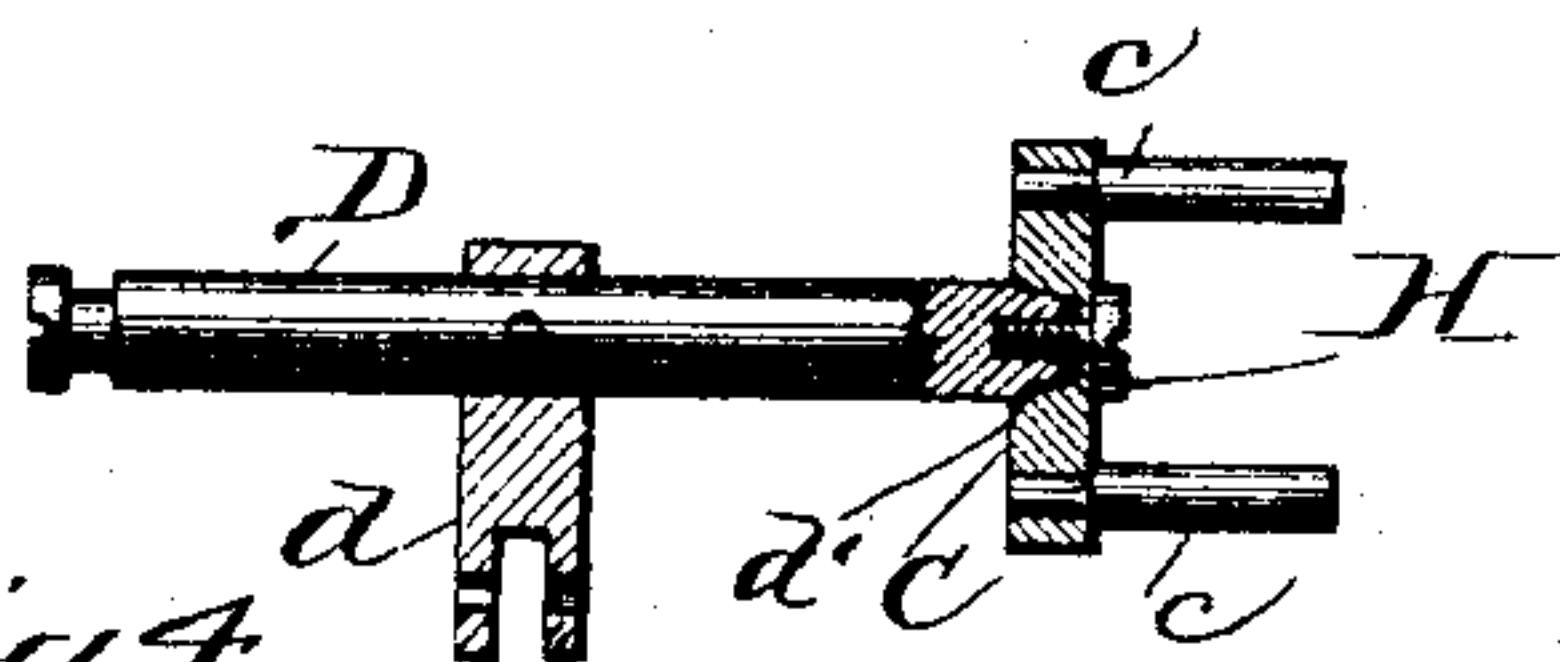
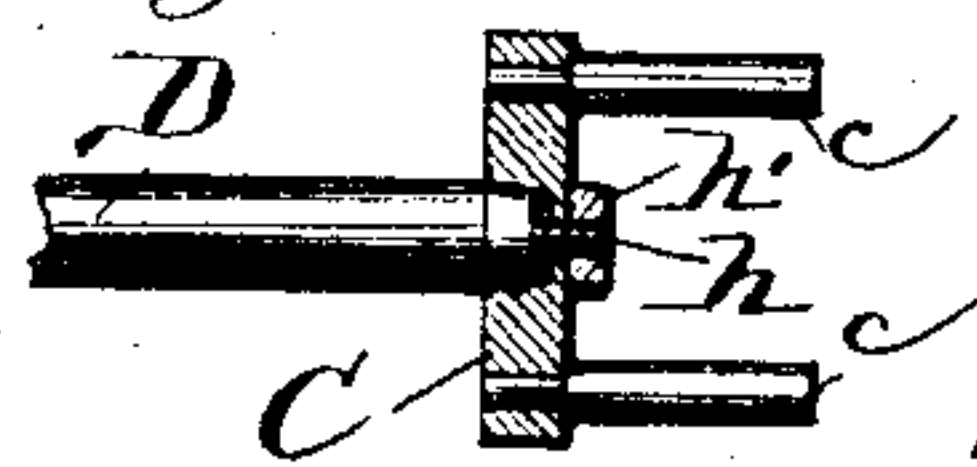


Fig. 4.



Witnesses
H. Rosseter
Fred H. Miles

Inventor
George B. Durkee
By Chas. G. Page,
Atty.

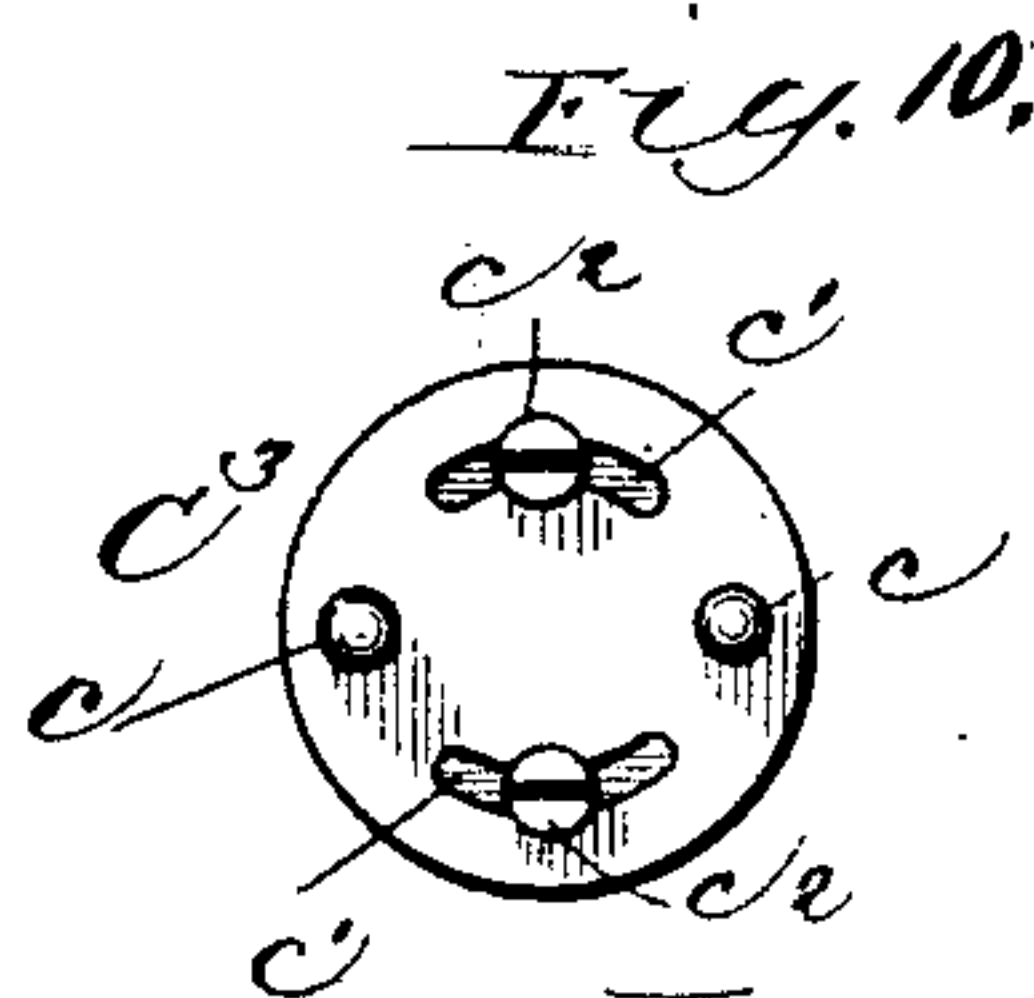
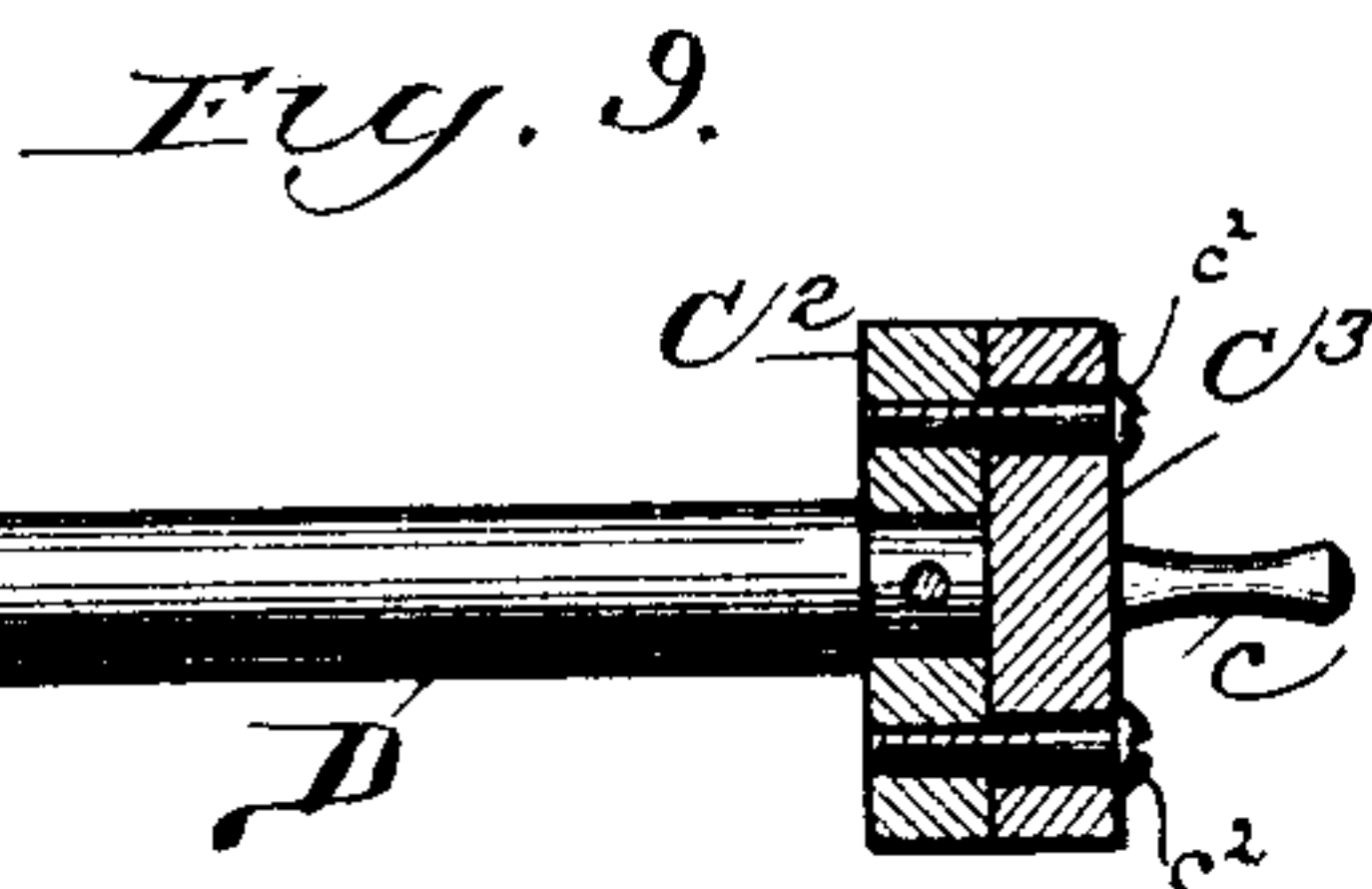
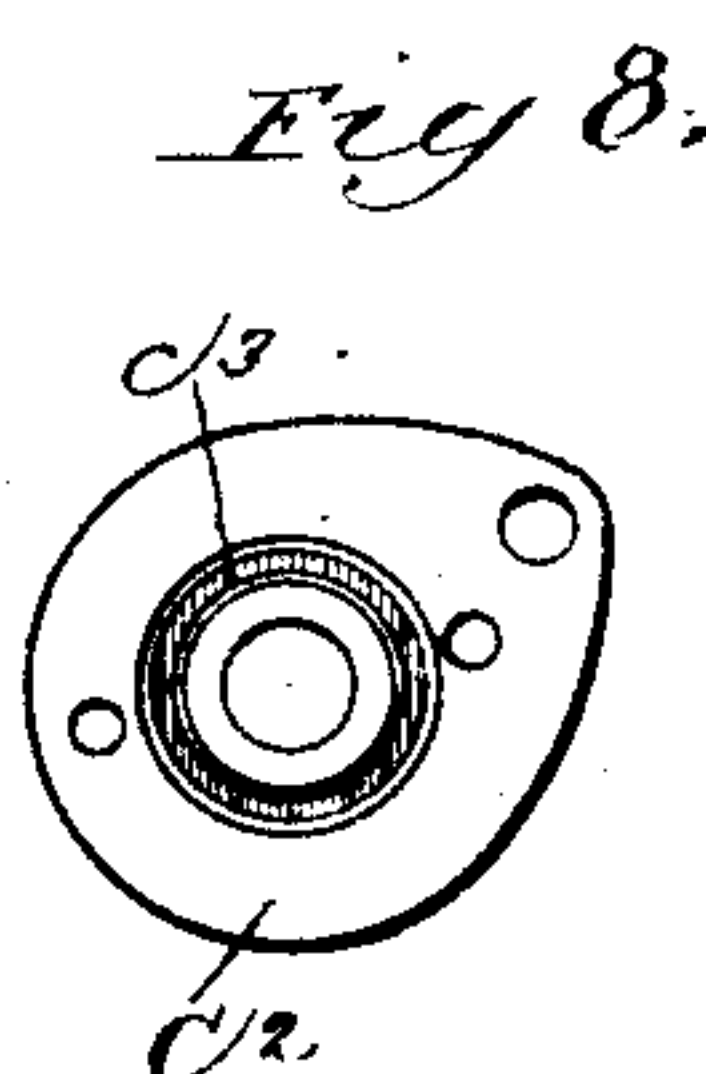
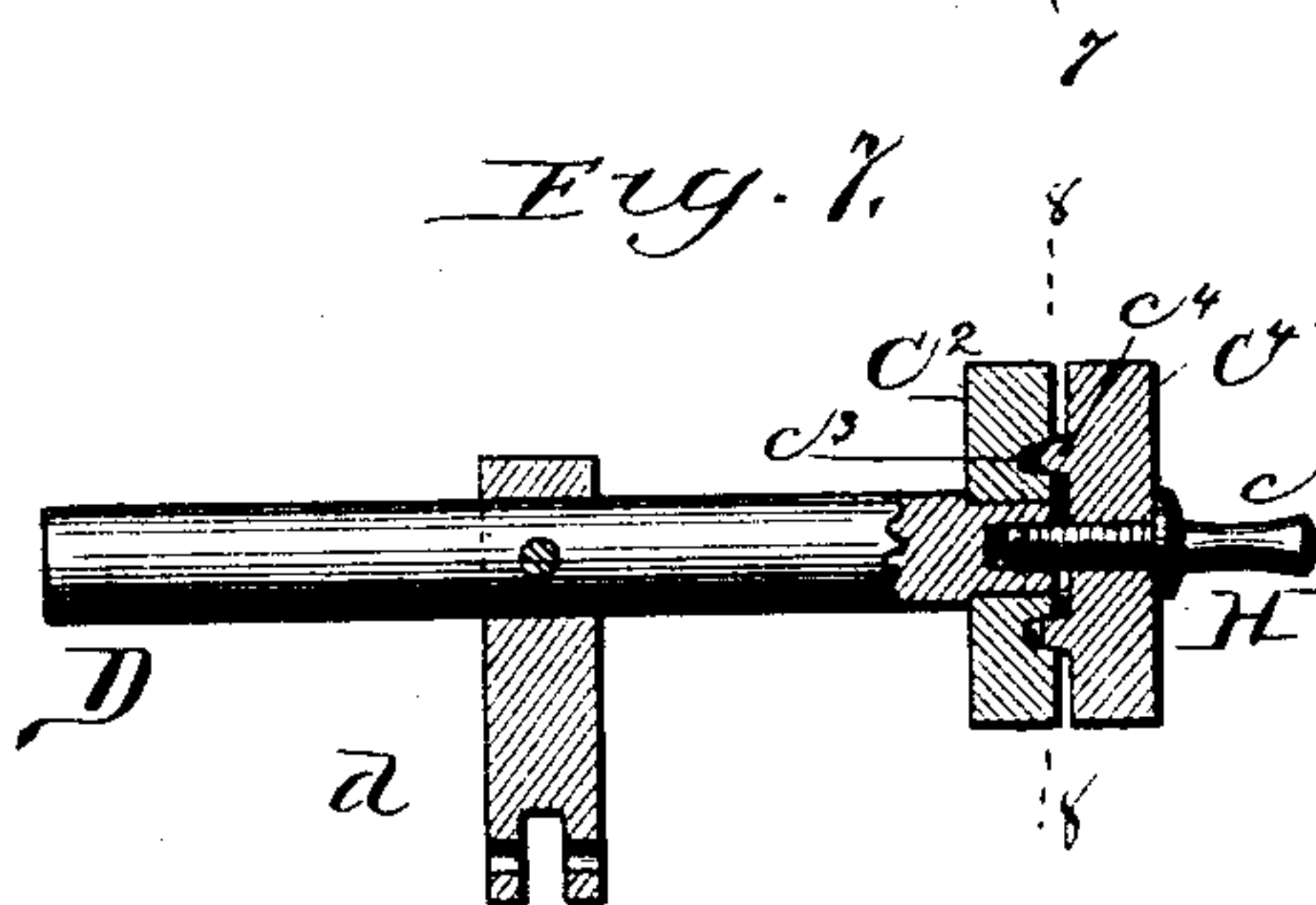
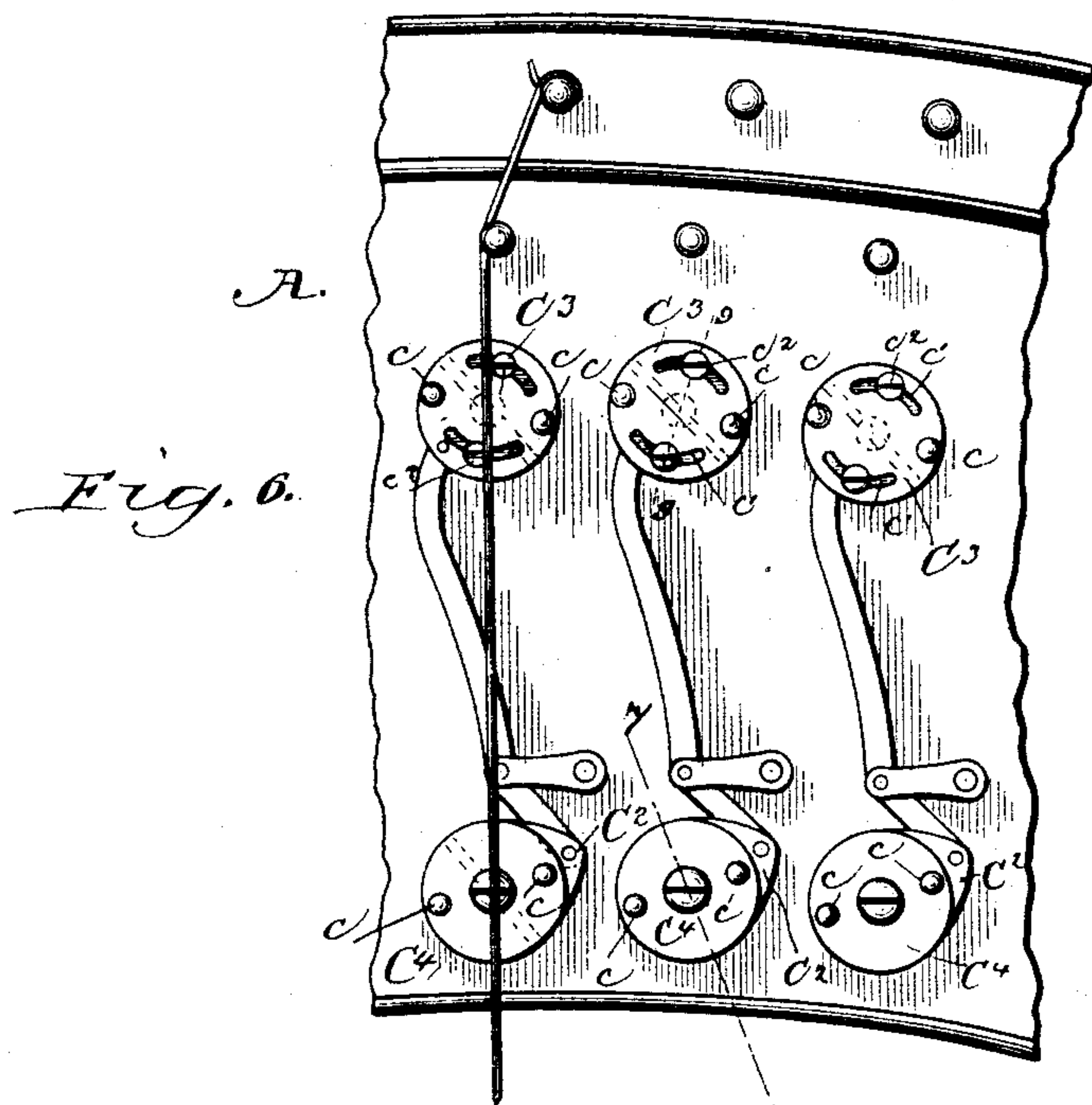
(No Model.)

3 Sheets—Sheet 3.

G. B. DURKEE.
HARP.

No. 437,917.

Patented Oct. 7, 1890.



Witnesses
W. Foster.
Fredk. H. Mills

Inventor
George B. Durkee
By Chas. G. Page
Atty.

UNITED STATES PATENT OFFICE.

GEORGE B. DURKEE, OF CHICAGO, ILLINOIS, ASSIGNOR TO LYON & HEALY,
OF SAME PLACE.

HARP.

SPECIFICATION forming part of Letters Patent No. 437,917, dated October 7, 1890.

Application filed January 24, 1889. Serial No. 297,452. (No model.)

To all whom it may concern:

Be it known that I, GEORGE B. DURKEE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Harps, of which the following is a specification.

In the construction of harps prior to my invention the portion of the instrument employed for producing flats, sharps, and naturals, and known as the "double action," has been considered only as a non-adjustable feature and has been arranged as a fixture wherein necessary and accurate adjustment and regulation of its component members could not be attained. As a result of the constant or frequent use for any considerable length of time of a harp involving such construction of double action, certain objectionable features are brought prominently to notice, and by reason of its entire lacking in special provision for an individual adjustment of the flat and sharp producing members the lost motion caused by wear in the numerous coupling-joints and also the variable sizes of strings render it an absolute impossibility to preserve the exact tuning of the harp in all of the required positions of the action.

The object of my invention is to obviate all of the aforesaid objectionable features in the construction of harps and to provide the action with simple, ready, and efficient means for adjustment and exact regulation, both with reference to any lost motion in its working parts and with reference to the various and varying sizes of strings which harp-players are obliged to use in restringing their instruments from time to time.

A further object of my invention is to permit any performer on the harp to perfect the tuning of the instrument in case of "false strings" or those which do not have the same diameter throughout their length.

A further object is to avoid the great labor and consequent heavy expense which have heretofore rendered the cost of the best harps a heavy burden upon the purchaser and to produce at a less expense a more perfect instrument than has been attained prior to my invention.

In order to more clearly set forth my invention and illustrate the comparative advantage of my improvement therein involved, I desire to first briefly refer to the old standard method of producing flats and sharps on the harp. According to such old method the instrument is provided with seven pedals, which are conveniently arranged at the base, and which severally represent and are allotted to the seven letters C D E F G A B used in the musical staff. The modern harp as constructed under said method is a six-octave instrument, commencing and ending with E, the seven pedals being named after the seven letters hereinbefore referred to. Of these seven pedals each is connected with a set of sharpening-fingers allotted to all of the strings of the letter to which the pedal is allotted—as, for example, the E-pedal is connected with and employed to operate the several sharpening-fingers which by the action of the E-pedals are to be synchronously operated for the purpose of changing the tension of the seven E-strings.

The sharpening pegs or fingers for the foregoing purpose have been fixed upon rotary disks included in the action in the head or upper portion of the instrument, the portions of the action, respectively, allotted to the different letters being respectively operated from the pedals by connecting-rods, whereof seven are employed in correspondence with the number of pedals with which said rods have been connected by screws termed "regulating-screws." It frequently happens that one or more strings of the same letter will rattle between the sharpening pegs or fingers, which are all arranged in pairs upon the several disks—as, for example, one or more of the seven E-strings may rattle, while no defect whatever will be noticeable in the remaining E-strings. This said disturbance may be caused by such wearing out of certain joints in the action as will involve lost motion, which said fault is developed and made manifest more at one or more points on the action than in the remaining parts thereof.

When the foregoing defect arises, it has been customary to take the instrument to some skilled repairer of musical instruments, and thereupon the repairer adjusts one or

more of the pedal-rods by adjusting the regulating-screws at the base, the rods thus adjusted (shortened, for example) being the ones relating to sets of letters involving a rattling of one or more of the strings belonging to a set wherein the defect becomes noticeable. Said adjustment produces the desired result in so far that it checks the previously-existing rattling; but in thus adjusting any one of the rods, in order to check the rattling of one of the seven strings, which through the medium of said rod is subject to the action of a particular pedal, all of the remaining strings of said set will be subjected to an unnecessary action on the part of the sharpening pegs or fingers by which they are engaged. Thus, if one of the E-strings passing between a pair of sharpening pegs or fingers should be found to rattle, the shortening of the connection between the E-pedal and the portion of the action allotted to the disks and fingers for the seven E-strings for the purpose of so adjusting the disk carrying a pair of fingers allotted to the string that is at fault will not only adjust said disk so as to cause its sharpening pegs or fingers to properly grip said particular E-string, but will also synchronously adjust the remaining disks allotted to the six remaining E-strings and thereby cause the pegs or fingers thereon to improperly grip such remaining strings and so kink them as to produce an undesirably higher tension and rise in pitch, and hence leave the instrument out of tune musically. Regardless, however, of said defect the foregoing has been, so far as I am aware of, the only remedy sought and the best known, and therefore in applying such partial remedy it has been customary to make such tuning average by dividing the excess of tuning among all the strings. This renders it a self-evident fact that prior to my invention the double-action harp has been an instrument incapable of being kept in perfect tune.

The extreme annoyance incident to the foregoing defect in the harp has been long felt not only by myself, but by many performers upon such instrument, and frequently I have been disposed to lay aside the best "Erard harp" solely on account of a feeling of indisposition to play upon an imperfectly-tuned instrument.

While I have hereinbefore particularly referred to the E-strings, it will be understood that the same difficulty attends the remaining strings, and that in the modern harp as constructed prior to my invention but one adjustment can be made for the seven strings and that such adjustment must be common to all seven strings.

In carrying out my invention I prefer retaining the old regulating-screws for connecting the rods with the pedals, since such devices are serviceable in determining the correct length of rod or connection between a pedal and action. In place, however, of securing the disks that carry the sharpening-fingers as fixtures upon the spindles which constitute certain component members of the action, I provide each spindle with a rotary adjustable disk or head carrying one or more, but preferably a couple, of sharpening pegs or fingers, whereby for each string passing between a pair of sharpening-fingers an individual adjustment can be made without in any wise affecting the remaining strings, since by such arrangement the pairs of sharpening-fingers are practically capable of separate or individual adjustments.

Prior to my invention the disks have been pinned as fixtures upon the spindles and provided each with a pair of fingers, which in the first instance must be set with extreme care and nicety, so that each pair of fingers may properly grip a string, and to do this has involved much labor and skill, and hence has rendered the production of a good harp an extremely expensive matter.

By my invention, however, the disks can be applied to the spindles and separately adjusted with ease and rapidity, and should from any cause one of the disks require adjustment after the sale of the instrument the user can readily remedy the defect and bring the instrument into perfect tune.

In the accompanying drawings, Figure 1 represents in perspective a double-action harp with the base broken away, so as to show the pedal connections. Fig. 2 represents, partly in side elevation and partly in vertical section, the upper portion of a harp involving my improvement, a portion of the head or top part of the harp being broken away for convenience of illustration. Fig. 3 represents, partly in section and partly in elevation, one of the spindles having a sharpening-disk attached thereto in accordance with my invention. Fig. 4 represents a portion of one of the spindles with the sharpening-disk held thereon by a nut applied to a threaded stem on the spindle in place of a screw, as in Fig. 3, the disk in said Fig. 4 being shown in section. Fig. 5 is a face view of one of the disks and shows in full lines a string passing between the pegs or fingers, which, as a mere matter of illustration, are out of contact with the string by reason of the position of the disk. Said figure, however, indicates in dotted lines that the disk has been turned so as to cause the pegs or fingers to engage and take a bite on the string, which is thereby bent or kinked. Fig. 6 represents in side elevation a portion of a harp having the sharpening-fingers and certain links or couplers on the outside of the head, and illustrates my improvement applied thereto, as hereinafter set forth. Fig. 7 represents a section on line 7 7, Fig. 6, with a portion of the spindle in elevation. Fig. 8 shows the inner grooved face of the disk or head of Fig. 7, and is a section on line 8 8 in said Fig. 7. Fig. 9 is a section on line 9 9, Fig. 6, with the spindle in elevation. Fig. 10 is a face view of the outer disk of Fig. 9.

In said drawings, A indicates the head, and A' the base, of a double-action harp having at its base the required number of foot-pedals B. The position of the harp in Fig. 1 permits but two of such pedals being seen, it being understood, however, that the usual number may be provided.

The rotary sharpening-disks C are each provided with a pair of studs or fingers *c*, which are rigid with and arranged to project from the respective faces of the disks. The strings pass between said fingers, one string being arranged to pass between each pair of said fingers, as usual. The disks C are arranged upon or carried by rotary arbors or spindles D, whereof each spindle is provided with an arm *d*, in order that the spindle may be connected with and operated from an appropriate portion of the action.

The entire action is not herein shown, nor need it be so illustrated, it being sufficient for the purpose of my invention to show certain links or octave-couplers E, arranged to connect link-work F with the arms *d* of certain of the spindles and to further represent the pedal-rod G, which serves to connect one of the foot-pedals with said link-work, whereby by operating said foot-pedal the sharpening-disks allotted to a set of strings of a particular letter may be operated.

From the foregoing it will be understood that the mechanism or independent portion of the action shown serves for operating the sharpening-disks allotted to all of the strings of a particular letter, and that in like manner similar mechanisms or independent portions of the action are employed and severally allotted to the remaining differently-lettered strings.

According to the old method the disks are simply fitted upon and permanently pinned to the spindles, thereby involving an arrangement having all of the attendant disadvantages hereinbefore referred to as incident to the old art.

In Fig. 3 I have shown a sharpening-disk secured to the spindle in accordance with my invention, whereby while the disk is attached to the spindle it is capable of independent rotary adjustment thereon. In said figure the one end of the spindle is made somewhat tapered or conical, as at *d'*, and the disk is correspondingly bored or provided with a corresponding socket or recess to receive said conical or tapered end of the spindle. By crowding or forcing the disk upon the spindle it will wedge and bind upon the conical or tapered spindle end, the tightness and rigidity of the disk upon the spindle being dependent upon the extent to which the disk is forced thereon. As a means for thus forcing the disk upon the tapered end of the spindle and holding it tightly thereon so long as may be necessary, a screw H is arranged to work through the center of the disk and engaged in a threaded socket in the end of the spindle. By such arrangement the screw can be turned in a direction to permit the disk to loosen up and

be turned upon the spindle independently of the latter, whereby the player may with great nicety and accuracy effect such independent rotary adjustment of the sharpening-disk as may be necessary, and after such adjustment has been made he can tighten up the screw, so as to tighten the disk upon the spindle. The screws by which the disks C are thus tightened upon their spindles are also preferably so arranged with relation to the movements of the spindles that when the spindles and disks thereon are operated for the purpose of varying the tension of the strings the bodily rotation of each spindle and disk thereon shall be in a direction to tighten rather than to loosen the screw allotted thereto.

While the foregoing is an exceedingly simple and desirable mode of permitting the individual rotary adjustments of the several disks, the desired end can be attained by means of the construction involved in Fig. 4, but varying somewhat in detail. Thus in Fig. 4 the disk is fitted upon the conical or tapered end of the spindle, as in Fig. 3; but the spindle has at its end a threaded stem *h*, which extends centrally through the disk and receives a nut *h'*, that can be tightened upon the face of the disk, so as to force the disk upon the tapered or conical end of the spindle.

In certain harps a portion of the action has been arranged upon the outside of the head of the harp, the portions thus externally arranged being the heads or disks that have been provided with fingers and permanently pinned, as upon the spindles, and certain links connected directly with said heads or disks.

Figs. 6 to 10, both inclusive, represent my improvement applied to such arrangement of harp action. In said arrangement the heads or disks C² are permanently pinned upon their allotted spindles D, as in the old way; but in place of providing them directly with fingers I arrange against the face of each disk C² either a disk C³ or a disk C⁴, provided with sharpening-fingers *c*. The disks C³ are provided with one or more (but preferably with a couple of) slots *c'*, adapted to receive screws *c*², which pass through said slots and screw into the disks C². By such arrangement the screws can be loosened to permit an individual adjustment of disks C³ independently of the heads or disks C², and after said disks C³ have been properly adjusted the screws can be tightened, so as to clamp the disks C³ firmly against the disks C².

In Figs. 7 and 8 the disk C³ is fixed on the spindle and provided with an annular groove *c*³, which is made wedge-shaped in cross-section—that is to say, with sides converging toward the bottom of the groove. The disk C⁴ is in such case provided on its inner side with an annular or part annular rib *c*⁴, made wedge-shaped in cross-section and arranged to enter and wedge into the groove in the disk C³. A screw H passes centrally through disk C⁴ and enters the spindle on which the disk C², Fig. 7, is secured, whereby by loosening the screw

the disk C^4 , that is provided with fingers c , can be turned independently of the spindle and disk C^2 , while, on the other hand, by tightening up said screw the wedge-shaped rib c^4 can be so wedged into the groove c^3 as to hold the disks together as firmly as though they were in one piece. The disks C^2 , that are secured to the spindles in accordance with the old way, can be either circular or heart-shaped or any other desired form, it being observed that both of said forms have been used and that the presence of both is indicated in Fig. 6, wherein I have applied to certain of the disks C^2 the individually-adjustable disks, as in Figs. 9 and 10, and that to certain other of the disks C^2 , I have applied disks C^4 , according to the mode I have illustrated in Figs. 7 and 8.

From the foregoing it will be seen that various modifications can be made whereby individual adjustments of the disks, heads, or carriers for the sharpening-fingers can be made, and that as a matter of principle herein involved the sharpening-fingers severally allotted to different strings have individual or independent adjustments, whereby a player upon noticing any defect in the tune of the harp or any rattling of the strings may readily remedy the same.

What I claim as my invention is—

1. In a harp-action, a set of rotary adjustable disks or carriers individually adjustable independently of one another and of the remaining portion of the action by which the synchronous action of a set of such disks or carriers is effected and provided each with a couple of sharpening-fingers arranged for gripping, kinking, and sharpening a string in accordance with the individual rotary adjustment of the disk or carrier.

2. The combination, substantially as hereinbefore set forth, with the spindles or arbors connected up in a harp-action, of the disks provided with sharpening-fingers and adjustable upon said spindles, for the purpose described.

3. The combination, substantially as hereinbefore set forth, in a harp-action, of a set of spindles having conical or tapered ends, disks provided with sharpening-fingers and applied to said conical or tapered ends of the spindles, and screws for tightening the disks upon the spindles to which they are severally allotted, for the purpose described.

GEORGE B. DURKEE.

Witnesses:

CHAS. G. PAGE,
ANNIE COATES.