

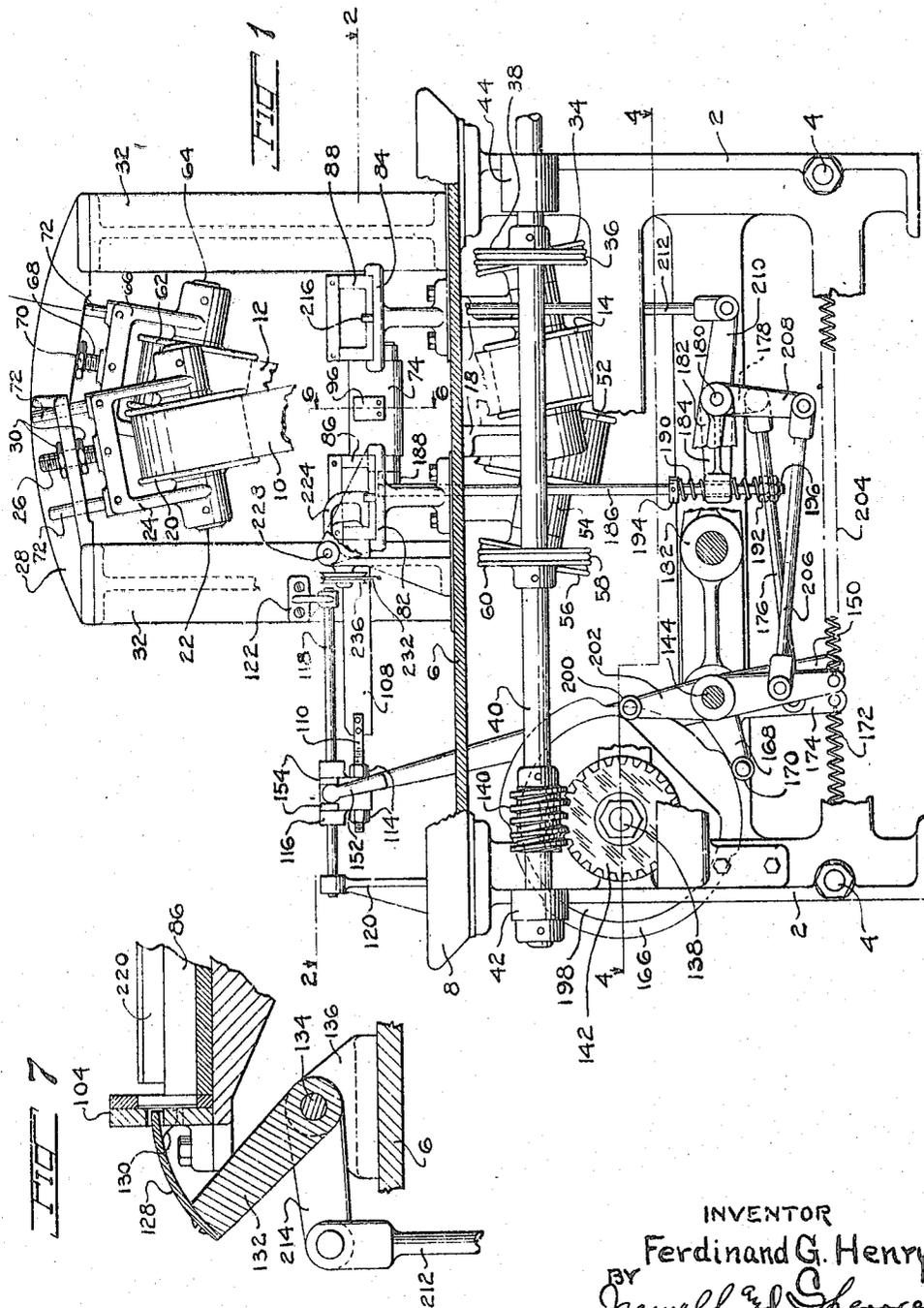
Nov. 18, 1924.

1,515,737

F. G. HENRY  
STROPPING MACHINE

Filed July 16, 1920

4 Sheets-Sheet 1



INVENTOR  
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Nov. 18, 1924.

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STROPPING MACHINE

Filed July 15 1920

4 Sheets-Sheet 2

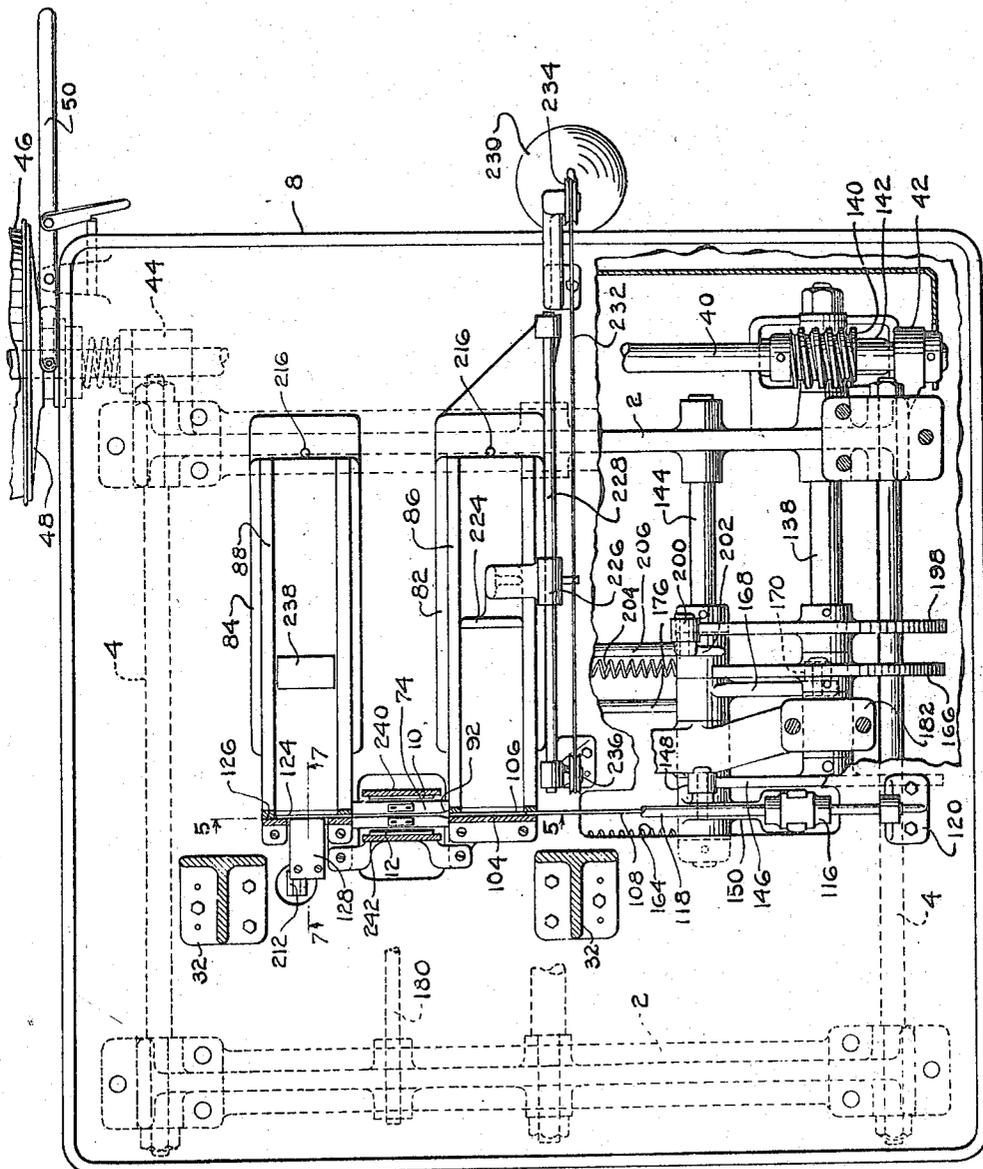


FIG. 2

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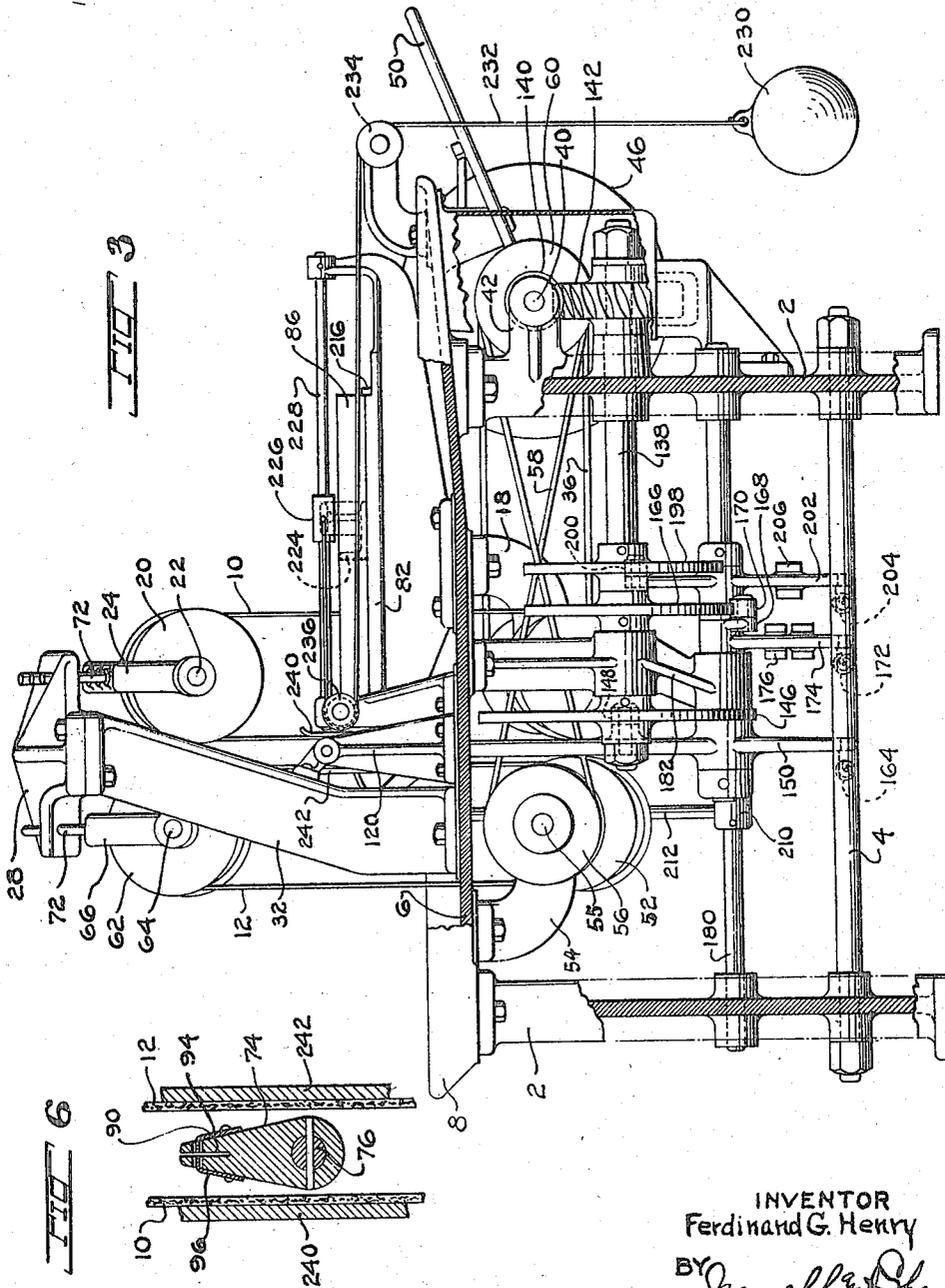
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STROPPING MACHINE

Filed July 15 1920

4 Sheets-Sheet 3



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STROPPING MACHINE

Filed July 16, 1920

4 Sheets-Sheet 4

FIG 4

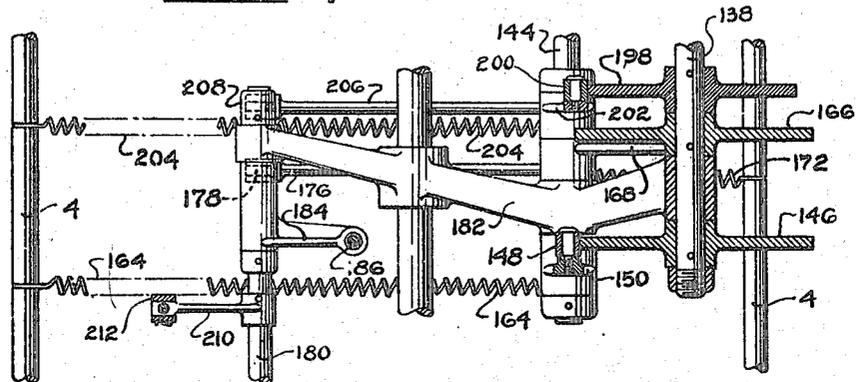


FIG 5

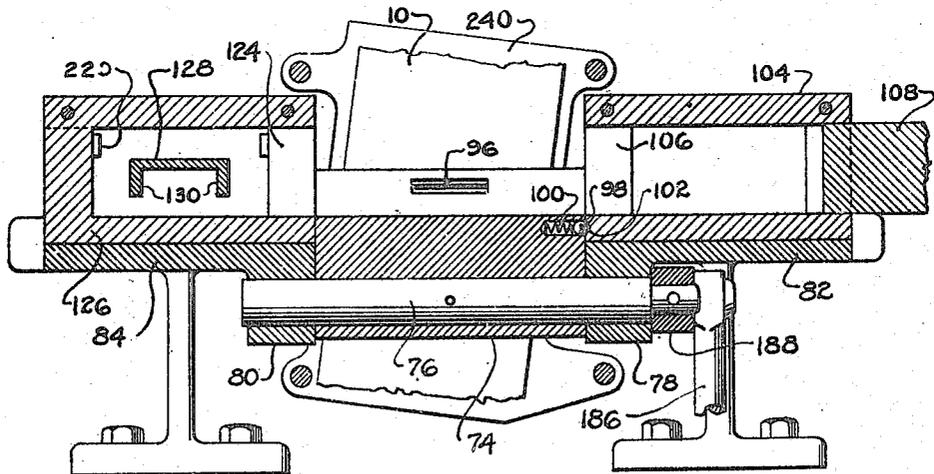


FIG 8

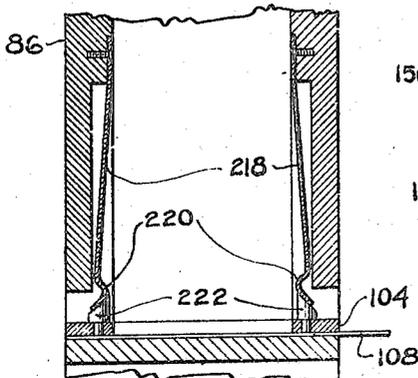
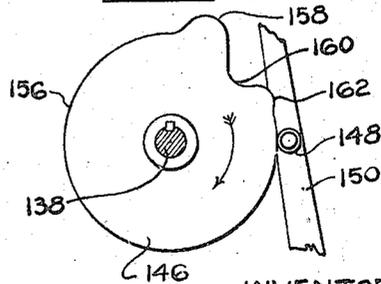


FIG 9



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# UNITED STATES PATENT OFFICE.

FERDINAND G. HENRY, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS,  
TO WALDEN KNIFE COMPANY, OF WALDEN, NEW YORK, A CORPORATION OF NEW  
YORK.

## STROPPING MACHINE.

Application filed July 16, 1920. Serial No. 396,667.

*To all whom it may concern:*

Be it known that I, FERDINAND G. HENRY, a citizen of the United States, residing at New York, N. Y., have invented certain new and useful Improvements in Stropping Machines, of which the following is a clear, full, and exact description.

This invention relates to stropping machines, and is herein shown as embodied in a stropping machine designed to strop the thin removable razor blades now employed with various types of safety razors. It will be understood, however, that the invention is not restricted to the particular embodiment or uses herein illustrated and described, and that many features of the invention are of general utility in the art to which the invention relates.

A general object of the invention is to provide a stropping machine which will automatically present the work to be stropped to the stropping mechanism, effect the stropping of the work, and then remove it from the stropping mechanism.

More particularly, the invention aims to provide means for automatically presenting, in succession, to a stropping mechanism a series of thin blades to be stropped, effecting the stropping of these blades automatically, then removing them from the stropping mechanism, and preferably delivering them to a stack or galley in such manner that they can readily be handled for such further operations as are to be performed on or in connection with them.

An important feature of the invention is the novel arrangement of the strops, whereby the abrasive cut of each is in a direction oblique to the cutting edge of the blade or other work to be stropped.

Another important feature of the invention is the novel means for delivering the blades to the stropping mechanism by an endwise movement—that is, by a movement parallel to the cutting edge.

The invention also comprises novel means for presenting a supply of blades to the blade feeding mechanism after the stropping operation, and retaining them in convenient condition for presentation to other machines, or even for manual manipulation.

Other important features and objects of the invention will appear from the following

description and claims when considered in connection with the accompanying drawings, in which—

Fig. 1 is a front elevation of a machine embodying the invention, certain parts being broken away to disclose more clearly other parts otherwise wholly or partly concealed;

Fig. 2 is a horizontal section of the machine shown in Fig. 1 substantially on the line 2—2 of Fig. 1, parts of this view being also broken away;

Fig. 3 is a side elevation, with parts in section, of the machine shown in Fig. 1, as viewed from the left in Fig. 1;

Fig. 4 is a sectional detail showing the arrangement of the cams and of the levers operated by said cams, this section being taken on the line 4—4 of Fig. 1;

Fig. 5 is a section through the blade feeding mechanism on the line 5—5 of Fig. 2;

Fig. 6 is a section through the blade holder and associated strops on the line 6—6 of Fig. 1;

Fig. 7 is a sectional view through the mechanism for delivering the blades to the receiving galley after the stropping operation, this view being taken on the line 7—7, Fig. 2;

Fig. 8 is a sectional detail showing the blade receiving and delivering end of one of the galleys, the view showing also the means for holding the retaining pawls out of blade retaining position when the galley is in blade delivering position; and

Fig. 9 is a side elevation of the cam which operates the blade feeding slide, this view showing also a portion of the slide operating lever.

The illustrated machine comprises side frame castings 2, connected by cross-rods 4, these castings supporting a table top 6, preferably having a guard flange 8, upon which top are carried the various supports for the blade holding galleys, blade feeding mechanism, blade holder, and the upper supports for the endless blade strops.

The stropping means of the present invention comprises two endless blade strops 10, 12, the strop 10 passing over a driving pulley 14, carried upon a shaft 16, having its bearings in a bracket 18, attached to the under side of the table top 6, the strop 10 also passing over an idler pulley 20, mounted

upon a shaft 22, carried in a yoke 24, having a threaded extension 26, adjustably held upon a cross-piece 28 by nuts 30 upon opposite sides of the crosspiece. The crosspiece 28 is carried upon upright supports 32 mounted upon the table top 6.

The shaft 16 carries outside the bearings in bracket 18 a grooved pulley 34, over which passes a belt 36 traveling in the groove of a second grooved pulley 38 upon the main driving shaft 40 of the machine. The main driving shaft 40 of the machine has its bearings in brackets 42 and 44, preferably cast integral with the associated frame member 2, and at one end the shaft is provided with a driving pulley 46 connected to any suitable source of power, and either directly connected to the shaft 40 through suitable clutch mechanism 48 controlled by a lever 50, this mechanism not being specifically shown and described, since it constitutes no part of the present invention.

The other strop 12 likewise passes over a guide pulley 52 supported upon a shaft having its bearings in a bracket 54, and carrying at one end a grooved pulley 56 connected by a belt 58 to a second grooved pulley 60 on the driving shaft 40, the strop 12 also passing over an idler pulley 62 carried upon a shaft 64, in a yoke 66, having a threaded extension 68, adjustably held in the cross-piece 28 by nuts 70, in the same manner as the extension 26 of the yoke 24.

By suitably adjusting the yokes 24 and 66 upon the crosspiece 28, the desired degree of tautness may be given to the strops. The proper alinement of the yokes is preferably maintained by guide-rods 72 extending from the upper ends of the yokes 24 and 66, and guided in openings in the crosspiece 28.

The strops 10 and 12 preferably travel in planes substantially parallel to each other in their operative paths of travel and are preferably spaced apart such a distance that the blade held in an oscillating blade holder 74, arranged midway between the strops to oscillate about an axis substantially parallel to the planes of the strops in this region, will be presented to each strop at such an inclination to its plane as will produce the desired bevel upon the blade from the stropping operation, the blade holder being preferably operated to present one side of the blade to one strop, and then to oscillate into position to present the other side of the blade to the other strop, the blade being preferably given equal bevels upon its two sides, although it will be understood that the invention is not restricted in this respect.

The blade holder 74 as shown particularly in Figs. 1 and 5 of the drawings, is carried upon a rockshaft 76 having its bearings in ears 78 and 80, depending respectively from the supports 82 and 84, upon which are car-

ried the supply and receiving galleys 86 and 88 and also the blade-guide and feeding mechanism hereinafter to be described. The blade holder itself, as shown in Fig. 6 of the drawings, comprises a wedge-shaped piece having a blade receiving slot 90 in its upper edge, this slot being somewhat enlarged at its blade receiving end, as shown at 92, so as to facilitate guiding the blades into the holder. Spring blade retaining jaws 94 project through transverse openings 96 into the slot 90 to such an extent that the blade forced endwise into the slot must engage and press these jaws apart, thus causing the jaws to hold the blade firmly in the holder 74 for the stropping operation. The construction of the blade holder and the manner of delivering blades into the holder constitute important features of the present invention.

The blade holder is rigid with the rockshaft 76, and is rocked by said shaft to present the blade first to one strop and then the other by means hereinafter to be described, this means preferably stopping with the blade holder in the position shown in Fig. 5. In this position it will be noted that the blade holder is centered for the feeding operation by means of a ball 98 pressed by a spring 100 into a notch 102 in one of the blade guides 104. In this position of the blade holder, it will be seen that the slot 90 of the blade holder is in line with the guide-way 106 in the guide 104, in which guide-way the blade feeding slide 108 travels. The slide 108, which is preferably a strip of steel of approximately the thickness—or possibly slightly more or less than the thickness—of the blade to be fed, is connected to a threaded extension 110 adjustably held by means of nuts 114 in a slide 116, traveling upon a guide rod 118, carried by a bracket 120 on the table 6, and a second bracket 122 on one of the uprights 32. The slide 108 is operated by mechanism, hereinafter to be described, first to push the razor blade along the guide-way 106 into the slot 90 in the blade holder 74, then to withdraw slightly while the blade holder oscillates between the strops to present the blade alternately first to one strop and then to the other, and then, after the stropping operation—when the blade holder has returned to the position shown in Fig. 5—again to move forward and to force the blade from the slot 90 in the blade holder 74, into the guide-way 124, in a second guide 126, from which the blade is then pushed by an oscillating pusher 128 into the receiving galley 88, the pusher 128 being segment-shaped, having depending lugs which increase the width of its pushing face, and being carried upon an arm 132 attached to a rockshaft 134, having its bearings in brackets 136 upon the table top 6.

The blade feeding mechanism, the blade

holder, and the pusher for pushing the blades into the receiving galley are operated from cams carried upon a transverse cam shaft 138 driven from the main shaft 40 by means of a worm 140 engaging a worm wheel 142 upon the cam shaft 138. Extending parallel to the cam shaft 138 is a stationary shaft 144, upon which are mounted several levers which cooperate with the cams upon the cam shaft 138.

The feeding slide 108 is operated from an edge cam 146 on the cam shaft 138, this cam engaging a cam roll 148 upon a lever 150 fulcrumed upon the stationary shaft 144 and forked at its upper end at 152 to embrace the slide 116 which it engages between lugs 154 upon the two sides of said slide. It will be noted that cam 146 (see Fig. 9 of the drawings) has a concentric portion 156, which is the part that is engaging the cam roll 148, while the stropping operation is taking place. Following this concentric portion in the direction of rotation of the cam is the highest point 158 on the cam, which effects the blade ejecting movement of the slide 108—that is, the movement that forces the blade from the slot 90 in the holder 74 in front of the pusher 128 into position to be pushed into the galley 88. Following the highest point 158 on the cam is the lowest point 160, which permits the slide 108 to withdraw beyond the delivery end of the galley 86 to engage another blade to be moved into the slot 90 in the blade holder. This movement of the blade into the blade holder is effected by the part 162 of the cam, following which it will be noted there is a slight withdrawal movement down to the level of the concentric part 156 of the cam. The cam roll 148 is held in engagement with the cam 146, to cause the lever 150, to follow the curvature of the cam, by the action of a spring 164, connected at one end to the lower end of the lever 150, and at its other end to one of the cross-rods 4 of the machine frame.

The oscillation of the blade holder 74 is effected from an edge cam 166 on the cam shaft 138 by connections now to be described. Upon one arm 168 of a bell-crank lever, fulcrumed on the stationary shaft 144, is carried a cam roll 170 engaging the cam 166, this cam roll being held in engagement with said cam by means of a spring 172 connected at one end to the other arm 174 of said bell-crank lever, and at its other end to one of the cross-rods 4 of the machine frame. The arm 174 of said bell-crank lever is also connected by a link 176 to an arm 178 of a second bell-crank fulcrumed upon a stationary shaft 180 carried by brackets 182, the other arm 184 of the last-mentioned bell-crank having its end bored to receive a rod 186 pivotally connected at its upper end to an arm 188 attached to one

end of the rockshaft 76 upon which the blade holder 74 is carried. A yielding connection is provided, between the bell-crank arm 184 and the rod 186, comprising springs 190 and 192 surrounding the rod 186 above and below the arm 184 and confined between a collar 194 fastened to the rod 186 above the arm 184 and nuts 196 screwed upon the lower end of the rod. The stroke imparted to the arm 184 by the cam 166 is preferably more than enough to oscillate the blade holder from one strop to the other, the remainder of the stroke being taken up by one or the other of the springs 190, 192, thus placing a yielding pressure upon the blade as it is held against the strop. The amount of this pressure can be varied by adjusting the nuts 196.

The pusher 128 is operated from a cam 198 carried on the cam shaft 138, this cam engaging the cam roll 200 on the upper end of the lever 202 fulcrumed on the stationary shaft 144. Cam roll 200 is held against the cam 198 by the action of a spring 204 connected at one end to the lower end of the lever 202, and at its other end to one of the frame cross-rods 4. A link 206 connects the lower arm of the lever 202 to one arm 208 of a bell-crank fulcrumed on the stationary shaft 180, the other arm 210 of said bell-crank being connected by link 212 to an arm 214 on the rockshaft 134, which carries the pusher 128.

From the foregoing description of the connection between the pusher 128 and cam 198, it will be seen that the blade pushing movement of the pusher is effected by the action of the spring 204, which causes the cam roll 200 to follow the shape of the cam 198. There is thus no danger of breakage of the machine in the event of clogging, due to a blade becoming misplaced in the guide-way.

The blades to be operated upon are preferably carried to the machine in a portable galley, such as shown in Figs. 2 and 8, the galley in which the supply of blades to be treated is held being preferably identical in construction with that in which the blades are to be received after treatment, whereby these galleys may be carried from one to another of a series of machines which I have designed for use in the manufacture of razor blades, the receiving galley of one machine—after being filled—serving as the supply galley of the next machine, and vice versa. These galleys are placed horizontally in the machine, being carried upon the supports 82 and 84 and, as shown, are located between pins 216 upon these supports and the respective guides 104 and 126. As shown in Fig. 8 of the drawings, each galley has at its end—which serves both as a delivery end and a receiving end—spring retaining pawls 218 having shoulders 220 normally

projected over the side edges of the endmost blade in the galley. To facilitate delivery of the blades to the feeding mechanism, the guide 104 is provided—upon its face adjacent to the galley 86 which holds the blades to be stropped—with a pair of beveled pins or lugs 222, which engage correspondingly beveled faces of the pawls 218 when the galley is shoved into blade delivering relation to the guide 104 and spring these pawls back out of blade engaging position, thus permitting the blades to be moved freely into the path of the feeding slide 108 when that is withdrawn into blade receiving position. The blades are forced along the galley toward the guide 104 by an arm 224 projecting behind the endmost blade in the line of blades in the galley, this arm being carried by a slide 226 guided on a rod 228. The arm 224 is held constantly pressed against the endmost blade in the line by the action of a counterweight 230, carried on a cord 232, and passing over a pulley 234 and about a second pulley 236 near the forward end of the galley, whereby the weight tends to pull the slide 226 toward the forward end of the galley.

When one of the galleys is used as a receiving galley, the spring pawls 218 are left in their normal position, no spreading means being provided upon the guide 126, and therefore each blade must be pushed past the retaining shoulders 220 on the pawls 218 by the pusher 128. In the receiving galley it is only necessary to provide a slidable weight, such as the weight 238 shown in Fig. 2, this weight being forced along the galley by the action of the pusher 128 as it pushes the successive blades past the shoulders 220 of the pawls 218.

From the foregoing description, the operation of the machine will readily be understood. As soon as the clutch 48 is operated to connect the pulley 46 with the driving shaft 40, the endless strops 10 and 12 will be driven by their driving pulleys 14 and 52, which in turn are driven from the shaft 40 by the belts 36 and 58, these strops preferably passing over backing plates 240 and 242 in the region where the stropping operation takes place.

Starting the machine causes the cam shaft 138 to rotate through its worm and gear connection with the shaft 40, whereby the feeding slide will be operated to engage the blade which has been forced into the guide 104 by the action of the counterweight 230 upon the arm 224, and will move this blade along the guide into the slot 90 of the blade holder and between the spring fingers 94. As the feeding slide 108 withdraws for a slight distance—but not enough to uncover the mouth of the galley 86—the blade holder will be oscillated by its con-

nections with the cam 166 to carry the blade held between the spring fingers 94 in the slot 90, first against one of the strops 10, 12 and then against the other.

The stropping operation having been completed, the blade holder 74 moves to its intermediate position shown in Fig. 5, in which the slot 90 is again in line with the guide-ways 106 and 124, at which time the cam roll 148 will ride upon the highest point 158 of the cam 146, and the slide 108 will be moved to eject the blade from the slot 90 in the blade holder 74, the blade being carried forward into the guide 124 until it is in line with the pusher 128, which then operates to push it past the spring shoulders 220 on the spring pawls 218 into the receiving galley 88, this operation forcing the weight 238 along the galley 88 a distance equal to the thickness of one blade. In the meantime, the slide 108—following the movement of the cam roll 148 into the depression 160 of the cam 146—has withdrawn far enough to uncover the end of the galley 86, thus permitting the weight 230 to act upon the arm 224 to force another blade into the guide-way 106 in front of the slide 108. The operation is then repeated until either the supply of blades is exhausted, or the clutch 48 is operated to disconnect the driving pulley 46 from the shaft 40.

What I claim as new is:

1. In a machine of the class described, a blade holder arranged to hold a blade in substantially fixed relation to the holder during the operation thereon and having relatively fixed portions spaced from each other to form a blade receiving slot and means for taking a blade from a source of supply and feeding it into said slot.

2. In a machine of the class described, a blade holder arranged to hold a blade in substantially fixed relation to the holder during the operation thereon and having relatively fixed portions spaced from each other to form a blade receiving slot extending from one side of said holder to the other, and means for feeding a blade endwise into said slot from one side of said blade holder.

3. In a machine of the class described, a blade holder arranged to hold a blade in substantially fixed relation to the holder during the operation thereon and having relatively fixed portions spaced from each other to form a blade receiving slot extending from one side of said holder to the other, means for feeding a blade endwise into said slot from one side of said blade holder and for likewise moving said blade out of said blade holder to the other side thereof.

4. In a machine of the class described, a blade holder comprising blade engaging jaws yieldingly held normally in clamping

relation, and means for guiding and forcing a blade endwise into position between said jaws.

5 5. In a machine of the class described, a blade holder comprising blade engaging jaws yieldingly held normally in clamping relation, and means arranged to engage one end of a blade held by said jaws and force it endwise out of said jaws.

10 6. In a machine of the class described, an oscillating blade holder having a position of rest and means operating transversely to the plane of oscillation of said blade holder for feeding a blade thereto while in its position of rest.

15 7. In a stropping machine, the combination with opposed strops, a blade holder arranged to oscillate between said strops, and means for delivering a blade to said blade holder, said means having a further movement for ejecting the blade from said holder after the stropping operation.

20 8. In a machine of the class described, a blade holder comprising a member having a blade receiving slot and blade retaining springs extending into said slot from opposite sides thereof and arranged to be forced apart by the blade as it enters said slot.

25 9. In a machine of the class described, a blade holder comprising a member having a blade receiving slot enlarged at its blade receiving end to facilitate entrance of the blade, blade retaining springs having inwardly bent ends projecting into said slot and means for inserting blades edgewise into the slot.

30 10. A machine of the class described comprising, in combination, stropping means, a blade holder movable to present first one side and then the other of a blade held therein to said stropping means, and means for automatically delivering the blade to be stropped to said blade holder and for removing said blade from said holder after the stropping operation.

35 11. A machine of the class described comprising, in combination, stropping means, a blade holder movable to present first one side and then the other of a blade held therein to said stropping means, and means for moving the blade to be stropped edgewise into said blade holder.

40 12. A machine of the class described comprising, in combination, stropping means, a blade holder movable to present first one side and then the other of a blade held therein to said stropping means, and means for moving the blade to be stropped edgewise into said blade holder and for moving said blade edgewise out of said holder after the stropping operation.

45 13. A machine of the class described comprising, in combination, stropping means, a blade holder, movable to present first one side and then the other of a blade held

therein to said stropping means, and means for moving the blade to be stropped in the general direction of its edge into one end of said blade holder and for moving said blade also in the general direction of its edge out of the other end of said blade holder after the stropping operation. 70

14. The combination with means for operating on a razor blade and a blade holder for presenting the blade to said operating means, of means for holding a supply of blades to be treated, means for moving a single blade from said supply into said blade holder, said means having a further movement to eject said blade from said blade holder after it has been acted upon by said first mentioned means. 75

15. In a machine of the class described, the combination with a blade holder comprising blade engaging jaws yieldingly held normally in clamping relation to each other, of a guide arranged to guide a blade endwise between said jaws, a second guide arranged to receive said blade endwise when it is ejected from said jaws, and means for moving a blade along said first-mentioned guide into position between said jaws and for moving said blade from its position between said jaws into said receiving guide. 80

16. In a machine of the class described, the combination with a galley for holding blades to be treated, a galley for receiving the blades after treatment, a blade holder arranged to hold a blade in substantially fixed relation to the holder during the operation thereon, a guide extending from said supply galley into blade-delivering relation to said blade holder, a second guide extending from said blade holder to blade-delivering relation to said receiving galley, and means for automatically effecting, in succession, movement of the blades from the supply galley along said first-mentioned guide to the blade holder and for effecting the movement of said blades in succession from said blade holder along said last-mentioned guide to said receiving galley. 85

17. In a machine of the class described, the combination with a galley for holding razor blades and along which said blades are movable in a direction substantially normal to the blade plane, of a blade holder having a to and fro movement in a direction substantially parallel to the movement of the blades along said galley and having a position of rest, and means for guiding and moving the innermost blade of those in said galley from said galley to said blade holder when said holder is in its position of rest. 90

18. In a machine of the class described, the combination with a galley for holding a supply of razor blades to be treated and along which said blades are movable in a direction substantially normal to the blade 95

- plane, a second galley for receiving the blades after treatment, means for guiding and moving said blades in a rectilinear path in succession from said first galley into position to be treated and then after treatment into position opposite said second galley, and means movable lengthwise of said second galley for pushing said blade from said aforementioned means into said galley.
19. In a machine of the class described, the combination with means for operating upon razor blades and a galley for receiving the blades after they have been operated upon, of spring-pressed retaining pawls at the receiving end of said galley having bevelled ends arranged to be engaged by the ends of the blades and forced back as the blades are moved into the galley for retaining the endmost blade, and means for forcing each blade after it has been operated upon past said retaining pawls into said galley.
20. In a machine of the class described, the combination with means for operating upon razor blades, a galley for holding a supply of blades, a second galley, interchangeable with the first, for receiving the blades after they are operated upon, and means for moving the blades singly from said first galley to the operating means and for then moving said blades from the operating means into the second galley.
21. In a machine of the class described, the combination with means for operating upon razor blades, a galley for holding a supply of blades to be operated upon, a second galley, interchangeable with the first, for receiving the blades after they are operated upon, means for transferring the blades from the first galley to the operating means and then to the second galley, said galleys being parallel to each other and said transferring means including mechanism for moving the blades in a direction normal to the directions of movement of the blades in the galleys.
22. In a machine of the class described, the combination with means for operating upon razor blades, of a horizontal galley for holding a supply of blades to be operated upon, said blades being supported upon edge in face abutting relation in said galley, a second galley, interchangeable with the first, for receiving the blades after they are operated upon, means for transferring the blades from said first galley to said operating means and then to said second galley, and means for moving said blades along said first galley to said transferring means.
23. In a machine of the class described, the combination with means for operating on a blade, a blade holder for presenting the blade to said operating means and means for delivering the blade to said blade holder and for removing it therefrom, of a galley for holding a supply of blades to be operated upon by said delivering means, said galley having yielding means for retaining the blades therein, whereby the galley may be removed bodily with a supply of blades, and means associated with the delivering means for rendering said retaining means inoperative when the galley is brought into operative relation to said delivering means.
24. In a machine of the class described, the combination with means for operating upon razor blades, a supply galley and a receiving galley for said blades, of means operating in a rectilinear direction normal to the direction of movement of the blades in said galleys for transferring a blade from said supply galley to said operating means and then to a position opposite said receiving galley, blade retaining springs mounted on the opposite sides of the receiving galley at the blade receiving end thereof, and having beveled faces arranged to be engaged by the blades to push back the springs as the blades are projected into the galley, and shoulders for engaging the blades to hold them in position in the galley, and means for pushing the blades past the retaining springs into the galley.
25. In a machine of the class described, the combination with means for operating upon razor blades, of a supply galley and a receiving galley both arranged on one side of the line of feed of the blades from the supply galley and toward the receiving galley, means operating in a rectilinear direction normal to the direction of movement of the blades in said galleys for transferring a blade from the supply galley into position to be presented to the operating means and from said position to the receiving galley and arranged to control at all times the movement of the blades from said position into the receiving galley, means located upon one side of the line of feed of the blades in said direction for moving the blades in the supply galley toward said transferring means, and means located upon the other side of the line of feed for moving the blades from said transferring means into said receiving galley.
26. In a machine of the class described, the combination with means for operating upon blades and a blade holder arranged to hold the blades in substantially fixed relation to the holder during the operation thereon for presenting the blade to said means, of a two-step feeding device in the path of which the blades are located at a certain point in the operation of the machine thereon to cause said device to feed the blades arranged first to feed a blade to said holder by movement of said device in a certain direction and then after the blade has been operated upon by said operating means to eject said blade therefrom by a second

movement of said device in the same direction, and means for moving said blade out of the path of said feeding device at the end of the second feeding step.

5 27. A machine of the class described comprising, in combination, stropping means, a blade holder arranged to present a blade to be stropped to said means, a galley for holding the blades to be stropped arranged to hold and guide the blades by engagement with one or more peripheral edges of the same, a similar second galley for receiving the stropped blades, means for taking a blade from said first galley and delivering it to said blade holder, and for moving said blade into said second galley after the stropping operation.

20 28. A machine of the class described comprising, in combination, opposed strops, a blade holder and means to oscillate it to present a blade alternately to said strops, and means for introducing a blade to be stropped into said holder and for removing it from said holder after the stropping operation.

25 29. A machine of the class described comprising, in combination, stropping means, a movable blade holder arranged to present a blade to be stropped to said means by a lateral movement of the blade, means for feeding blades to be stropped singly to said blade holder and means acting transversely to the direction of movement of the feeding means for advancing blades successively into the field of operation of the feeding means.

30 30. A machine of the class described comprising, in combination, opposed strops traveling in paths which cross, automatically actuated means for driving said strops, a blade holder, and means independent of the strops for oscillating said holder to present a blade alternately to said strops.

40 31. A machine of the class described comprising, in combination, opposed strops traveling in paths which cross, a blade holder arranged to oscillate between said strops in a plane oblique to the path of travel of each, and means for delivering a blade to be stropped to said holder and for removing said blade from said holder after the stropping operation.

50 32. A machine of the class described comprising, in combination, opposed strops moving in paths which cross, a blade holder arranged to oscillate between said strops in a plane oblique to the path of travel of each strop, means for driving said strops and means for oscillating said blade holder.

60 33. A stropping machine comprising, in combination, opposed endless strops, an oscillatory blade holder movable between said strops to present a blade to be stropped alternately thereto, the stropping faces of said strops traveling in directions oblique to the edge of the blade in said holder and also in directions oblique to each other, whereby the

abrasions upon one side of the cutting edge of the blade are inclined in one direction and the abrasions on the opposite side are inclined in another direction and means for oscillating the blade holder.

70 34. A stropping machine comprising, in combination, endless belt strops having stropping faces traveling in directions oblique to each other, and a blade holder movable to present a blade held thereby alternately to said strops, said holder being arranged to present the blade with its edge oblique to the direction of movement of each strop.

80 35. In a stropping machine, the combination with opposed endless belt strops, pairs of supporting pulleys for said strops arranged to guide said strops in paths which cross, and means for oscillating a razor blade to be stropped between said strops substantially at the point of crossing and in a plane oblique to the path of travel of each strop.

85 36. In a stropping machine, the combination with opposed endless belt strops and pairs of pulleys for supporting and driving said strops, of a blade holder arranged to oscillate between said strops, and means for delivering a blade endwise to said blade holder.

90 37. In a machine of the class described, the combination with stropping means, a blade holder arranged to present a blade to be stropped to said means and means for automatically feeding blades singly to said blade holder and for removing the blades singly from said blade holder after the stropping operation, of a removable galley for holding a supply of blades to be operated upon by said feeding means and a second galley interchangeable with the first galley arranged to receive the blades from said blade holder after the stropping operation.

95 38. In a machine of the class described, the combination with stropping means, a blade holder arranged to present a blade to be stropped to said stropping means and means for feeding the blade to said holder and for removing it from said holder, of interchangeable galleys arranged respectively to contain a supply of blades to be fed to said holder and to receive the blades after the stropping operation, means acting upon the supply of blades in said first mentioned galley to move them horizontally into position to be acted upon by said feeding means and means acting transversely to the direction of feeding movement for moving the blades removed from said blade holder into said last mentioned galley.

100 39. In a stropping machine, the combination with an oscillating blade holder and opposed endless strops traveling in directions oblique to each other into alternating engagement with which the oscillation of

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said holder brings a blade held thereby, of means for effecting the oscillation of said blade holder constructed to impart to said holder an oscillating stroke of a length greater than the distance between said strops, yielding connecting devices between said blade holder and said means and backing plates for said strops behind those portions of the strop engaged by the blade.

40. A machine for operating on blades having, in combination, means for operating on blades and mechanism for presenting blades to the operating means and for delivering the blades therefrom, comprising devices constructed to form a blade guideway, a blade holder for carrying blades into and out of engagement with the operating means, and means for moving the blade holder transversely of the guideway toward and from a position in line with said guideway.

41. A machine for operating on blades having, in combination, means for operating on blades, mechanism for presenting blades to the operating means and for delivering the blades therefrom, comprising devices constructed to form a blade guideway, a movable blade holder for carrying blades into and out of engagement with the operating means, and means for moving the blade holder transversely of the guideway into and out of position to receive blades from said guideway.

42. A machine for operating on blades having, in combination, means for operating on blades, mechanism for presenting blades to the operating means and for delivering the blades therefrom, comprising devices constructed to form a blade guideway through which the blades are arranged to slide, a movable blade holder the blade holding parts of which are arranged to move together as a unit into and out of operating position with relation to the guideway for carrying blades into and out of engagement with the operating means, and means for moving the blade holder to carry the blade holding parts thereof together into and out of position to deliver blades to said guideway.

43. A machine for operating on blades having, in combination, means for operating on blades, mechanism for presenting blades to the operating means and for delivering blades therefrom, comprising a movable blade holder for carrying blades into and out of engagement with the operating means, devices constructed to form a blade guideway from which blades are delivered into the blade holder, and to form a second blade guideway into which blades are received from the blade holder, and means for moving the blade holder into and out of position to receive blades from the

first guideway, and into and out of position to deliver blades to the second guideway.

44. A machine for operating on blades having, in combination, means for sharpening blades, a receiving galley arranged to hold and guide the blades by engagement with one or more peripheral edges of the same, and means for presenting blades successively to the means for operating thereon and then delivering the same into the receiving galley.

45. A machine for operating on blades having, in combination, means for sharpening blades, means provided with a blade guideway arranged to receive blades after they are acted upon by said sharpening means, a receiving galley constructed to hold and guide the blades by engagement with one or more peripheral edges of the same and arranged to receive blades from said guideway and means for passing blades through said guideway and projecting the same into the receiving galley.

46. A machine for operating on blades having, in combination, means for operating on rectilinear blades, means having a blade guideway arranged to receive blades after they are acted upon by said sharpening means, arranged for the passage of blades edgewise therethrough and having a width only slightly greater than the thickness of a blade so as to hold the blade substantially from lateral movement therein, means for passing blades through said guideway, a receiving galley arranged transversely to said guideway and means for engaging one face of a blade and projecting the same in a direction transverse to the blade plane from the guideway into the receiving galley.

47. A machine for operating on blades having, in combination, means for operating on blades, a blade holder arranged to hold a blade substantially in fixed relation to said holder during the operation thereon for carrying blades into and out of engagement with the means for operating thereon, devices constructed to form a blade guideway arranged to deliver blades edgewise to said blade holder and to form a second blade guideway arranged to receive blades edgewise from said blade holder.

48. A machine for operating on blades having, in combination, a movable blade holder, means for operating on blades, a supply galley, a receiving galley, means for transferring the blades from the supply galley to the blade holder before they are operated upon and for transferring the blades from the blade holder to the receiving galley after they are operated upon and means for moving the blade holder to present the blades to the operating means.

49. A machine for operating on blades

having, in combination, means for operating on blades, means having a blade guideway, a blade holder, a second blade guideway, means for transferring the blades in succession from the first blade guideway to the blade holder before the operation thereon and for transferring the blades from the blade holder to the second blade guideway after the operation and means for moving the blade holder to present the blades to the operating means.

50. A machine for operating on blades having, in combination, means for operating on blades, means for presenting blades to the operating means and for delivering blades therefrom comprising a blade-holding galley removably mounted in the machine and constructed to serve either as a supply galley or as a receiving galley, and means for holding said galley alternately in position to supply blades successively to be operated upon or in position to receive blades successively after they are operated upon.

51. A machine for operating on blades having, in combination, means for operating on blades, means for presenting blades to the operating means and for delivering blades therefrom comprising a galley adapted to receive a pack of blades, placed face to face, and having a central guideway along which blades may be moved in a direction transverse to the blade plane formed by a base plate and lateral ribs rising therefrom, and means for removably locating the galley in operating position in the machine.

52. A machine for operating on blades having, in combination, means for operating on blades, means for presenting blades to the operating means and for delivering blades therefrom comprising a supply galley adapted to receive a pack of blades placed face to face and constructed for the passage of blades along the same by a movement of the blades in a direction transverse to the blade plane, means provided with a guideway into which the blades are delivered directly and successively by said galley arranged for the passage of the blades therethrough by a movement of the blades in the blade plane in the delivery of the same to the operating means, means having a similar guideway in line with said first guideway and adapted to receive the blades after being operated upon, and a similar galley arranged to receive the blades successively from the latter guideway.

53. A machine for operating on blades having, in combination, means for operating on blades means for presenting blades to the operating means and for delivering blades therefrom comprising means provided for a guideway arranged for the passage of the blades therethrough by movement of the blades in the plane thereof and in the direction of their forward edges in deliv-

ering the same to the operating means, a galley adapted to receive a pack of blades, placed face to face, constructed for the passage of blades along the same by a movement of the blades in a direction substantially perpendicular to the plane thereof and arranged substantially perpendicular to said guideway so as to deliver directly the blades successively thereto, means having a similar guideway arranged to receive the blades successively after they are operated upon, and a similar receiving galley arranged substantially perpendicular to the second guideway into which the blades are delivered successively from the latter guideway.

54. A machine for operating on blades having, in combination, means for operating on blades means for presenting blades to the operating means and for delivering blades therefrom comprising means having a guideway arranged for the passage of blades therethrough by a movement of the blades in the plane thereof and in the direction of their forward edges, a blade holder into which the blades are delivered from said guideway, and means for moving the blade holder in a direction substantially perpendicular to the blade plane to present the blades to the operating means.

55. A machine for operating on blades having, in combination, means for operating on blades, means for presenting blades to the operating means and for delivering blades therefrom comprising a blade holder, means for moving the blade holder in a direction substantially perpendicular to the blade plane to present the blades to the operating means, and means having a guideway arranged to receive blades from said blade holder and constructed for the passage of blades therethrough by a movement of the blades in the plane thereof and in the direction of their forward edges.

56. A machine for operating on blades having, in combination means for operating on blades, mechanism for presenting blades to the operating means and delivering blades therefrom comprising means having a blade guideway constructed for the passage of blades therethrough by movement of the blades in the plane thereof and in the direction of their forward edges, a blade holder arranged to receive blades from said guideway, means for moving the blade holder in a direction substantially normal to the blade plane to present the blades to the operating means, and means having a second guideway similar to the first guideway and arranged in line therewith to receive blades from said blade holder after they are operated upon.

57. A machine of the class described, having in combination means for sharpening the edges of blades, means having a guideway arranged for sliding movement of the blades

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- therethrough leading past the blade sharpening means in which the blades are held while operated upon, a supply galley arranged to deliver blades to said guideway, a receiving galley arranged to receive blades from said guideway, and mechanism for sliding the blades in succession through the guideway and for causing the transfer of the blades in succession from the galley to the guideway.
58. A machine of the class described, having in combination means for sharpening the edges of blades, means having a guideway leading past the blade sharpening means and arranged for the sliding of the blades edgewise therethrough in which the blades are held while operated upon, a supply galley arranged to deliver blades to said guideway, a receiving galley arranged to receive blades from said guideway, and mechanism for sliding the blades in succession through the guideway and for causing the transfer of the blades in succession from the supply galley to the guideway.
59. A machine of the class described, having in combination means for sharpening the edges of blades, means having a guideway arranged for sliding movement of the blades therethrough leading past the blade sharpening means in which the blades are held while operated upon, a supply galley arranged to hold a pack of blades and to deliver the same to the guideway by movement of the blades in a direction transverse to the blade plane, a receiving galley into which the blades are carried from the guideway by movement of the blades in a direction transverse to the blade plane, and mechanism for sliding the blades in succession through the guideway and for causing the transfer of the blades in succession from the supply galley to the guideway and from the guideway to the receiving galley.
60. A machine of the class described, having in combination means for sharpening the edges of blades, means having a guideway constructed for the sliding of the blades therethrough and arranged to guide the blades edgewise past the blade sharpening means in which the blades are held while operated upon, a supply galley arranged to hold a pack of blades and to deliver the same in succession to the guideway by movement of the blades in a direction substantially normal to the blade plane, a receiving galley into which the blades are delivered from the guideway by movement of the blades in a direction substantially normal to the blade plane, and mechanism for sliding the blades in succession through the guideway and for causing the transfer of the blades in succession from the supply galley to the guideway and from the guideway to the receiving galley.
61. A machine of the class described, having in combination means for sharpening the edges of blades, means having a guideway constructed for the sliding of the blades therethrough and arranged to guide the blades endwise past the blade sharpening means in which the blades are held while operated upon, a supply galley arranged to hold a pack of blades and to deliver the same in succession to the guideway by movement of the blades in a direction substantially normal to the blade plane, a receiving galley into which the blades are delivered from the guideway by movement of the blades in a direction substantially normal to the blade plane, and mechanism for sliding the blades in succession through the guideway, and for causing the transfer of the blades in succession from the supply galley to the guideway and from the guideway to the receiving galley.
62. A machine of the class described, having in combination means for sharpening the edges of blades, means stationary in the direction of movement of the blades and having a guideway extending past the operating means in which the blades are held while operated upon, a receiving galley to receive the blades in succession from the guideway, and means for causing movement of the blades in succession through the guideway and from the guideway into the receiving galley.
63. A machine of the class described, having in combination means for operating on blades, means having a rectilinear guideway leading past the operating means and arranged for the sliding movement of the blades therethrough in which the blades are held while operated upon, a supply galley arranged to deliver blades to said guideway, a receiving galley arranged to receive blades from said guideway, and mechanism arranged to control at all times the movement of the blades for sliding the blades in succession through the guideway and for causing the transfer of the blades in succession from the supply galley to the guideway and from the guideway to the receiving galley.
64. A machine of the class described, having in combination means for operating on blades, means having a rectilinear guideway leading past the operating means and arranged for the sliding of blades edgewise therethrough in which the blades are held while operated upon, a supply galley arranged to deliver blades to said guideway, a receiving galley arranged to receive blades from said guideway, and mechanism arranged to control at all times the movement of the blades for sliding the blades in succession through the guideway and for causing the transfer of the blades in succession from the supply galley to the guideway and from the guideway to the receiving galley.

65. A machine of the class described, having in combination means for sharpening the edges of blades, means stationary in the direction of movement of the blades and having a guideway leading past the blade sharpening means and arranged for the sliding of the blades therethrough in which the blades are held while operated upon, a receiving galley arranged to receive the blades from said guideway, and mechanism for sliding the blades in succession through the guideway and for causing the transfer of the blades in succession from the guideway to the receiving galley.

66. A machine of the class described, having in combination means for sharpening the edges of blades, means stationary in the direction of movement of the blades and having a guideway leading past the blade sharpening means and arranged for the sliding of the blades edgewise therethrough in which the blades are held while operated upon, a receiving galley arranged to receive

blades from said guideway, and mechanism for sliding the blades in succession through the guideway and for causing the transfer of the blades in succession from the guideway to the receiving galley.

67. A machine of the class described, having in combination means for operating on blades, means having a rectilinear guideway in which the blades are held while operated upon, a receiving galley arranged relatively to the said guideway so as to receive the blades therefrom, and means arranged to control at all times the movement of the blades for passing the blades through the guideway past the operating means and projecting the same from the guideway into the receiving galley.

Signed at Jersey City, N. J. this 13 day of July, 1920.

FERDINAND G. HENRY.

Witnesses:

EMMA C. PETERSEN,  
GEORGE WHITE.

**Certificate of Correction.**

It is hereby certified that in Letters Patent No. 1,515,737, granted November 18, 1924, upon the application of Ferdinand G. Henry, of New York, N. Y., for an improvement in "Stropping Machines," errors appear in the printed specification requiring correction as follows: Page 8, line 90, claim 46, strike out the word "rectilinear" and insert the same before the word "blade" in line 91; page 9, line 61, claim 53, for the word "for" read *with*, and line 72, same claim, for the misspelled word "substantialy" read *substantially*; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 31st day of March, A. D. 1925.

[SEAL.]

**KARL FENNING,**  
*Acting Commissioner of Patents.*