2 Sheets—Sheet 1.

R. EICKEMEYER.

Hat-Shaving Machine.

No. 217,079. Patented July 1, 1879.

Fig. 1.

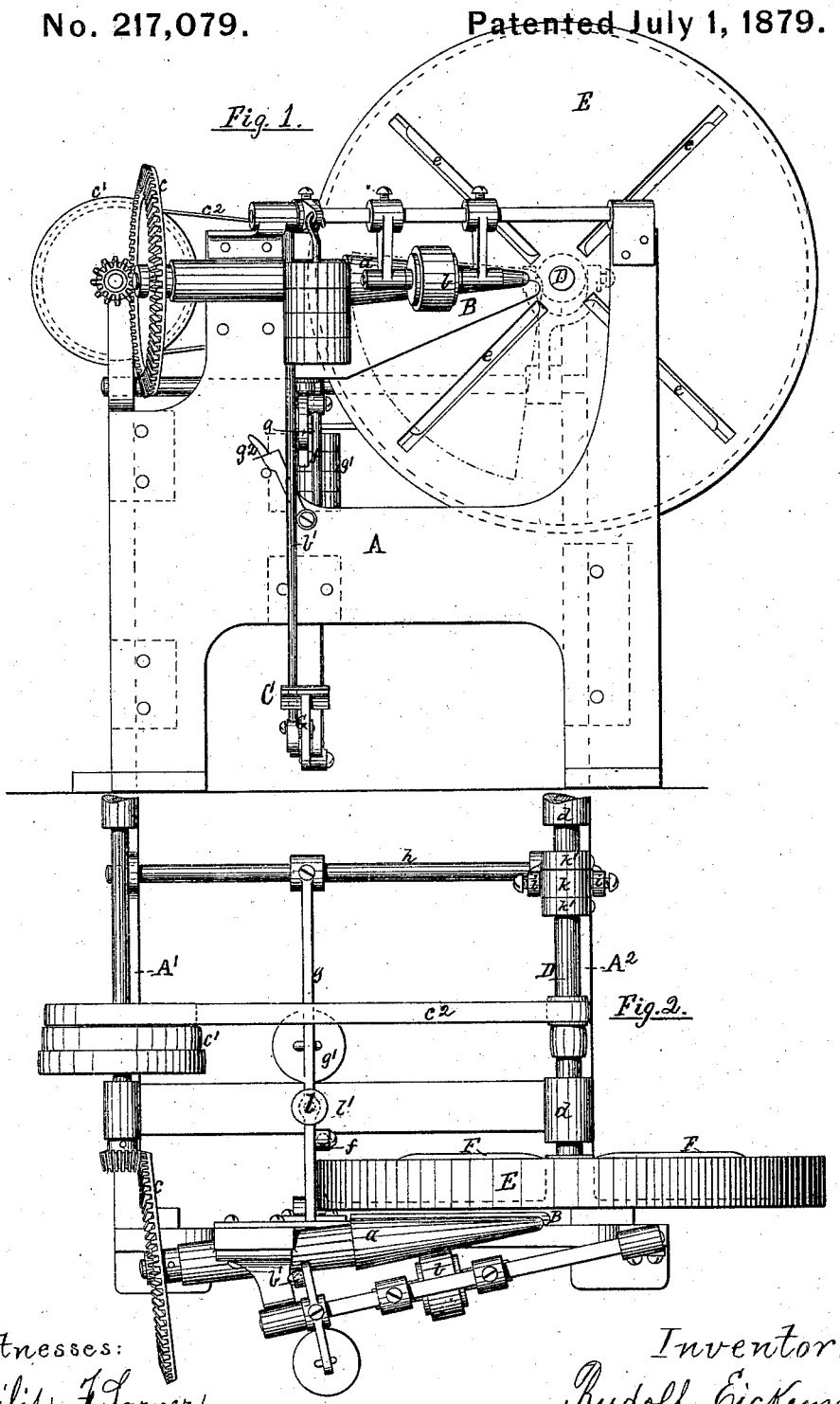

Fig. 2.

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2 Sheets—Sheet 2.

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Fig. 3.

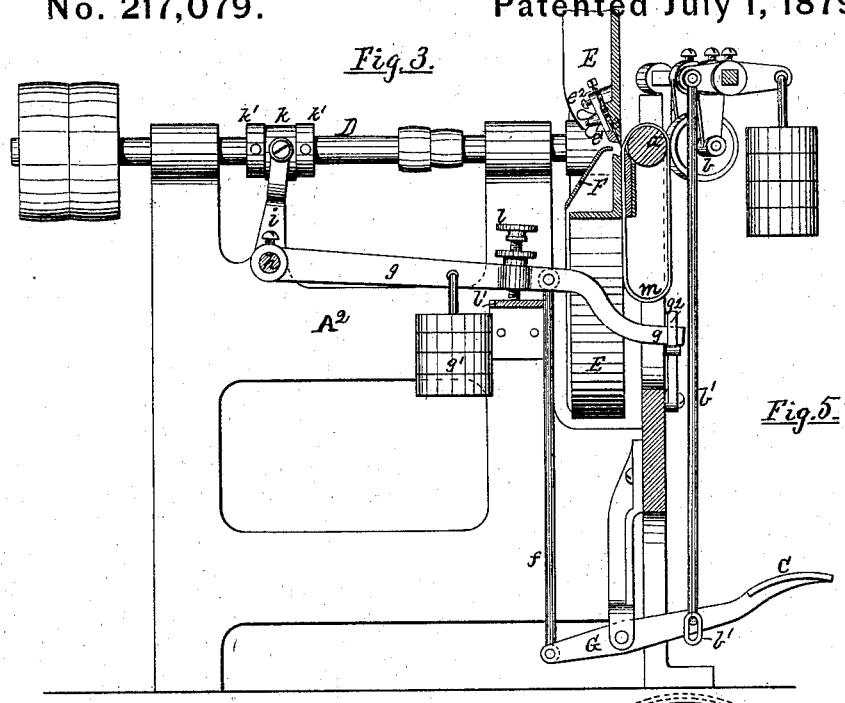
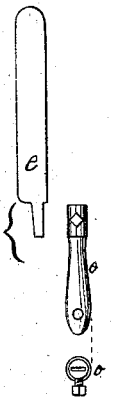


Fig. 5.



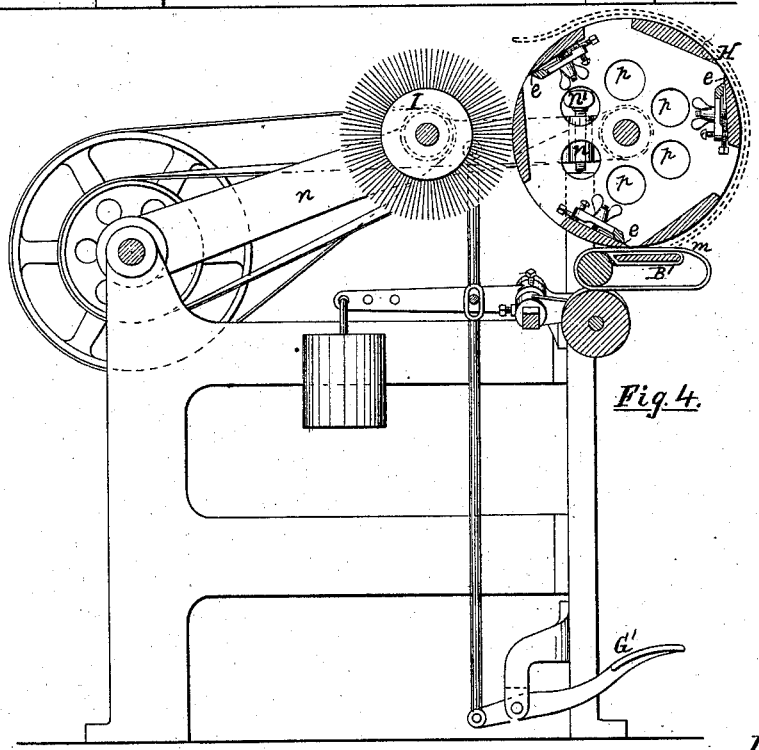


Fig. 4.

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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. **217,079**, dated July 1, 1879; application filed April 4, 1879.

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 certain new and useful Improvements in Hat-Shaving Machines; and I do hereby declare that the following specification, taken in connection with the drawings furnished and forming a part of the same, is a true, clear, and complete description of my invention.

The class of machinery to which my present invention pertains is, so far as my knowledge extends, novel with me, and the machinery shown and described in my Letters Patent No. 210,509, dated December 3, 1878, is the first organized mechanism of which I have cognizance by which the operation of "shaving" felt hats composed wholly or in part of fur could be practically performed, it having been done prior to my said invention only by means of a knife in the hand of a workman.

As stated in my prior Letters Patent referred to, no actual shaving is practically involved in the so-called "shaving" operation, because the objectionable coarse hair which is in the fur and is to be removed from the hat-body is seldom, if ever, cut, but is instead pulled out bodily, and if the hair should be cut at the surface of the felt the attendant "stubble" would deprive the hats of that soft finish so desirable in fur goods.

At the beginning of my experiments upon this subject I confined my attention to that mode of operation which involved the use of a reciprocating knife, and the imparting thereto of a motion which corresponded to its movement when used as a hand implement; but my present improvements relate to machinery in which the knife or knives are continuously moved or driven in one direction over the surface of the hat-body, and with such a knife or knives I employ supporting, feeding, and controlling mechanism, which I prefer to be substantially similar to that shown and described in my said prior Letters Patent.

The prime object sought by me through my present invention is an increased capacity for performing the required service as compared with my original machines, and the knives being driven continuously in one direction the new machines are much more smoothly and steadily operated than the reciprocating-knife machines.

The main feature of my invention consists in the combination, with a suitable supporting-bed adapted to occupy the interior of a hat-body, of a knife or knives, which are mounted on a revolving knife-head, and are moved or driven continuously in one direction.

The manner of mounting and driving a knife or knives thus driven may be considerably varied, and I hereinafter show two methods of mounting and driving the knives, in one of which each knife moves more rapidly at one end than at the other, said movement in that respect being somewhat similar to the movement of the reciprocating knife in my former machine. By the other method, hereinafter shown, the knives are so mounted that they are driven with equal speed at both ends thereof—that is to say, I employ knife-heads of different form. In one machine I have shown the knives mounted radially on a revolving disk, and in the other they are mounted longitudinally on the periphery of a revolving cylinder.

My invention further consists in the combination, with a knife or knives continuously driven in one direction and a supporting-bed adapted to occupy the interior of a hat-body, of mechanism for separating the knives from the bed, whereby a hat can be readily inserted and removed; and in this connection my invention further consists in the combination, with a revolving knife-head and supporting-bed, of a treadle by which the head and bed may be separated, and I employ therewith a stop for maintaining them in a separated condition, as in my former machines; and, further, in the combination, with the knife or knives thus driven and the supporting-bed, of mechanism for adjusting the bed and knives with reference to each other so that hat-bodies of various thicknesses may be properly shaved; and in this connection my invention further consists in the combination, with a revolving knife or knives mounted on a disk driven by a sliding shaft, of a treadle and an adjustable stop, which adjustably limits the movement of the disk and knives toward the supporting-bed and the hat thereon.

In my prior machines the rearward motion

of the reciprocating knife served to free its edge from the hair pulled from the felt during its forward movement, and, as this freeing function is important, I have combined with my revolving knives devices by which the hair is removed from the edges of the knives; and another feature of my invention consists in the combination, with revolving knives in a hat-shaving machine, of an edge-clearer, which removes the adhering hair from the edges of the knives. An edge-clearer such as is intended to be embraced by me as a part of my invention in the combination last stated may be variously constructed, and I have herein shown two forms thereof, one of which operates to induce a current of air across the edge of each knife for removing the hair, while the other operates by direct contact with the hair while being carried on the edges of the knives. In this connection my invention further consists in the combination, with a knife mounted on a revolving disk, of a deflecting-plate on the rear of the disk, which, when the disk is revolved, causes a current of air to be forced or driven across the edge of the knife and through the opening in the disk, which is occupied in part by the edge of the knife.

I am well aware that machines have heretofore been employed for shearing and napping hats and woolen fabrics; but in all such machines there are moving cutters which either co-operate, so that the edges of one set of cutters sweep over the edges of another set, or there are moving cutters which sweep over the edge of a stationary cutter, and in both cases they operate after the manner of shears. It will readily be seen that such machines cannot pull hair from felt, which is the prime object of my machine.

To more particularly describe my invention, I will refer to the accompanying drawings, of which there are two sheets.

Figure 1, Sheet 1, represents, in front elevation, a disk-machine embodying the several features of my invention. Fig. 2, Sheet 1, represents the same in top view. Fig. 3, Sheet 2, represents the same in vertical section adjacent to line *x y*, Fig. 2. Fig. 4, Sheet 2, represents, in central vertical section, a cylinder-machine embodying my invention. Fig. 5, Sheet 2, represents a knife detached from the machine and a handle used therewith while grinding it.

The frame of the machine is composed of three cast-metal skeletonized plates, of such form as to afford the requisite mountings, and A denotes the front plate, and A^1 A^2, respectively, denote side plates, which may be connected at their rear ends with each other by tie-braces.

The supporting-bed B, Figs. 1, 2, and 3, has a vertical face instead of a horizontal one, as in my former machines.

The conical feed-roll *a*, feed-wheel *b*, its weight, and treadle C are substantially as shown in my prior patent, to which reference may be had for a more complete description.

The feed-roll *a* is driven by gear *c*, cone-pulleys c^1, and belt c^2 from the main shaft D of the machine.

The main shaft is provided with a driving-pulley and the usual loose pulley at one end, and upon the other end the knife-disk E is mounted so that its front face occupies a vertical plane parallel with the coincident face of the supporting-bed B.

The knives *e* are mounted on the rear side of the disk so that their edges project slightly through radial slots or openings therein, and they are secured and adjusted at the proper angle by clamping-bars e^1 and set-screws e^2, substantially as in my prior patent. The angle at which these knives are set with reference to the surface of the bed or of the hat-body when thereon is such as to cause the knives to engage with and pull the hairs without cutting them. The angle of the knife may be somewhat varied—say, from twenty to twenty-five degrees to the face of the disk.

On the disk shown four knives are mounted; but the number thereof may be varied, it being, however, desirable that the disk be balanced either by oppositely-located knives or corresponding counter-weights.

Care should be taken in adjusting the knives that their edges do not project too far beyond the face of the disk; otherwise they may have too rank a hold upon the hats and injure them. The speed of the disk may be varied; but good results will be attained if each knife have, say, from seven to eight hundred movements across the bed per minute.

For clearing the pulled hair from the edges of the knives thus mounted, each is provided with an edge-clearer in the deflecting-plate F, which is mounted on the rear side of the disk parallel with the knife-edge on the opposite side of the knife-slot, as clearly shown in Fig. 3. The space intervening between the disk and the inner surface of this plate is similar to the interior space of an elongated funnel, so that when the disk is rapidly revolved air is taken in at the wide opening and forced out of the narrow opening between it and the disk, adjacent to the knife-edge, and across it, blowing the hair therefrom outward from the face of the disk through the knife-slots.

In order that the bed and knives may be rendered adjustable with reference to each other, so that hats of different thicknesses may be properly operated upon, the bed and the feeding mechanism may be capable of adjustable movement; but as a simpler construction is involved by having the knife-disk movable to and from the bed, I prefer that method, and therefore the main shaft D, on which the knife-disk is mounted, is fitted in its boxes *d* so that it can slide longitudinally; and I so construct this portion of the machine that the disk may be moved rearward from the bed, to afford space for more conveniently placing a hat-body on the bed, as well as for removing it.

The disk and its shaft are moved by means of a treadle, C, the lever G of which, at its

rear end, is connected, by a rod, *f*, to a lever, *g*, which has its fulcrum in a rock-shaft, *h*, provided with a vertical arm, *i*, which engages with a sleeve, *k*, on main shaft D, and confined between two collars, *k'*, which are secured to the shaft by set-screws. The lever *g* has a weight, g^1, which serves to maintain the knife-disk in its most forward position when not otherwise controlled by the treadle, and for maintaining the knife-disk in its most rearward position without continuing foot-pressure on the treadle. A hinged stop-finger, g^2, on the front of the frame is relied upon for supporting the outer end of lever *g*, and preventing its being depressed by its weight g^1. For adjustably limiting the forward movement of the disk toward the bed, so as to properly operate upon a thin or a thick hat-body, the lever *g* is provided with a stop-screw, *l*, the lower end of which has a resting-contact with the upper surface of a cross-bar, *l'*, whereby the lever may be limited with reference to its downward movement, to secure the proper location of the knife-disk with reference to the bed. As in my prior machines, the same treadle controls the feed-wheel *b*, its treadle-rod *b'* having a slot at its lower end, which admits of the movement of the knife-disk away from the bed in advance of the movement of the feed-wheel, and it also secures the movement of the feed-wheel in advance of the knife-disk when the latter is moving toward the bed, it being desirable that the hat-body be properly held on its bed so long as the knife-disk is in contact therewith.

The hat-body, when flattened and in position for shaving, is shown in triangular dotted outline in Fig. 1 and in solid lines at *m*, Fig. 3. The conical feed-roll *a* and the bed B, clad as heretofore with an elastic or yielding material, are within the hat-body, as shown, and the movement of the portion of the hat-body next to the knives by the feeding mechanism is in a direction opposite to the movement of the knives when shaving.

The machine shown in Fig. 4 has a knife-cylinder instead of a knife-disk. The cylinder H is mounted in bearings at the end of a pivoted frame, *n*, which admits of its being lifted and lowered by the treadle G' for the placing of a hat-body upon the feed-bed B', which, in this instance, is horizontal, and supports the hat-body *m*, as in my prior patent, and has also the same feeding mechanism. The frame *n* has adjusting stop-screws, (one of which is shown at *n'*,) which correspond in function with the stop-screw *l*, previously described in connection with the disk-machine for adjustably locating the revolving knife carrier or head with reference to the bed.

The knife-cylinder H is a skeletonized structure, having two ends and properly slotted longitudinal peripherical sections, to the inner sides of which the knives *e* are secured by bars and screws, as in the disk previously described, and also as in my prior patent, and said knives are set therein at the proper angle to perform the desired service. The treadle G' lifts the knife-cylinder in advance of the stopping of the feed mechanism, and starts the feed in advance of the arrival of the cylinder into working position, substantially as in the other machines referred to. The form of the knife-cylinder precludes the employment of an edge-clearer adjacent to each knife of the character previously described in connection with the disk-machine, although an independent fan may be used with fair results. I prefer, however, in a cylinder-machine to employ as an edge-clearer a rapidly-revolving brush-wheel, I, as shown, which, by being driven more rapidly than the cylinder, and in proper relation to the edges of the knives, will keep them clear of pulled hair.

The ends of the knife head or cylinder H are provided with openings *p*, as shown, through which air passes to the interior of the cylinder when in motion, and thence outward through the knife-slots and the other open spaces in its periphery. The currents of air thus induced contribute to the clearing of the knife-edges; but, in order that the dust and hair may be thrown away from the operator, a hood may be employed partially covering the cylinder, as indicated in dotted lines. The openings *p* may each be provided at their outer sides with funnel-shaped plates for increasing the air-currents, which may thus be rendered of sufficient power to properly clear the knives without the use of the brush-wheel clearer.

A detached knife, *e*, is shown in Fig. 5. It is preferably provided with a shank or tang, by which it may be secured to a handle, *o*, provided with a set-screw, whereby it may be conveniently held and controlled while being ground or sharpened.

In my former machines the knife is provided with a permanent handle, and such might be used in these machines, although it is deemed preferable that the handles should not project beyond the periphery of the disk or the ends of the cylinder; and to increase the sizes of disk or cylinder to accommodate the handles would involve weight and cost not balanced by any practical advantages.

In view of the detailed description of the mechanism thus given, it will be readily understood that while either machine is in motion the depression of the treadle will render the bed accessible to the placing of the hat thereon, and that on releasing the treadle the feed-motion will cause the hat-body to move over the surface of the bed, while the knives operate in pulling the hair, and that when the operation is completed and the treadle depressed the hat-body may be removed and another substituted.

As stated in my prior patent in connection with the reciprocating-knife machines, these present machines, in which the knives continuously move in one direction, may be employed to actually shear the felt with results similar to those heretofore attained with pouncing

mechanism operating upon flat or straight surfaces.

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

It is also obvious that some of the stated combinations of mechanism are capable of profitable use independently of other mechanism; but for attaining the best results I prefer machines embodying substantially the several features particularly shown and described.

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

1. The combination, in a machine for shaving hats, of a supporting-bed and a knife or knives mounted upon a revolving knife-head, substantially as described.

2. In a hat-shaving machine, the combination, with a supporting-bed for hat-bodies and a knife or knives mounted in a revolving head, of mechanism for separating the knives from the bed, substantially as described.

3. In a hat-shaving machine, the combination, with a revolving knife-head and supporting-bed, of a treadle for separating them, and a stop, whereby they may be maintained in a separated condition for the ready insertion or removal of a hat-body, substantially as described.

4. In a hat-shaving machine, the combination, with a revolving knife-head and a supporting-bed adapted to occupy the interior of a hat-body, of adjusting mechanism, substantially as described, for setting the knife-head and bed with reference to each other for operating on hat-bodies of various thicknesses, as set forth.

5. The combination, with a supporting-bed, of a knife-head mounted upon a sliding shaft, a treadle for moving said shaft longitudinally, and an adjustable stop for adjustably limiting the movement of the knife-head toward the bed, substantially as described.

6. In a hat-shaving machine, the combination, with knives in a revolving head, of an edge-clearer for removing from each knife-edge the pulled hair which adheres thereto, substantially as described.

7. The combination, with a slotted revolving disk or knife-head and its knife or knives, of a deflecting-plate for each knife at the rear of the disk, which, when the head is revolved, causes a current of air to be forced across the edge of the knife for removing hair therefrom, substantially as described.

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