

(Model.)

4 Sheets—Sheet 1.

J. E. CRISP & G. W. COPELAND.

Boot Treeing Machine.

No. 232,944.

Patented Oct. 5, 1880.

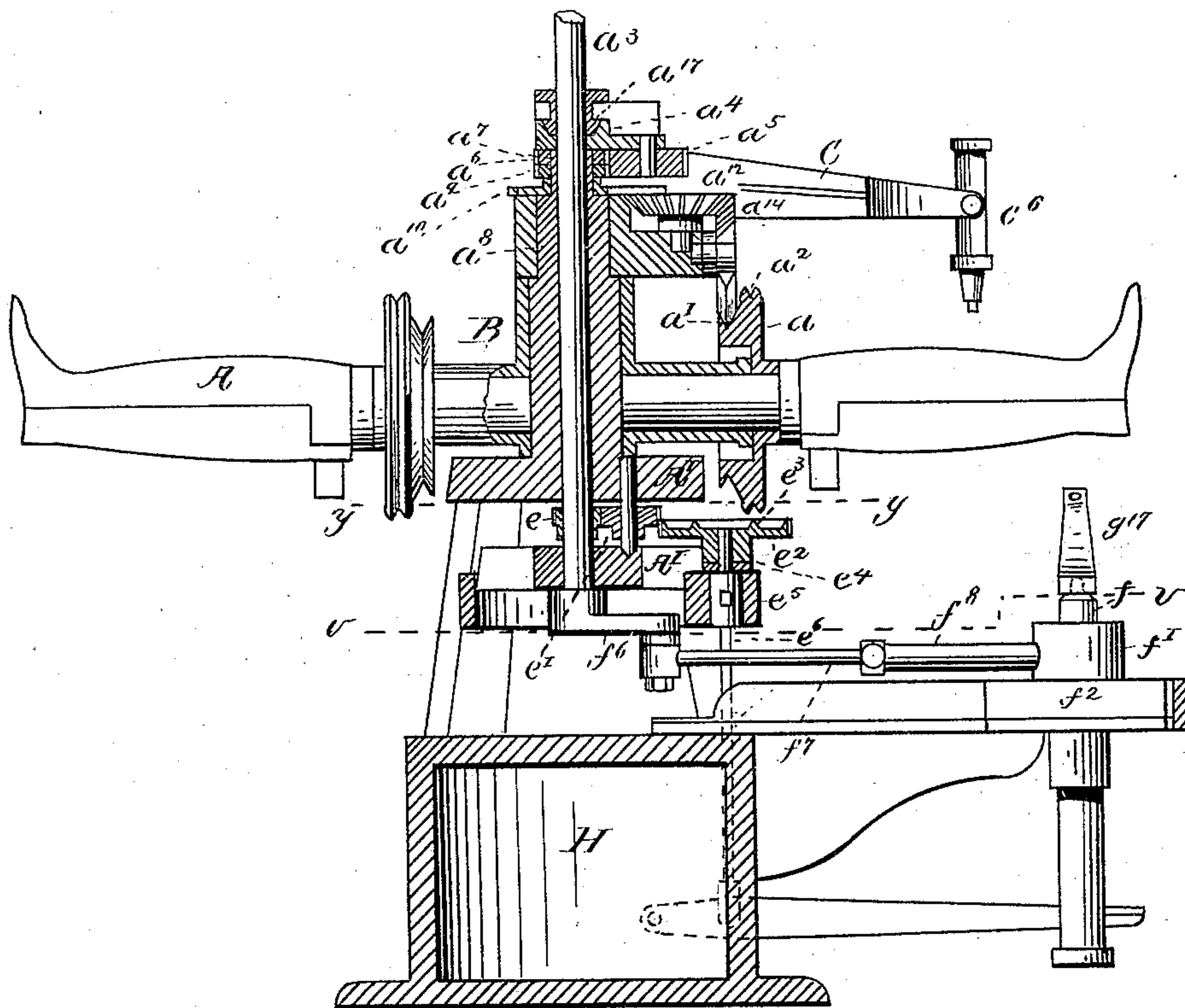


Fig. 1.

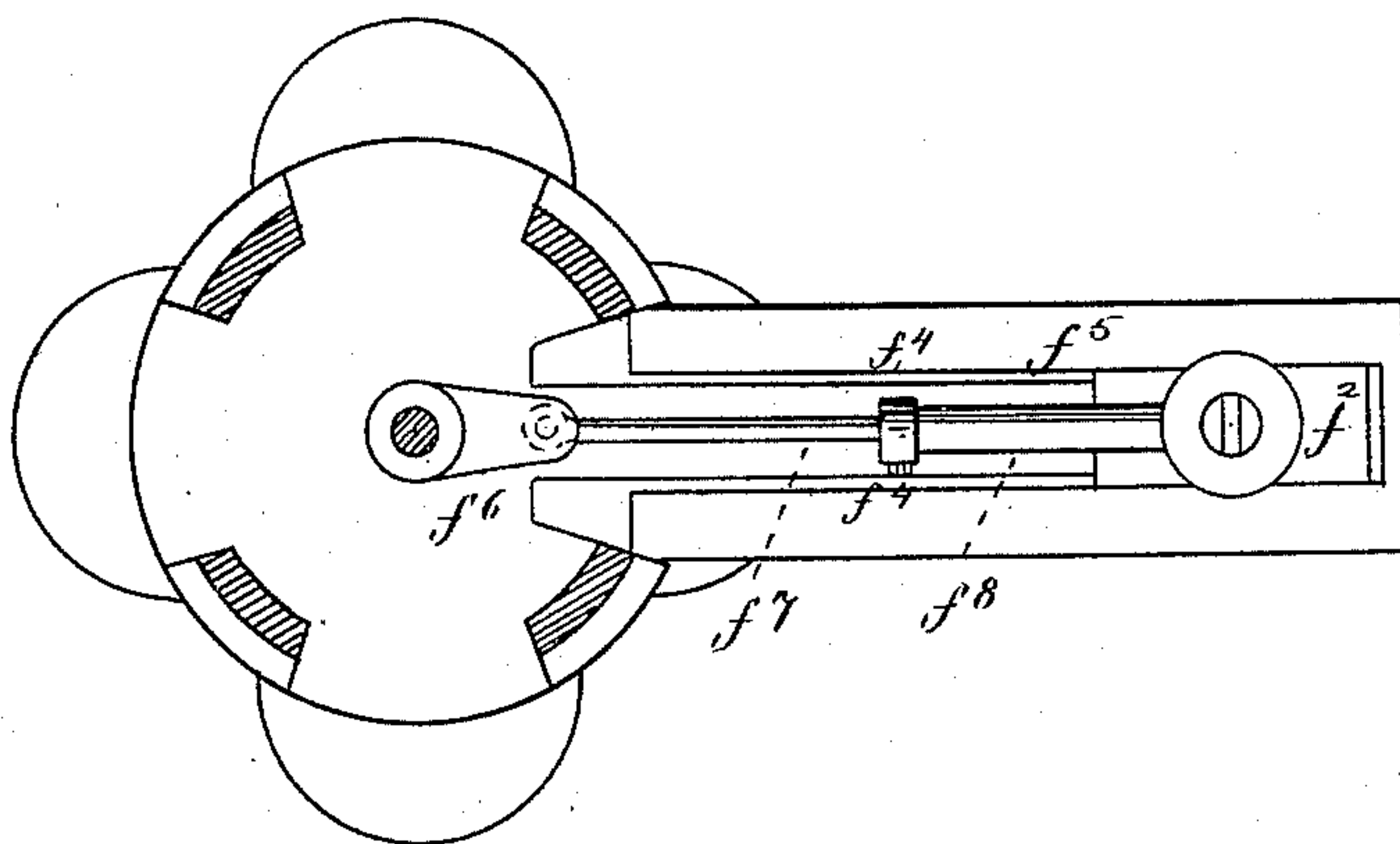


Fig. 2.

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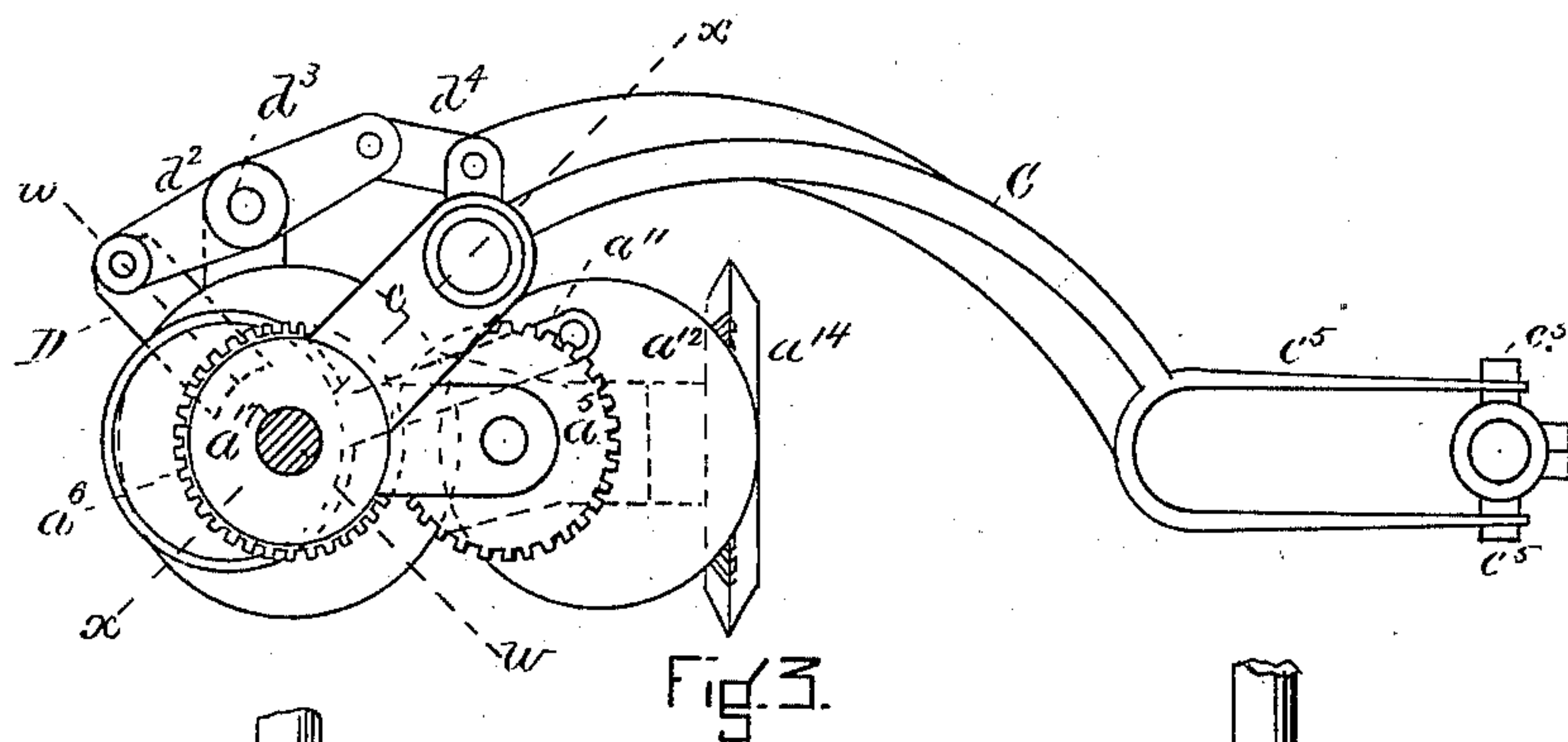


Fig. 3.

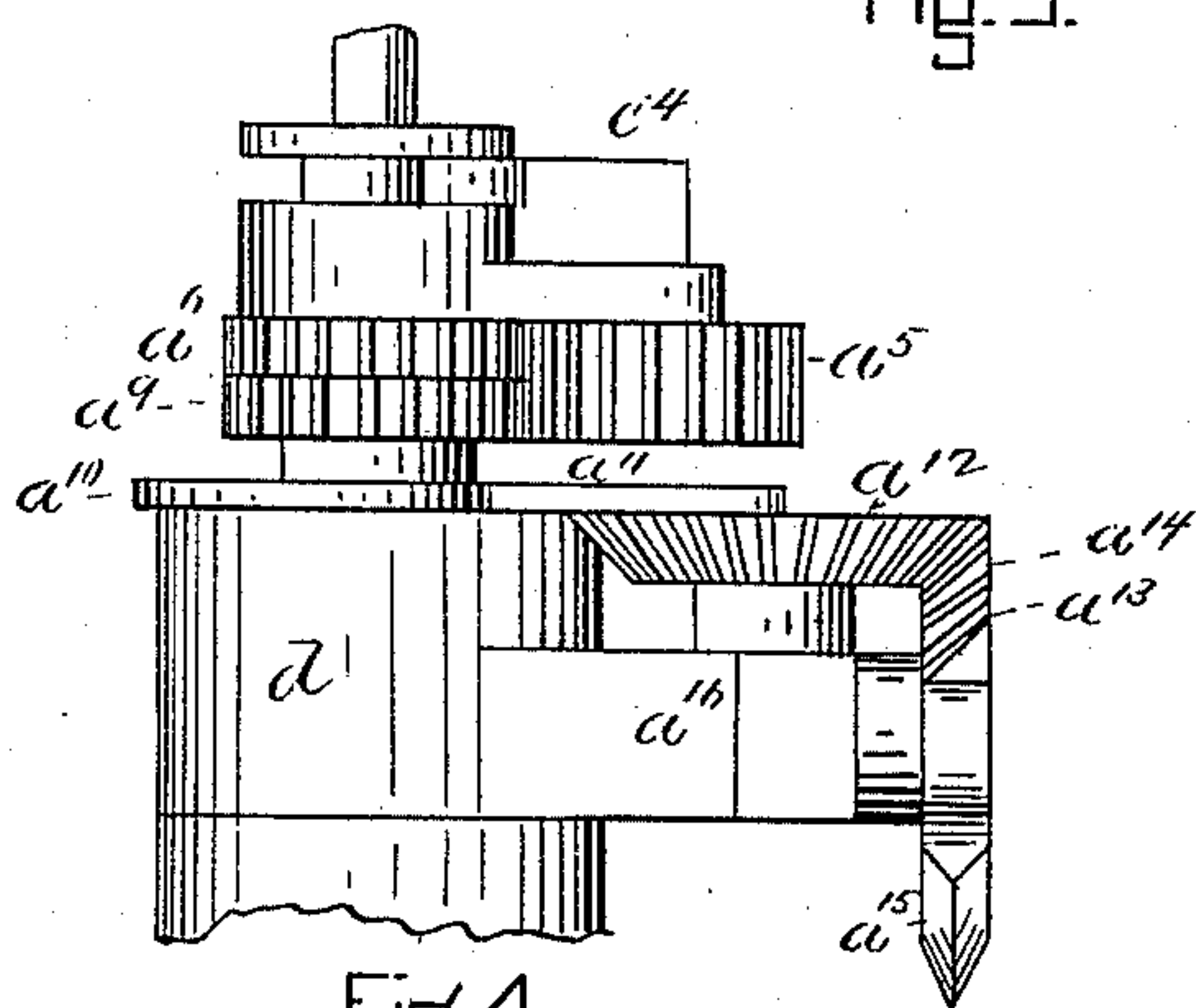


Fig. 4.

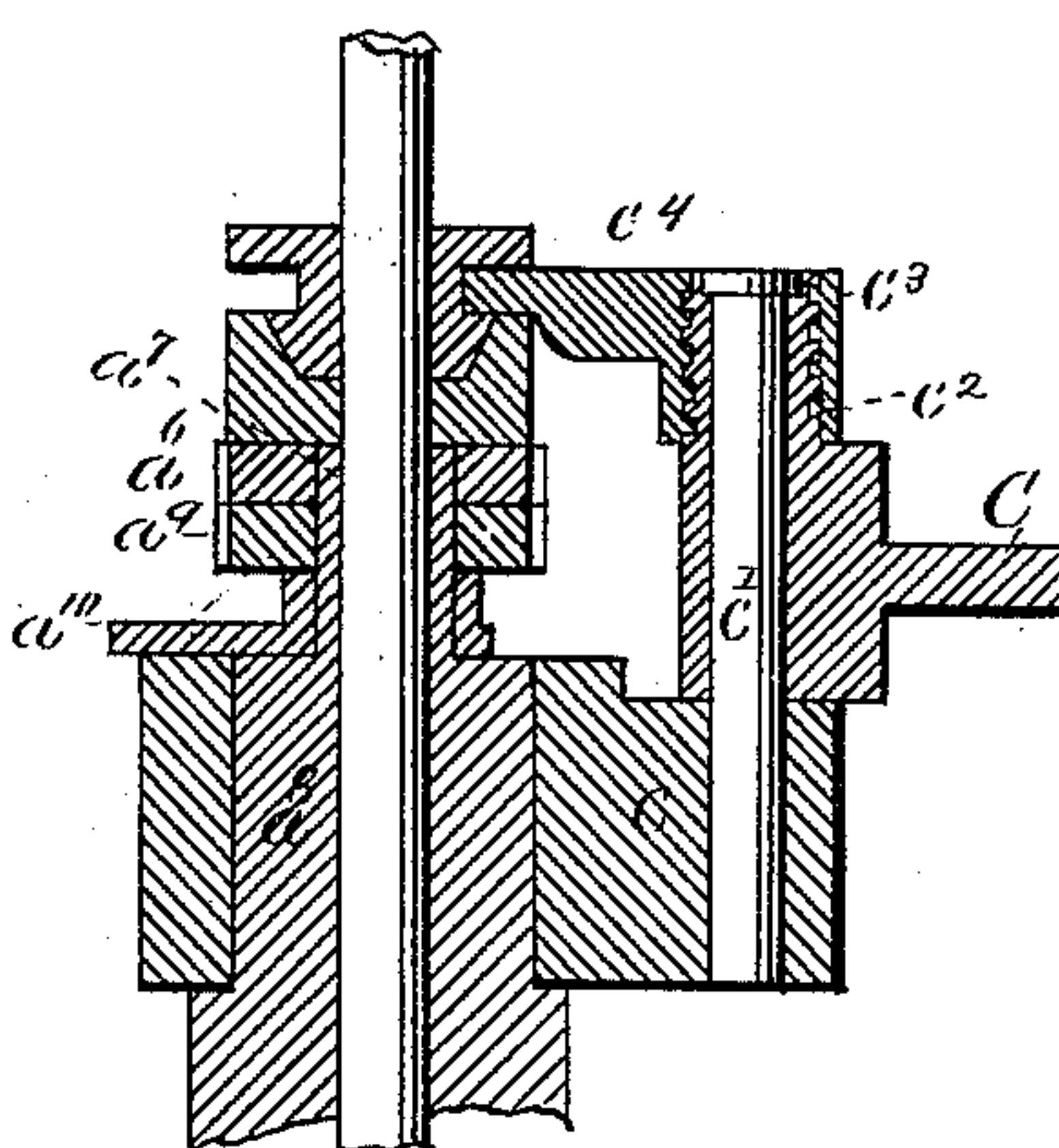


Fig. 5.

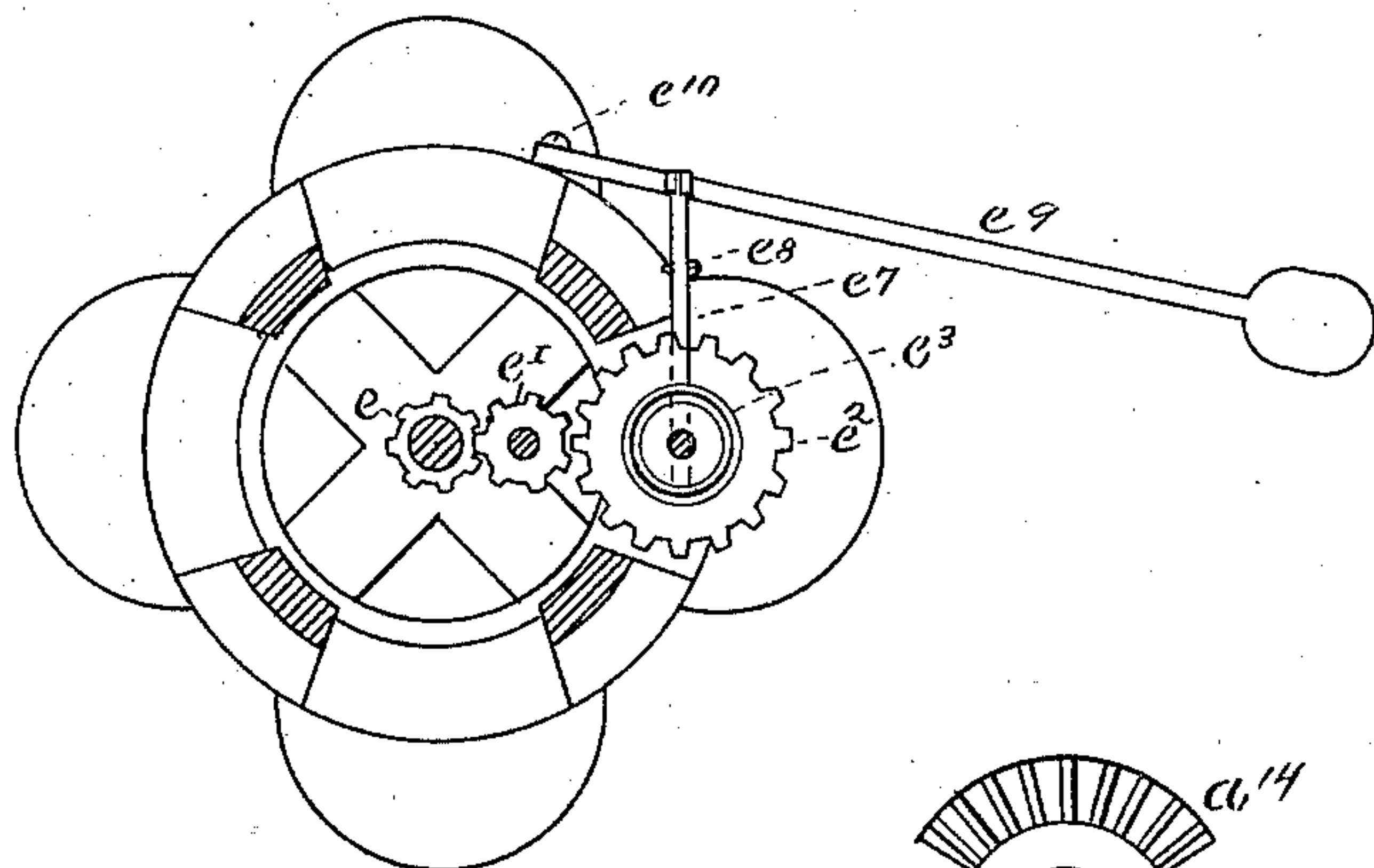


Fig. 6.

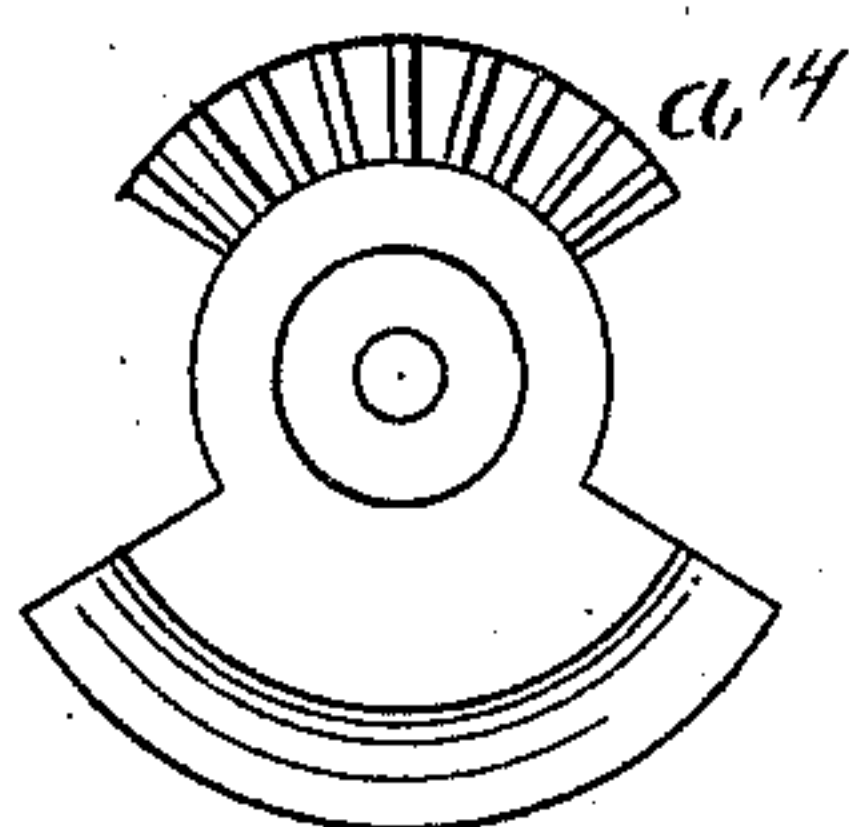


Fig. 7.

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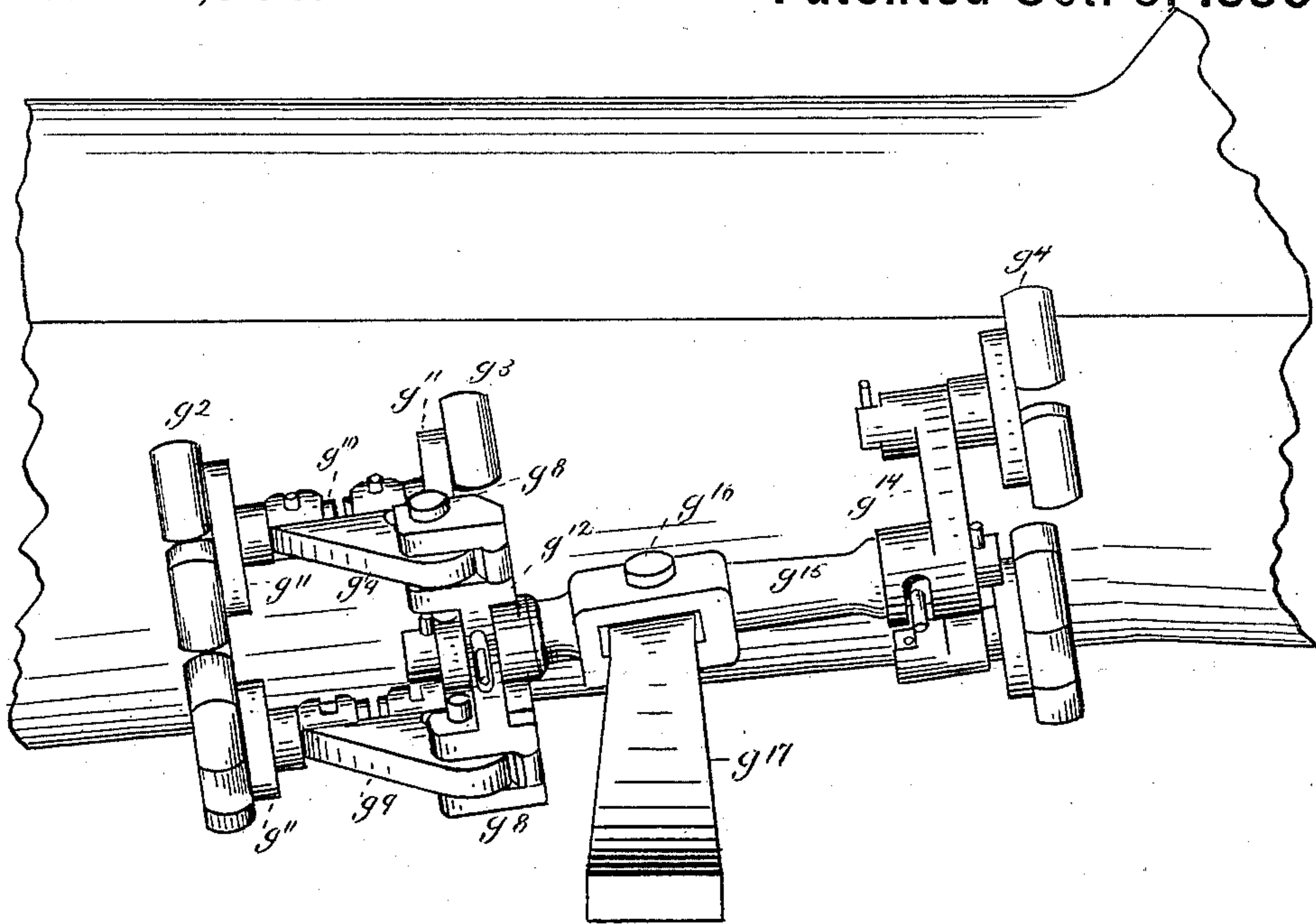


Fig. 9.

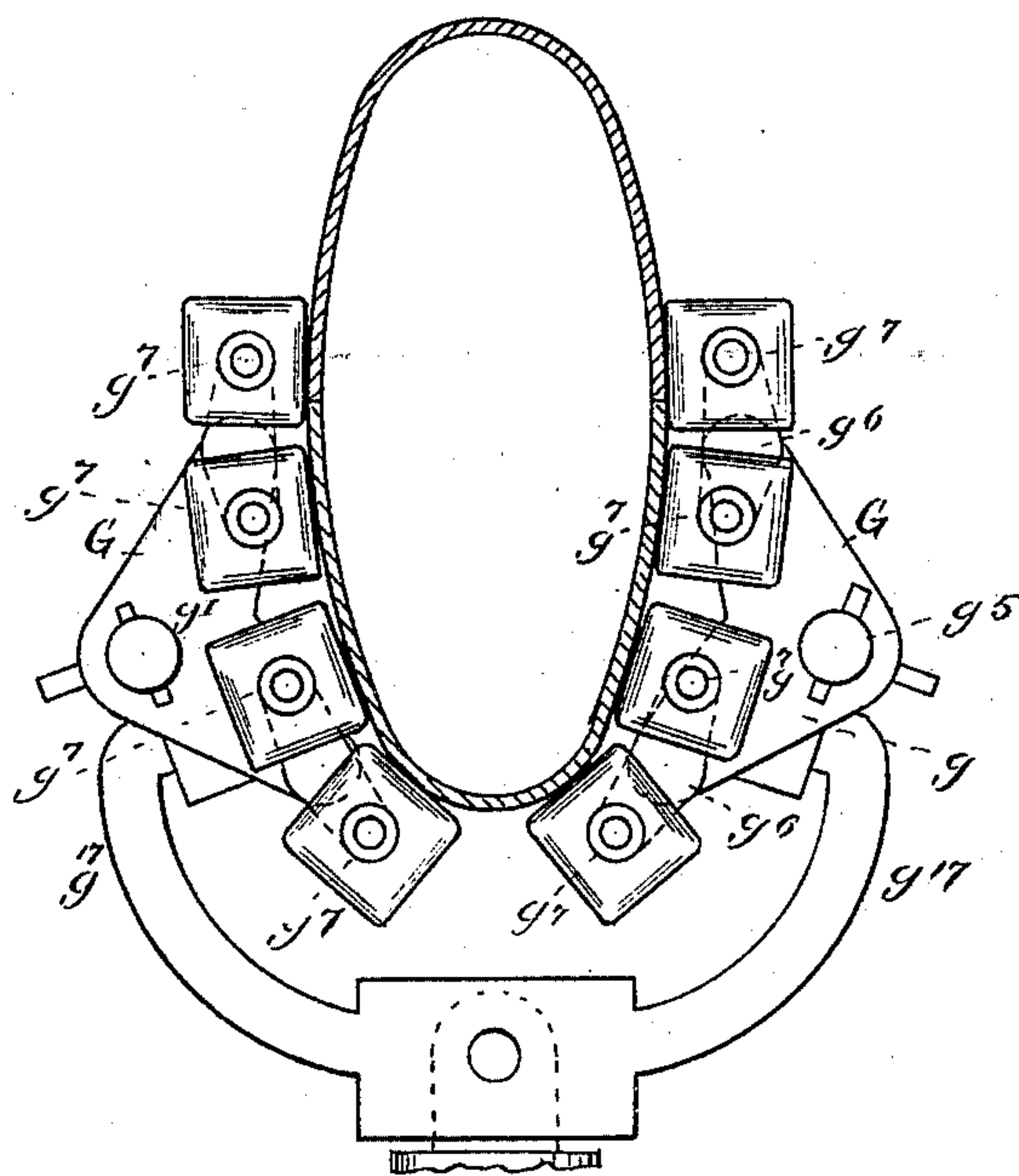


Fig. 10.

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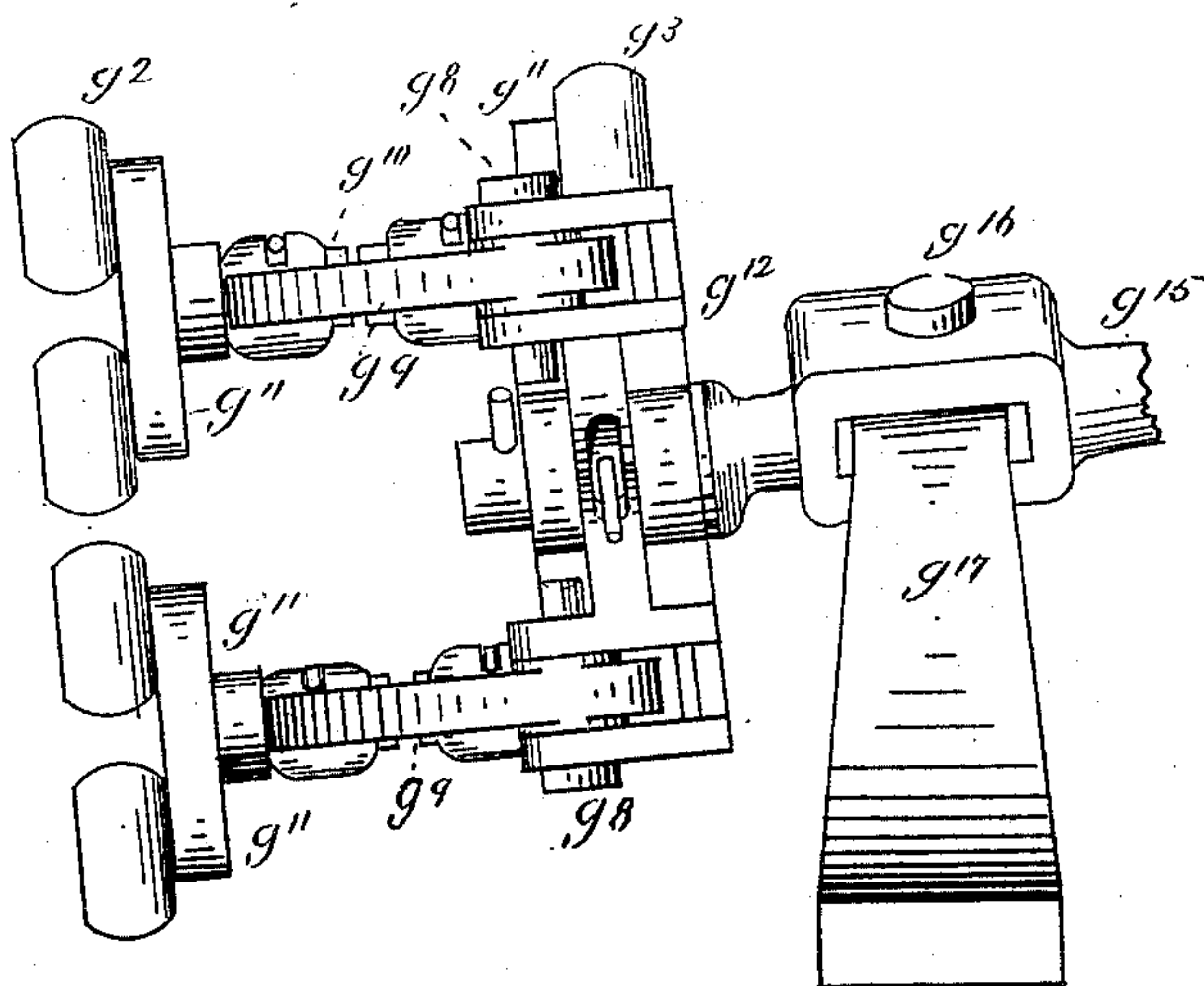


Fig. 11.

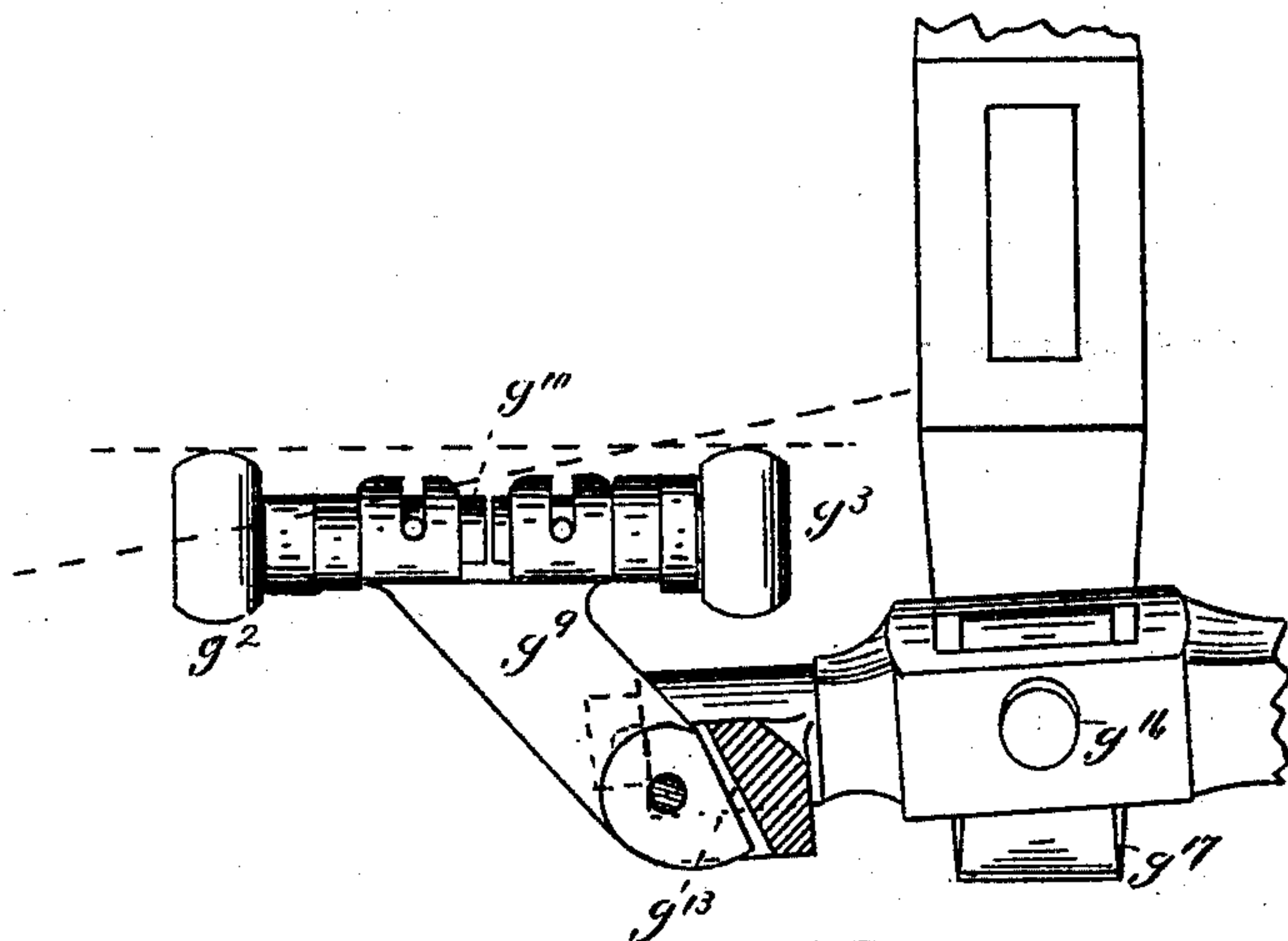


Fig. 12.

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UNITED STATES PATENT OFFICE.

JOSEPH E. CRISP, OF BOSTON, AND GEORGE W. COPELAND, OF MALDEN,
MASSACHUSETTS.

BOOT-TREEING MACHINE.

SPECIFICATION forming part of Letters Patent No. 232,944, dated October 5, 1880.

Application filed August 16, 1880. (Model.)

To all whom it may concern:

Be it known that we, JOSEPH E. CRISP, of Boston, in the county of Suffolk, and GEORGE W. COPELAND, of Malden, in the county of Middlesex, both in the State of Massachusetts, citizens of the United States, have made a certain Improvement in Boot-Treeing Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification in explaining its nature, in which—

Figure 1 represents a view of our improved machine, part in side elevation and part in section. Fig. 2 is a view, part in plan and part in cross-section, of the portion below the dotted line *vv* of Fig. 1. Fig. 3 is a plan of a portion of the top of the machine. Fig. 4 is an enlarged view, in elevation, of a part of the operative mechanism. Fig. 5 is a sectional view of a portion of the mechanism shown in Fig. 4 on the line *xx* of Fig. 3. Fig. 6 is a plan and section of the part of the machine below the dotted line *yy* of Fig. 1. Fig. 7 is a section on the line *ww* of Fig. 3. Fig. 8 is a plan of a sector employed in transmitting movement from one part of the machine to another. Fig. 9 is a perspective of a portion of the tool or rub-stick employed on the side and back surfaces of the boot. Fig. 10 is an end elevation thereof, the boot and boot-tree being shown in cross-section. Fig. 11 is an enlarged view of a part of the tool shown in Fig. 9, and Fig. 12 is a side view of one portion of the tool to illustrate the mechanism for obtaining a movement hereinafter described.

This invention embraces, first, means for providing a boot-tree with partial rotation upon its axis, forward and back, whereby sections of the boot are presented and withdrawn from the tool or rub-stick without entirely revolving the tree; second, means for providing the boot-tree with complete rotation upon its axis, adapted to be alternately used with the mechanism for providing it with partial rotation; third, means whereby the same operative mechanism is employed for giving two or more boot-trees these movements; fourth, a rub-stick of peculiar construction adapted to

operate upon the side and back portions of the boot; fifth, means for providing said rub-stick with a reciprocating movement between the heel and knee end of the boot-tree; sixth, the combination of a rub-stick adapted to be reciprocated upon the boot-leg with a boot-tree having a movement of rotation forward and back upon its axis; seventh, the combination of a boot-tree having a movement of rotation either continuous in one direction or forward and back with a rub-stick adapted to be reciprocated automatically upon the side and back portions of the boot-tree, and with a rub-stick adapted to be reciprocated upon the front, sides, and foot portion of the tree by hand; eighth, various details in construction and organization, all of which are hereinafter more fully described; and the chief object of the invention is to provide means whereby the larger and easier portions of the boot to finish are treed automatically, while the smaller and more difficult parts are hand-finished; and in order that the automatic tool may do as much work as possible, and yet not interfere with the operation of the hand-tool, we have oscillated the surface of the tree in relation to said automatic tool, thereby presenting sections of the boot to the tool that otherwise could not be reached by it unless the working-surface of the tool were lengthened, in which case it would interfere with the free use of the hand-tool, and would therefore have to be done by hand.

In the drawings, A represents the boot-trees. They are supported at their knee end substantially as described in reissue Letters Patent granted to Joseph E. Crisp, assignor, Nos. 9,055 and 9,124, and the trees are made expansible and are heated, if desired. They are also adapted to be revolved, in presenting them in succession to the rub-sticks, with the jack B, from which the hollow posts or sleeves which support the trees radiate horizontally, and which, with the posts, is similar in construction and operation to the jack shown and described in said Letters Patent No. 9,124.

Each post or boot-tree is provided with a disk, *a*, which has the grooves *a'* *a''* in its circumference, when it is desired that the boot-

tree should be provided with a movement of rotation forward and back and with a continuous revolution in one direction.

The mechanism for communicating a movement of rotation forward and back to the tree consists of the main shaft a^3 of the machine; the revolving arm a^4 , which furnishes a bearing for the gear-wheel a^5 , and which revolves it around the shaft; the fixed gear-wheel a^6 , that is fastened to a sleeve, a^7 , projecting upwardly from the post a^8 ; the gear-wheel a^9 , which is fastened to the sleeve projecting upwardly from an eccentric, a^{10} ; the said eccentric; the eccentric-bar a^{11} , which connects the eccentric with the bevel-gear a^{12} and provides it with a partial movement of rotation back and forth; the double sector a^{13} , which has teeth a^{14} upon its upper face to engage with the bevel-gear a^{12} ; and a friction-surface, a^{15} , V-shaped in cross-section upon its lower surface to engage with the groove a' in the disk a .

The sector and the bevel-gear a^{12} have suitable bearings in the bracket a^{16} projecting outwardly from the post.

The gear attached to the eccentric has one less tooth than the fixed gear above it, and upon the revolution of the gear-wheel a^5 around them the gear attached to the eccentric is moved very slowly, consequently this provides the eccentric with a very slow rotation. This movement can be increased by decreasing the number of teeth. A clutch, or one member thereof, a^{17} , sliding on a fast feather on the shaft, and provided with a vertical movement thereon, as hereinafter explained, is adapted to engage with the other member on the swinging arm a^4 in providing it with revolution.

Although the part a^{17} of the clutch may be engaged or disengaged by any suitable mechanism, we prefer to operate it by the arm C that supports the upper rub-stick. This arm, preferably, is curved, as represented in Fig. 3. It is secured to the bracket c by the stud or pinion c' , and it has formed on the upper portion surrounding the stud a screw-thread, c^2 , which receives the screw-thread c^3 upon the arm c^4 , which carries the portion a^{17} of the clutch. Upon a slight lateral movement of the arm C on the center c' the screw is revolved, causing the arm c^4 and the part a^{17} of the clutch to be lifted upwardly, thereby disengaging that portion of the clutch from its other part.

When means are provided for continuously revolving the boot-tree in one direction it is desirable that the mechanism for partially revolving it, as above described, shall be lifted sufficiently to disengage the portion a^{15} of the sector from the groove a' , and to effect this, although other mechanism may be employed, we again prefer to use the arm C.

In order that this portion of our invention may be understood it is necessary to state that the brackets a^{16} and c are attached to or formed on a collar or sleeve, d , and that provision is

supplied for moving the collar and the mechanism that it supports and the mechanism on the shaft above it vertically upon the post a^8 and shaft, and this we accomplish by means of the wedge or inclined block D, the slot d' in the collar d having its upper wall shaped to conform to the inclination of the wedge or inclined block. The block is given a horizontal movement by means of the lever d^2 , pivoted at d^3 to a bracket extending outwardly from the sleeve d and the link d^4 , that connects one end of the lever with the arm C. Upon the movement of the arm away from the boot-tree the lever is operated to move the block D inwardly, thereby causing the collar to lift upon its inclined surface, and it may be closed or moved inwardly sufficient to allow its inner end to rest upon the notch d^5 in the post a^8 .

The arm C is provided at its outer end with a yoke, c^5 , that supports the cylinder c^6 , the cylinder being provided with trunnions or projections which are supported by the ends of the yoke, and which enable the cylinder to be rocked or oscillated in a direction lengthwise of the boot-tree.

The mechanism for providing the boot-tree with continuous revolution consists in the gear-wheel e , near the lower end of the main shaft a^3 , the gear-wheel e' , having suitable bearing in the frame A' , and the gear-wheel e^2 , which has a circular V-shaped projection, e^3 , on its upper face, and a long sleeve, e^4 , projecting downwardly into its bearing e^5 . The V-shaped projection e^3 , when the gear-wheel is moved upwardly by the rod e^6 , lever e^7 , pivoted at e^8 , and treadle e^9 , pivoted at e^{10} , engages with the V-shaped recess or groove a^2 in the disk a .

We do not, however, intend to confine ourselves to the use of the two sets of mechanism herein described for providing the boot-tree with partial or continuous revolution, but may use either separately. Neither do we intend to confine ourselves to the special forms of sector, nor to the method of operating the revolving disk a by the frictional contact of the sector or projection e^3 therewith, nor to its form, but may use in lieu thereof a gear-wheel in the one instance and a bevel-gear in the other. Neither do we confine ourselves to the specific mechanism described for providing the tree with its movement of partial revolution to and fro; but we may use any known appliances for providing the same with said movement without departing from the spirit of this invention.

The rub-stick supported by the cylinder c^6 is described in our application for patent for improvement in boot-treating machines filed July 2, 1880, and it is unnecessary to give a further description thereof here, with this exception: The rub-stick is held against the boot-tree by compressed air. It is so supported as to have universal movement in relation to the surface of the boot-tree, and it is adapted to be reciprocated upon the front part of the boot-tree and upon the foot portion by hand.

The rub-stick for operating upon the sides and back portion of the boot-tree is supported upon a piston-rod, f , and the cylinder f' , and the rub-stick is pressed against the surface of the boot-tree by compressed air or other like elastic pressure.

The cylinder is suitably supported by a block, f^2 , which is reciprocated on the ways f^4 in the bracket or table f^5 by the crank f^6 on the lower end of the shaft a^3 , and the connecting-rod f^7 , and the sleeve f^8 . The connecting-rod f^7 and sleeve f^8 are used for the purpose of providing an adjustment of the block f^2 to and from the main shaft, and in order that the rub-stick may be set to the length of the boot-tree, and this is accomplished by moving the sleeve inwardly or outwardly from the rod f^7 , as the case may be, and then locking then by a locking-screw.

The lower rub-stick, G , preferably consists of two parts, g g' , adapted to bear upon opposite surfaces of the boot-tree, or surfaces very nearly opposite, and we prefer to use three lines, g^2 g^3 g^4 , of pads, four in a line. The pads in the line g^4 are pivoted in relation to each other and to the rod g^5 substantially as the pads in our application of July 2, 1880, are pivoted to their supporting-bar, and have therefore the pivots or centers g^5 , g^6 , and g^7 for providing the pads with the conformability necessary. The lines g^2 g^3 have centers corresponding to the centers g^5 g^6 g^7 for the same purpose, and they are also provided with another center, g^8 , caused by the manner of supporting the blocks g^9 , which hold the rods g^{10} , that connect the arm g^{11} for carrying the pivots for the pads. These blocks g^9 are pivoted to the arm g^{12} in such a way that upon the movement of the two lines of pads g^2 g^3 toward the knee end of the boot both lines bear with equal force, or substantially equal force, upon the boot-tree or boot-leg thereon; but upon the backward movement, or movement from the knee end of the tree toward the heel, the line g^2 of pads is lifted from the boot-tree or boot thereon automatically, and sufficient play for this movement of the block g^9 is provided, as represented at g^{13} , Fig. 12, but not sufficient to prevent the line of pads g^3 from bearing on said backward or reversed movement. This construction of rub-stick is desirable in order that the upper border or edge of the boot may be thoroughly treed and finished, and in order that provision may be made for differences in the length of boot-legs, and in operation the line g^2 of pads is moved beyond the upper or knee end of the boot upon the boot-tree on every reciprocation of the stick, and on every reverse or backward movement the line is lifted to clear the edge, thus preventing its racking and the catching of the pads upon it.

It is obvious from this description that all boots varying in height the distance between the two lines g^2 g^3 of pads may be treed without changing the rub-stick.

The arms g^{12} and g^{14} , which support the lines

of pads, are connected by the rod g^{15} , which is pivoted at g^{16} to the arm g^{17} , and the two arms g^{17} are fastened to the piston-rod f .

The pipes and valves for conveying the compressed air to the cylinders c^6 and f' and for controlling its use are not herein shown, as they are of ordinary construction and are used in the ordinary way.

We propose to utilize the base H of the machine as a reservoir for compressed air, and from thence to conduct it to the cylinders.

The piston-rod f is of sufficient length to provide the under rub-stick with a considerable vertical movement in relation to the tree, in order that it may be out of the way when not in use sufficiently to allow the operator to wire the tree or otherwise manipulate it.

We do not confine ourselves to the special method of reciprocating the block f^2 , nor to the special form of the lower rub-stick herein described, but may use in lieu of the pads described one or more of the rolls, pads, or rub-sticks described in the various patents relating to the art of boot-treering.

The operation of the machine is as follows: The boot is adjusted upon a boot-tree and the necessary composition applied, and the tree is then presented to the action of the rub-stick. The lower rub-stick is moved upwardly automatically by the compressed air in the cylinder upon opening a valve, and automatically conforms to the surface of the boot-tree. It is then reciprocated, while the boot-tree has a partial movement of rotation upon its axis forward and backward. This brings all portions of the sides and bottom of the tree in position to be operated upon by the rub-stick during some portion of its reciprocation. While the under rub-stick is thus automatically finishing the sides and back of the boot the upper rub-stick is being moved by hand upon the front and foot portions of the boot. While this work is being done by one operator another is preparing the second boot upon another tree by adjusting it thereon and applying the composition. Upon the completion of the rubbing of the first tree by the movement of the arm C to the right and by the opening of a valve, the upper rub-stick is removed from the work and the lower rub-stick lowered therefrom sufficiently to expose the tree to the action of strapping and such other manipulation and to such inspection as may be necessary. Upon the further movement of the arm C to the right the mechanism for giving the boot-tree a partial movement of rotation is disengaged, and the mechanism for revolving it continuously in one direction can then be used. This last-named provision is of some advantage in revolving the boot-tree, in order that the operator may inspect his work thoroughly before removing the boot from the tree.

Of course, in lieu of giving the boot-tree a partial movement of rotation back and forward, the under rub-stick can be provided with such traversing movement back and forth as shall

correspond and be equivalent for the partial revolution of the tree, and shall accomplish the same purpose; and in lieu of the upper rub-stick, held as described, any ordinary hand-tool operated by hand may be used.

Having thus fully described our invention, we claim and desire to secure by Letters Patent of the United States—

1. A boot-treeing machine provided with mechanism, substantially as described, whereby the boot-tree is partially rotated upon its axis in one direction, and is automatically reversed and partially rotated in the opposite direction, all combined and arranged substantially as set forth.

2. In a boot-treeing machine, the combination of a boot-tree and mechanism, substantially as described, for giving it alternate forward and backward rotation upon its axis, and also independent mechanism for providing it with continuous revolution thereon, all combined and operating substantially as described.

3. In a boot-treeing machine, the combination of mechanism for providing a boot-tree with partial rotation upon its axis in one direction and for reversing this movement and for rotating the boot-tree in the opposite direction, and also independent mechanism for providing it with continuous rotation upon its axis, with a jack carrying a series of tree-holding devices and adapted to present the trees in succession to said mechanism, substantially as and for the purposes set forth.

4. The combination of a boot-tree, mechanism for partially rotating it upon its axis in one direction and for reversing this movement and for rotating the tree in the opposite direction, with a rub-stick held against the boot-tree by compressed air or other elastic pressure and reciprocated thereon, substantially as described.

5. The combination, in a boot-treeing machine, of a boot-tree having a partial movement of rotation forward and back on its axis, an under rub-stick held against the boot-tree by compressed air or other elastic pressure and reciprocated thereon, and adapted to automatically finish the sides and back of the boot, with an upper rub-stick held against the boot by compressed air or other elastic pressure, and adapted to be reciprocated by hand upon the front and foot portions of the boot, substantially as and for the purposes described.

6. In a boot-treeing machine, the combination of the arm C with the cylinder c^6 , substantially as and for the purposes described.

7. In a boot-treeing machine, the arm C, carrying the cylinder c^6 , supporting and actuating the upper rub-stick, said arm having a lateral movement in relation to the boot-tree, substantially as and for the purposes described.

8. In combination with a boot-tree, a rub-stick vertically supported in its cylinder be-

neath the tree, adapted to be automatically reciprocated vertically by suitable elastic force, and to fall back from contact with the tree when said force is removed, by means substantially as described.

9. The combination of the arm C with the mechanism for providing the boot-tree with a partial movement of rotation forward and backward upon its axis, and connecting devices whereby, upon the partial movement of said arm away from the tree, the said mechanism is stopped, substantially as and for the purposes described.

10. The combination, in a boot-treeing machine, of the arm C, the mechanism for imparting to the boot-tree a partial movement of rotation forward and backward upon its axis, a wedge, and connecting devices, whereby, upon the full movement of the arm away from the boot-tree, the said operating mechanism is disengaged from the boot-tree or disk thereon, substantially as and for the purposes described.

11. The combination of the gear-wheel e^2 , adapted to be rotated by the main shaft, as described, and having a V-shaped projection, e^3 , upon its upper face, with means for engaging and disengaging the said wheel with or from the disk A or the boot-tree, substantially as and for the purposes described.

12. The combination of the cylinder f' , supporting a rub-stick, with means for reciprocating the same horizontally, substantially as and for the purposes described.

13. The combination of the cylinder f' , the main shaft a^3 , and intermediary connecting devices adapted to be shortened or lengthened, whereby the portion of the cylinder in relation to the shaft may be increased or diminished, substantially as and for the purposes described.

14. The combination of the gear-wheel a^5 , having the movement described, the fixed gear-wheel a^6 , the gear-wheel a^9 , fastened to the eccentric, the eccentric a^{10} , the connecting-bar a^{11} , the bevel-gear a^{12} , and the sector a^{13} , substantially as and for the purposes described.

15. The combination of the sector a^{13} with mechanism, as described, for providing it with a vertical movement in relation to the disk a , substantially as and for the purposes set forth.

16. The combination of a boot-tree adapted to be continuously revolved by mechanism substantially as set forth with a rub-stick held against the tree or the boot thereon by compressed air or other elastic pressure and automatically reciprocated horizontally on said tree, substantially as and for the purposes described.

17. A boot-treeing machine having a rub-stick provided with two pads or lines of pads pivoted in relation to each other, substantially as set forth, one of which pads or lines is adapted to be moved from the work automatically in moving in one direction, and to bear

upon the work in moving in the other direction, substantially as and for the purposes described.

5 18. In a boot-treeing machine, the combination of two or more lines of pads, pivoted to conform to the surface of the boot-tree, as described, and arranged in two groups upon the arms g^{17} , in the relation to each other set forth.

10 19. In a boot-treeing machine, the combination of one rub-stick held against the boot-tree by compressed air or other yielding pressure and reciprocated thereon, and adapted to automatically finish the sides and back of the
15 boot, and another rub-stick held against the boot by compressed air or other like yielding

pressure, and adapted to be reciprocated upon the front and foot portions, or either, of the boot and a boot-tree, substantially as and for the purposes described.

20 20. In a boot-treeing machine, a gang or group of conformable pads pivoted with relation to each other, substantially as set forth, and adapted to be forced against the boot-tree by compressed air or other like yielding pressure and automatically reciprocated thereon,
25 substantially as described.

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