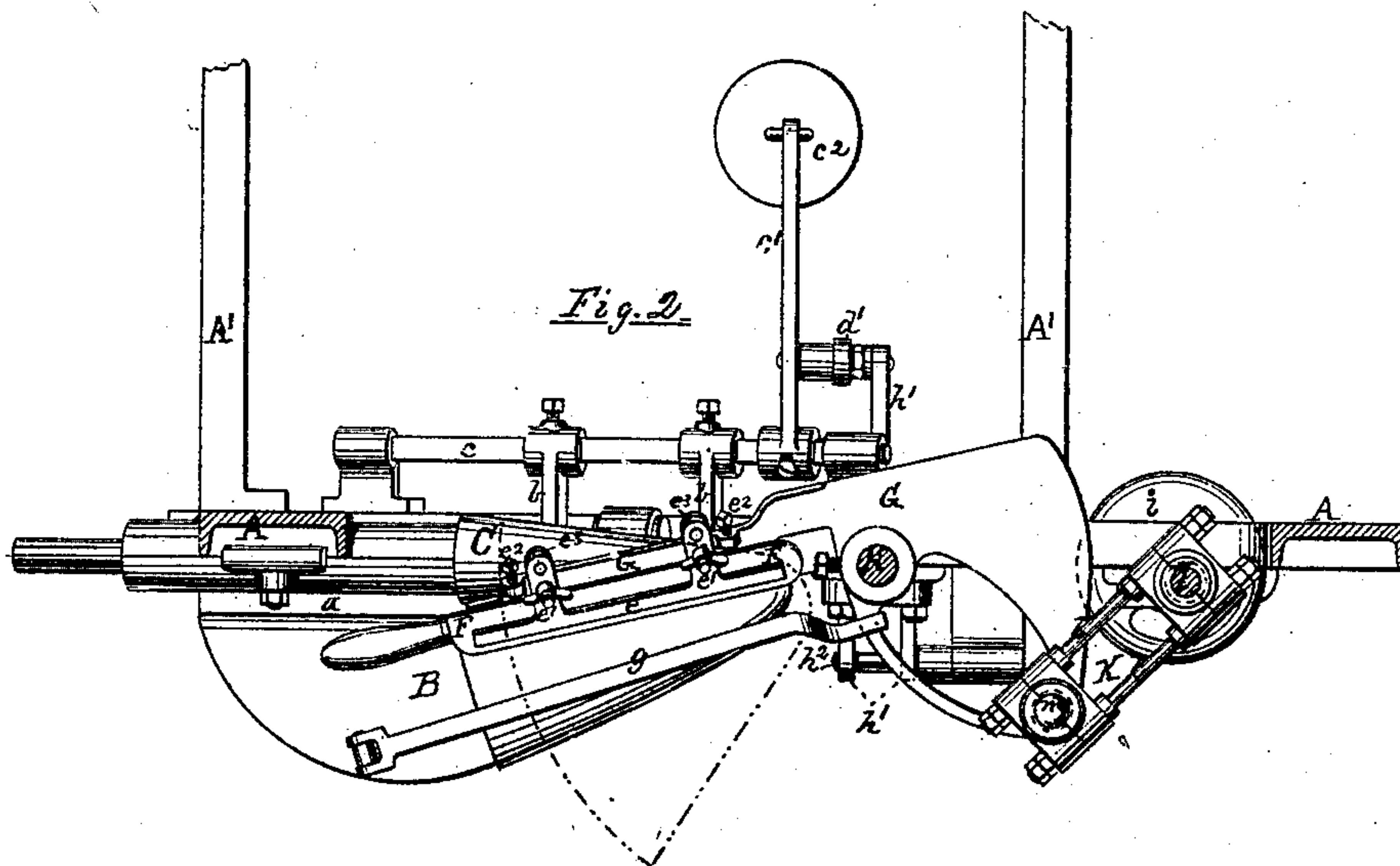
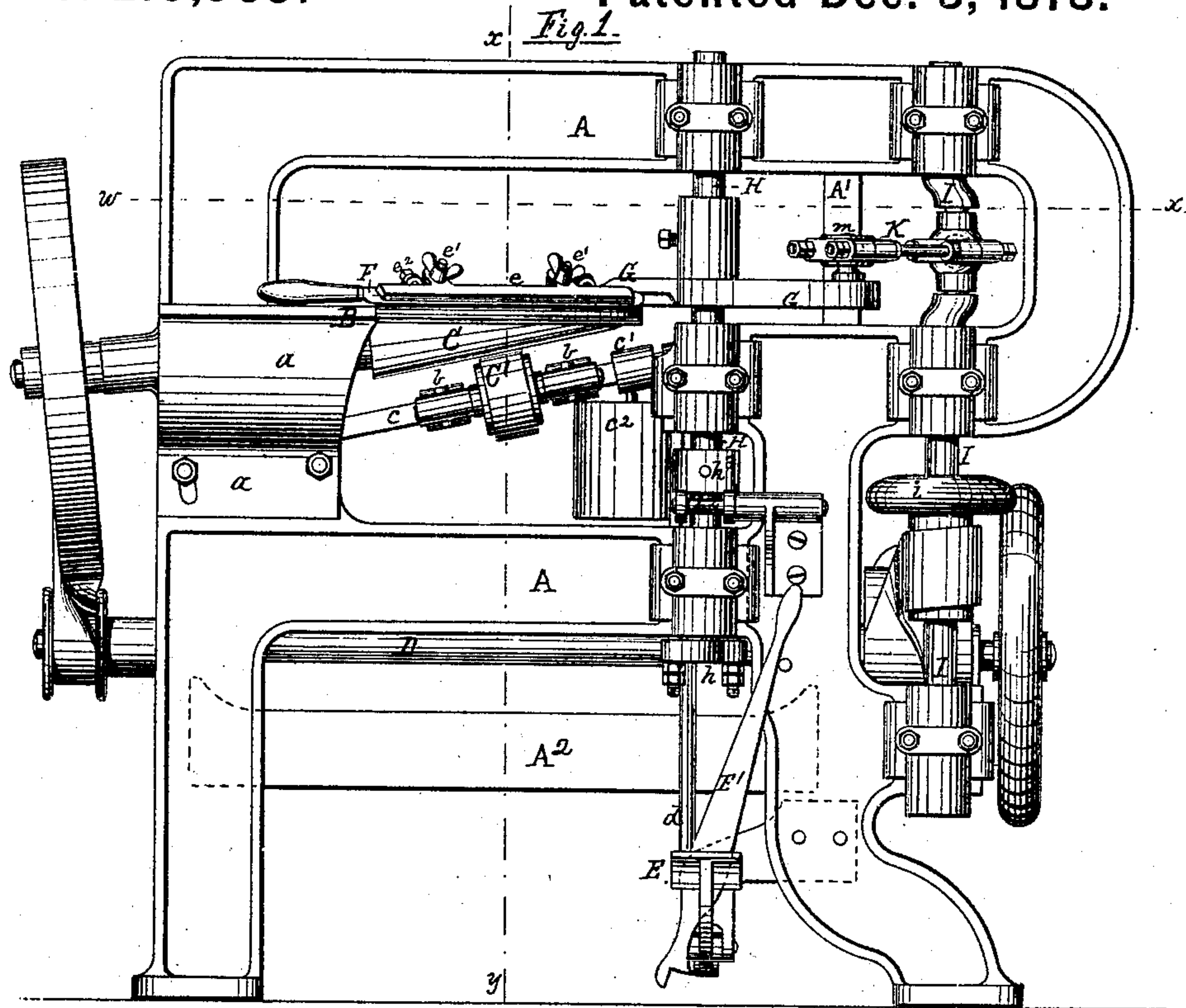


R. EICKEMEYER.
Hat-Shaving Machine.
No. 210,509. Patented Dec. 3, 1878.



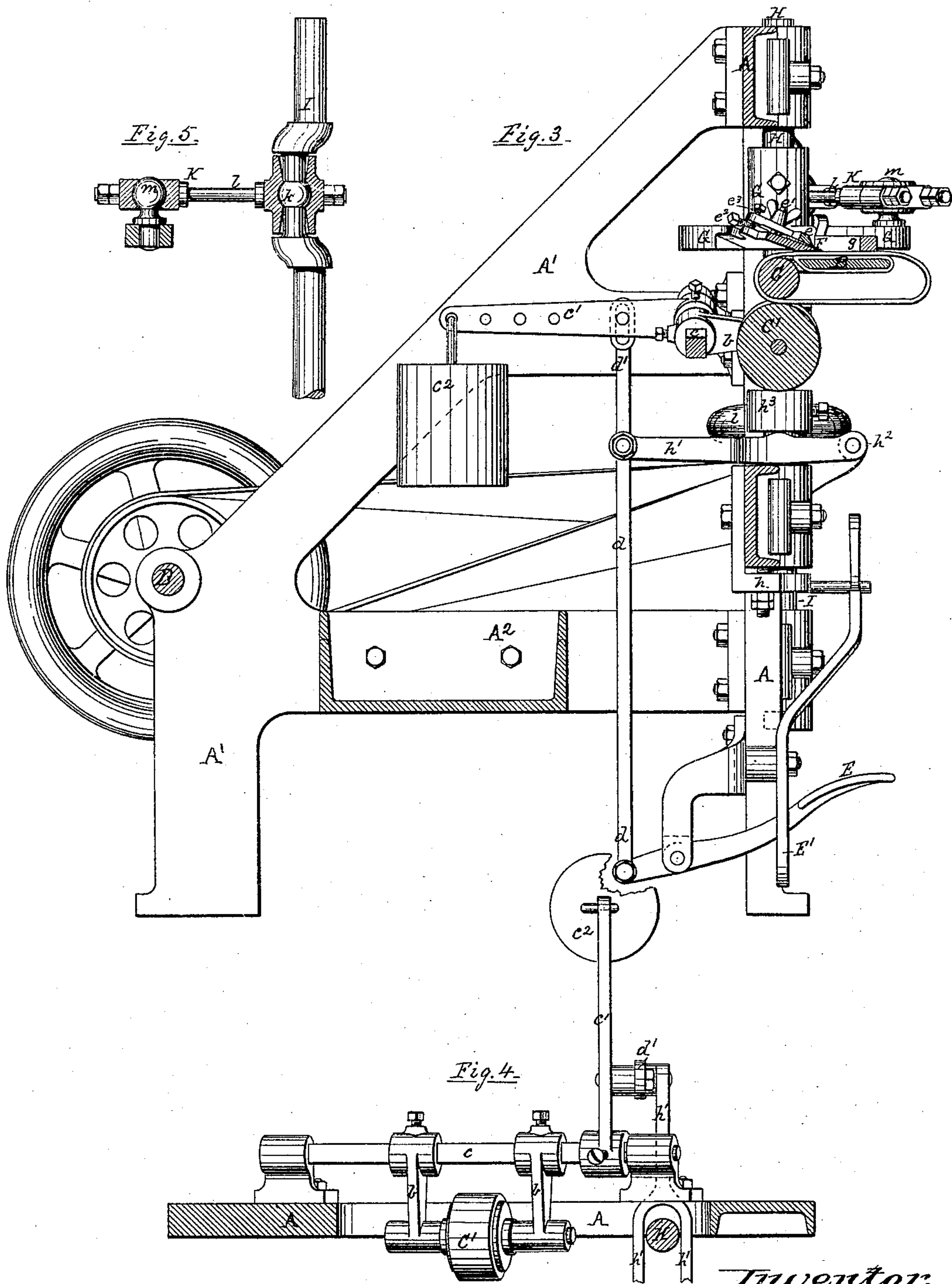
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By *Wm. C. Wood* Atty.

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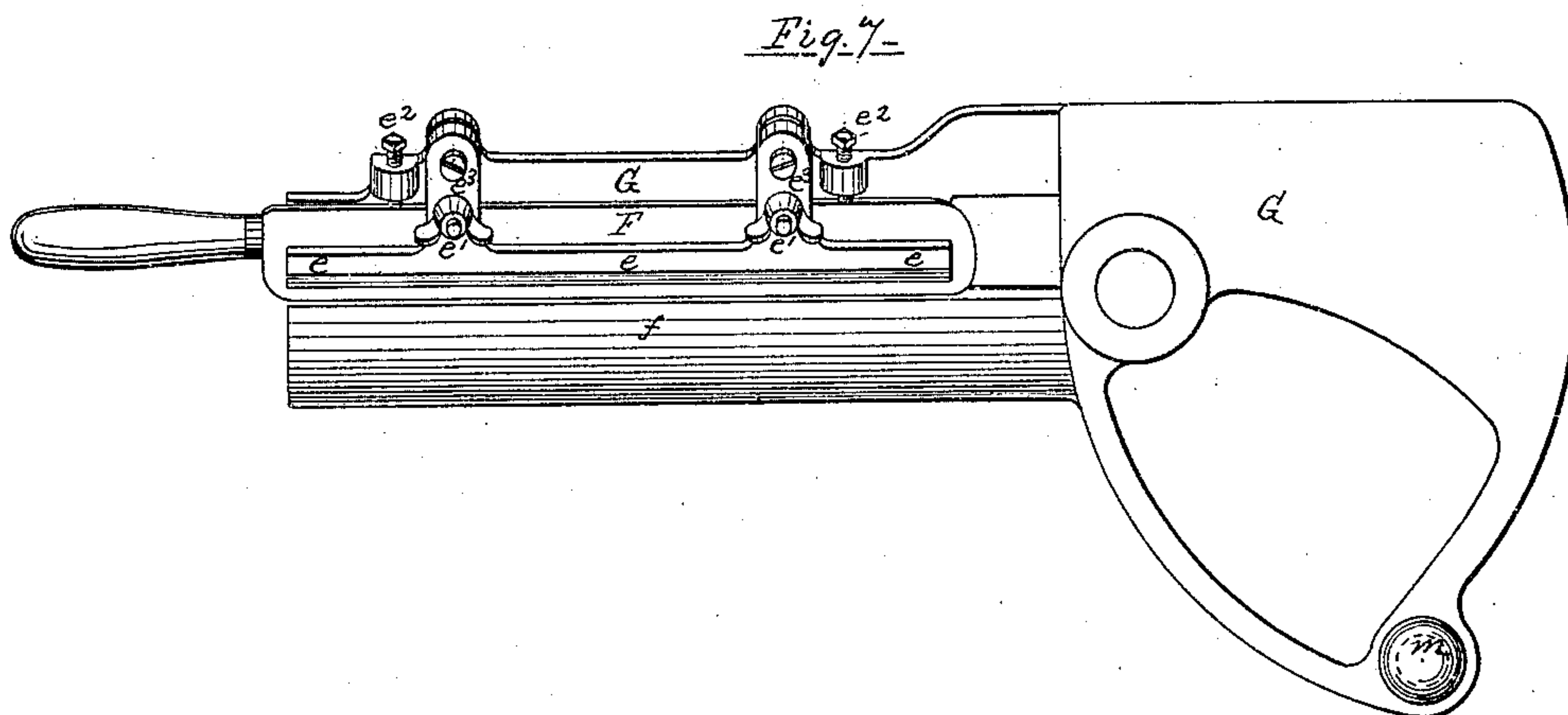
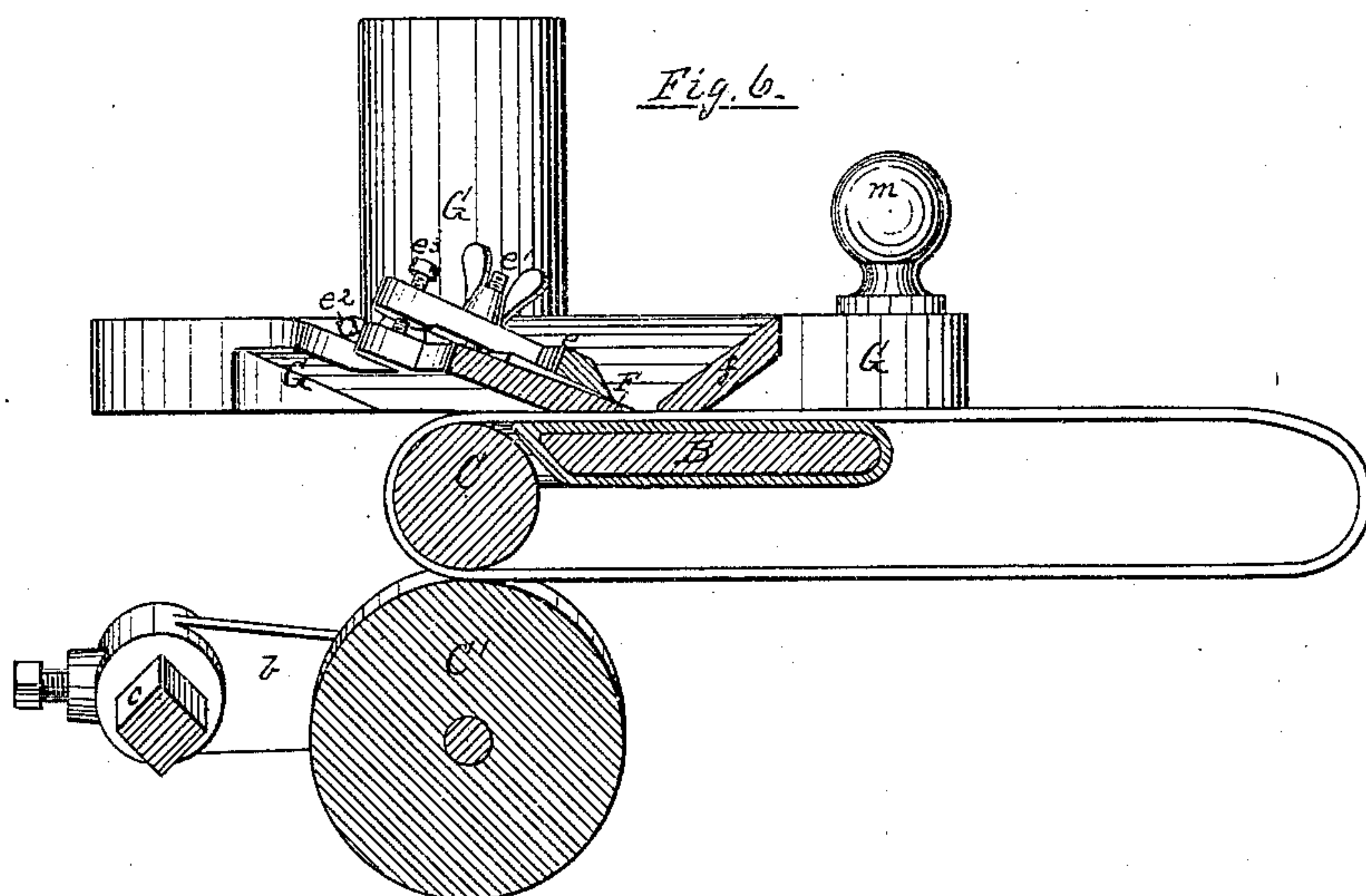
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UNITED STATES PATENT OFFICE.

RUDOLF EICKEMEYER, OF YONKERS, NEW YORK.

IMPROVEMENT IN HAT-SHAVING MACHINES.

Specification forming part of Letters Patent No. **210,509**, dated December 3, 1878; application filed November 16, 1878.

To all whom it may concern:

Be it known that I, RUDOLF EICKEMEYER, of Yonkers, in the county of Westchester and State of New York, have invented a certain new and useful Hat-Shaving Machine; and I do hereby declare that the following specification, taken in connection with the drawings furnished and forming a part thereof, is a clear, true, and complete description of my invention.

The prime object of my invention is to perform by machinery the operation of "shaving" felted hat-bodies composed wholly or in part of fur. The fur used for hats contains more or less long coarse hair, which does not incorporate with the fur in felting, but works outward, and much of it adheres to and projects from both surfaces of the hat-body. The hair inside the body need not be disturbed, but no desirable exterior finish can be subsequently attained without the removal of the outer hair. Heretofore this hair has been removed by means of a knife in the hand of a workman, and because of this use of a knife the operation has been termed "shaving," although, in fact, no shaving is done, because the hairs are seldom, if ever, cut, but are bodily pulled and scraped from the felt. Should the coarse hair be cut at the surface of the felt, the stubble would deprive the hat of that delicate soft finish so desirable in fur goods.

In my machine I employ a rapidly-vibrating sharp knife, but its edge engages with the hair and pulls it from the hat-body when employed for the particular purpose intended. From the fact, however, that the reciprocating knife may be made to actually shave or shear to any desired extent into a felted hat-body or hat, it is obvious that my machine may be applied to that purpose with results approximating more or less closely to those heretofore attained with well-known pouncing mechanism upon flat or straight surfaced felt.

In my machine I employ a supporting-bed, arranged to occupy the interior of a hat-body, and a reciprocating knife, by which the shearing operation may be performed if the hat-body be moved by hand or otherwise, and this combination constitutes the main feature of my invention.

For readily applying the hat between the bed and knife, they are so constructed as to be capable of separation, and this may be accomplished by having either or both capable of movement away from each other, and this construction constitutes another feature of my invention.

For properly operating upon hat-bodies of various thicknesses, another portion of my invention consists in the adjustability of the knife with reference to the bed; and another part of my invention consists in the particular means of adjustment employed, the same being a knife-frame mounted on a spindle provided with a vertically-adjustable step-bearing.

For securing proper operation of the knife on a hat-body of irregular thickness, the bed is clad with an elastic or yielding material, and the same constitutes another feature of my invention.

For automatically presenting the surface of the hat-body progressively to the edge of the knife, my invention further consists in the combination, with a supporting-bed and a vibrating knife, of feeding mechanism, whereby the hat-body is rotated while partially flat-wise upon the bed, and, still further, in the combination, with the bed and knife, of a driven conical roller and a feed-wheel, these latter constituting a desirable feeding mechanism.

In order that the feed-wheel may co-operate with a conical roller in rotating hat-bodies of different sizes, my invention further consists in a feed-wheel which is adjustable longitudinally with reference to the conical roll, it being desirable that the feed-wheel engage with the hat-body and adjacent to its open end.

For rendering the feed-wheel variable in its capacity to engage with a hat-body in rotating it, said wheel is controlled by a weighted lever, and this feature, in proper combination, constitutes another portion of my invention.

For affording a wide space between the feed-wheel and conical roll, whereby a hat-body may be readily put upon the bed, another portion of my invention consists in a feed-wheel controlled by a treadle, and, still further, in the combination therewith of a stop-lever, whereby, when the feed-wheel has been swung

away from the conical roll, it may be retained in that position.

For properly controlling and adjusting the knife, my invention further consists in the combination therewith of a knife-frame, a clamping-bar, and adjusting-screws.

For obviating such jar, shock, and undue vibration as would be liable to cause injury to a hat-body by a knife not evenly and smoothly vibrated, my invention further consists in the combination, with the knife, of a knife-frame, pivoted and balance-weighted on each side thereof, and a crank-shaft connected with the knife-frame and balance-weighted.

For conveniently lifting the knife and frame from the bed, my invention further consists in the combination, with said knife-frame and its spindle, of a treadle, by which the knife, its frame and spindle are lifted, and, still further, in combining therewith a stop-lever.

For first lifting the knife-frame, and then controlling the feed-wheel after a hat has been "shaved," and also for starting the feed before the knife is located in an operative position, my invention further consists in the combination, with the feed-wheel and the vibrating knife-frame, of a treadle common to both, which, on being depressed, first lifts the knife-frame and then swings the feed-wheel, and when allowed to rise first places the feed-wheel and then the knife into operative positions.

The knife-frame being frequently lifted, it is desirable that it should not interfere with its vibratory movement; and another feature of my invention consists in the combination, with the knife-frame and crank-shaft, of a link, provided with flexible connections, which permit the free vertical movement of the knife-frame without any corresponding movement of the crank-shaft.

For smoothing the hat-body on the bed, as it is fed toward the knife, my invention further consists in the combination, with the bed, of a drag-bar, which rests longitudinally upon the hat-body.

For preventing the knife from cutting into the felt, my invention further consists in the combination, with the knife and its frame, of a knife-guard, located in front of the knife parallel with its edge, and mounted on or forming a part of the knife-frame. This guard at its thin edge so acts upon the hair during the backward movement of the knife as to render it more readily accessible to the knife during its forward movement, and, although it also performs a smoothing function, it may be used with or without the drag-bar previously mentioned.

To more particularly describe my invention, I will refer to the accompanying three sheets of drawings, in which—

Figure 1, Sheet 1, is a front elevation of a machine embodying the several features of my invention. Fig. 2, Sheet 1, is a top view of the front portion of the machine, which is also partially in section on line *w x*, Fig. 1.

Fig. 3, Sheet 2, is a vertical sectional view on line *x y*, Fig. 1, on an enlarged scale. Fig. 4, Sheet 2, is a top view of the feeding mechanism, its weight, and levers as connected to the front plate of the frame, which is partially shown, in section. Fig. 5, Sheet 2, represents a portion of the crank-shaft, connecting-link, and knife-frame, the two latter in section. Fig. 6, Sheet 3, represents, on an enlarged scale, in section, a knife-frame, bed-plate, and feed-rolls, with a hat-body in position to be sheared. Fig. 7, Sheet 3, is a top view of the knife-frame shown in Fig. 6.

The frame of the machine is composed of three skeletonized cast-metal plates. The front frame-plate, *A*, is of such form as to afford the requisite mountings for the mechanism, and the side plates *A*¹ are united by a wide tie-brace, *A*², centrally located.

The bed *B*, on which a hat-body is supported, is mounted on the face of the front plate, at one side thereof, and provided with a bracket, *a*, having screw-bolts, by which it is secured to the frame, and one of its bolt-holes is slotted, so as to admit of an inclined longitudinal adjustment of the bed. The supporting-bed is a thin rigid plate, converging in its edge outline to a well-rounded point, so that when it occupies the interior of a hat-body the latter will be flatly supported to the extent of its length and the width of the bed-plate.

For affording a yielding surface, I prefer that the upper surface of the bed be clad with some elastic material; and I have found that smooth fur-felt is well suited for this purpose. The felt covering also affords sufficient friction to prevent any movement of the hat-body by the knife.

It is desirable that the hat-body be automatically rotated while on the plate, and I therefore provide a feed-motion to progressively feed the entire surface of the body. A number of well-known feed-motions in hat machinery may be employed with good results; but I have devised mechanism for this purpose, which consists of a conical roll, at and below the rear edge of the bed-plate, and a compressing feed-wheel, which co-operates therewith upon a hat-body interposed between them.

The conical roll *C* is mounted in bearings on the front plate, and so inclined that the upper surface of the roll is parallel with the upper surface of the bed-plate, and it derives motion through a pulley on its shaft and a belt from the main shaft *D* at the rear of the frame. The conical roll *C* is scored longitudinally near its base for more readily engaging in frictional contact with a hat-body.

The compressing feed-wheel *C'* has a flat face, and is preferably clad with an elastic covering. It is mounted on an inclined shaft, so that its flat face is parallel with the longitudinal line of the lower side of the conical feed-roll *C*. The inclined shaft of the feed-wheel *C'* is mounted in arms *b*, supported at the rear ends by an inclined square shaft, *c*, which has

bearings in brackets projecting rearward from the rear side of the front plate, A, as clearly shown in Fig. 4. The feed-wheel arms *b* can be moved and adjusted longitudinally on the square shaft, whereby said wheel may be located at any desired point with reference to the conical roll, and made to engage with any portion of the hat-body. The square shaft *c* is provided with a rearwardly-projecting lever, *c*¹, which is laterally perforated for a portion of its length to receive the hook of a weight, *c*², which, according to its location on the lever, causes the feed-wheel *C* to bear with more or less pressure upon a hat-body interposed between it and the conical roll, and so attain the proper feeding movement.

With the description thus far, it will be obvious, if a hat-body be pulled endwise upon the bed-plate and the conical roll, these latter being within the body, as indicated by dotted lines in Fig. 2, and with the feed-wheel outside the body, compressing it against the conical roll, and the main shaft be then rotated, that the hat-body will be revolved in a flattened condition, so as to present progressively its entire exterior surface to the action of shearing devices, operating above the bed-plate.

To conveniently control the feed-wheel and permit the ready placing of a hat-body on the bed, I have provided a treadle, E, by which the feed-wheel may be forced away from the conical roll. The treadle is mounted on an arm near the bottom of the front frame-plate, and its lever is connected, by a rod, *d*, a stud, and link *d'*, with the weighted lever *c*¹ on the square shaft *c*; but the link *d'* is slotted at its upper end, Fig. 3, so as to admit of a certain movement of the treadle prior to the lifting by it of the weighted lever, for purposes hereinafter to be described.

It will be seen that the depression of the treadle throws the feed-wheel out of operative position, and for so retaining it a stop-lever, E', is provided, which so engages with the treadle-lever as to maintain it in a depressed position while the workman is adjusting a hat-body to the bed. This feeding mechanism may obviously be largely varied in its details without materially affecting the results, and I do not, therefore, limit my invention to this precise mechanism.

I will now proceed to the description of the vibrating knife and the mechanism by which it is operated. I have shown in my drawings two knife-frames, differing somewhat in their construction.

In Figs. 1, 2, 3, 6, and 7 the knife F is shown as having a long thin blade, with round ends, to prevent tearing into the felt, and a handle, by which it may be conveniently adjusted and safely handled when detached, and also while being sharpened.

The knife-frames G are in form like a bell-crank lever, the knife being secured to the long arm thereof, which has a straight surface laterally beveled to a thin edge, which serves as a bed for the knife at such an angle—

say, from twenty degrees to thirty degrees—as is most favorable for its effective operation. The knife is secured to the knife-frame by a longitudinal clamping-bar, *e*. The clamping-bar has two arms, each of which has two holes. One of these holes in each arm is centrally located for reception of a thumb-nut bolt, *e*¹, and the other hole, near the end of the arm, is tapped for the reception of a set-screw, *e*², which bears at its end upon the surface of the knife-frame. These set-screws enable the clamping-bar to be so adjusted that its lower surface will bear flatly upon the upper side of the knife when the thumb-nuts are turned down tightly, as illustrated in Fig. 6. The knife having been partially clamped it is adjusted laterally by means of two set-screws, *e*², which, by contact with the back of the knife, are made to advance its edge to any desired position.

In Figs. 6 and 7 the knife-frame G is shown to be provided with a guard, *f*, which is located in front of and parallel with the arm of the frame to which the knife is secured, and its top is beveled downward toward the knife-edge, leaving a narrow open space, through which the edge of the knife projects slightly, as in smoothing-planes. This guard *f* performs a double function in rendering it impossible for the knife to take a rank hold upon a hat-body under any circumstances, and also in compressing and smoothing the hat-body during the movements of the knife and frame. The thin edge of the guard, during the backward movement of the knife, so lifts and bends backward more or less of the hair that the knife, during its forward movement, can more readily engage therewith.

The knife-frame in Figs. 1 and 2 has no guard; but a drag-bar, *g*, is employed, which performs the compressing and smoothing function without so fully obviating the before-mentioned possibility of cutting into a hat-body as with the guard. The drag-bar is at one end hinged by a swivel-pivot to the bed-plate, so that it may be swung upward and around out of the way while putting a hat-body into position, and then returned and permitted to bear its weight upon the hat-body. The free end of the drag-bar extends over a portion of the knife-frame, so that when the latter is lifted the drag-bar is also lifted from the hat-body.

The drag-bar may be used to advantage even if the knife-frame be provided with a guard. The guard *f*, however, is preferable to the drag-bar even in the performance of the single function of the latter, because the guard moves to and fro with the knife-frame.

The knife-frame has a hub and set-screw, and is pivotally mounted upon and secured to a vertical spindle, H, which is housed in bearings in the front frame-plate, A, and is supported at its foot by a step-plate, *h*, which is suspended from the frame-plate by means of bolts and nuts, whereby said spindle and the knife-frame may be set at any desired ele-

vation with relation to the supporting-bed. To balance the weight of the knife and the long arm of the knife-frame, the triangular portion of the short arm of the frame is of solid metal, proportioned in bulk and weight so as to equal the weight of that part of the frame which is on the opposite side of its spindle. Any undue vibration of the machine will cause the knife to work irregularly on the felt.

In order that the knife-frame may be elevated for the insertion of a hat-body, the spindle H is controlled by the treadle E, previously described, the lever of which is connected by the rod *d* with the end of a horizontal lever, *h*¹, which is furcated at its opposite end and loosely embraces the spindle H. The lever *h*¹ has its fulcrum on a stud, *h*², in a bracket on the front frame-plate, and it lifts the spindle by contact with the lower side of a collar, *h*³, secured to the spindle by a set-screw.

The stop-lever E', previously described, serves to maintain the treadle in a depressed position during the placing of a hat-body on the bed, and, as before described, the same treadle also throws the feed-wheel C' away from the conical roll, this latter movement following the lift of the knife-frame. It will be seen that with the treadle the knife-frame may be held at any desired height above the supporting-bed, and the operation of the knife fully controlled.

The knife-frame is rapidly reciprocated by means of a vertical crank-shaft, I, driven by belt from the main shaft, and connected to the frame by a link, K.

The crank shaft is provided with a balance-wheel, *i*, counter-weighted to balance the throw of the crank. The wrist-pin of the crank, as shown in Fig. 5, is provided centrally with a ball, *k*, and the link is composed of duplicate rods *l*, which unite two half-boxes fitted to embrace the ball on the wrist-pin and to allow the outer end of the link to rise and fall with the knife-frame, to which it is connected by a ball-and-socket joint, *m*. The link-rods are threaded and provided with nuts, whereby the wear of the boxes may be compensated from time to time.

The operation of each portion of the machine having been described in connection with the detailed description, it will be unnecessary to further enlarge thereon. The speed at which the knife is vibrated may be varied, according to circumstances; but I have attained good results with from seven hundred to eight hundred revolutions of the crank-shaft. The work performed is fully equal to the best hand results, and it is done with great rapidity.

I do not limit my invention to the exact construction and mechanism shown, as it is obvious that it may be largely modified without departing from my invention or materially affecting the results.

Many of the novel combinations of mechanism may obviously be used independently of

other mechanism with results more or less approximating to those attainable with the machine constructed as particularly shown and described.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a hat-shaving machine, the combination, with a reciprocating shaving-knife, of a supporting-bed, substantially as described.

2. In a hat-shaving machine, the combination, with a reciprocating shaving-knife, of a supporting-bed and mechanism for separating them, substantially as described.

3. In a hat-shaving machine, the combination, with a reciprocating shaving-knife and a supporting-bed, of mechanism for adjusting them with reference to each other, substantially as described.

4. In a hat-shaving machine, the combination, with a supporting-bed, of a shaving-knife and frame, pivotally mounted on a shaft which is vertically adjustable, substantially as described.

5. The combination, with a shaving-knife, of a supporting-bed provided with an elastic covering, substantially as described.

6. The combination, with a supporting-bed and a shaving-knife, of feeding mechanism, substantially as described, for rotating a hat-body while partially flatly laid upon the bed, as set forth.

7. The combination, with the bed and knife, of a driven conical roll and a feed-wheel, substantially as described.

8. The combination, with the bed, knife, and conical roll, of a feed-wheel, which is adjustable longitudinally with reference to the conical roll, substantially as described.

9. The combination, with the bed, knife, and conical roll, of a feed-wheel, controlled by a weighted lever, substantially as described.

10. The combination, with the bed and conical roll, of a feed-wheel and a treadle, substantially as described, whereby the feed-wheel may be moved away from the conical roller to stop the feed, as set forth.

11. The combination, with the bed, conical roll, feed-wheel, and treadle, of a stop-lever, substantially as described, whereby the feed-wheel may be maintained out of working relations with the conical roll, as set forth.

12. The combination, in a hat-shaving machine, of the shaving-knife and a vibrating knife-frame provided with a clamping-bar and adjusting-screws, substantially as described.

13. The combination, with the shaving-knife, of a pivoted vibrating knife-frame, which is balance-weighted, and a crank-shaft, connected therewith and balance-weighted, substantially as described, whereby the knife is smoothly driven, as set forth.

14. The combination, with the vibrating knife, its frame, and spindle, of a treadle for lifting them, substantially as described.

15. The combination, with the knife, its

frame, spindle, and treadle, of a stop-lever for maintaining them in an elevated position, substantially as described.

16. The combination, with the feed-wheel and knife, of a treadle common to both, substantially as described, whereby the feed-wheel is placed into operative position in advance of the placing of the knife, and the knife removed therefrom in advance of the corresponding movement of the wheel, as set forth.

17. The combination, with the vibrating knife and frame, of a crank-shaft and a link flexibly connected to the frame and shaft, substantially as described.

18. The combination, with the bed and feeding mechanism, of a drag-bar for smoothing the hat-body, substantially as described.

19. The combination, with the knife and its frame, of a knife-guard mounted on the frame, or forming a part thereof, and located in front of the edge of the knife and parallel therewith, substantially as described.

RUDOLF EICKEMEYER.

Witnesses:

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GEORGE HARR.