(No Model.) 3 Sheets—Sheet 1.

W. H. BARNUM & E. C. OAKLEY.

HAT TRIMMING MACHINE.

No. 450,986. Patented Apr. 21, 1891.

Fig. 1

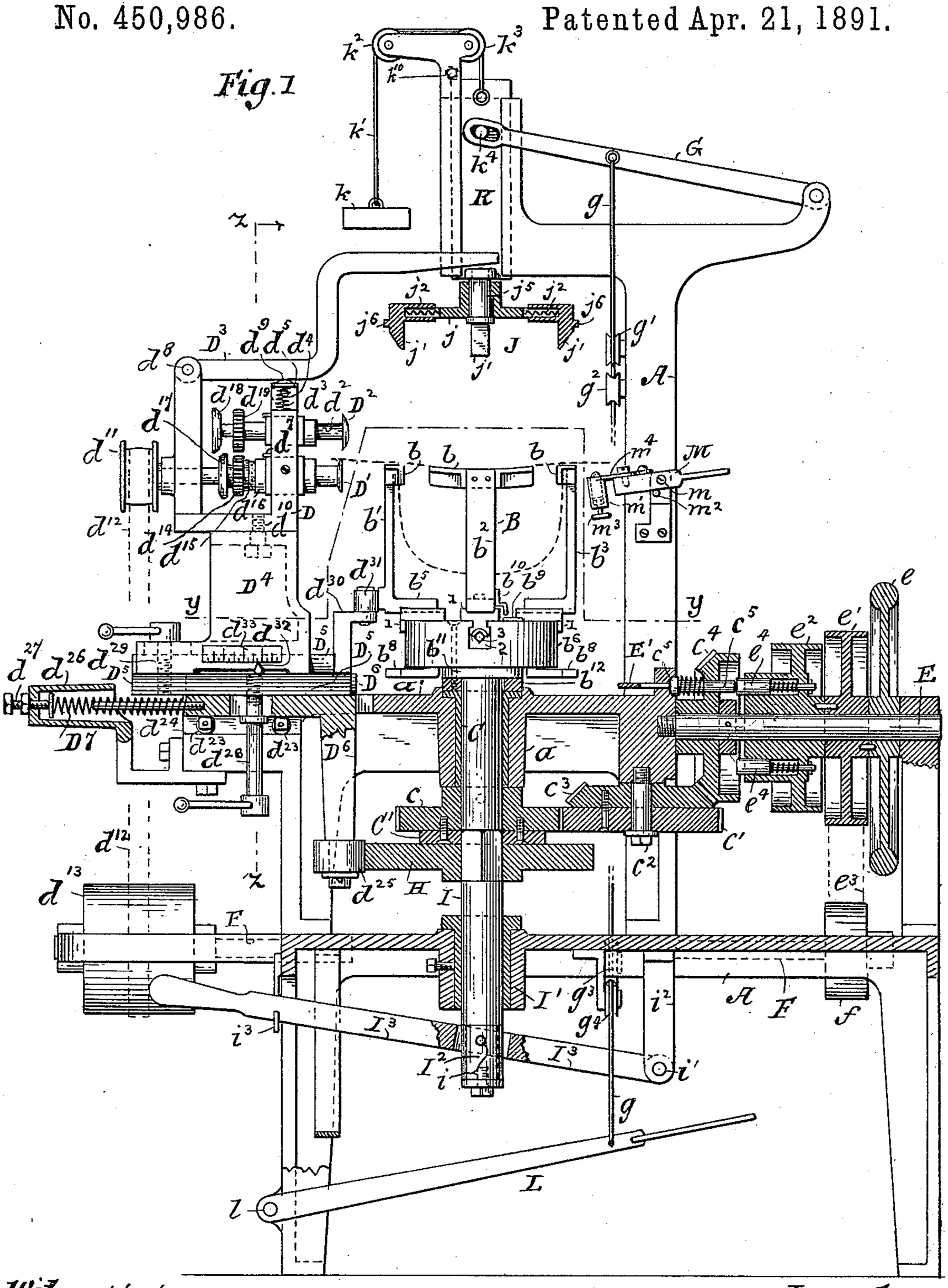

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Fig. 3

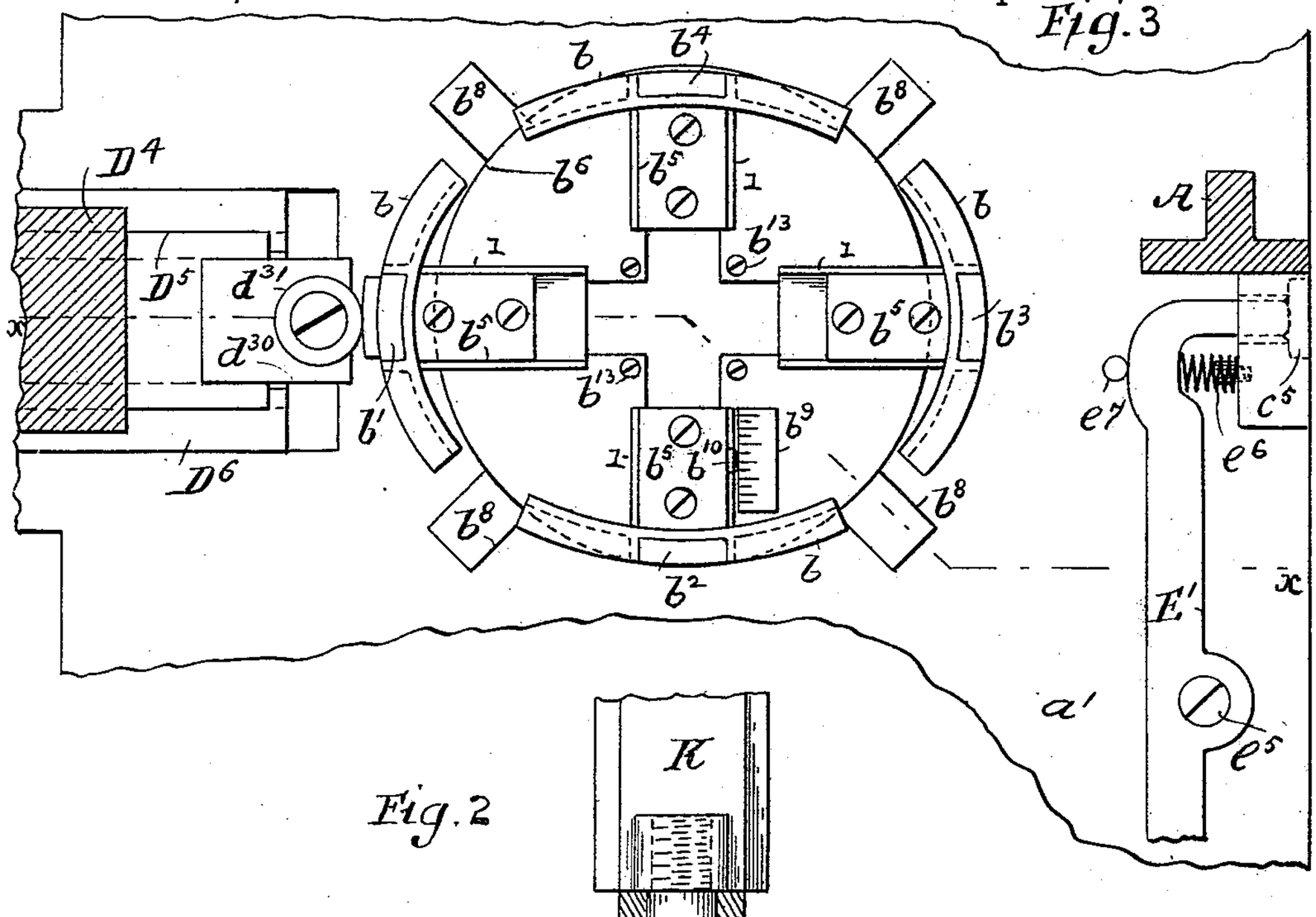

Fig. 2

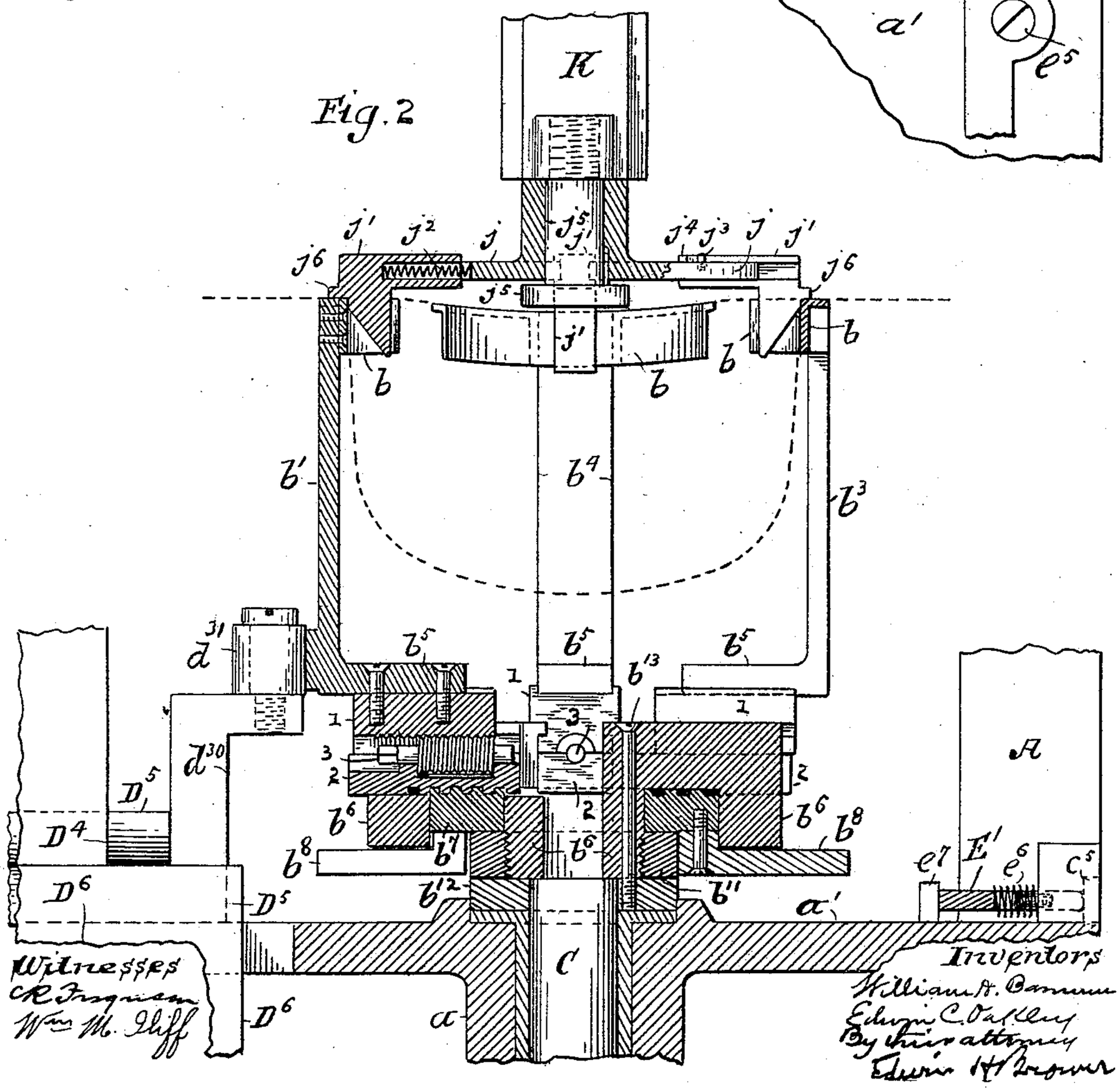

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Fig. 4

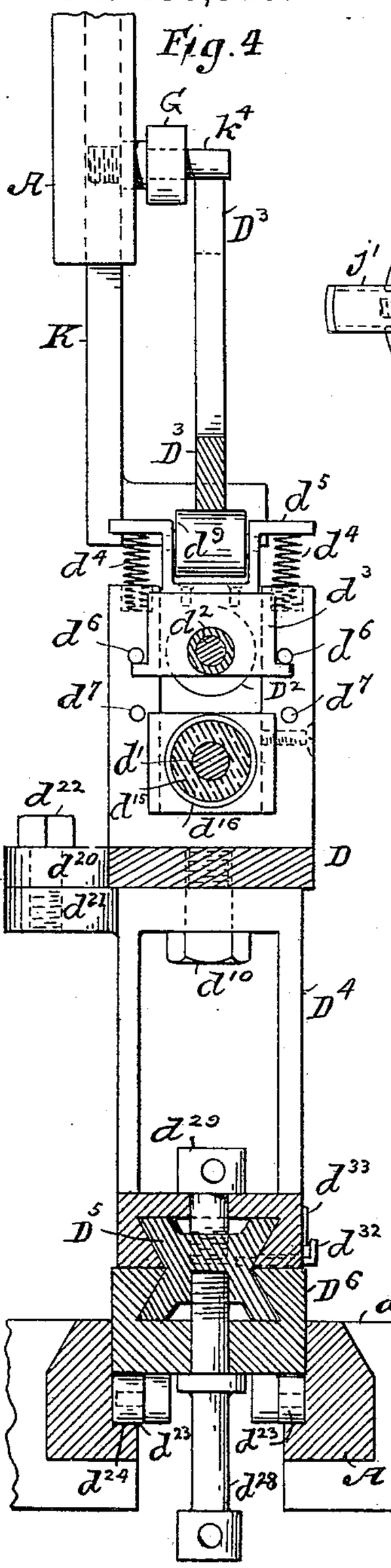


Fig. 6

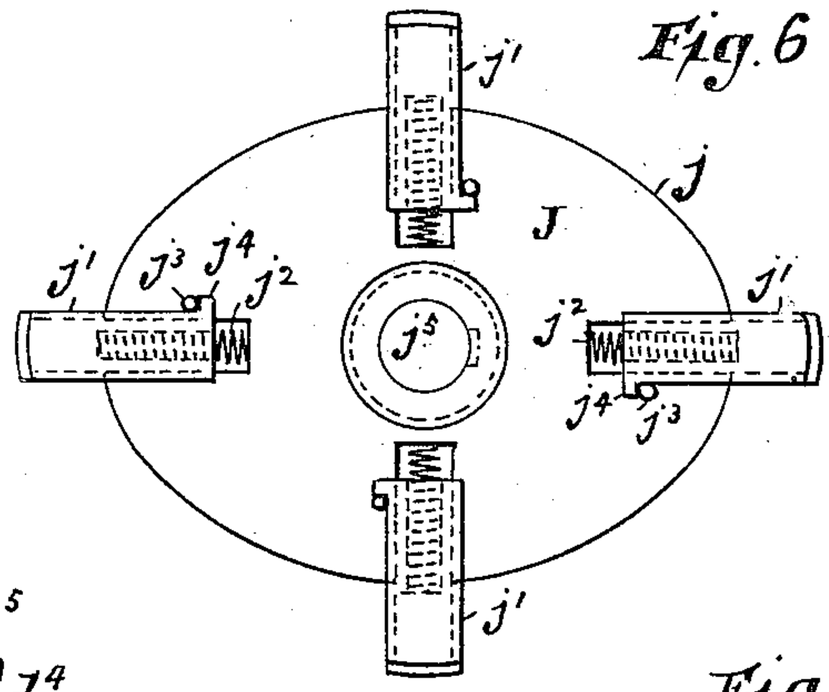
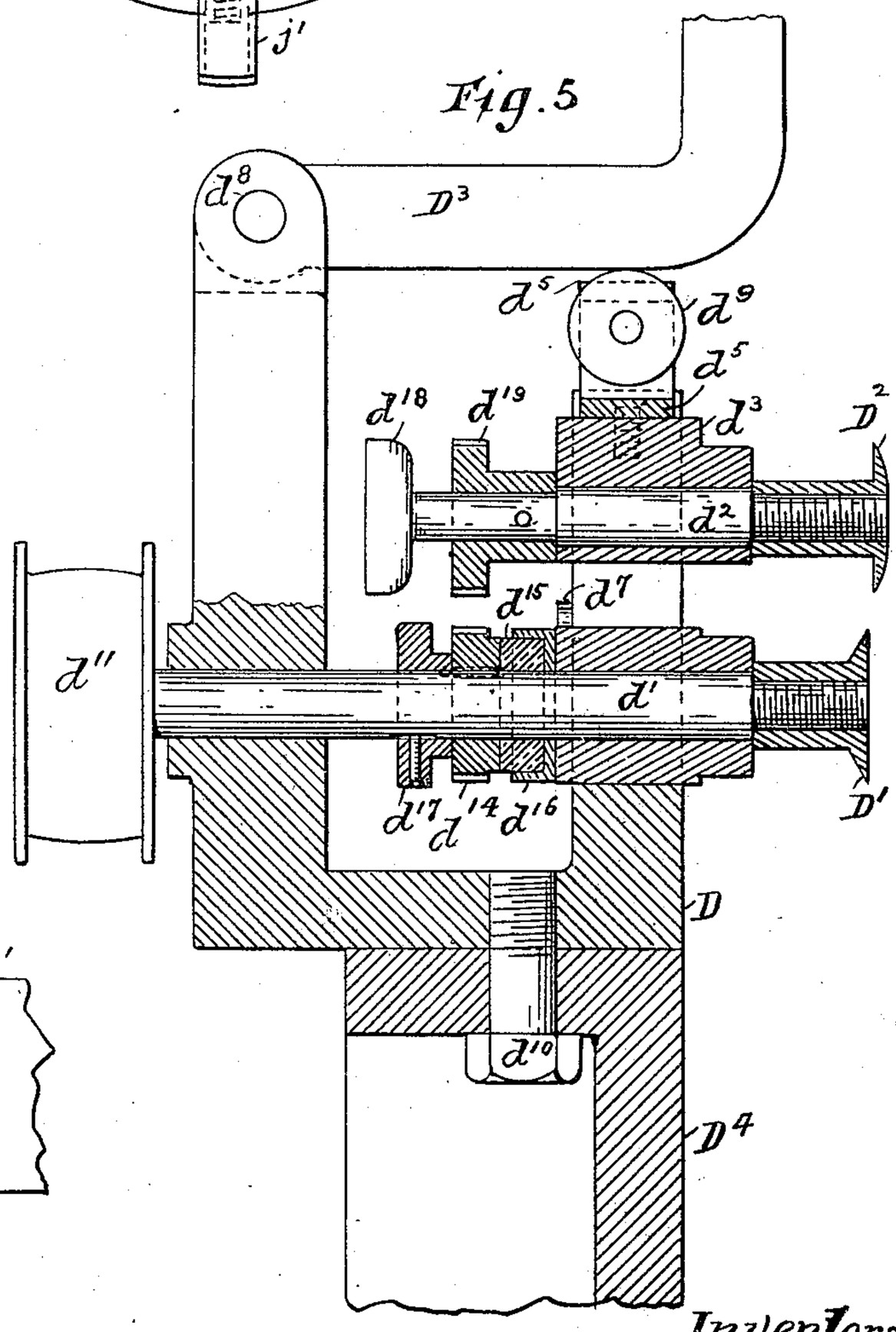


Fig. 5



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UNITED STATES PATENT OFFICE.

WILLIAM H. BARNUM, OF DANBURY, AND EDWIN C. OAKLEY, OF BETHEL, ASSIGNORS TO CHARLES H. MERRITT, OF DANBURY, CONNECTICUT.

HAT-TRIMMING MACHINE.

SPECIFICATION forming part of Letters Patent No. 450,986, dated April 21, 1891.

Application filed June 21, 1890. Serial No. 356,243. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM H. BARNUM, of Danbury, in the county of Fairfield and State of Connecticut, and EDWIN C. OAKLEY, of Bethel, in the county of Fairfield and State of Connecticut, have invented a certain new and useful Improvement in Hat-Trimming Machines, of which the following is a specification.

Our improvement relates to machines which are employed for trimming the brims of hats. These machines are commonly termed "rounding-jacks" or "hat-trimming" machines.

We will describe a machine embodying our improvement, and then point out the novel features in the claims.

In the accompanying drawings, Figure 1 is a sectional elevation of a machine embodying our improvement. Fig. 2 is a sectional elevation of the upper portion of the same on a larger scale, the section being taken as indicated by the dotted line $x\,x$, Fig. 3, and representing certain parts in different positions. Fig. 3 is a horizontal section of the machine, taken at the plane of the dotted line $y\,y$, Fig. 1. Fig. 4 is a vertical section taken at the plane of the dotted line $z\,z$, Fig. 1, and looking in the direction indicated by the arrow, which is marked at one end of said line. Fig. 5 is a vertical section, on a large scale, of the cutters and their appurtenances, besides certain adjacent portions of the machine. Fig. 6 is a top view of a hold-down or device for retaining the parts in position while being trimmed or rounded.

Similar letters of reference designate corresponding parts in all the figures.

A designates the frame of the machine. It may be of any suitable construction and made of any desirable material.

B designates a support for a hat-body to be trimmed. As here shown, this support consists of four arms $b'\ b^2\ b^3\ b^4$, which at the upper ends are provided with segmental plates b, which are adapted to together support a hat-body by fitting around the crown and affording a rest for that portion of the brim, which is immediately adjacent to the crown. It will be seen by reference to Fig. 3 that the segmental pieces of the arms $b'\ b^3$ are of a shorter or more abrupt curve than the segmental pieces of the arms $b^2\ b^4$, and that, therefore, these segmental pieces together conform quite well to the shape of an ordinary hat-body.

The arms $b'\ b^2\ b^3\ b^4$ are connected at the lower ends with blocks b^5, which are fitted in slideways formed in the block b^6, so as to be capable of moving toward and away from a common center. These blocks b^5 are severally made of two sections 1 and 2, the former of which is fitted to slide longitudinally upon the other. A screw 3 is combined with the two sections 1 2 of each block b^5. The construction of one of the blocks and the engagement of the screw with its two sections is well illustrated in Fig. 2. By thus forming the blocks of adjustable sections, we provide for setting the arms $b'\ b^2\ b^3\ b^4$ at different distances from the common center toward and away from which they may be adjusted by means of adjusting the blocks b^5, which carry them. All the blocks b^5 engage with a block b^7, which rotates about the common center relative to which the blocks are capable of adjustment, and is provided on its upper face with a scroll-shaped or spiral thread, which engages with threaded segments on the adjacent portions of the sections 2 of the blocks b^5, so that by rotating this block b^7 the blocks b^5 may together be adjusted outwardly or inwardly. Thus provision is afforded for adjusting the segmental pieces b to adapt them to hold hats of different sizes. If it should become desirable to adjust these segmental pieces for hats of different shape, the screws 3 of one or more of the blocks b^5 would have to be manipulated. As shown, the ends of the screws 3 are made of polygonal form, so that a wrench may be engaged with them when it is necessary to rotate them for the purpose of changing the relation between the sections of the blocks b^5, and to provide for an adjustment of the rotary block b^7. The latter is provided with a number of handles b^8, which extend downwardly from the block and thence radially outward. We prefer to provide the block with a number of these handles b^8, so that the blocks may be manipulated from a number of points in their circumference.

We prefer to combine with the body piece

or block b^6 and one of its blocks b^5 a scale and index, whereby the blocks b^5 can be adjusted to different sizes of hat-bodies and it may be determined whether hat-bodies subjected to treatment in the machine are of the standard size. We have shown a scale b^9 arranged on the upper side of the body piece or block b^6 and an index or pointer b^{10} fastened to the side of one of the blocks b^5 to travel over the scale, as may be best understood from Figs. 1 to 3. The body piece or block b^6 has a central hub projecting from its under side. A ring b^{11} is screwed upon the outside of this hub. Below this ring and the hub a ring b^{12} is arranged. This ring is secured by screws b^{13} with the body piece or block b^6, and hence is incapable of independent movement.

The ring b^{12} is to be connected to a shaft C. The shaft C therefore carries the hat-support, consisting of the segment-pieces b. It serves to rotate the hat-bodies in such a manner as to connect the brim requiring trimming to rotary cutters D′ D².

The shaft C is journaled in a bearing a provided in a cross-piece or bed a', which is comprised in the machine-frame A. It has affixed to its lower end a gear-wheel c, which meshes with a gear-wheel c' affixed to a stud c^2, which is supported by the frame A. A bevel gear-wheel c^3 is affixed to the gear-wheel c' and engages with a bevel gear-wheel c^4, which is loosely mounted upon shaft E.

The shaft E is secured in the frame A of the machine. It is not intended to rotate. On it are loosely mounted a fly-wheel e, a belt-pulley e', and a driving-belt pulley e^2. The fly-wheel and the two belt-pulleys are locked together by cross-pins which rotate in unison. The belt which is fitted to the driving-pulley e^2 transmits to the machine power from any source. The belt-pulley e' transmits power through a belt e^3 to a belt-pulley f, affixed to a counter-shaft F.

The machine is intended to cause but a single rotation of the hat-body and then stop. To enable it to do this we combine with the belt-pulley e^2 and the bevel gear-wheel c^4 a clutch, and also combine with the latter a stop whereby the operation of the machine will be terminated periodically. The clutch consists of a number of pins e^4, which are fitted in cavities formed in the driving-belt pulley e^2 in positions parallel with the axis of the latter. These pins e^4 are shouldered. Their larger ends project from the pulley e^2 toward the bevel gear-wheel c^4, while their smaller ends extend through the backs of the cavities in the pulley e^2, which accommodate them and are furnished beyond the back of said cavities with cross-pins, whereby they are prevented from becoming detached from the pulley. Coiled springs surrounding the smaller portions of the pins e^4 and within the cavities in the pulley e^2 tend to force the pins e^4 toward the bevel gear-wheel c^4. The bevel gear-wheel c^4 is provided with a cavity, in which a pin c^5 is fitted in a position parallel with the axis of the wheel and at such a distance from the axis that this pin may engage with one of the pins e^4 of the pulley e^2. The pin c^5 is forced toward the frame of the machine by means of a spring which is coiled around it and is designed to have a bearing at one end against the bevel-wheel c^4 and at the other end against a head with which the pin is provided.

In the machine-frame is a recess, into which the head of the pin c^5 may be forced by the spring. When the pin is forced into this recess, the gear-wheel c^4 will be locked to the frame and the machine stopped. Once in each rotation of the bevel gear-wheel this will occur. When the pin c^5 is moved longitudinally to disengage it from the frame A, it will project into the path of the pins e^4, and the first one of these pins e^4 which reaches it will transmit motion through it to the bevel gear-wheel c^4, and in this way the machine will operate. As soon as the pin c^5 comes opposite its recess in the frame it will move longitudinally out of engagement with that one of the pins e^4 with which it was previously engaged. Hence it will no longer be in condition to derive motion from the driving-belt pulley e^2, and will, moreover, be stopped by engagement with the frame A.

E′ is a lever fulcrumed at e^5 to the cross piece or bed a' of the machine-frame. At one end it is bent to extend into the recess which is provided in the machine-frame for the reception of the pin c^5. This end is moved outwardly away from the recess by a spring e^6, as far as it is permitted to move by a stop-pin e^7, which is inserted in the cross piece or bed a'. The other end of this lever is provided with a handle and extends into a position convenient for the operator of the machine. When this lever is oscillated against the resistance of the spring e^6, it may be made to force the pin c^5 out of its recess in the machine-frame A and into the path of one of the pins e^4. The advantage of providing a number of pins e^4 is so that the driving-pulley e^2 may more readily engage with the bevel gear-wheel c^4. A yielding connection between the pins e^4 and the driving-belt pulley e^2 is advantageous, because if the lever E′ should force the pin c^5 toward the driving-belt pulley e^2 when one of the pins e^4 happens to be opposite said pin c^5 breakage will be obviated by the longitudinal yielding of the pin e^4, and after that the next pin e^4 will engage with the pin c^5.

J designates a device termed a "hold-down," whose function is to secure a hat-body in the hat-holder B. This consists, essentially, of a body-piece j, which may advantageously be made of oval form and a number of adjustable arms j' fitted to said body. These arms j' are fitted into radial notches in the body j and provided with sockets in which helical springs j^2 are arranged. These springs bear at one end against the extremities of the sockets of the arms j' and at the other end against the backs of the notches in the

body j; hence they tend to force the arms outward. Stop-pins j^3, inserted in the body and in position to cross lugs j^4, with which the arms at their inner ends are provided, limit the outward movement of the arms. This hold-down J is fitted to a stud j^5, which is secured to a slide K. The slide K works vertically in the slideway formed in the machine-frame. When it is lowered, the hold-down is brought into contact with a hat-body in the hat-holder and serves to secure it in place. The arms j' at their outer ends have downward extensions, which are inclined at their lower extremities, so that when they are lowered they may wedge themselves into a hat-body. Above the inclines are lugs j^6, which will bear against that portion of the brim of a hat-body which is contiguous to the crown. It will be readily understood that the hold-down acts with a yielding pressure to clamp a hat-body in the hat-holder. When the hold-down has secured a hat-body in the holder, it may rotate with the hat-holder and hat-body by turning about the stud j^5.

The slide K is counterbalanced. In the present instance its counter-balance consists of a weight k, attached to one end of a cord or like device k', which passes around guide-pulleys k^2 k^3, which are mounted upon the machine-frame and is fastened to the slide K. The upward movement of the slide under the influence of the counter-balance is limited by a stop-pin k^{10}, inserted in the machine-frame.

The lever G, previously mentioned, is longitudinally slotted near one end to receive a pin k^4, extending horizontally from the slide K. A cord, chain, or like device g is connected to the lever G, passes thence around guide-pulleys g' g^2 g^3 g^4, mounted on studs supported by the machine-frame, and is fastened to a treadle or lever L, which is fulcrumed to the machine-frame by a pin l. The end of the lever G, which is connected to the slide K, projects so far forward or to one side of the slide K that in descending it will impinge against the lever D^3 and move the latter downward.

The attendant of the machine will, after inserting a hat-body in the holder B, depress the treadle L, and so lower the hold-down J and the upper cutter D^2. Having done this, he will manipulate the lever E' so as to unlock the bevel gear-wheel c^4 from the machine-frame and interlock it with the driving-belt pulley e^2. This will cause the hat-holder to make one complete rotation and at the end of its rotation the machine will automatically come to rest. If then the attendant releases the pressure upon the hold-down, the latter will rise.

Having now described the adjustability of the holder for the hat-bodies and the means of rotating the same, we will take up the cutters D' D^2. These are supported in a frame D. The lower cutter D' is mounted upon a shaft d', which is journaled in a fixed position in the frame D. The upper cutter D^2 is mounted upon a shaft d^2, which is journaled in a bearing-box d^3, which is capable of sliding vertically in one of the arms of the frame D. Springs d^4, located between the upper extremities of the arm just mentioned and laterally-extending lugs d^5, with which the bearing-box for the shaft d^2 is provided, move the bearing-box upwardly when this is possible and hold it and the shaft d^2 in an elevated position with the cutter D^2 out of operation. Pins d^6 limit the upward movement of the bearing-box d^3 and pins d^7 limit its downward movement. It is depressed by a lever D^3, which is fulcrumed by a pin d^8 to one of the arms of the frame D and extends thence over the top of the bearing-box d^3. Preferably a roller d^9 will be journaled to the bearing-box beneath the lever D^3. The lever D^3 is swung downwardly by a lever G, presently to be described. It will be swung upward by the springs d^4. The frame D is pivotally connected by a pin or screw d^{10} to a slide-piece D^4. Hence it may be rotated or oscillated at any time upon this pin d^{10} as a center to swing the cutters D' D^2 and the lever D^3 out of an operative position. We have shown a screw-pin d^{10}, and this is advantageous because it may be made to clamp the frame D in any position to insure the stability of the frame D. When in its operative position, we may provide it and the slide-piece D^4 with lugs d^{20} d^{21} and fit a screw d^{22} into the same.

The shaft d' of the lower cutter D' has affixed to it a belt-pulley d^{11}. A belt d^{12} passes around the same and also around a pulley d^{13}, which is made sufficiently wide to permit of the travel of the belt in the direction of its axis to allow of adjusting the cutters nearer to or farther from the hat-holder. The pulley d^{13} is on the counter-shaft F, previously referred to, and therefore is continuously driven from the belt-pulley e'.

On the shaft d' of the lower cutter a gear-wheel d^{14} is affixed. This wheel engages with a gear-wheel d^{19}, which is affixed to the shaft d^2 of the upper cutter. Consequently when the shaft d^2 is lowered to adjust the upper cutter to an operative position the shaft d^2 of this cutter will be rotated.

To provide for securing a proper alignment of the cutters, we support the shaft d' so that it can have a longitudinal adjustment. Its movement is precluded in one direction by the impingement of the inner end of the body of the cutter against the bearing-box in which the outer end of the shaft is journaled. Its movement in the other direction is resisted by means of a spring d^{15}. This spring is shown as consisting of a block of india-rubber fitted in a box d^{16}, which abuts against one end of the bearing-box last mentioned. The gear-wheel d^{14} is secured to the shaft d' just in rear of the spring d^{15}. Obviously the shaft d' may move longitudinally in one di-

rection by pressing the spring and will be moved in the reverse direction by the action of the spring.

Affixed to the shaft d' of the lower cutter is a disk d^{17}, and on the shaft d^2 of the upper cutter is affixed a cam d^{18}, which has a rounded surface that is adapted on the descent of the shaft d^2 to contact with the disk d^{17} to force the shaft d' forwardly, or, in other words, toward the hat-holder. By this combination of parts we provide for adjusting the cutters into proper relation with each other during the time they are used.

The slide D^4 is fitted to a slide D^5 and the slide D^5 is fitted to a slide D^6. Each one of these slides is capable of movement toward and from the hat-holder. The slide D^5 is also capable of movement in these directions independently of the slide D^6, and the slide D^4 is capable of a similar movement independently of the slide D^5, as well as of the slide D^6. The slide D^6 has a horizontally-extending portion and a downwardly-extending portion. The horizontally-extending portion is provided on the under side with rollers d^{23}, which are fitted to studs extending from lugs formed with the slide and travel along rails or ledges d^{24}, with which the machine-frame is provided.

The downwardly-extending portion of the slide D^6 is preferably provided with a roller d^{25}, which bears against a cam H. This cam may advantageonsly be made of wood. It is mounted upon a shaft I, which is arranged in line with the shaft C and derives rotary motion from the latter. The cam H is to have the same outline as that to which the brims of hat-bodies are to be trimmed, although it need not be of the same size as the edge of the brims when trimmed. As this cam rotates it moves the slide D^6, and consequently the slides D^5 D^4 and cutter-carrying frame D relatively to the center of the hat-holder. As shown, it only moves these parts outwardly, and a spring D^7, which, as here shown, acts against the slide D^6 and moves them inwardly. This spring, as shown, at one end surrounds a pin that projects outwardly from the horizontal portion of the slide D^6 and extends into a pocket d^{26}, with which the machine-frame is provided. The spring bears against a plate which is attached to a screw d^{27}, that is longitudinally adjustable in the pocket. Hence by manipulating this screw the tension of the spring may be varied. The pocket, as here shown, is made integral with a bracket, which is fastened to the machine-frame.

Obviously different hat-bodies will require cams H of different shape, and owing to this we provide for readily substituting one such cam for another. A simple way of affording this provision consists in constructing the upper end of the shaft I to interlock with the lower end of the shaft C, and so supporting the shaft I that it may be moved vertically to disengage it from and re-engage it with the shaft C. The shaft I has its upper end made polygonal, and the shaft C is provided with a socket capable of engaging with the polygonal end of the shaft I. This socket is not in the present instance formed in the shaft C, but consists of a collar C', which is attached to the shaft C. This collar is shown as fastened to the shaft C indirectly by being secured through the agency of screws to the gear-wheel c, which is secured to the said shaft.

The shaft I is supported in a bearing I', which is provided in a cross-piece of the machine-frame, and at the lower extremity has a step-bearing in a sleeve I^2, that is pivotally connected by a pin i with a lever I^3. This lever I^3 is fulcrumed by a pin i' to a bracket i^2, secured to a cross-piece of the machine-frame. Between the ends it is slitted or bifurcated to embrace the sleeve I^2, and this portion is connected by the pin i to said sleeve. The other end of the lever I^3 has a handle, whereby it may be swung up and down to raise and lower the shaft I. This end of the lever may by a slight lateral movement be engaged with and disengaged from a hook i^3, which is fastened to the machine-frame. When the lever is engaged with this hook, it will support the shaft I in a position to maintain engagement with the shaft C. After the disengagement of the lever from the hook the lever may be lowered to disengage the shaft I from the shaft C. After this the cam H may be lifted off the polygonal end of the shaft I, with which it interlocks, and it may be replaced by a different cam, after which the shaft I will be elevated again to engage with the shaft C.

The slide D^5 is preferably made to form a double dovetail to engage with both the slide D^6 and the slide D^4. A screw d^{28} passes through a slot that extends lengthwise of the horizontal portion of the slide D^6 and engages with a tapped hole in the slide D^5. This screw is provided with a collar of sufficient size to extend across the said slide. Hence by turning the screw it may be made to clamp the slides D^5 D^6 together.

The slide D^4 has a horizontal portion, which is provided with a slot that is elongated toward the hat-holder. Through this slot passes a screw d^{29}, which engages with a tapped hole in the slide D^5. The screw d^{29} has a head which bridges across the said slot. Hence by turning the screw the slides D^4 D^5 may be clamped together.

The slide D^5 is provided with an arm d^{30}, which is preferably furnished with an antifriction roller d^{31}. Normally the arms b' b^2 b^3 b^4 of the hat-holder occupy such positions that the arms b' will be opposite the roller d^{31} of the slide D^5. When the arms of the hat-holder are adjusted, the arm b' will therefore adjust the slide D^5 to the proper position to suit the size of hat-body for which the adjustment of the hat-holder was made. This adjustment would adjust the cutters properly if the hat-bodies of the size for which the adjustment

of the holder was made had to be trimmed to project the same extent from the hat-body. If, however, the brims of the hat-bodies were trimmed so as to be broader or narrower, an adjustment of the slide D^4 relatively to the slide D^5 would have to be made. To facilitate this adjustment for the projection of a brim of any desired width, we preferably combine with the slides D^4 D^5 a scale and index d^{32}. The scale is here shown as fastened to the slide D^4 and the index is made in the form of a rod screwed into the slide D^5 and working through a notch in one edge of the slide D^4.

It is obvious that the outward movement of the slide D^5 is produced by the scroll or cam b^7, whereby the corresponding movement of the hat-holder arms is produced, and that the reverse movement of said slide is produced by the spring D^7.

An adjustment between the slides D^6 D^5 provides for the use of a cam of a different shape as distinguished from one merely of a larger size, corresponding to the size to which the hat-holder was adjusted.

M designates a chalk-holder. As here shown, it consists of a lever fulcrumed by a pin m to the machine-frame and having a socket m', which holds a piece of chalk. By oscillating the lever the chalk may be brought in contact with the under side of the brim of a hat-body. The socket for the chalk has preferably combined with it a screw m^3, which may serve to cause the chalk to project more or less. Normally the lever of the chalk-holder rests upon a stop-pin m^2. The socket m' of the chalk-holder is shown as formed with a plate m^4, which has a sliding connection with the lever M. In this way the chalk may be adjusted to act on the brim nearer to or farther from the crown. If the cross-pin m^2 were elevated a little, so as to move the lever M into a horizontal position, the sliding section m^4 could be moved lengthwise to mark upon the lower end of the under side of the brim without any operation of the lever M. In this case the lever would have to be shortened at the end which is the nearer to the hat-holder, so as to allow of the adjustment of the chalk beyond the circumference of the brim.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. In a hat-trimming machine, the combination, with a number of arms provided with segmental pieces forming a hat-holder, of a scroll-cam for adjusting said arms toward and from a common center, and a device for causing an adjustment of the arms independent of the scroll-cam, substantially as specified.

2. In a hat-trimming machine, the combination, with a number of arms provided with segmental pieces forming a hat-holder, of a scroll-cam for adjusting said arms toward and from a common center, and a number of blocks severally composed of two sections, one of the sections of each block supporting one of the arms, the said scroll-cam operating upon the other sections of each of the blocks, and an adjusting device for each block intermediate of its two sections, substantially as specified.

3. In a hat-trimming machine, the combination, with a number of arms provided with segmental pieces forming a hat-holder, of a scroll-cam for adjusting said arms toward and from a common center, a number of blocks severally composed of two sections, one of the sections of each block supporting one of the arms, the said scroll-cam operating upon the other sections of each of the blocks, and an screw for each block intermediate of its two sections, substantially as specified.

4. In a hat-trimming machine, the combination of the arms b' b^2 b^3 b^4, the blocks composed of sections 1 2, the screws 3, the scroll b^7, and the handle b^8, substantially as specified.

5. In a hat-trimming machine, the combination of a hat-holder comprising a number of arms, a scroll-cam for adjusting these arms, a cutter, and a support for the cutter movable toward and from the hat-holder, said cutter-support being moved in one direction by the said scroll-cam during the adjustment of the arms, and mechanism, substantially such as described, for moving the support in the opposite direction, substantially as specified.

6. In a hat-trimming machine, the combination of a hat-holder comprising a number of arms, a scroll-cam for adjusting these arms, a cutter, a support for the cutter movable toward and from the hat-holder, said cutter-support being moved in one direction by the said scroll-cam during the adjustment of the arms, a spring for moving the cutter-support in the other direction, and mechanism, substantially such as described, intermediate of the scroll-cam and holder, substantially as specified.

7. In a hat-trimming machine, the combination of a hat-holder comprising arms b' b^2 b^3 b^4, a cutter, a support for the cutter movable toward and from the hat-holder, an arm extending from the cutter-support, a projection on the arm b' of the hat-holder coacting with the arm of the cutter-support, and a scroll-cam for adjusting the arms of the hat-holder and during the adjustment of these arms imparting motion to the cutter-support through one of said arms, substantially as specified.

8. In a hat-trimming machine, the combination of a hat-holder, a pair of cutters, one of which is movable vertically toward and from the other, the other having a longitudinal movement, springs for raising the vertically-movable cutter, a foot-lever, and intermediate mechanism for moving the vertically-movable cutter toward the other, substantially as specified.

9. In a hat-trimming machine, the combination of a hat-holder, a vertically-movable cutter, a cam on the shaft of said cutter, a lever for causing the downward movement of the cutter, another cutter mounted on a longitudinally-movable shaft, and a disk on the longitudinally-movable shaft, the said cam

and disk contacting and operating to adjust the lower cutter when the upper cutter is depressed, substantially as specified.

10. In a hat-trimming machine, the combination of a hat-holder, a pair of cutters, one of which is movable toward and from the other, shafts supporting said cutters, gear-wheels on said shafts, a bearing for one of the cutter-shafts providing for a longitudinal movement of said shaft, a spring for moving this shaft in one direction, and a cam and disk on the two cutter-shafts for shifting the longitudinally-movable cutter-shaft against the resistance of its spring to move the cutters into proper alignment, substantially as specified.

11. In a hat-trimming machine, the combination of a hat-holder, a pair of cutters D′ D², cutter-shafts d' d^2, a bearing-box d^3 for the cutter-shafts d^2, capable of rising and falling, a bearing-box for the cutter-shaft d', which permits of a longitudinal movement of this shaft, a spring d^{15} for moving the cutter-shaft d' in one direction, and a cam d^{18} and disk d^{17}, which upon the lowering of the cutter-shaft d^2 will coact to produce a proper alignment of the cutters, substantially as specified.

12. In a hat-trimming machine, the combination of a cutter, a hat-holder, a shaft for rotating the hat-holder, a gear-wheel c^4, geared to said shaft, a belt-pulley e^2, pins e^4 c^5, having yielding connections with the said pulley and gear-wheel, a machine-frame constructed with a recess for the pin c^5, and a lever for moving the pin c^5 out of its recess in the machine-frame and into the path of said pin e^4, substantially as specified.

13. In a hat-trimming machine, the combination of a hat-holder and a hold-down consisting of a body connected with a stud to rotate about the same and provided with radial guides, and a number of arms fitted to said guides and having sockets for receiving springs which at one end bear against the guides of the body, substantially as specified.

14. In a hat-trimming machine, the combination of a hat-holder and a hold-down consisting of a body connected with a stud to rotate about the same and provided with radial guides, and a number of arms fitted to said guides and having sockets for receiving springs which at one end bear against the guides of the body, said arms having outwardly-inclined lower extremities, substantially as specified.

15. In a hat-trimming machine, the combination of a hat-holder and a hold-down consisting of a body connected with a stud to rotate about the same, and a number of radially-adjustable arms having downward projections inclined on the outer side and having flanges above said inclines, substantially as specified.

16. In a hat-trimming machine, the combination of a hold-down, a vertically-movable slide supporting the same, a counter-balance for the slide and hold-down, a lever for depressing the slide, a vertically-movable cutter, and a lever for lowering said cutter and extending into the path of the lever for lowering the slide, so as to receive motion from the latter, substantially as specified.

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