June 12, 1934. M. L. BICKART 1,962,119

HONING APPARATUS AND METHOD

Filed Aug. 24, 1931

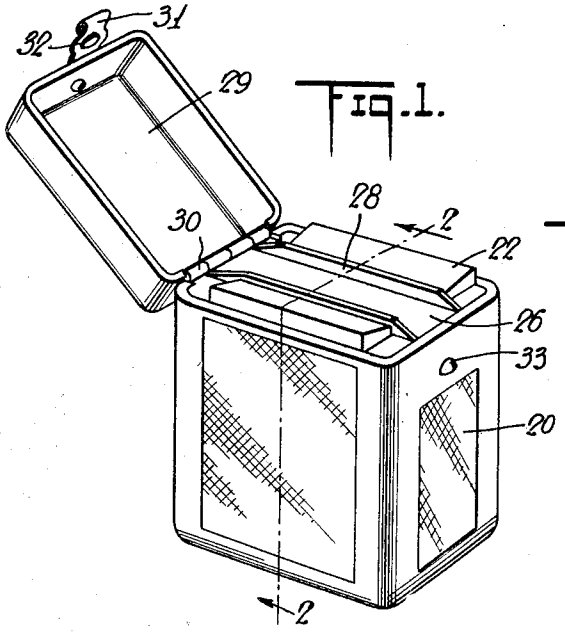


Fig. 1.

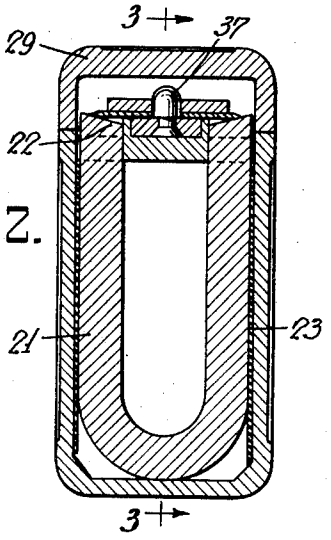


Fig. 2.

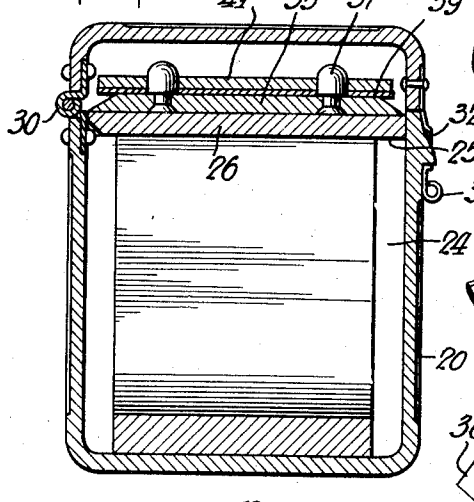


Fig. 3.

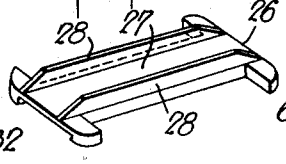


Fig. 4.

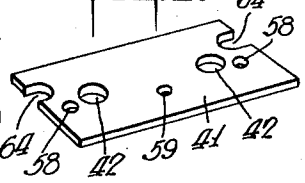


Fig. 5.

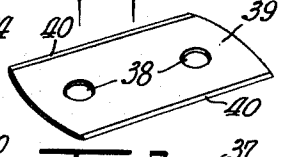


Fig. 6.

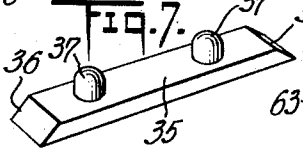


Fig. 7.

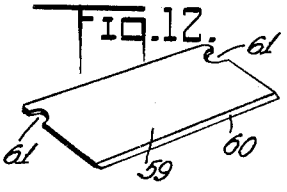


Fig. 12.

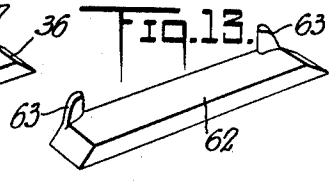


Fig. 13.

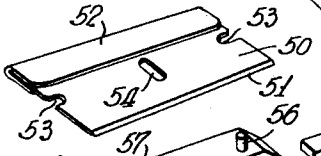


Fig. 9.

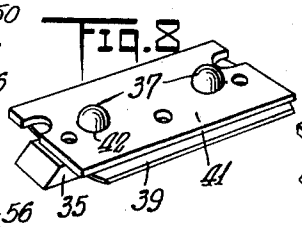


Fig. 8.

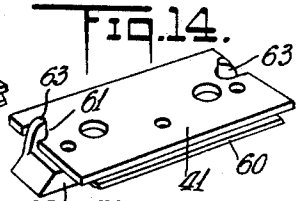


Fig. 14.

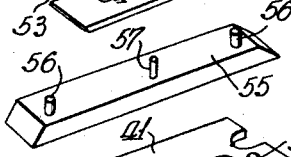


Fig. 10.

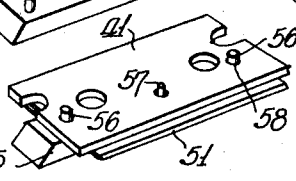


Fig. 11.

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Patented June 12, 1934 1,962,119

UNITED STATES PATENT OFFICE

1,962,119

HONING APPARATUS AND METHOD

Monroe L. Bickart, Stamford, Conn., assignor to Automatic Lighter Corporation, a corporation of Delaware

Application August 24, 1931, Serial No. 558,852

24 Claims. (Cl. 51—212)

My present invention relates to apparatus and to methods for honing or conditioning cutting blades, particularly safety razor blades by resort to forces including that of magnetic attraction.

An object of the invention is to provide apparatus of the above type, by which accurate engagement of the cutting edge area of the blade with a magnet is assured, and by which in the application, in the honing operation and in the removal of the blade, stresses prejudicial to the efficacy of the blade are inherently avoided.

A more specific object of the invention is to guard against misalignment or skewing of the cutting edge with respect to the magnetic pole end and thereby to dispense with the need for any particular precaution in the utilization of the device or carrying into execution the method.

Another object is to provide a sharpening device in which the danger of a user cutting his fingers or otherwise injuring himself is reduced to a minimum during honing operations.

Another object is to provide an apparatus of the character described, which will combine simplicity of construction with ruggedness and durability in use, and will also combine convenience of manufacture and low manufacturing cost with efficiency and facility of operation.

Another object is to provide apparatus of the above type by which a combined mechanical and magnetic honing treatment of the blade is readily accomplished, yet in the absence of rotating parts, transmissions or bearing structures that involve cost and complication and may be subject to derangement.

Another object is to provide honing apparatus of the above type which shall be of universal application for blades of various different types and which shall be of substantially equal efficacy in its use for any of such blades.

The invention embodies the principle generically claimed in the prior patent to Alexander Girtanner No. 1,796,096 of March 10, 1931, and constitutes an improvement upon the construction of said application. In common with the disclosure of said application, the cutting edge or edges of the blade are disposed in physical contact with a pole end or the pole ends of a magnet preferably a permanent magnet of the horse shoe type within a case.

It is a feature of the present invention to afford positioning means for correlating the blade with the magnet pole ends for determining sliding displacement of the blade along the pole ends, with the area of the cutting edge or edges in contact with said pole ends for a combined mechanical and magnetic honing operation.

The means for coordinating and effecting movement of the blade according to another feature comprises a pair of plates between which the blade is clamped, the lower of such plates being narrower and being guided in a runway between the magnet poles; the upper of such plates constituting a handle locked with respect to the lower plate by studs cooperating therewith as well as with the positioning conformations of the blade.

According to another feature, the upper of the clamping plates is of para-magnetic material and its free edge terminates slightly short of the cutting edge of the blade to serve as a keeper therefor and to aid in concentrating the magnetic flux through the cutting edge in its traverse between the pole end and the keeper plate.

According to another feature, the guide plate and the keeper plate are coordinated with each other to maintain the blade therebetween in flat condition and are coordinated with the magnet unit to maintain the cutting edge of the blade thus in flat condition, in face to face contact with the corresponding magnet pole end.

According to another feature one of the two plates between which the blade is clamped is universal, of equal applicability for any of a variety of blade constructions for which the hone is adapted, and means is afforded whereby a companion plate suitable for the particular blade construction to be honed can be used.

More particularly, and in a preferred embodiment interchangeable blade positioning slide plates are provided with studs or pins for coordination with the characteristic number, size and positions of apertures, slots or notches in the different designs of blades, for which the apparatus is adapted, while the keeper plate is provided with holes, slots and/or notches for accommodation of the studs or pins of each and all of the various slide plates, so that such keeper plate is of universal construction.

In the accompanying drawing, in which are shown one or more of various possible embodiments of the several features of the invention:

Fig. 1 is a perspective view of the encased magnet unit, shown open and in perspective,

Fig. 2 is a transverse sectional view taken on the line 2—2 of Fig. 1,

Fig. 3 is a transverse sectional view taken on the line 3—3 of Fig. 2,

Fig. 4 is a perspective view of the runway guide piece,

Fig. 5 is a perspective view of the keeper plate,

Fig. 6 is a perspective view of a blade of the Gillette type adapted to be honed by the use of the apparatus,

Fig. 7 is a perspective view of the corresponding blade holder plate,

Fig. 8 is a perspective view showing the coordination of the plates with the blade clamped therebetween.

Figs. 9, 10 and 11 are perspective views similar respectively to Figs. 6, 7 and 8 showing the elements and coordination of elements in connection with a Gem type of blade and

Figs. 12, 13 and 14 are views respectively similar to Figs. 6, 7 and 8 showing the blade, the guide plate and the coordination of plates and blade with respect to a Valet type of blade.

Referring now to the drawing, the generally rectangular case 20 preferably of molded material has enclosed therein a permanent horse-shoe magnet 21 made of wide bar stock and having elongated pole pieces 22 beveled inwardly and preferably protruding above the edge of the case and permanently secured therein, as by cementing to fibrous lining sheets 23 in turn cemented to the walls of the case. The case is slightly longer than the width of the magnet or the length of its pole pieces and the case is molded with fillets or ribs 24 extending along the inner vertical edges thereof and affording stop shoulders 25 for a bridge piece 26 preferably extending flush with the top of the case and straddling the protruding pole ends 22 and frictionally or otherwise secured in position. The bridge piece may be of molded material or of diamagnetic metal and preferably determines a runway 27 longitudinally of the pole ends, presenting upstanding guide ribs 28 against the inner edges of the pole ends.

The case is shown with a flanged cover 29 hinged at 30 to the narrow upper edge thereof, provided with a sheet metal clip 31 at the forward edge thereof which has an aperture 32 coacting with a cam stud 33 molded as an integral part of the front of the case.

Reference is now had particularly to Figs. 1 to 8 in which a blade positioning or holder member 35 shown separately in Fig. 7 is employed comprising a bar of any suitable material preferably non-magnetic material, of width to fit in the runway 27, of thickness to extend slightly above the inner edge of the beveled pole end 22 and beveled at its ends 36. This blade holder element has upstanding studs 37 of diameter and at distance corresponding to the apertures 38 of the conventional blade 39 of the Gillette type, which has two cutting edges 40 as shown in Fig. 6, and is of flexible steel. The thickness of the positioning bar or plate 35 is such that the blade lying flat thereon as shown in Fig. 2 will extend with its beveled cutting edges 40 in face to face contact with the beveled pole ends 22 of the magnet.

An operating piece 41 shown separately in Fig. 5 is superposed over the blade that has been positioned as set forth, such piece having a pair of holes 42 registering with the studs 37 of the holder and the apertures 38 of the blade.

Even if the plate 41 were of diamagnetic material it could serve as an operating handle, which when slid back and forth longitudinally of the pole ends would slide the cutting edges of the blade along the pole ends to afford a mechanical honing action thereon, in addition to the magnetic honing action which the present device presents in common with that of the Girtanner patent above identified.

Preferably, however, the plate 41 is of paramagnetic material and, as best shown in Figs. 2 and 8, is of width somewhat less than the width of the blade 39, so as to lie flat over substantially the entire area of the blade with the beveled cutting edges of the blade, however, exposed freely beyond the edges of the keeper.

In this arrangement, the magnetic flux from the permanent magnet is concentrated through the cutting edge on its way to the keeper plate of high magnetic permeability, and is similarly concentrated through the other cutting edge in the return from the keeper plate to the other magnet pole. A greatly intensified magnetic attraction thus occurs at the cutting edges to afford an enhanced straightening or honing action thereon.

In the use of the embodiment as set forth, the blade guide 35 is positioned in the runway 27, the blade superposed thereover and then the keeper 41 is applied. Thereupon the keeper is grasped and slid back and forth several times in the only direction in which it has freedom of movement, namely along the runway.

In this operation, not only is the blade accurately positioned as set forth, for its beveled cutting edges to extend in surface engagement with the beveled pole edges, but throughout the sliding movement back and forth, such surface contact is maintained and the magnetic action intensified as above set forth together with the mechanical honing operation contribute to a most effective sharpening action.

With a new blade honed originally as set forth and then honed after each shave, remarkable improvement of the blade and prolongation of the effective life thereof is accomplished by the invention.

In this operation, the surfaces of the beveled cutting edges of the blade throughout are maintained in direct engagement with the pole ends and no skewing action occurs that might have any tendency to distort the cutting edge or to bend up short parts of the edge, either in the course of application, in the course of sliding or in the removal of the blade from the device.

As specified in the Girtanner Patent No. 1,796,095 the operation may be repeated with the blade reversed although with the present invention excellent results are obtained even without such reversal.

Figs. 9, 10 and 11 show the application of the same principle for the honing of a blade of the Gem type. Fig. 9 at 50 shows a Gem type blade which is non-flexible, has a beveled cutting edge 51, a reinforce back 52, lateral notches 53 and an elongated transverse slot 54 midway of the notches.

The blade positioning member or holder comprises a block 55 similar to that of Fig. 7 but instead of the studs 37 it presents three pins or studs of smaller diameter, the two outer pins 56 straddled by the lateral notches 53 of the blade, the median pin 57 protruding through the slot 54. The keeper plate of Fig. 5 has lateral holes 58 and a median hole 59 adapted to accommodate the two pins 56 and pin 57 respectively of the plate 55.

Now referring to Figs. 12, 13 and 14, the mode of use for a Valet type blade is shown. The latter blade 59 has a single cutting edge 60 and lateral notches 61 near its non-cutting edge. The guide or holder plate for the Valet sharpener is shown in Fig. 13 and comprises a plate 62 identical with that of Figs. 7 and 10, but having studs, pins or fins 63 extending upward from opposite

ends and along one of the side edges of the plate, said fins to be straddled by the notches 61 of the blade 59. The keeper plate of Fig. 5 has notches 64 in its lateral edges to straddle the fins 63.

The mode of use of the honer and its operation for the Gem type and for the Valet type blade will be obvious from the previous description in connection with the Gillette type blade.

From the foregoing description it will be seen that the keeper plate is universal, including apertures 42 which accommodate the studs for the Gillette blade, apertures 59 and 59′ to accommodate the three pins for the notches and slot of the Gem type blade and lateral notches 64 to accommodate the fins for the lateral notches of the Valet type blade.

The hone unit is preferably marketed with the universal keeper plate 41 and with one each of the holder plates shown in Figs. 7, 10 and 13. The purchaser would use only that one of the three guide plates corresponding to the type of razor employed by him, and by keeping the others could readily interchange the holder plate if and when occasion arose to change over to some other type of razor. While illustratively the invention is shown as applied to three characteristic types of blades, namely the Gillette, the Gem and the Valet, it is understood that the principle of the invention could be carried forward in application to other types of blade now or hereafter in existence. In any event, it would be necessary merely to provide an additional blade holder plate with the necessary apertures or notches.

In each embodiment the blade holder plate and the keeper plate serve as a clamp for the median longitudinal area of the blade and in each maintain the blade in flat condition, for disposing the beveled cutting edge or cutting edges in direct face to face contact with the correspondingly beveled pole end or ends of the magnet. In each case the blade is held substantially rigidly against flexure between the clamping plates and against the poles, and is thus maintained throughout the sliding operation, and can be conveniently removed only after the clamping plates with the interposed blade have been slid off the magnet. No skewing action can thus take place at the cutting edge in the course of blade removal from the device. This expedient has the further advantage that the blade is correctly honed in its flat condition and the magnetic and mechanical forces applied in use are utilized wholly for effective honing and not partially or entirely for bringing about blade flexure. Moreover, no disturbance of the honing effect occurs due to release of flexure upon removal of the flexed blade from the hone.

While the invention finds its preferred embodiment in the combined magnetic and mechanical honing operation set forth, it will be understood that the arrangement disclosed for assuring correct coordination of the cutting edge with the magnet pole, and the para-magnetic keeper, by means of which the magnetic flux is highly concentrated at the cutting edge, affords high utility even apart from the mechanical feature. It will also be understood that the construction for effecting the mechanical honing has utility apart from the magnetic feature. The best results, however, are attained by utilizing the two honing agencies simultaneously in the manner set forth.

It will thus be seen that there is herein described apparatus in which the several features of this invention are embodied, and which apparatus in its action attains the various objects of the invention and is well suited to meet the requirements of practical use.

As many changes could be made in the above construction, and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

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

1. A magnetic hone including a pair of spaced magnet pole ends, blade guide means slidable longitudinally of said pole ends and coordinated with respect to the magnet and the blade, to dispose the cutting edge thereof in contact with the face of one of said magnet poles, and a magnetic keeper coordinated with said guide and adapted to exert surface pressure upon the main area of the blade.

2. A blade hone comprising a pair of magnet poles in spaced parallel relation, means for disposing and guiding a blade for longitudinal sliding engagement of the beveled cutting edge thereof along one of the poles of the magnet, and means for retaining the width of said blade rigid to prevent flexure thereof and for mechanically pressing the beveled cutting edge against said magnet pole.

3. A blade hone comprising a pair of magnet poles in substantially parallel relation, means guiding the positioning and movement of a blade with the beveled cutting edge thereof in face to face engagement with one of said poles, and a magnetic keeper superposed over the major area of the blade with the cutting edge of the latter exposed beyond the edge of the keeper.

4. A blade hone comprising a pair of magnet poles in substantially parallel relation, means guiding the positioning and movement of a blade with the beveled cutting edge thereof in face to face engagement with one of said poles, a magnetic keeper superposed over the major area of the blade with the cutting edge of the latter exposed beyond the edge of the keeper and means to maintain said keeper substantially immovable with respect to said blade during the sliding movement of the latter longitudinally of the magnet poles.

5. A blade honing apparatus comprising a pair of magnet poles, a blade guide and a blade keeper, said elements having coacting parts to prevent substantial displacement with respect to each other in the respective planes thereof, and to maintain a blade interposed therebetween substantially locked against displacement in the plane thereof and with the cutting edge thereof exposed beyond the edge of the keeper, and guide means associated with the magnet poles for confining the longitudinal movement of the blade guide with the cutting edge of the blade in direct contact with one of the magnet poles.

6. A blade hone comprising magnet poles, a pair of plates adapted to clamp a blade therebetween one of said plates having a stud coacting with the other plate and with the blade to maintain the three elements in coordinated relation, said magnet pole structure being conformed for guiding the position and movement of one of said plates to dispose the cutting edge of the clamped blade in contact with one of the poles, the other plate being of para-magnetic material.

7. In a magnetic blade hone, the combination of a narrow guide plate having upstanding studs for coaction with a specialized form of cutting blade, a keeper plate for face to face contact with the blade and having means to coact with said studs for location of a free edge of said plate parallel and contiguous to, but short of the cutting edge of the blade, and a magnet structure having a guide runway between the poles thereof for accommodating said guide plate.

8. A magnetic hone comprising a pair of parallel magnet poles, means for clamping the central portion of a flexible razor blade at the portion of the latter between said poles and for maintaining said blade in substantially unflexed condition with the beveled edge or edges thereof in face to face contact with a pole or said poles, and means for guiding the blade and its clamping structure for sliding movement longitudinal of the pole ends of said magnet.

9. A magnetic hone comprising a pair of parallel magnet poles, means for clamping the central portion of a flexible razor blade at the portion of the latter between said poles and for maintaining said blade in substantially unflexed condition with the beveled edge or edges thereof in face to face contact with a pole or said poles, and means for guiding the blade and its clamping structure for sliding movement longitudinal of the pole ends of said magnet, the clamping portion below being magnetically isolated with respect to the magnet poles and the clamping plate above said blade being in magnetic circuit with said poles.

10. A magnetic hone comprising a case having a magnet therein with the two pole faces thereof exposed at the upper end of the case, a diamagnetic spacer occupying the opening between said poles and determining a runway between said poles and a blade holder slidable in said runway and having protruding means coacting to position the cutting edge or edges of the latter with respect to the magnetic pole or poles.

11. A magnetic hone comprising a case having a magnet therein with the two pole faces thereof exposed at the upper end of the case, a diamagnetic spacer occupying the opening between said poles and determining a runway between said poles and a blade holder slidable in said runway and having protruding means coacting to position the cutting edge or edges of the latter with respect to the magnetic pole or poles, and a keeper plate of para-magnetic material conformed to coact with the blade positioning means of the blade holder, the edge of said keeper plate in position being superposed over the blade, but spaced from the cutting edge of the latter.

12. A magnetic hone comprising a case having a horse shoe magnet therein with parallel elongated ends beveled inward and exposed from the open end of the case, clamping means for a flexible blade adapted to be coordinated with said magnet to dispose a blade in unflexed flat condition between the poles with the bevel edge or edges of the blade in face to face contact with the beveled pole end or ends, part of said magnet structure constituting a guide coacting with said clamping means to determine the sliding movement of said blade edge or edges along and in contact with said pole end or ends.

13. As an article of manufacture, a magnetic hone unit comprising a case, a horse shoe magnet therein having elongated ends exposed at the open end of the case, and a diamagnetic blade guide slidable longitudinally of said pole ends, exposed therebetween and having its horizontal face below said pole ends.

14. A universal magnetic hone adapted for use for various different models of safety-razor blades, said sharpener including a pair of magnet poles of opposite polarity adapted to be bridged and contacted by any of said blades, blade clamping means including two elements, one adapted to be disposed between said pole ends and the other to be superposed thereover and over the blade, one of said coacting clamping elements having conformations coacting with the characteristic holding means, of each of various types of blades and the other being removable and having conformations coacting with the holding conformations for a particular type of blade.

15. A universal magnetic hone adapted for use on various different models of safety-razor blades, said hone including a pair of magnet poles of opposite polarity adapted to be bridged and contacted by any of said blades, blade clamping means including two elements, one adapted to be disposed between said pole ends and the other to be superposed thereover and over the blade, one of said coacting clamping elements having conformations coacting with the characteristic holding means, of each of various types of blades and the other being removable and having conformations coacting with the holding conformations for a particular type of blade, said clamp and said magnet unit being arranged to facilitate sliding of said clamp lengthwise of said pole ends, the clamp elements and the interposed blade having cooperating parts to prevent displacement of any with respect to the other in the plane thereof.

16. A universal magnetic hone adapted for different constructions of safety-razor blades, said hone including a magnet unit comprising a case having a horse shoe magnet therein with its pole ends elongated and exposed at the top of the case, a clamp structure including a pair of metal plates comprising a lower and narrower one slidable longitudinally between said pole ends and having upstanding studs adapted to cooperate with the particular structure of the blade to be sharpened, the other plate of wider construction having apertures to accommodate said studs, said latter plate of para-magnetic material and of width slightly less than that of the blade, said clamping elements being correlated with the magnet unit to maintain the blade in flat condition with its beveled cutting edge or edges in direct engagement with the pole or poles of the magnet.

17. A magnetic hone, comprising a case, a horse shoe magnet therein having elongated pole ends exposed at the top of the case, a runway between said pole ends, interchangeable blade positioning means slidable in the runway each of said interchangeable means having a characteristically arranged set of upstanding studs for coordination with the corresponding positioning conformations of the different types of blades, and a keeper plate of para-magnetic material, cut away to universally accommodate the studs of each of said interchangeable means.

18. A magnetic razor hone for flexible double-edged wafer type blades comprising a case having elongated pole ends exposed at the top thereof, a runway between said pole ends, a blade positioner comprising a narrow strip of metal adapted to be slid along said runway with the cutting edges in contact with the pole ends and having a pair of upstanding studs to extend through apertures in the blade, and an operating member comprising a plate cut away to accommodate the

upstanding studs and engaging the upper surface of said blade.

19. A magnetic razor hone for flexible double-edged wafer type blades comprising a case having elongated pole ends exposed at the top thereof, a runway between said pole ends, a blade positioner comprising a narrow strip of metal adapted to be slid along said runway with the cutting edges in contact with the pole ends and having a pair of upstanding studs to extend through apertures in the blade and an operating member comprising a plate cut away to accommodate the upstanding studs, said operating member being a plate of para-magnetic material in contact with said blade, of width nearly equal to that of the blade and with its edges terminating slightly short of the cutting edges of the blade.

20. A magnetic hone for blades of the "Gem" type comprising a case, a pair of elongated magnet pole ends exposed from the top thereof, a slide runway therebetween a blade positioning member of metal slidable along said runway and having upstanding pins to enter the notches in the lateral edges of the blade and a central pin to enter the elongated slot in the middle of the blade, an operating plate cut away to accommodate the ends of said three studs and serving for sliding thereof with the blade positioning member and the blade longitudinally of the pole ends and the blade in direct engagement with the pole ends.

21. A magnetic hone for blades of the "Gem" type comprising a case, a pair of elongated magnet pole ends exposed from the top thereof, a runway therebetween, a blade positioning member of metal slidable along said runway and having three upstanding pins to enter the notches in the lateral edges of the blade and the elongated slot in the middle of the blade, an operating plate cut away to accommodate the ends of said three studs and serving for sliding thereof with the blade and the positioning member longitudinally of the pole ends, said operating plate being of para-magnetic material with one edge thereof terminating short of and parallel to the cutting edge of the blade said blades being arranged with respect to the magnet to dispose the cutting edge of the blade in contact with one of the pole ends.

22. A magnetic hone for a blade of the "Valet" type comprising a case having a horse shoe magnet therein with exposed elongated pole ends, a runway exposed between said pole ends, a metal plate slidable in said runway and having a pair of upstanding flattened pins near one lateral edge thereof adapted to be straddled by the lateral notches of the blade, and an operating plate to be superposed over the blade, having lateral notches to accommodate said studs, by which the blade with its associated parts can be slid back and forth along and in contact with the pole ends.

23. A magnetic hone for a blade of the "Valet" type comprising a case having a horse shoe magnet therein with exposed elongated pole ends, a runway exposed between said pole ends, a metal plate slidable in said runway and having a pair of upstanding flattened pins near one lateral edge thereof adapted to be straddled by the lateral notches of the blade, and an operating plate to be superposed over the blade, having lateral notches to accommodate said pins, by which the blade with its associated parts can be slid back and forth along and in contact with the pole ends, said operating plate being of para-magnetic material superposed over the blade and having its free edge terminating in the vicinity but short of the cutting edge of the blade.

24. As an article of manufacture a keeper plate for use in a magnetic sharpener adapted for universal application to blades of the "Gillette", "Gem" and "Valet" type, said plate of para-magnetic metal, of length substantially that of the safety razor blades and width less than such blades, said plate having circular apertures spaced for registry with those of a "Gillette" blade, having three smaller circular apertures spaced for approximate registry with the lateral notches and the intermediate slot of a "Gem" blade, and having a pair of lateral notches for registry with those of a "Valet" blade.

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