M. L. LUEBBEN.

MACHINE FOR SHARPENING SAFETY RAZOR BLADES.

APPLICATION FILED OCT. 14, 1919.

1,382,794.

Patented June 28, 1921.

4 SHEETS—SHEET 1.

Fig. 1.

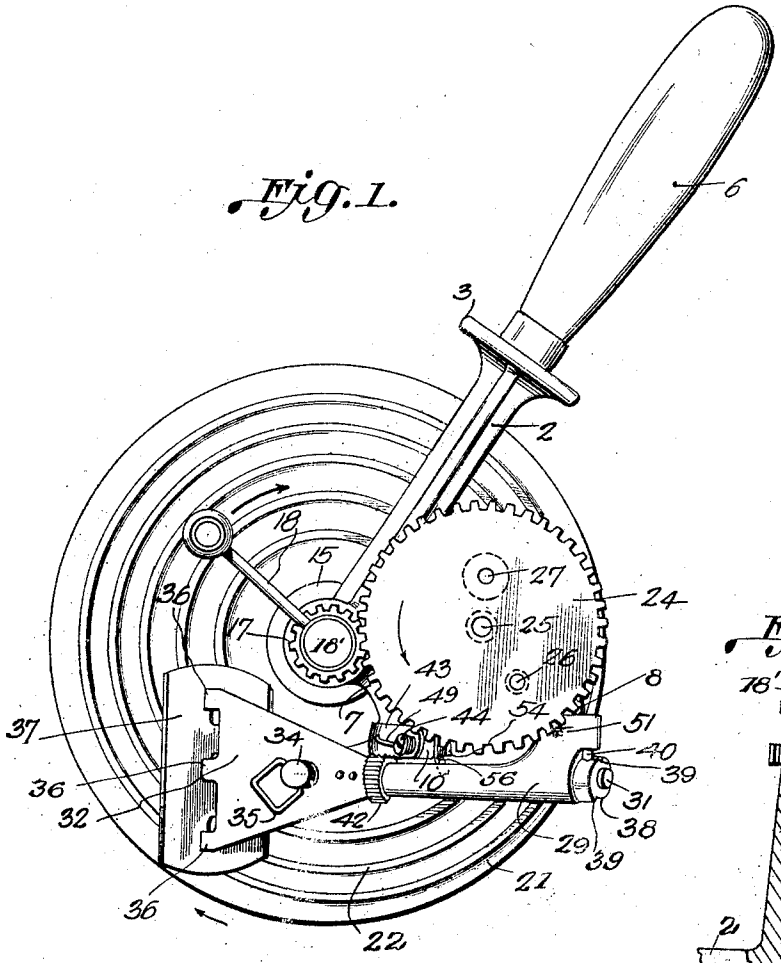


Fig. 1a.

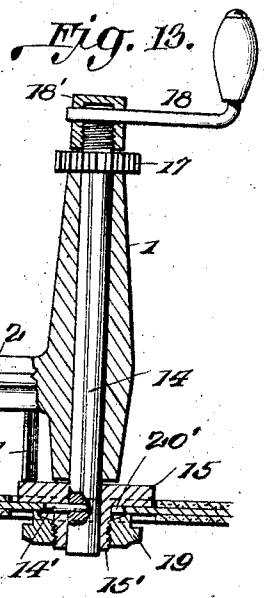
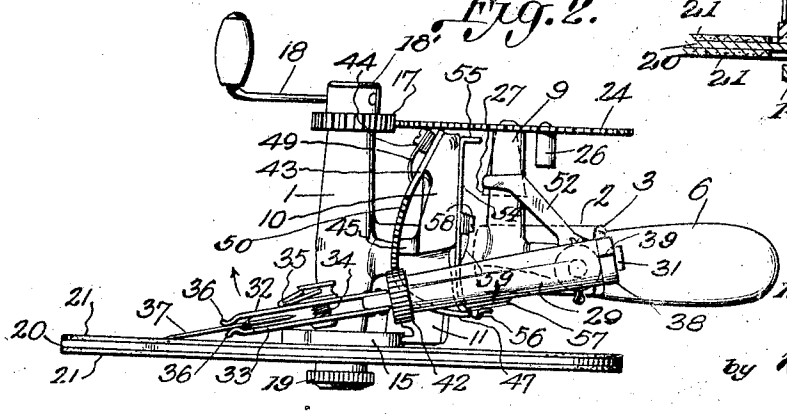


Fig. 2.



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Fig. 3.

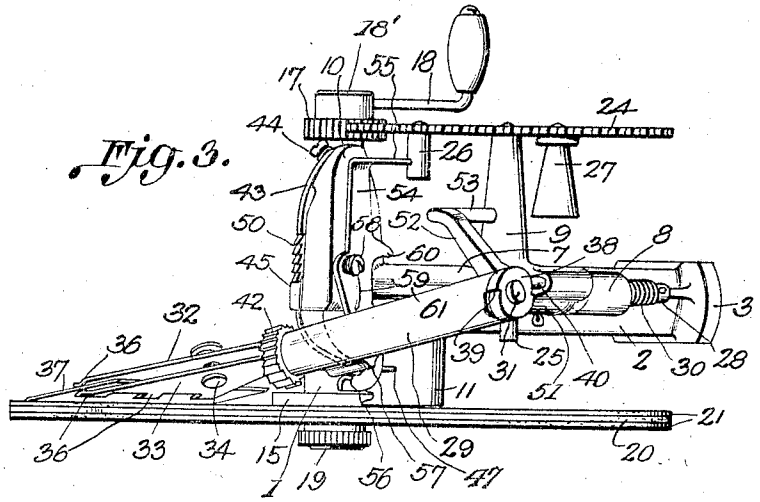


Fig. 4.

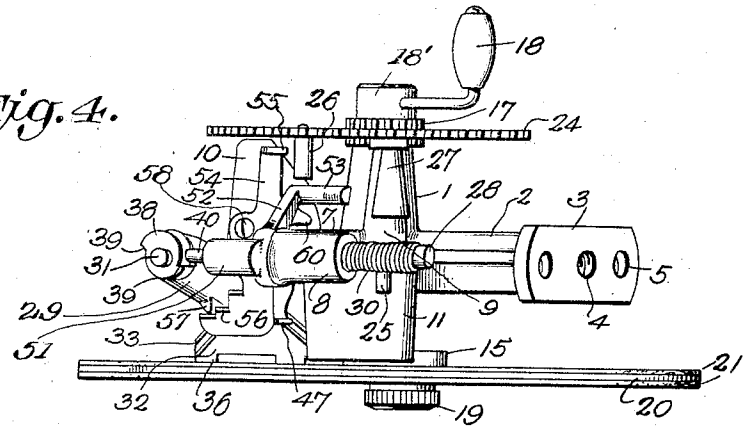
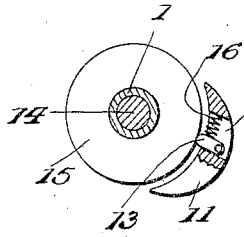


Fig. 12.



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4 SHEETS—SHEET 3.

Fig. 5.

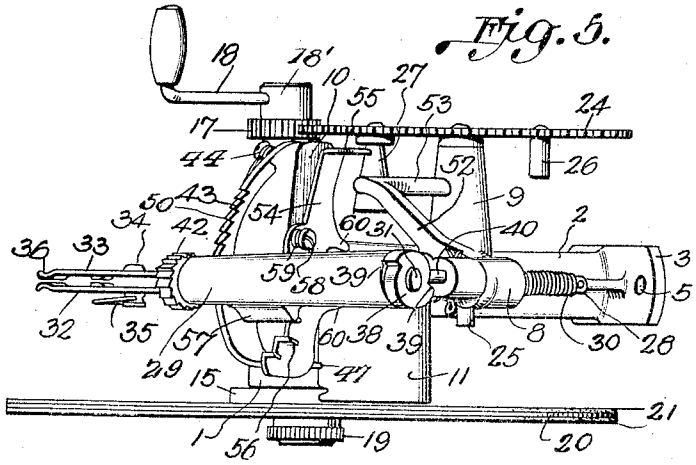


Fig. 9.

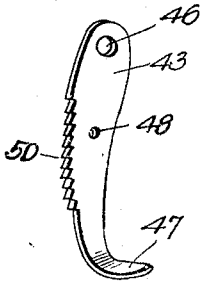


Fig. 8.

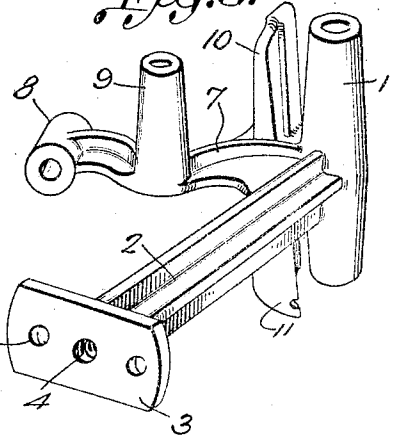


Fig. 10.

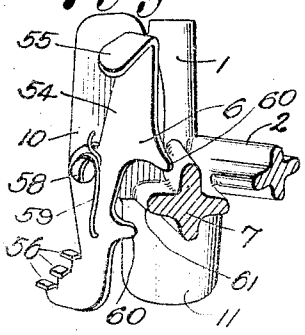
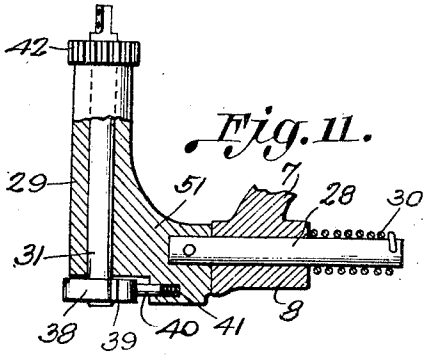


Fig. 11.



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4 SHEETS—SHEET 4.

Fig. 6.

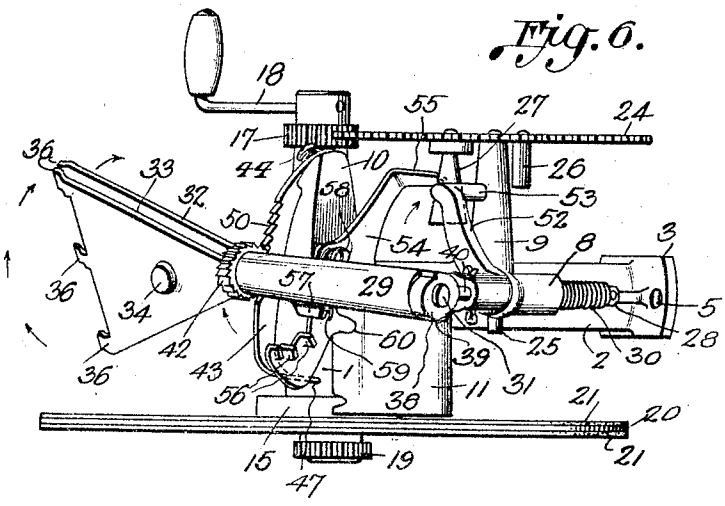
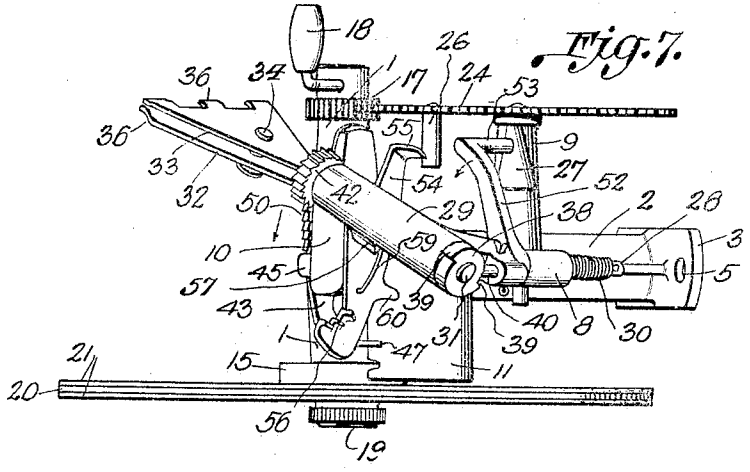


Fig. 7.



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UNITED STATES PATENT OFFICE.

MELCHIOR L. LUEBBEN, OF ST. LOUIS, MISSOURI.

MACHINE FOR SHARPENING SAFETY-RAZOR BLADES.

1,382,794. Specification of Letters Patent. **Patented June 28, 1921.**

Application filed October 14, 1919. Serial No. 330,607.

To all whom it may concern:

Be it known that I, MELCHIOR L. LUEBBEN, a citizen of the United States, residing in the city of St. Louis, and State of Missouri, have invented certain new and useful Improvements in Machines for Sharpening Safety-Razor Blades, of which the following is a specification.

My invention has for its object the provision of a simple and efficient mechanism whereby blades of safety razors may be sharpened. One object of the invention is to provide a compact and simply arranged machine which may be operated by one hand while held in the other hand or permanently secured to a fixed support. The invention seeks to provide a machine for the stated purpose which, when in use, will act upon one face of the blade at the edge thereof for a definite period and will then automatically reverse the blade so that the opposite face will be acted upon, a further object being to apply the sharpening action diagonally along the blade with the lines of action on one face of the blade crossing the lines of action on the other face of the blade. Another object of the invention is to provide means whereby when the blade is reversed it will be prevented from coming into forcible contact with the honing or sharpening member and chipping, splitting or other injury of the blade will be avoided, and a still further object of the invention is to provide means whereby the blade will be reversed after being lifted from the honing or sharpening member and prevented from turning as it returns to the normal position in engagement with the sharpening or honing member. Other incidental objects of the invention will appear in the course of the following description and the invention resides in certain novel features which will be particularly pointed out in the appended claims.

One embodiment of the invention is illustrated in the accompanying drawings which form a part hereof and in which—

Figure 1 is a plan view of a razor-blade-sharpening machine, the parts being arranged to be held in the hand and the razor blade being in engagement with the honing or sharpening disk;

Fig. 2 is a side elevation with the parts in the same positions as shown in Fig. 1;

Fig. 3 is a view of the machine with the working parts arranged as shown in Figs. 1 and 2, but viewed from a different angle;

Fig. 4 is a similar view taken from another angle;

Fig. 5 is an elevation from the same view point as employed in Fig. 3, but showing the blade-holder raised from the honing disk;

Fig. 6 is a similar view showing the blade-holder in the act of reversing;

Fig. 7 is a similar view showing the blade-holder fully reversed and at the highest point of its movement.

Fig. 8 is a detail perspective view of the frame;

Fig. 9 is a detail perspective view of a ratchet track employed to effect reversal of the blade-holder;

Fig. 10 is a detail perspective view of a stop lever for supporting the blade-holder arm, a portion of the adjacent frame being shown in section;

Fig. 11 is a detail horizontal section through the blade-holder rocking arm;

Fig. 12 is a detail section showing means for preventing backward movement of the sharpening or honing disk;

Fig. 13 is a vertical section through the driving shaft.

In carrying out my invention, I employ a frame which, as shown more particularly in Fig. 8, may be a single casting having a tubular post or standard 1 forming a bearing for the shaft which carries the honing or sharpening member. At an intermediate point of the height of this post 1, an arm 2 extends radially therefrom and this arm has its outer end constructed with a transverse base plate 3 which is provided centrally with an internally threaded socket 4 and near its ends with openings 5. A handle 6 having a threaded stem at one end may have said stem engaged in the socket 4 so that the device may be held in one hand while being operated, as will be readily understood, the said handle being shown attached to the arm 2 in Figs. 1 and 2. If it be desired to secure the device to a fixed support, the base plate 3 is placed flat against the support and screws or similar fasteners inserted through the openings 5 into the support as will be readily understood. A second arm 7 extends radially from the post 1 in the plane of the arm 2 and, at its outer end, the said arm 7 carries a sleeve or bearing 8 which is disposed in the same plane as the arms 2 and 7, but with its axis substantially at a right angle to the axis of the arm 7 and out of parallelism with the arm 2. A second sleeve or bearing 9 rises from the arm 7 ap-

proximately midway its ends and on one side of the said arm 7 is a standard 10, a hanger or foot piece 11 depending from the arm 7 approximately in the vertical plane of the standard 10. The foot piece or hanger 11 is constructed with a concave inner face disposed concentrically with the post 1 and in its extreme lower end it is constructed with a recess or chamber 12 containing a friction pawl 13 arranged to bear against an annular shoulder or collar 15 on the driving shaft 14 whereby to prevent backward movement of said shaft. A spring 16 bears upon the pawl 13 and holds it to the collar to bind thereon upon attempted backward movement thereof but yield to the forward movement. The driving shaft is fitted in the post 1 for free rotation and is equipped adjacent its upper end with a pinion 17 which may rest upon the upper end of the sleeve 1 and thereby aid in preventing endwise movement of the shaft, the collar or brake disk 15 being secured on the lower end of the shaft adjacent the lower end of the post so as to aid in preventing endwise movement of the shaft. The handle 18 consists of a crank having its longer arm inserted through diametrically opposite openings in the side walls of a cap nut 18′ which engages the threaded upper extremity of the driving shaft as shown most clearly in Fig. 13. The parts are so proportioned that when the nut is turned home, the shank or longer arm of the crank will be clamped by the end of the shaft and the upper walls of the openings in the nut. If the nut is loosened, the crank may be rotated in the openings so that its handle will be inverted to economize space in boxing for the market. The collar or brake disk 15 has a threaded hub 15′ to receive a clamping nut 19 and is secured to the smooth lower end of the driving shaft by a pin 14′, an end of which may project from the hub to engage the sharpening member. The sharpening or honing member consists of a thin metal disk 20 having a central opening whereby it may be fitted over the end of the driving shaft and having notches or recesses 20′ in the wall of the opening to engage the end of the pin 14′, whereby it will be forced to rotate with the shaft. As shown in Fig. 13, the clamping nut 19 bears against the under face of the disk 20 and clamps it against the brake disk 15 so that it will be held against dropping. Secured to the opposite faces of the disk 20 by any suitable adhesive are facing disks or rings 21 of leather or other suitable material, the said facing disks being of different texture so that both honing and stropping may be accomplished. It will be readily understood that by removing the nut 19, the disk 20 may be removed and reversed so that the coarser disk 21 may be placed uppermost if the blade is to be honed or the finer disk may be placed uppermost if only stropping is needed. On each facing disk is a spiral rib 22. As shown clearly in Fig. 1, the blade will be held to the disk at an angle to the radius of the same so that the spiral rib 22 will ride under and along the entire edge of the blade and leave no portion of its surface untreated. The pinion 17 meshes with a gear 24 which is secured to the upper end of a shaft 25 fitted rotatably in the bearing sleeve 9 of the frame and depending from the said gear 24 are a pin 26 and a cam 27, the pin 26 being cylindrical while the cam 27 is in the form of a conical block having its apex secured to the gear. The pin and the cam are disposed on different radii of the gear but at opposite sides of the shaft 25 and the cam is longer than the pin, as clearly shown. The pin 26 engages and actuates the stop lever which supports the blade-holder arm while the primary function of the cam 27 is to rock the blade-holder arm and lift the same when the blade is to be reversed.

A pivot pin 28 is fitted through the sleeve or bearing 8 and has the blade-holder arm 29 secured to one end. The opposite end of the pivot pin projects beyond the sleeve or bearing 8 and a spring 30 is coiled around the projecting portion of the pin, one end of the spring being secured to the pin at the end of the same and the opposite end of the spring being engaged under the outer portion of the arm 7 whereby the tension of the spring will yieldably hold the pin in such position that the blade-holder arm 29 extends downwardly from the bearing 8 toward the honing or stropping disk, as shown in Figs. 2 and 3. A shaft 31 is rotatably fitted through the arm 29 and to the forward end of said shaft I secure the blade-holder consisting of similar clamping plates 32 and 33 through one of which plates a headed set screw 34 is inserted to be engaged in a threaded opening in the coacting plate. The head of the screw may be milled or otherwise constructed so that it may be easily engaged for turning and in the drawings I have illustrated a small bail 35 pivotally secured in the head and adapted to be folded flat against the adjacent clamping plate when the machine is in use. The bearing sleeve 8 is located an appreciable distance above the lower end of the post 1 and the honing and stropping disk, and the blade-holder carrying arm 29 will, therefore present the blade-holder to the honing disk at an obtuse angle therewith so that the proper bevel will be formed on the edge of the blade and there will be ample clearance for the bail 35 when said bail happens to be on the under side of the blade-holder in the operation of the machine. The free edges of the plates 32, 33 are constructed with mating lugs or teeth 36 which are adapted to bear against the opposite faces of the blade 37, as shown clearly in Figs. 1,

2 and 3, so that when the screw 34 is turned home the blade will be securely held.

On the outer end of the shaft 31, I secure or form a stop disk 38 having diametrically opposite radial shoulders 39 which by engaging a stop pin 40 will prevent backward rotation of the shaft. It will be understood that the peripheral edge of the disk 38 is eccentric to the shaft 31 between the stop shoulders 39 so that it will ride readily past the end of the pin 40 when the shaft is being rotated to reverse the blade holder, and said pin is yieldably held in engagement with the stop disk by a spring 41 housed within a socket of the arm 29 which receives the pin, as clearly shown in Fig. 11. On the inner end of the shaft 31, I secure a ratchet pinion 42 which, upon the upward movement of the blade holder arm, engages a ratchet track 43 so that the shaft 31 will be rocked and the blade holder reversed. The ratchet track 43 is loosely supported at its upper end upon the upper end of the standard 10 and is mounted to have a slight pivotal movement upon the screw or pin 44 by which it is secured to the standard, and also to move slightly in the direction of the length of said pin or screw so that it may clear or be engaged behind a lug or tooth 45 on the side of said standard near the lower end of the same. As shown most clearly in Fig. 9, this track 43 consists of a metal plate having an opening 46 at its upper end to receive the securing device 44 and having its lower end turned at an angle to provide a lip 47, the function of which will presently appear. The track is tapered toward its lower end and at an intermediate point of its length is provided with a perforation 48 to receive one end of a spring 49 which is coiled around the fastening member 44 and has one end secured to the standard 10 so that the force of the spring is exerted to swing the lower portion of the track outwardly toward the pinion 42. The inner edge of the track is smooth throughout its extent but while the outer edge is smooth at its upper and lower portions, for a considerable distance between its upper and lower ends it is constructed with downwardly projecing ratchet teeth 50, the teeth of the ratchet pinion 42 being so disposed that they will be presented to the teeth 50 in opposition thereto and engage therewith. It will be readily understood that if the track be projected outwardly and the arm 29 then swung upwardly, the pinion 42 will be caused to engage the teeth 50 and will be thereby rotated to roll along the track and will consequently rock the blade holder so as to reverse the same, as shown in Figs. 6 and 7.

By referring to Fig. 11 more particularly, it will be noted that the shaft 31 is disposed at a right angle to the pivot pin 28 and the arm 29, in which the shaft 31 rotates, is constructed with an offset 51 in which the end of the pivot pin 28 is secured. The end of the offset 51 abuts the end of the bearing sleeve 8 and from the end of the offset a crank or rocker arm 52 rises. The said rocker arm 52 extends obliquely inwardly and upwardly from the offset 51 and at its upper extremity is provided with a crank or tappet arm 53 which extends into the path of the cam 27 so as to be engaged by the same. In the operation of the machine, the rotation of the gear 24 will bring the lower end of the cam 27 against the tappet arm 53 and the continued movement of the gear and the cam wall cause the said member 53 to ride up upon the cam thereby rocking the arm 29 about the axis of the pivot pin 28 and against the tension of the spring 30 so that the said arm will rise from the position shown in Figs. 1, 2 and 3 to that shown in Fig. 5 and then successively to the positions shown in Figs. 6 and 7. When the arm has reached the position shown in Fig. 7, the cam 27 will clear the end of the tappet 53 and the spring 30 will then at once cause a return movement of the blade-holder arm.

The stop lever 54 is pivoted upon the side of the standard 10 opposite that side upon which the ratchet track is mounted. This stop lever is a thin metal plate having a lateral lip or lug 55 at its upper end to be engaged by the pin 26 and equipped on its outer edge at its lower end with a plurality of steps 56 which are successively engaged by a teat or small rib 57 on the under side of the blade-holder-arm 29. The member 54 is pivotally attached to the standard 10 by a screw or pin 58 which is inserted through the stop lever at about the center thereof, and a spring 59, coiled about said pin and having its opposite ends secured respectively to the standard and the lever, tends to hold the lower end of the lever projected outwardly under the blade-holder arm. To limit the rocking movement of the lever, I provide the spaced teeth or lugs 60 on the inner edge thereof which are adapted to engage the opposite sides of a rib 61 on the arm 7 of the frame so that the lever cannot be swung by the pin 26 to such an extent that the steps 56 will be out of position to receive the blade-holder arm nor can it be swung by the spring 59 to such an extent that the lip or lug 55 cannot be engaged by the pin 26.

If the handle 18 be rotated so as to rotate the pinion 17 and the gear 24, the abrading disk will be simultaneously rotated inasmuch as it is secured directly to the lower end of the driving shaft to the upper end of which the handle is attached. The abrading disk will, consequently, be caused to act on the under face of the blade at the edge of the same and will readily hone or strop one

side of the edge. Assuming the parts to be in the positions shown in Fig. 1, the rotation of the gear 24 will bring the cam 27 against the tappet 53 whereupon said tappet will be lifted and the rocker arm begin to rise. The spring 59 will at once throw the lower end of the lever 54 outwardly under the rocker blade-holder carrying arm and this movement of said lever will cause its lower end to clear the lip 47 of the track 43, said track being normally in contact with the outer surface of the tooth or lug 45 so as to rest thereagainst. The described rocking of the lever 54 is limited by the engagement of the upper lug or tooth 60 with the upper side of the rib 61 on the arm 7. During the initial rising movement of the arm 29, the ratchet 42 will be riding upon the lower smooth portion of the track 43 without rotating but when it reaches and engages the teeth 50 it will be thereby caused to rotate so that the shaft 31 will rotate in the arm 29 and the blade-holder and blade will be reversed. The teeth 50 extend through so much of the track 43 as is necessary to impart to the shaft 31 a half revolution and when the half revolution is completed the ratchet pinion 42 will ride upon the upper smooth portion of the track and will force the track inwardly against the tension of the spring 49 so that the track will engage behind the lug or tooth 45, the track being preferably somewhat resilient to facilitate this action. The upward movement of the blade-holder arm will continue until the rocker arm 52 with its tappet 53 clears the cam 27 whereupon the spring 30 will cause a dowward movement of the blade-holder arm and the blade-holder. This downward movement, however, will be arrested by the engagement of the teat or rib 57 with the uppermost step 56 on the stop lever so that the blade will not be carried at once against the abrading member but will be supported in such a position that it may be conveniently removed for use. The lower end of the stop lever 54 being now at its outermost position and the track being engaged behind the lug 45, the lip 47 on the track will extend in rear of the stop lever. If the operation, however, is continued, the rotation of the gear 24 will bring the pin 26 against the lip or lug 55 of the stop lever and will swing the lower end of said lever inwardly against the tension of the spring 59 whereupon the blade-holder arm will drop and the rib 57 will engage the intermediate step 56, the blade being then close to but not against the honing or stropping disk. The operation proceeds continuously, however, so that the arm rests only momentarily on the intermediate step 56, the function of which is to break the descent of the blade so that it will no impinge forcibly upon the honing or stropping disk but will engage the same gently without any dimunition of the pressure. As the lower end of the stop lever swings inwardly, its inner edge will ride against the lip 47 of the track and push the said lip aside so that the track will be moved bodily laterally to escape from behind the stop lug 45 whereupon the spring 49 will project the track into position to be again engaged by the ratchet pinion 42 in the continued operation of the machine which will cause a repetition of the cycle of movements which have been described, the return of the track to its normal position being simultaneous with the contact of the blade upon the blade upon the honing of stropping disk. When the machine is in use, the teat 57 will be over but out of contact with the lowermost step 56. Should it be necessary, however, to remove the abrading member, the pressure against the under side of the blade will be thereby relieved and the teat 57 will thereupon engage and rest on the lowermost step 56 so that the force of the spring 30 cannot throw the parts out of proper adiustment while a new abrading member is being fitted in place.

My improved machine is obviously simple in construction and compact in the arrangement of its parts. It may be employed to sharpen blades of any style of safety razors and will produce the desired cutting edge rapidly and smoothly. The blade will be positively held at the proper angle to the abrading member necessary to produce an effective cutting edge and the results attained will be uniform. The device is entirely automatic in maintaining the proper sequence of the several steps in the operation and requires no attention upon the part of the user except to insert and remove the blades and turn the handle. The stop lever which constitutes a shiftable support for the blade holder arm will support the said arm when the same is engaged by the highest step on the lever in such position that a blade may be inserted or removed very easily and without any unnecessary exposure of the user to contact with the sharp edge of the blade. The said lever checks the descent of the blade-holder after it has been reversed so that the blade will not be brought forcibly against the abrading member and thereby chipped, split, or otherwise injured, but the descent of the blade and approach of the same to the abrading member will be intermittent and gradual, the blade coming into contact with the abrading member gently but without any reduction of the working pressure. It will be noted that the smooth portions of the working edge of the track are in line with the points of the ratchet teeth of the track so that when the pinion has cleared the toothed portion of the track and rides upon the upper smooth portion thereof it will positively force the track inwardly so

that the lower end thereof will engage behind the stop lug on the supporting standard and the track will not offer any resistance to the return movement of the blade-holder. It is to be particularly noted that the blade is held to the abrading member at an angle to the radius of the same so that the honing or stropping action is diagonal to the blade and this action is enhanced by the provision of the spiral rib which causes the working point of contact to shift along the edge of the blade. When the blade is reversed, the same action is effected on the previously upper face of the blade but relatively in the opposite direction so that the lines of treatment cross each other. It is also to be noted that the abrading member is removable and reversible so that the honing and stropping of the blade may be accomplished in the same machine.

Having thus described the invention, what is claimed as new is:

1. In a machine for the purpose set forth, the combination of an abrading member, a blade-holder, means acting constantly to hold a blade in the blade-holder against the abrading member, means for periodically moving the blade-holder from the abrading member and reversing the same and then permitting return of the blade-holder to the abrading member, a movable element, means for projecting said element normally toward the blade holder, means for retracting said element, and a series of stops on said element to be successively engaged by the blade-holder during its return movement as the element is retracted whereby to retard said return movement of the blade holder.

2. In a machine for the purpose set forth, the combination of a flat-faced abrading member, means for rotating said abrading member, a blade-holder-carrying arm pivotally mounted at one end above the abrading member for rocking movement in the plane of its own longitudinal axis toward and from the abrading member, a rocker arm projecting upwardly and inwardly from the pivoted end of the blade-holder-carrying arm, a blade-holder mounted for rotation in the free end of the blade-holder-carrying arm, yieldable means acting constantly on the blade-holder-carrying arm to hold the same toward the abrading member, means above the abrading member to periodically engage the free end of the rocker arm and thereby move the blade-holder-carrying arm from the abrading member, means acting on the blade-holder to rotate the same as the carrying arm moves from the abrading member, and means on the blade-holder and the carrying arm at the pivoted end of the latter to prevent rotation of the blade-holder as said arm moves toward the abrading member.

3. In a machine for the purpose set forth, the combination with a frame, of a flat-faced rotatable abrading member mounted thereon, a carrying arm pivotally mounted on the frame to move toward and from the abrading member, a rocker arm projecting from said carrying arm, a blade-holder mounted for rotation in said carrying arm, yieldable means acting on said carrying arm to hold it to the abrading member, a driving member rotatably mounted upon the frame above the abrading member and said carrying arm, a cam pin carried by and depending from said member to engage the rocker arm and thereby swing the carrying arm from the abrading member, and means for rotating the blade holder as the carrier arm moves from the abrading member.

4. In a machine for the purpose set forth, the combination of an abrading member, a blade-holder mounted for movement toward and from the abrading member, a pinion on the blade-holder, a track pivotally mounted at the side of the blade-holder, means for moving the track into engagement with said pinion as the blade-holder moves away from the abrading member whereby to rotate the blade holder, and means for holding the track out of engagement with the pinion during the return movement of the blade holder.

5. In a machine for the purpose set forth, the combination of an abrading member, a blade-holder movable toward and from the abrading member, a pinion on the blade-holder, a track pivotally mounted adjacent the blade-holder, yieldable means for holding the track in engagement with the pinion as the blade-holder moves from the abrading member whereby to reverse the blade-holder, means for holding the track from the pinion during the return movement of the blade-holder, and means for checking the return movement of the blade-holder, said means being arranged to set the track to again engage the pinion when the blade-holder is again moved from the abrading member.

6. In a machine for the purpose set forth, the combination of an abrading member, a blade-holder movable toward and from the abrading member, a pinion on the blade-holder, a movably mounted track arranged to engage said pinion as the blade-holder moves from the abrading member whereby to reverse the blade-holder, means for holding the track out of engagement with the pinion during the return movement of the holder, and means for setting the track to again engage the pinion upon the next movement of the blade-holder.

7. In a machine for the purpose set forth, the combination of an abrading member, a blade-holder arranged adjacent the abrading member for rocking movement from and to the same, a track pivotally mounted adja-

cent the blade-holder and having a laterally projecting lip at its lower end, a pinion on the blade-holder to engage said track during the movement of the blade-holder from the abrading member, a stop lever having its lower end constructed to project under the blade-holder and retard the movement of the same toward the abrading member, the said lower end of the stop lever being arranged to engage the laterally turned lip on the track and set the same to be engaged by the pinion, means for rocking the blade-holder, means for actuating the stop lever, and means for holding the track out of engagement with the pinion during the return movement of the blade-holder.

8. In a machine for the purpose set forth, the combination of a frame, a continuously moving abrading member supported on the frame, a blade-holder pivotally mounted on the frame adjacent the abrading member, a pinion on the blade-holder, a track pivotally mounted upon the frame adjacent the blade-holder, means for yieldably holding the track in engagement with the pinion as the blade-holder moves from the abrading member, a stop lug on the frame arranged to be engaged by the track during the movement of the blade-holder toward the abrading member, and means for releasing the track from said stop lug.

9. In a machine for the purpose set forth, the combination of a frame, a driving shaft mounted therein, an abrading member carried by one end of said driving shaft, a blade-holder pivotally mounted on the frame, a pinion on the blade-holder, a track movably mounted on the frame to engage said pinion during the movement of the blade-holder from the abrading member, a gear mounted on the frame and driven from the driving shaft, a rocker arm extending from the blade-holder, a stop lever mounted on the frame and constructed to check the movement of the blade-holder toward the abrading member, yieldable means for holding said lever in engagement with the blade-holder, yieldable means acting on the blade-holder to hold it to the abrading member, a cam pin carried by the gear to engage said rocker arm and thereby move the blade-holder from the abrading member, and a trip pin carried by said gear arranged to engage the stop lever and actuate the same to release the blade-holder and set the track.

10. In a machine for the purpose set forth, the combination of an abrading member, means for continuously moving the same, a blade-holder arranged adjacent the abrading member, means for rocking the blade-holder from and toward the abrading member, means for rotating the blade-holder as it moves from the abrading member, a stop lever adapted to project under the blade-holder and provided with a series of stops to be engaged by the blade-holder, and means for yieldably holding the stop lever in a position with the stops under the blade holder.

In testimony whereof I affix my signature.

MELCHIOR L. LUEBBEN. [L. S.]