March 26, 1935. N. H. WATTS ET AL 1,995,875

RAZOR BLADE SHARPENING MACHINE

Filed Sept. 19, 1933

Fig. 1.

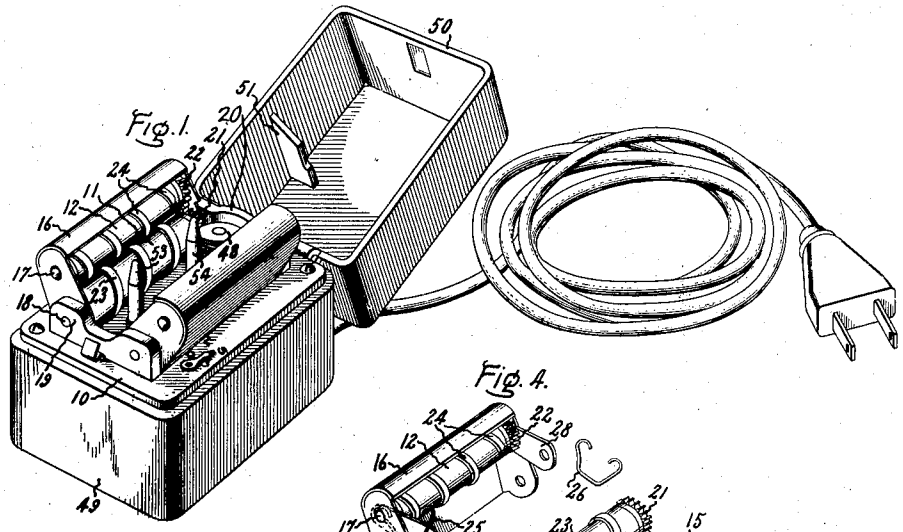


Fig. 4.

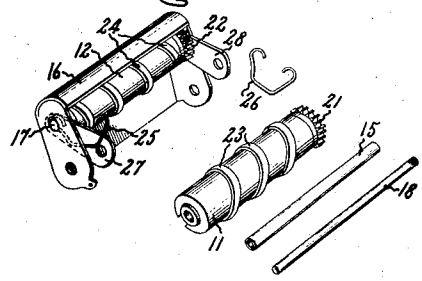


Fig. 5.



Fig. 2.

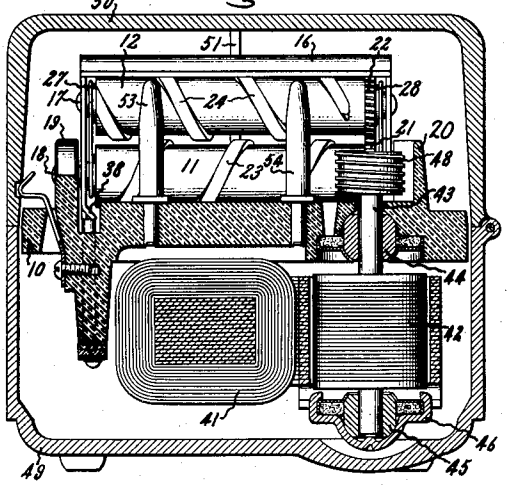


Fig. 3.

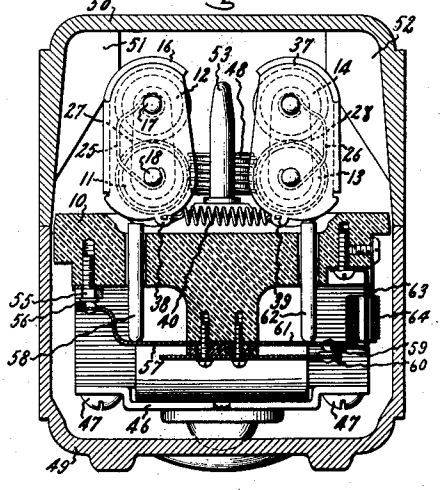
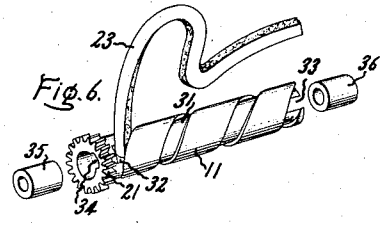


Fig. 6.



Inventors
Noble H. Watts,
Charles A. Clauss.
by Harry E. Dunham
Their Attorney

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RAZOR BLADE SHARPENING MACHINE

Noble H. Watts and Charles A. Clauss, Bridgeport, Conn., assignors to General Electric Company, a corporation of New York

Application September 19, 1933, Serial No. 690,040

7 Claims. (Cl. 51—80)

Our invention relates to razor blade sharpening machines and more particularly to a razor blade sharpening machine driven by an electric motor.

In razor blade sharpening machines provided with a leather stropping surface, difficulty has been experienced in the cutting of the leather by the razor blade. This is generally caused by the blade being inclined at an incorrect angle to the roll when the rolls are advanced to sharpening position. The edge of the blade then cuts into the leather and eventually results in the stropping material becoming severed, requiring renewal of the stropping surface. When the two edges of the blade are sharpened at the same time it may happen that one of the rolls engaging the blade in advance of the other roll will tilt the blade at an angle so that when the other roll moves into engagement with the edge the blade will cut the stropping surface. Also, unless the rolls are exactly positioned, one edge may be sharpened and the other edge may not even be engaged by the other roll.

An object of our invention is to provide a razor blade sharpening machine in which the rolls are so arranged and driven as to insure equal and simultaneous engagement with the opposite edges of the blade.

Another object of our invention is to insure the proper positioning of the razor blade on the supporting pins before the rolls are in full engagement with the opposite edges so that the blade will not extend at an angle to the rolls which may result in damage to the stropping surfaces.

A still further object of our invention is to provide means to time the sharpening action.

What we consider to be novel and our invention will be better understood by reference to the following specification and appended claims when considered in connection with the accompanying drawing, in which Fig. 1 is a perspective view of a sharpener; Fig. 2 is a side elevation in cross section; Fig. 3 is an end elevation in cross section; Fig. 4 is a detail view of the roll assembly; Fig. 5 is a detail view of the upper roll spindle; and Fig. 6 is an exploded view of one of the sharpening rolls.

In the drawing 10 indicates a plate on which is supported sharpening rolls 11, 12, 13, and 14. In Fig. 4 the assembly of rolls 11 and 12 is better indicated. Roll 11 is pivoted on a tube 15. Roll 12 is carried by a casing 16 and is pivoted in oval openings in the ends of casing 16 by means of spindle 17. Tube 15 passes through openings in the bottom end of casing 16. Casing 16 and roll 12 carried thereby are pivoted about spindle 18 which passes through tube 15 and is journaled in upstanding portions 19 and 20 of plate 10 which may be seen in Fig. 1. Rolls 11 and 12 are provided with gears 21 and 22. Spiral stropping surfaces 23 and 24 are provided on each of rolls 11 and 12 respectively, and so positioned that the adjacent convolutions on one roll are spaced between the adjacent convolutions on the other roll. Relative radial movement of rolls 11 and 12 is permitted by the oval openings or guides in which spindle 17 is journaled. To compensate for wear of these stropping or sharpening surfaces 23 and 24, springs 25 and 26 are provided and engage the spindle 17 and tube 15. Springs 25 and 26 in addition to compensating for the wearing of the sharpening surfaces provide a spring pressure between the rolls which remains constant and provides the sharpening pressure desired to accomplish the sharpening of the razor blade. To protect springs 25 and 26 from wear due to the adjacent rotating rolls 11 and 12, plates 27 and 28 are provided and located between the ends of rolls 11 and 12 and springs 25 and 26. Plates 27 and 28 are provided with openings which fit loosely on spindle 17 and tube 15. Grooves 29 and 30 are provided in spindle 17 as may be seen in Fig. 5 in which the springs 25 and 26 fit and prevent the longitudinal movement of the spindle in the loose guides in casing 16 and thus secure spindle 17 and roll 12 in position in casing 16. The construction of the rolls is indicated in Fig. 6 in which roll 11 is shown with its stropping surface 23 removed from the spiral groove 31 in which it is adapted to seat. The gear 21 is integral with the roll 11. Openings 32 and 33 communicating with the central bore of roll 11 are provided at each end of spiral groove 31. A longitudinal groove 34 is also provided on the inner bore of roll 11 in line with openings 32 and 33. The stropping surface is thus secured in spiral groove 31 with its ends extending into openings 32 and 33 and groove 34. These ends are locked in position upon the insertion of two end bushings 35 and 36 which fit within the central bore of tube 11. Bushings 35 and 36 may be aligned and the proper bearing surface provided merely by the drilling of the openings of the bushing. The assembly of rolls 13 and 14 is identical with that of rolls 11 and 12 and, as better indicated in Fig. 3, casing 16 and casing 37 in which roll 14 is carried are provided with extensions 38 and 39 respec-

tively at one end with openings in which a spring 40 is seated. Spring 40 urges the rolls 12 and 14 to the inoperative position rotating them about the axis of rolls 11 and 13.

On the bottom of plate 10 a motor stator 41 having an armature 42 with a shaft 43 passing through an opening in the plate 10 is secured. Shaft 43 is provided with self-aligning bearings 44 and 45, the upper bearing 44 being secured in an opening of plate 10 and the lower bearing 45 by bearing support 46 which is secured with the stator to plate 10 by means of studs 47. A projection in bearing support 46 serves as an end thrust to the lower end of shaft 43. On the end of shaft 43 worm gear 48 is secured which engages gear 21 secured to roll 11 and a corresponding gear secured to roll 13. In order to insure quiet and efficient operation, gear 21 is provided with teeth inclined at the angle of the thread or worm 48. The teeth on gear 22 are inclined at the same angle. Gears secured to rolls 13 and 14 are similarly provided with angular teeth. A housing 49 for the motor and related parts is provided to which plate 10 is secured. As best indicated in Fig. 1, a hinged cover 50 for the rolls is provided and has integral cam surfaces 51 and 52 which are adapted to engage casings 16 and 37 to move the upper rolls 12 and 14 from the inoperative position to which they are biased by spring 40 to a full operative position when the cover 50 is in the fully closed position. Cam surfaces 51 and 52 are so shaped as to move rolls 12 and 14 simultaneously about the spindles of rolls 11 and 13. Cover 50 with the integral cams 51 and 52 provides an important feature of this invention in that they insure simultaneous and equal movement of the two rolls 12 and 14 from the inoperative to the operative position so that there is no danger of one roll engaging one side of the razor blade before the other roll is moved to a corresponding position. This prevents the roll which would otherwise first engage the razor blade from tilting it at an angle so that it cuts into the stropping material on the other roll. Tapered pins 53 and 54 are provided for positioning the razor blade between the rolls. To control energization of the motor, switching means is provided consisting of a stationary contact 55 and a movable contact 56 which is carried on a spring member 57 which biases contact 56 into engagement with stationary contact 55. To move contact 56 from engagement with stationary contact 55 a pin 58 is provided engaging spring member 57 at one end and a cam surface provided on casing 16 at the other end. The cam surface is so arranged as to permit contact 56 to move into engagement with contact 55 as the rolls are moved to operative position upon the closure of the cover 50. Also, the contacts 55 and 56 are in engagement before the rolls are moved to the full operative position so that when the upper rolls first engage the razor blade they are rotating in such a direction as to force the razor blade down into normal position on the bottom rolls 11 and 13 if it was not properly seated before cover 50 was closed. This arrangement further insures the proper seating of the blade to prevent cutting of the stropping surface by the edges of the blade. To time the operation of the sharpener and to control the deenergization of the motor upon the completion of the sharpening action of the rolls, contacts 59 and 60 are provided, contact 59 being carried by a spring member 61 biasing contact 59 out of engagement with contact 60. Movement of contact 59 into engagement with contact 60 against the bias of spring 61 is accomplished by a pin 62 which is engaged by a cam surface on casing 37 as the rolls are moved to the inoperative position by spring 40. A bimetallic thermal strip 63 is provided which is adapted to latch contacts 59 and 60 in the closed position by engagement of an extension of spring member 61. Thus, when the contacts 59 and 60 are moved into engagement upon the movement of the rolls to an inoperative position thermal strip 63 engages spring member 61 and latches the contacts closed. Contacts 59 and 60 are connected in series in the motor circuit with the contacts 55 and 56. When the rolls are subsequently moved to operative position, pin 62 no longer holds contacts 59 and 60 in engagement but thermal strip 63 latches them closed. A thermal coil 64 is provided connected in the circuit of the motor and surrounds the thermal strip 63. When the motor is run for a sufficient time to sharpen the blade the thermal strip 63 moves out of engagement with spring member 61 and permits contacts 59 and 60 to separate. This causes a deenergization of the motor. It is also to be noted that if the cover 50 is opened causing contacts 59 and 60 to be again closed through the intermediary of pin 62, the contacts will not be latched closed by thermal strip 63 until it has moved back to its normal position. This regulates the timing of sharpening action and prevents an overheating of the motor by repeated use of the sharpening machine before the motor has had time to cool. The combination of the thermal latching means with the contacts in the circuit of the motor makes it possible to use a motor which is just sufficiently large to perform the necessary sharpening operation without the danger of the motor being in continued operation for such a length of time as to cause damage to the insulation by the overheating of the motor.

From the foregoing it will be seen that a razor blade sharpening machine is provided with means for protecting the stropping surfaces by insuring the proper seating of the blade as the rolls are moved to operative position. In addition, thermal control is provided which regulates the timing of the sharpening action and makes possible a compact machine without danger of damage to the motor by continuous operation of the device. Also, the rolls are provided with compensating means to insure the proper sharpening action throughout the life of the device and without requiring careful adjustment of the parts and provides the desired sharpening pressure.

What we claim as new and desire to secure by Letters Patent of the United States, is:

1. A razor blade sharpening machine comprising a plate, a motor supported on one side of said plate, a plurality of sharpening rolls supported on the other side of said plate, means interconnecting said motor and said rolls, a housing for said motor, means biasing said rolls to an inoperative position, a pivoted cover for said rolls adapted to move the rolls to operative position upon closure of the cover, and switching means actuated upon closure of said pivoted cover to control the energization of said motor.

2. A razor blade sharpening machine comprising a plate, a motor supported on one side of said plate, a plurality of sharpening rolls supported on the other side of said plate, means interconnecting said motor and said rolls, a housing for said motor, means biasing said rolls to inoperative position, a pivoted cover for said rolls adapted to move the rolls to operative position, switching

means actuated upon closure of said pivoted cover to complete energization of the motor, and thermal control means adapted to deenergize the motor upon a predetermined temperature rise.

3. In a razor blade sharpening machine, two rolls, sharpening material wound spirally with spaced convolutions about each roll, a gear on one roll meshing with a corresponding gear on the other roll, a casing, a spindle for one roll pivoted in bearings in said casing, a tube passing through the other roll and pivoted in openings in said casing, a support for said rolls, and a spindle passing through said tube and secured in upstanding portions of said support.

4. In a razor blade sharpening machine, two rolls, sharpening material wound spirally with spaced convolutions about each roll, a gear on one roll meshing with a corresponding gear on the other roll, a casing, a spindle for one roll pivoted in bearings in said casing, a tube passing through the other roll and pivoted in openings in said casing, and a support for said rolls.

5. A razor blade sharpening machine comprising a plate, a motor stator secured to one side of said plate, a motor armature having a shaft passing through said plate, a worm gear on the end of said shaft passing through said plate, a roll pivoted in upstanding portions of said plate and having a gear meshing with said worm gear, a second roll having a gear meshing with the gear on said last named roll, means biasing said rolls toward each other, means biasing said last named roll to inoperative position, means to move said roll against said biasing means to operative position, switching means actuated upon the movement of said roll to operative position to complete energization of said motor, and thermal control means actuated upon a predetermined rise in temperature of said motor to deenergize the motor.

6. A razor blade sharpening machine comprising a plate, a motor secured to said plate, a shaft connected to said motor and passing through said plate, a worm gear on the end of the shaft, rolls secured to said plate and having gears engaging opposite sides of said worm gear, rolls having gears engaging the gears of said first named rolls, means pivoting said last named rolls for movement about the axis of said first named rolls, resilient means for urging said first and second named rolls toward each other, means biasing said second named rolls from each other, switching means actuated by the movement of one of said second named rolls to complete energization of said motor, thermal control means actuated upon a predetermined temperature rise of said motor to deenergize the motor, and switching means actuated by the movement of another of said second named rolls to replace said thermal control means in operative position after the deenergization of the motor thereby.

7. A razor blade sharpening machine comprising a plate, a motor stator secured to one side of said plate, a motor armature having a shaft passing through said plate, a worm gear on the end of said shaft, a roll pivoted in upstanding portions of said plate and having a gear meshing with said worm gear, a second roll having a gear meshing with the gear on said last named roll, means biasing said rolls toward each other, means biasing said last named roll to inoperative position, means to move said roll against said biasing means to operative position, switching means actuated upon the movement of said roll to operative position to complete energization of said motor, and control means actuated after a predetermined time to deenergize the motor.

NOBLE H. WATTS.
CHARLES A. CLAUSS.