April 12, 1927. 1,624,593

G. D. GALLAGHER

SAFETY RAZOR BLADE STROPPER

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FIG. 1.

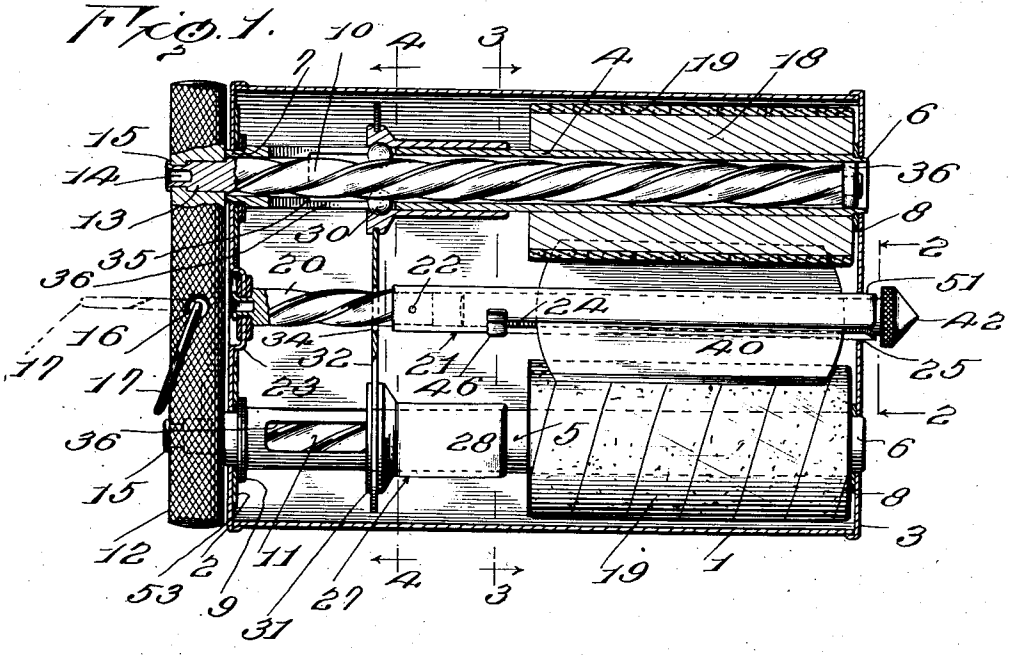


FIG. 2.

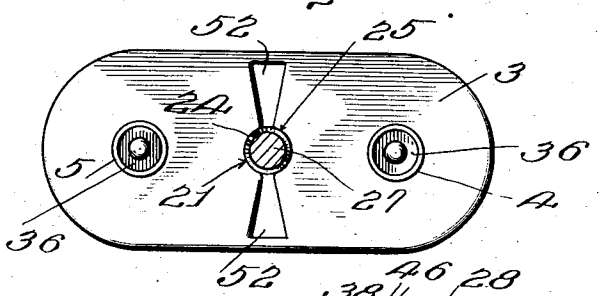
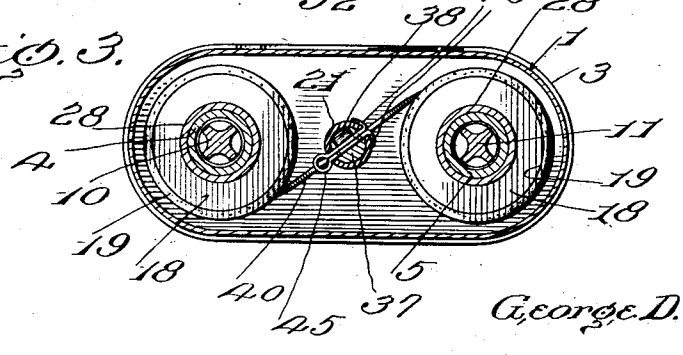


FIG. 3.



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FIG. 4.

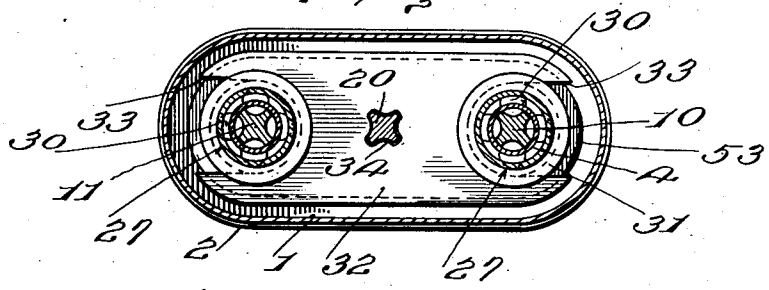


FIG. 5.

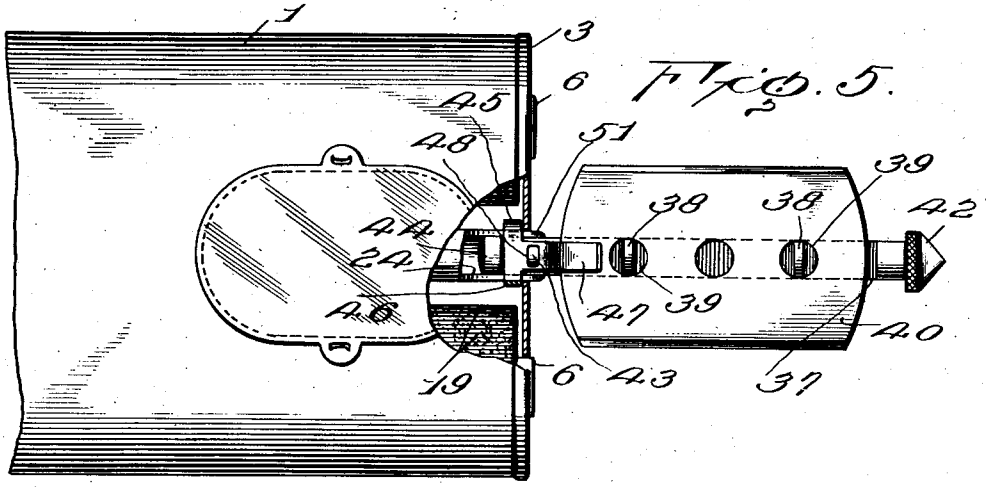


FIG. 6.

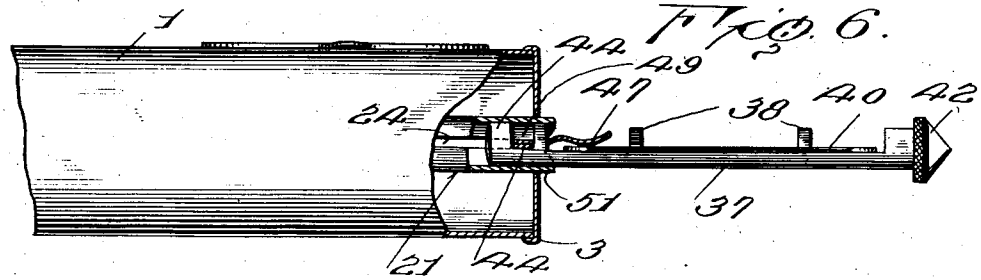
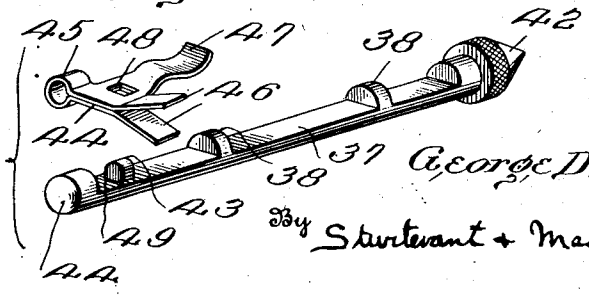


FIG. 7.



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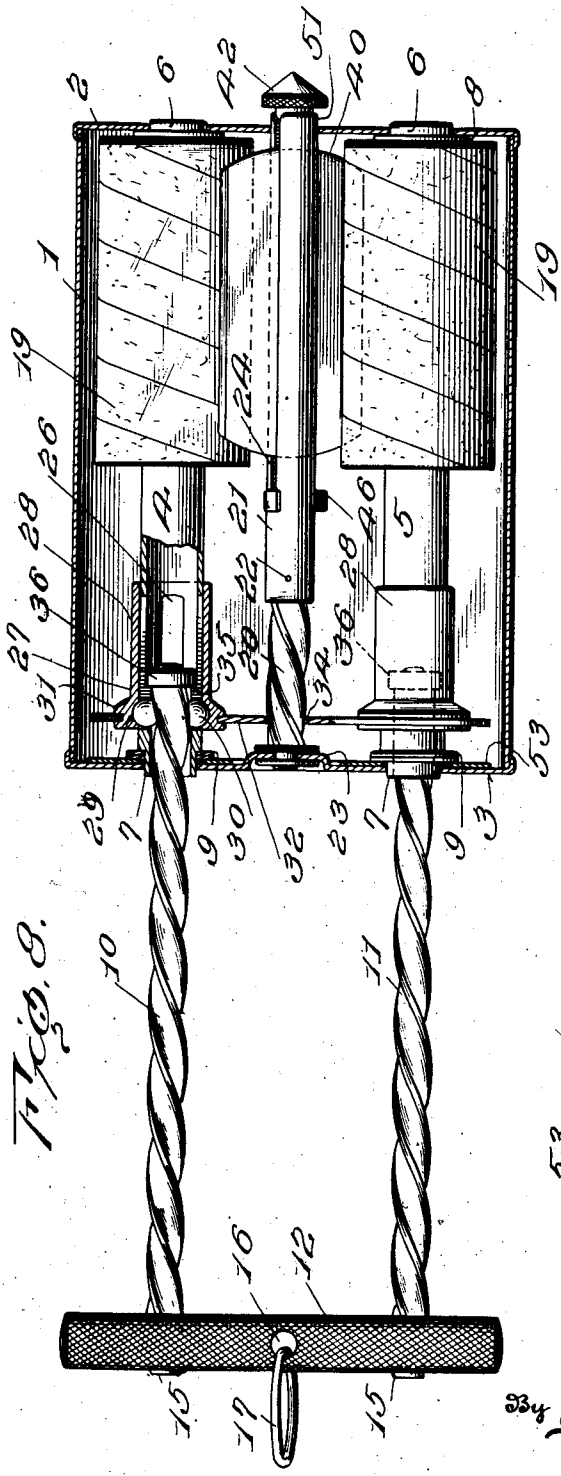


Fig. 8.

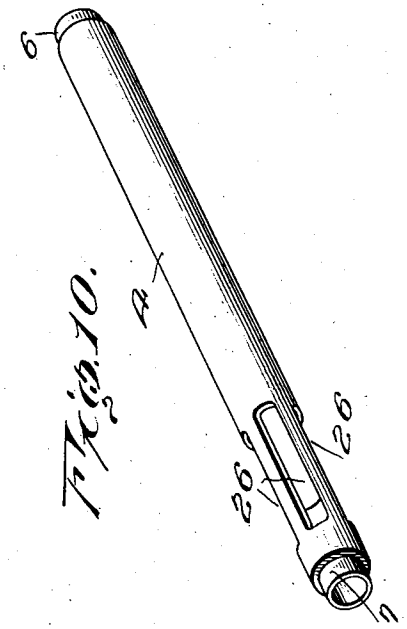


Fig. 10.

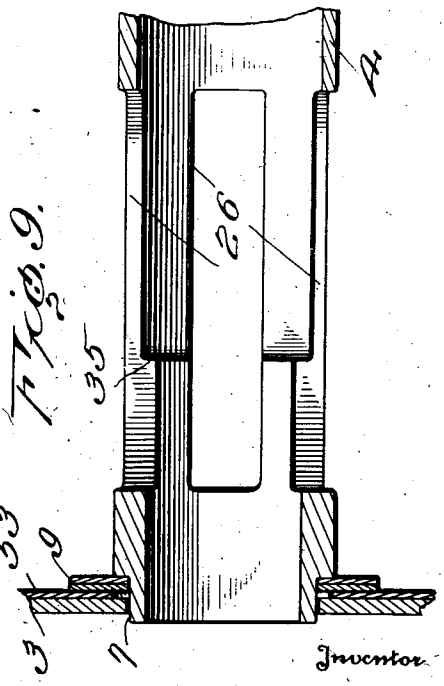


Fig. 9.

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Patented Apr. 12, 1927. 1,624,593

UNITED STATES PATENT OFFICE.

GEORGE D. GALLAGHER, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR, BY MESNE ASSIGNMENTS, OF PART INTERESTS TO NANNIE F. HOOS AND RUTH B. WALTEN, BOTH OF BALTIMORE, MARYLAND; CALLIE F. MOORE, OF WASHINGTON, DISTRICT OF COLUMBIA; AND J. MARSH MATTHEWS, OF BALTIMORE COUNTY, MARYLAND.

SAFETY-RAZOR-BLADE STROPPER.

Application filed July 28, 1921. Serial No. 488,102.

My invention relates to razor stropping devices, and more particularly to safety razor blade stroppers.

The present invention has for its main object certain improvements on the structures shown in my prior Patent No. 1,314,149, granted October 29, 1919, and my pending application, Serial No. 315,517, filed August 5, 1919.

The primary object of my present invention is to provide a neat, rugged and simple stropper of the spiral drive type.

A further object of the present invention resides in mounting the tubular sleeves which support the stropping rolls, so that their ends, or even one end, will not project from the enclosing casing as heretofore.

Still another object of the present invention is to provide a stropper of the type described in which the rotatable stropping rolls are held from axial movement.

Yet another feature of this invention resides in the novel ball bearing driving connection between the spiral driving member and the hollow tube on which the stropping rolls are mounted.

A further object of this invention resides in the means for limiting the extreme outward movement of the spiral driving member whereby the pressure of the blade against the stropping surface is relieved.

Another feature of this invention resides in the novel manner in which the free ends of the spiral driving member are provided with stops for limiting the outward movement of the driver.

A further feature of this invention resides in the novel manner of mounting the blade holding shaft so that it can float between the stropping rolls and thus compensate for any irregularities on the stropping surfaces.

Another feature of the invention resides in the novel mounting of the work holding shaft and in the cooperative arrangement of the bridge piece interconnecting the spools on the roll carrying tubes.

An additional phase of this invention includes the means for permitting the blade holder to slide back and forth in its surrounding tube while preventing its complete withdrawal from the tube and casing.

Another feature of this invention resides in the means for preventing the accidental axial movement of the blade holder while permitting its free withdrawal from its enclosing tube in order to remove the blade.

Yet another object of this invention is to provide a novel means for holding the blade in place upon the work holder in withdrawn position.

Another feature resides in a combined means for holding the blade holder from complete withdrawal from its casing, in preventing accidental endwise movement of the blade holder and in locking the blade upon the blade holder.

Yet another object of the invention resides in the means for preventing premature rotation of the ball bearing driven stropping rolls.

These and other objects will in part be obvious and will in part be hereinafter more fully disclosed.

Referring to the accompanying drawings:—

Figure 1 is a sectional plan view showing the driving spiral in inward position;

Fig. 2 is a view on the line 2—2 of Fig. 1;

Fig. 3 is a view on the line 3—3 of Fig. 1;

Fig. 4 is a view on the line 4—4 of Fig. 1;

Fig. 5 is a view of the blade holder and blade in withdrawn position;

Fig. 6 is a side view thereof;

Fig. 7 is a perspective view of the blade holder and the improved means for accomplishing a number of functions;

Fig. 8 is a view similar to Fig. 1, showing the driving spiral in extended position;

Fig. 9 is an enlarged sectional view of the slotted tube, and

Fig. 10 is a perspective view of the tube.

Referring to the drawings, in detail, the device comprises an enclosing casing 1 of metal, which is of a suitable size to fit well within the palm of the hand. The end caps 2, and 3 of the casing are suitably perforated on the opposite sides of the central axis of the casing to receive the two slotted tubes 4 and 5 which are slightly shouldered on their opposite ends as at 6 and 7 to receive washers 8 and 9. These opposite ends of

the tubes are thus rotated in the ends of the casing and are held from endwise movement with respect to said casing.

Reciprocable into and out of said casing through these tubes 4 and 5 is the spiral driver comprising the two spirals 10 and 11 connected together by the handle in the shape of a round or square metal bar 12. In the preferred construction, the ends of the spirals are turned down as at 13 to fit within corresponding bores in the handle, the ends of the turned down portion are countersunk as at 14 and the metal peened or turned over as at 15 to provide a simple and sturdy fastening. Intermediate its ends, the handle 12 is perforated as at 16 to receive a finger ring 17 which, when in use, takes the dotted position of Fig. 1, but when not in use, lies snugly against the handle as shown in full lines of Fig. 1. In some instances, the ring may be removed and a hook attached to the wall may be inserted through the hole 16. This provides an admirable way of suspending the device when not in use and also affords a most excellent means for holding the spiral driver rigid while permitting the casing to be reciprocated with respect thereto by being held in the palm of the hand.

The stropping rolls are fixed to the tubes 4 and 5 at one end thereof. These rolls comprise the cores 18 which are preferably wood, but may be of any suitable material rigidly fixed to the tube in any desired manner. The periphery of each roll is provided with a strip of stropping leather 19, preferably spirally wound thereon and fixed thereto as by gluing or otherwise. These rolls hence do not move relatively to the tubes but rigidly with them.

The blade holder is preferably mounted in the ends of the casing between the rolls so as to permit the blade to be automatically flopped therebetween as best illustrated in Fig. 3.

The blade holder comprises a spiral portion 20, preferably of different pitch from the spirals 10 and 11, and a blade holding tube 21, they being suitably joined rigidly together as at 22 by a pin or by sweating or wedging. The end of spiral 20 is turned down and rotatably journaled in the end of the casing 2 by countersinking and peening over the end as before described. Preferably the end cap is indented as at 23 to prevent the projection of the blade spiral fastening means beyond the end of the casing, suitable washers being used as necessary.

The blade holding tube 21 is slotted as at 24 in order to permit the blade to be inserted and withdrawn from the blade holding tube. The outer end of the tube is rotatively journaled as at 25 in the outer end of cap 3 of the casing. By means of this construction, it will be noted that the blade holding means comprising the spiral 20 and the slotted tube 21 is flexibly mounted in the casing—being journaled therein only at its two extreme ends so that the blade carried thereby is more or less free to yield laterally and accommodate itself to any irregularities in the stropping surfaces. This is a very practical and important feature.

For the purpose of rotating the rolls and properly positioning the blade with respect thereto, the tubes 4 and 5 are slotted adjacent the ends opposite the portions thereof on which the rolls are mounted. As best illustrated in Figures 9 and 10, the slots 26 are preferably three in number and spaced equally around the circumference of the tube. They may be either milled or punched according to the thickness of tube used. Loosely fitting over the tubes are the spools 27. Each one of these spools comprises a relatively long bearing in the form of a sleeve 28, the inner periphery of one end being countersunk as at 29 to form an annular cage for the balls 30, three in number, to correspond to the three slots 26. The spools are also formed with an upstanding rim 31 also provided with an exterior peripheral countersink adapted to receive the edge of the bridge piece 32. When the spools with the balls therein are assembled on the tubes, each ball will lie within a slot 26. These slots 26 are of sufficient length to permit the blade to be positioned from one stropping surface to the other as will be further described and the ends 33 of the slots are preferably formed as abrupt shoulders to limit the movement of the ball in the tube 4 in either direction.

The bridge piece 32 which effects the blade shifting is mounted as before described in the peripheral countersink of each spool and for the purpose of quick assembly, each end of the bridge is preferably cut away as at 33. Intermediate its ends, and at the central axis of the device, the bridge piece is formed with an angular bore 34 to correspond with the outline of the spiral 20. This bore may be of any suitable outline.

In my prior construction, no provision has been made for preventing the extreme outward movement of the spiral driver pressing the blade with excessive force against the stropping surface. In the present instance, this is overcome by providing the slotted tubes 4 and 5 with an internal shoulder 35—preferably by milling the inner tube with two diameters or by punching in a suitable shoulder when the tube is made of relatively thin stock. This shoulder 35 cooperates with the stops on the outer ends of the spirals 10 and 11. These stops comprise relatively thick washers 36 which fit over the turned down end portions of the spirals, being held in place by countersinking the

turned down ends and peening over the same as heretofore described. The diameter of these stops 36 is slightly larger than the diameter of the spirals 10 and 11 so that while the latter will slide freely through and past the shoulders 35, the stop will contact thereagainst as illustrated in Fig. 8, and will positively limit and stop the further outward movement of the spiral driver. In this manner, the pressure of the blade against the roll is relieved. It will be noted that the driver is limited in its inward movement by reason of the handle striking against the end cap 3 of the casing and is limited in movement in the opposite direction by these stops 36.

The blade holder 37 illustrated in Fig. 7 is adapted to telescope within the blade holding tube 21. The holder is provided with the usual lugs 38 adapted to fit into the holes 39 of the "Gillette" blade 40, the body of the holder being suitably milled or formed to permit the blade to lie flat thereon as shown. The outer end of the holder is provided with a knurled head suitably pointed as at 42 to prevent the blade holder from being forcibly held during the stropping operation.

At its inner end, the blade holder 37 is provided with a lug 43 spaced slightly from an end shoulder 44. Into this space fits the fastening device illustrated in Fig. 7. This fastening device has several functions. It is somewhat in the shape of a cotter pin and is preferably made of some tough springy metal such as phosphor-bronze. It has a rounded head 45 and two resilient legs 46, one of which is provided with an integral lateral portion 47 adapted to form a blade holding clip. This clip is perforated as at 48 to permit the clip to pass over the lug 43 and lie flat on the blade holder.

In certain aspects of the invention, the fastening device is made without the lateral clip 47 and perforation 48, in which case, the blade is not positively held on the blade holder. In assembling the blade holder in its tube within the casing 1, the end 44 is inserted within the end cap 3. The clip is then laid flat in the space 49 with the head overhanging one side and the legs 46 overhanging the other, the head and legs are then slipped through the registering slots 24 of the tube 21. The legs 46 are then bent around the outside of the tube as illustrated in Figures 3 and 5, the lug 43 passing through the hole 48 in the clip. With this construction, it is evident that the blade holder 37 cannot now be withdrawn clear of the casing because the legs 46 will strike the end walls 50 of the central opening in the end cap 3. It will also be evident that the resilient grip of the bent over legs 46 will prevent the accidental endwise movement of the blade holder 37 in its tube 21. This is very important because if the blade holder slip outwardly during the stopping operation, it will prevent the further operation of the device until the holder is pushed back in again. It is also clear that when the blade is inserted on the blade holder as shown in Figures 5 and 6, the blade will be slipped under the clip 47 and will be firmly held from dropping off the blade holder when in outward position. The portion 47 of the clip may be omitted if desired.

The end cap 3 is provided with the usual fan-shaped slots 52 through which the blade may be inserted into the casing 1.

Another valuable feature of this invention resides in the means for preventing premature movement of the stropping rolls on reversal of direction of the spiral driver. This means is particularly desirable when the ball bearing drive is used because of the rolls being very easily operated. It comprises a resilient shim 53 preferably of phosphor-bronze which is centrally apertured to freely receive therethrough the indentation 23 of the casing and is also recessed to permit the passage therethrough of the hollow tubes 4 and 5. As clearly shown in Figures 8 and 9, however, this shim being resilient bears against the washers 9 and presses them against the shoulders 7 to thereby put a drag on the rotation of the tubes 4 and 5. In certain instances, these shims may be utilized for increasing the pressure of the blade on the roll, due to the dragging action of the shim on the roll.

In operating the stropper, the blade holder 37 is pulled out and the blade 40 inserted thereon. The blade is then pushed into the casing between the two stropping rolls. The casing is held in one hand and the spiral drive reciprocated into and out of the casing.

The first movement is the blade positioning movement. The spirals 10 and 11 contacting with the balls 30 cause them to rotate and to move along with the spirals lengthwise of and along the slots 26 of the hollow tubes without moving the tubes. During this endwise travel of the balls, the spools 27 are carried along endwise on the tubes and move the bridge piece 32 laterally along the spiral 20 which is of sufficient pitch to flip the blade from contact with one roll into contact with the other roll before the balls have come to the end of the slots 26. When the balls do strike the abrupt shoulder at the end of the slots they are no longer free to move laterally, and as the spirals 10 and 11 continue their movement through the tubes 4 and 5, the balls will rotate these tubes and rotate the stropping rolls thereon to strop the blade. When the stop 36 contacts with the shoulders 35, the spiral driver is reversed which accordingly repeats in the same sequence, first the blade positioning and then the roll operating. This

action is continued until the blade is sufficiently stropped.

It is apparent that the pressure of the blade against the roll as in my prior construction is dependent upon the force executed upon the spiral driver. If a slight stropping pressure is needed, the spirals 10 and 11 are pressed lightly, the stropping pressure is light and the action slow. On the contrary, a vigorous reciprocation of the driver produces a strong pressure of the blade on the stropping roll and a speedy operation of the device. This variation in pressure of the blade on the rolls is due to the inclined surface of the spirals used and especially on the re-active effect of the two spirals, that is, the driving spirals 10 and 11 and the work holder spiral 21. For the reason that when more pressure is put on spirals 10 and 11, the blade is pressed more firmly against the roll which tends to hold the roll against turning and this in turn demands more pressure on the driver to rotate the rolls. As the effect is cumulative, the stropping action is ideal.

It will be obvious that minor changes in the details of construction and the arrangement of the parts may be made without departing from the spirit of the invention as set forth in the appended claims.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent, is:—

1. A device of the class described comprising an enclosing casing, hollow tubes rotatably journaled therein, stropping rolls on said tubes, a blade holder mounted in said casing and adapted to position the blade into contact with each stropping roll, spiral driving members reciprocable through said tubes, devices operable by said spiral members; said devices being constructed and arranged to rotate the rolls and to position the blade, and means for relieving the pressure of the blade against a roll on extreme movement of said spirals in one direction.

2. A device of the class described comprising an enclosing casing, stropping rolls, and a blade holder journaled therein, rigid driving means reciprocable into and out of said casing, devices for rotating said rolls, including a member cooperating with said blade holder for positioning said blade against the rolls on reciprocation of said driver, and means for relieving said blade of pressure against said roll on extreme movement of said driver.

3. A device of the class described comprising an enclosing casing, stropping rolls, and a blade holder journaled therein, rigid driving means reciprocable into and out of said casing, devices operated by said rigid driving means for rotating said rolls, said devices including means cooperating with said blade holder for positioning said blade against said rolls on reciprocation of said driver, and means for limiting the extreme movement of said driver in either direction.

4. A device of the class described comprising an enclosing casing, a hollow tube rotatably journaled therein and provided with an internal abutment, a stropping roll carried by said tube, a blade holder mounted in said casing, a spiral member reciprocable into and out of said tube, means operable by the reciprocation of said spiral for rotating said roll and positioning said blade holder, and means carried by said spiral adapted to contact said abutment to limit the movement of said spiral.

5. A device of the class described comprising an enclosing casing, hollow tubes rotatably journaled therein and provided with internal projecting shoulders, stropping rolls mounted on said tubes, a blade holder mounted in said casing, spiral members reciprocable into and out of said tubes, devices for rotating said rolls including means cooperating with said blade holder for positioning said blade on reciprocation of said members, said members having stops of larger diameter than said spirals carried thereby and adapted to engage said internal shoulders on said tubes to limit the movement of said spirals therein.

6. A device of the class described comprising an enclosing casing, hollow tubes rotatably journaled therein and provided with internal projecting shoulders, stropping rolls mounted on said tubes, a blade holder mounted in said casing, spiral members reciprocable into and out of said tubes, devices for rotating said rolls including means cooperating with said blade holder for positioning said blade on reciprocation of said members, said members having their free ends of smaller diameter, washers of larger diameter than said spirals seated on said portions of smaller diameter and means on the extreme ends of said members for holding said washers in position on said members.

7. A device of the class described comprising an enclosing casing, slotted tubes rotatably journaled therein, stropping rolls carried by said tubes, spiral members reciprocable through said tubes, spools slidingly mounted on said tubes, balls carried by said spools and projecting through the slots of said tubes to contact with said spiral members, a blade holder including a spiral portion mounted in said casing, a bridge piece connected with said spools and having an angular bore slidingly engaging said spiral of the work holder, whereby said blade holder is positioned and said stropping rolls are rotated on reciprocation of said spiral members.

8. A device of the class described comprising an enclosing casing, slotted tubes rotatably journaled therein, stropping rolls

carried by said tubes, spiral members reciprocable through said tubes, means slidingly mounted on said tube and carrying balls making driving contact with said spirals through the slots in said tubes, a blade holder mounted in said casing and having a spiral portion, said ball carrying means having a part held from rotation engaging said blade holder spirals to position said blade holder.

9. A device of the class described comprising an enclosing casing, shouldered tubes rotatably journaled therein and capable of slight endwise movement, stropping rolls on said tubes, spiral driving members reciprocable through said tubes, a blade holder mounted in said casing, means operable by said members for rotating said tubes and positioning said blade holder, and means adapted to force said tubes endwise to cause the shoulders thereon to engage fixed abutments whereby to prevent premature rotation of said tubes.

10. A device of the class described comprising an enclosing casing, stropping rolls journaled in spaced relation therein, a slotted blade holding tube mounted in said casing between said rolls, means for rotating said rolls and positioning said blade holding tube, a blade holder adapted to slide into and out of said tube with the edge of the blade projecting through the slots of said tube when said blade is within the casing, and means carried by said holder and extending through the slot in said tube so as to abut the casing preventing the complete withdrawal of said blade holder from said slotted tube.

11. A device of the class described comprising an enclosing casing, stropping rolls rotatably journaled therein, a blade holding member mounted in said casing between said stropping rolls, means for rotating said rolls, and positioning said blade holding member, a blade holder, slidable with respect to said member and through the end of said casing, means for non-detachably connecting said holder to said member and a spring clip carried by said means and adapted to receive the end of the blade thereunder to hold the blade from falling off when the holder is withdrawn from the casing.

12. A device of the class described comprising an enclosing casing, a slotted tube rotatably journaled therein, a stropping roll carried by said tube, a spiral member reciprocable through said tube, a spool slidingly mounted on said tube, balls carried by said spool and projecting through the slots in said tube to contact with said spiral member, a blade holder mounted in said casing, and means operably connected to said blade holder and operated by the movements of said sliding spool for positioning said blade, whereby said blade holder is positioned and said stropping roll is rotated on reciprocation of said spiral member.

13. A device of the class described comprising an enclosing casing having an end slot for the withdrawal of a blade and holder, stropping rolls rotatably journaled therein, a slotted blade holding tube mounted in said casing between said rolls, means for rotating said rolls and positioning said tube relatively thereto, a blade holder adapted to be withdrawn through the end slot of said casing and having spaced lugs thereon, a spring clip disposed between two adjacent lugs and having a head passing outwardly through one of the slots of said tube, and legs passing outwardly through the other slot of said tube, said legs being bent around into gripping contact with the outer periphery of said tube whereby said clip contacting with the mouth of said recess in the end of said casing prevents the complete withdrawal of said blade holder and whereby said gripping contact of the legs of said clip with the outer wall of said tube prevents the inadvertent endwise movement of said holder in said tube.

14. A device of the class described comprising an enclosing casing, stropping rolls rotatably journaled therein, a blade holding member mounted in said casing, means for rotating said rolls and positioning said member, a blade holder adapted to be withdrawn from said holding member outwardly through the end of the casing, and a spring clip interconnecting said blade holder and said blade holding member and adapted to prevent complete withdrawal of said blade holder from said casing, and adapted to prevent accidental endwise movement of said blade holder with respect to said holding member, and adapted to hold said blade on said blade holder when said holder is withdrawn to its position outside of said casing.

15. A device of the class described, comprising a support, a tube rotatably mounted thereon, a stropping roll on the tube, a blade holder on the support, a rigid driver reciprocable into and out of said tube, means operable by said driver for positioning the blade holder and rotating the roll and a shim adapted to press the tube endwise to frictionally drag the same and prevent premature rotation of the roll.

16. A device of the class described, comprising a support having opposed walls, a stropping roll rotatably journaled in said support, a blade holder having a spiraform end rotatably mounted in one wall of said support but held from endwise movement relative thereto, said blade holder having an opposite circular end mounted for free rotation in the opposite wall of said support, and means for rotating said roll and causing a piece to pass along said spiraform portion and angularly shifting said blade holder.

17. A device of the class described, comprising a support having opposed walls, a stropping roll rotatably journaled in said support, a blade holder comprising a slotted tube having one end circular in cross-section and directly journaled in a bore of one of said walls, said blade holder having a spiraform portion with a circular end extending through an opening in the other of said walls, said latter end having its extremity peened to prevent endwise displacement of said blade holder while permitting free angular movement thereof, and means for rotating said roll and acting on the spiraform portion of said blade holder for angularly shifting said blade holder.

18. A device of the class described, comprising a support having opposed walls, a stropping roll rotatably journaled thereon, a blade holder comprising a spiral portion, and a tube rigidly connected thereto, said spiral portion being pivotally connected to and angularly movable in the wall of a bore in one wall of said support and said tube being mounted in a bore in the opposite wall of said support, and means for rotating said roll and causing a piece to pass along said spiraform portion and angularly shifting said blade holder.

In testimony whereof, I affix my signature.

GEORGE D. GALLAGHER.