

P. E. BIRD.
 RAZOR SHARPENING MACHINE.
 APPLICATION FILED JULY 29, 1909.

993,016.

Patented May 23, 1911.

3 SHEETS-SHEET 1.

Fig. 1.

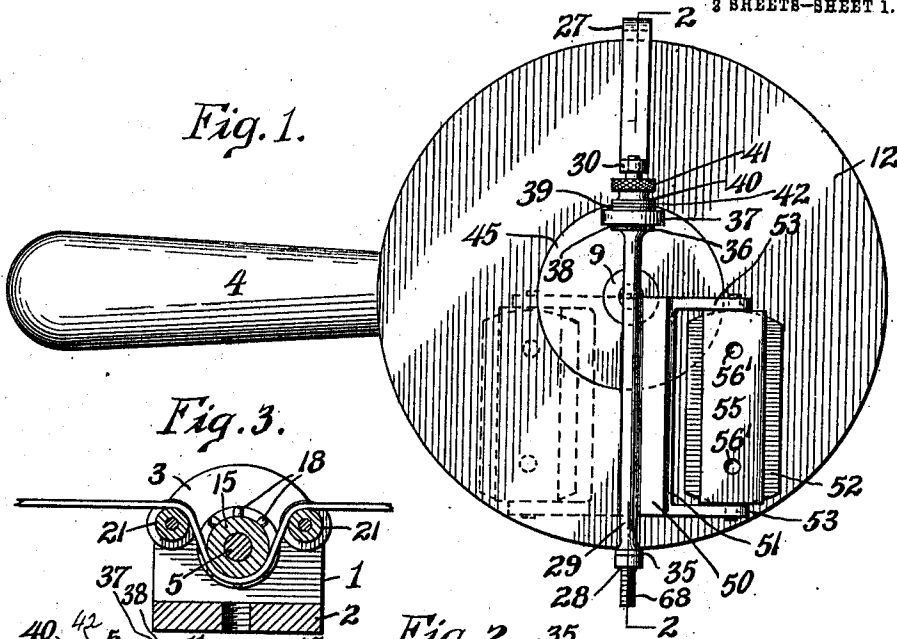


Fig. 3.

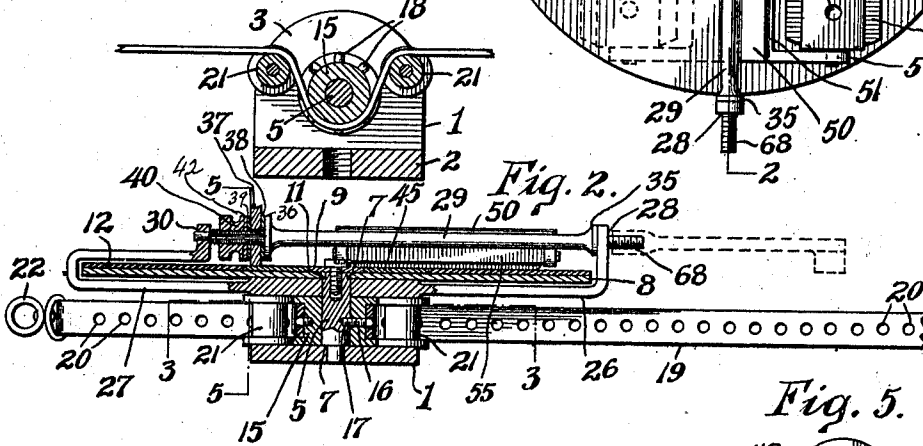


Fig. 2.

Fig. 5.

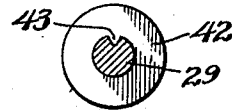


Fig. 4.

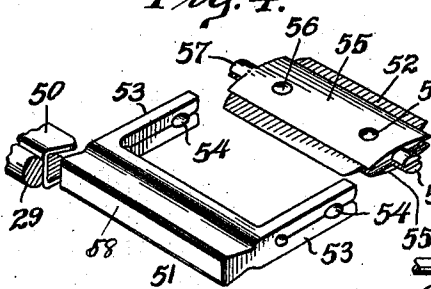
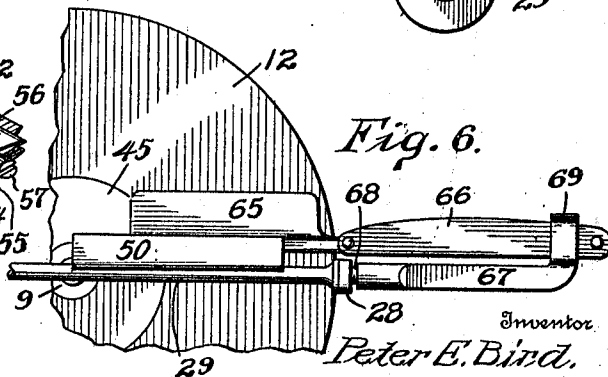


Fig. 6.



Witnesses

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2 SHEETS—SHEET 2.

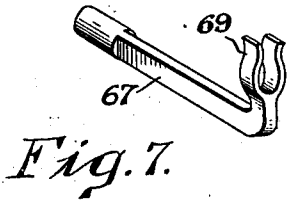


Fig. 7.

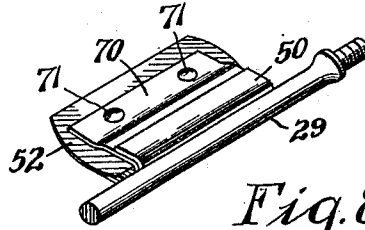


Fig. 8.

Fig. 9.

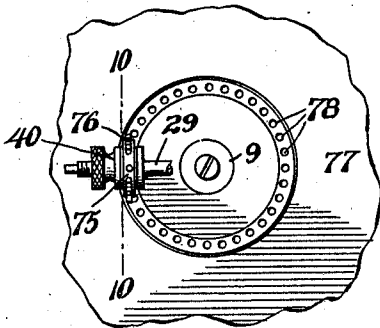


Fig. 11.

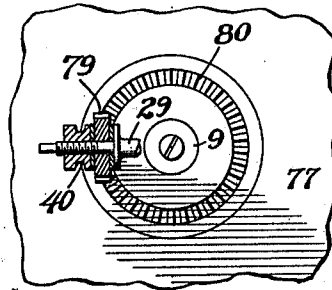


Fig. 10.

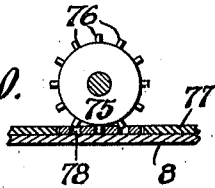
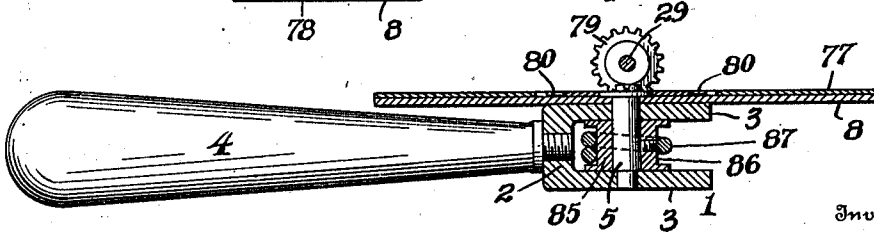


Fig. 12.



Inventor

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Witnesses

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Howe & Co.

Attorney

UNITED STATES PATENT OFFICE.

PETER E. BIRD, OF JENKINTOWN, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO
THOMAS B. HARPER, OF JENKINTOWN, PENNSYLVANIA.

RAZOR-SHARPENING MACHINE.

993,016.

Specification of Letters Patent.

Patented May 23, 1911.

Application filed July 29, 1909. Serial No. 510,277.

To all whom it may concern:

Be it known that I, PETER E. BIRD, a citizen of the United States, and a resident of Jenkintown, county of Montgomery, and State of Pennsylvania, have invented certain new and useful Improvements in Razor-Sharpening Machines, of which the following is a specification.

The main objects of this invention are to provide a simple durable and efficient machine by which a razor or other cutting tool may be conveniently and quickly sharpened; to provide a machine which may be used for sharpening either a detached blade, such as is used in safety razors, or the blade of an ordinary razor, or other similar tool while attached to its handle; to provide, in a sharpening machine, improved means for holding a two edged blade while being sharpened; to provide an improved sharpening machine having a flat rotary sharpening surface upon which the cutter to be sharpened is held so that the movement of the sharpening surface at the edge of the cutter is a direction oblique to the edge; to provide a razor sharpening machine having a rotary sharpener and improved means for rotating the sharpener; and to provide other improvements as will appear hereinafter.

In the accompanying drawings, Figure 1 is a top plan view of a razor sharpener constructed in accordance with this invention; Fig. 2 a section of the same on line 2—2 of Fig. 1; Fig. 3 a section of the same on line 3—3 of Fig. 2; Fig. 4 a perspective in detail of a portion of the same, the parts thereof being separated; Fig. 5 a transverse section of a portion of the same on line 5—5 of Fig. 2; Fig. 6 a fragmentary top plan view of the same showing an attachment for holding a razor handle and its attached blade in position for sharpening; Fig. 7 a perspective of an attachment forming a part of the device; Fig. 8 a perspective of a modified form of blade holder which may be used with this device; Fig. 9 a fragmentary top plan view of a modified form of this invention; Fig. 10 a fragmentary transverse section on line 10—10 of Fig. 9; Fig. 11 a fragmentary top plan view of a second modification of this invention and Fig. 12 a side elevation, partly in longitudinal section, of a modified form of this invention.

Referring to the drawings, one embodiment

of this invention comprises a substantially U-shaped yoke or support 1, having a central or base portion 2 and substantially parallel arms 3. This yoke may be threaded upon or integral with the inner end of a handle 4, and the yoke and its handle form a body or frame for supporting the movable parts of the device.

Journalled in the two arms of the yoke 1 is a spindle 5, both ends of which are reduced in diameter forming outwardly facing annular shoulders 7, one reduced end being journalled in one arm of the yoke with its shoulder 7 against the inner surface of the arm, and the other end of the spindle being journalled in the other arm of the yoke and having its shoulder 7 slightly outside of the outer surface of the arm, and its reduced portion projecting outwardly from the arm and supporting a sharpening disk 8 of metal or other suitable material. The disk is held against the adjacent shoulder 7 of the spindle and in fixed position with respect to the spindle by means of a washer 9 which is clamped against the outer surface of the disk, by means of a headed screw which extends through the washer and is threaded into the end of the spindle 5. Rotary movement between the disk and the spindle may further be prevented by a key 11 between the disk and the spindle. Upon the outer surface of the disk and extending from the periphery of the disk inwardly is secured an annular layer 12 of leather, or of leather coated with abrasive material, or of fabric coated with abrasive material, or of any other material or materials suitable for honing or sharpening a razor.

For imparting to the sharpening disk 8 an alternating or reciprocatory rotary movement a pulley 15 is removably fixed upon the spindle 5 between and in contact with the sides of the yoke 1 by means of a screw 16 which is threaded through the pulley and engages in a recess 17 provided therefor in the spindle, the screw holding the pulley not only against rotation with respect to the spindle, but also against movement longitudinally thereof, thus the spindle is held against longitudinal movement in its bearings by means of the pulley. The pulley 15 is preferably provided about its periphery with radial projections or teeth 18, and is preferably rotated by means of a band 19

of leather, or other suitable material having spaced perforations 20 adapted to engage these teeth, the band being held in contact with the pulley by means of two idlers 21, mounted between the sides of the yoke and upon opposite ends of the pulley. One end of the band 19 is provided with a ring 22, whereby the band may be attached to a fixed hook or other suitable support when it is desired to operate the machine.

For holding a cutter blade in position to be sharpened and for reversing the position of the blade to sharpen both sides of the blade, the arm 3 of the yoke 1 adjacent the sharpening disk is provided with oppositely extending resilient yielding brackets 26 and 27, which may be integral with the yoke or detachably connected thereto, and which may be made of metal or other suitable resilient material. These brackets are arranged radially of the sharpening disk, and one, 26, of these brackets is turned outwardly adjacent its outer end in a direction substantially perpendicular to the plane of the disk, terminating a short distance outside of the disk and is provided in this outwardly turned position with an aperture to form a bearing 28 for one end of the shaft 29. The other bracket 27 is turned outwardly around the periphery of the sharpening disk and then radially inwardly parallel to the disk, terminating in an outwardly projecting end between the periphery and the center of the disk and is provided in this end with an aperture forming a bearing 30 for the other end of the shaft 29. The outer end of the shaft 29 is provided with a collar 35 upon the inside and in contact with the inner surface of the adjacent bearing 26 to prevent movement of the shaft longitudinally outwardly.

For imparting to the shaft 29 an intermittent rotary movement in opposite directions, the shaft is provided, adjacent its inner end, with a collar 36, integral or rigid therewith, and between the collar and the bearing at the adjacent end of the shaft is mounted a friction roller 37, which is rotatable with respect to the shaft, but which is held against free movement upon the shaft by means of a friction washer 38 of leather or other suitable material surrounding the shaft and between the roller and the rigid collar 36, and a similar washer 39 surrounding the shaft upon the opposite side of the roller. These leather washers 38 and 39 are adjustably clamped against the roller by means of a nut 40 threaded upon the adjacent end of the shaft outside of the roller and its washers, the nut preferably having a knurled head 41 for convenience of manipulation, and to prevent the nut from being turned upon the shaft by the rotation of the roller with respect to the shaft a washer 42 of metal or other similar rigid material is

interposed between the nut and the adjacent leather washers, the metal washer being held against rotation with respect to the shaft by means of a key 43, preferably integral with the washer engaging in a key-way extending longitudinally of the shaft. In this construction it is evident that the nut may be tightened against the metal washer to press the leather washers against the opposite sides of the friction roller to retard the rotary movement of the roller with respect to its shaft, the roller, however, being rotatable with respect to the shaft when sufficient force is applied. By means of the resilient brackets 26 and 27 the roller is yieldingly pressed against and is adapted to be rotated by an annular friction disk 45 of leather or other suitable material rigid and concentric with the face of the sharpening disk 8, and bounded by the annular layer 12 of sharpening material.

Rigidly connected to the rotary shaft 29 of the blade holder is a spring clip 50 adapted to hold a blade directly in position to be sharpened or to receive a clasp 51 in which the blade may be removably mounted. The clasp 51 may be constructed in any suitable manner, for holding a two edged blade 52, such as is ordinarily used in safety-razors, the clasp is preferably in the form of a yoke made of resilient material, such as brass or spring steel, and having bifurcated yielding arms 53, each of which is provided adjacent its end with an oblong substantially oval aperture 54 formed between the two halves of the arm. These oblong apertures are adapted to form yielding bearings for two clamping plates 55 between which is removably secured the blade 52, the blade being provided as usual with two axially arranged apertures and one of the plates 55 being provided with corresponding apertures 56, while the other plate 55 is provided with studs 56' projecting inwardly therefrom and adapted to fit through the apertures of the blade and of the other plate. Each clamping plate 55 is provided on each end with a projecting lug 57, which is substantially semi-oval in cross-section and is adapted to form, with the corresponding lug, upon the other plate, a substantially transversely oval trunnion adapted to fit snugly in one of the oval apertures 54 of the clasp 51. The length of the main portion of each clamping plate 55 is substantially the same as the distance between the arms 53 of the clasp which is made substantially equal to the length of the usual detachable blade of a safety razor and the width of each plate is lightly less than the width of the blade so that the clamping plates holding the blade between them with its sharp edges exposed may be yieldingly supported in the yoke of clasp 51, the two portions of each arm of the clasp being sprung apart to permit the entrance of the

trunnions formed by the clamping plates into the oval apertures 54. When the blade 52 is thus positioned between the clamping plates and in the clasp 51, the blade will be held yieldingly against rotation with respect to the clasp, and substantially in the plane of the clasp, because of the oval or oblong shape of the trunnions and their bearings and by applying sufficient turning pressure to the clamping plates the divided portions of each arm will be sprung apart and the clamping plate and the blade may be rotated through half of a turn when the arms will again tend to hold the blade yieldingly in a fixed position. The intermediate portion 58, of the clasp 51, is substantially in the form of a dove-tail in cross section, and is adapted to slide longitudinally into engagement with the spring clip 50 which is rigid with the rotary shaft 29 of the holder and is held when in position, in the spring clip, substantially rigid with respect to the shaft.

When it is desired to hold a blade with a handle attached, such as a razor blade 65 and its handle, the blade clasp 51 may be removed from the holder and the blade of the razor or other tool may be inserted directly into the spring clip 50 which is adapted to hold the same, and the handle 66 of the tool is supported in a handle holding attachment, which consists of an arm 67, having one end provided with a longitudinal aperture and internal screw threads adapted to engage the outer end 68 of the rotary holder shaft 29, which is extended outwardly from its outer bearing, and is provided with external threads for this purpose. When the arm 67 of the handle holder terminates at its outer end in a yoke 69, extending substantially at right angles to the main portion of the arm 67, and adapted to receive the handle 66 and to support the same. This arm is preferably made of steel or brass, or other resilient material, and the sides of the yoke 69 of the arm are preferably constructed to clamp the handle yieldingly in position. When the arm 67 is threaded into position, the end of the shaft 29 is brought into contact with the end of the threaded aperture in the arm, and the arm may thus be held comparatively fixed with respect to the shaft, and when in this position, the yoke of the arm is substantially in alinement with the spring clip 50 of the shaft.

Instead of the clasp and clamping plates above described for holding the blade in position, a simple spring clasp 70, such as is shown in Fig. 8, may be used. In this case the clasp is in the form of a spring clip and is made of brass or any other suitable material, and is adapted to be held by the spring clip 50 rigid with the holder shaft 29 of the sharpener. This clasp is provided upon one side with apertures adapted to register with

the apertures through the blade and upon its other side with lugs 71 projecting inwardly and adapted to extend through the apertures in the blade and into the apertures in the opposite side of the clasp, thus holding the blade yieldingly and removably in position.

For rotating the sharpening disk instead of using a friction roller 37 engaging a corresponding annular friction disk 45, as heretofore described, a pinion 75 such as is shown in Figs. 9 and 10, having pins 76 projecting radially therefrom for teeth, may be used, and in this case, a sharpening disk 77 having spaced apertures 78 arranged in a circle concentric therewith to engage with the pins 76 of the pinion 75, is used.

A further modification shown in Figs. 11 and 12, of the means for rotating the sharpening disk, consists in substituting for the friction roller 37, a pressed, cut, or cast pinion 79, and in this case, the face of the sharpening disk is provided with a corresponding annular gear 80 with which the pinion 79 engages and through which the disk is revolved.

Instead of using a perforated band or strap, engaging a pulley provided with projecting pins as heretofore described, for actuating the sharpener, a pulley 85 having a smooth flanged face 86, may be used, around which is wound, for a single turn, an ordinary twisted or braided cord 87, or other suitable band, one end of which is provided as heretofore, with a ring adapted to be attached to a fixed support.

In the operation of this device, one end of the perforated strap or band 19 is secured in a fixed position by placing its ring 22 over a hook or other suitable support. The operator then grasps the other end of the strap in one hand and the handle of the machine in his other hand and reciprocates the handle longitudinally of the strap, whereupon an alternating rotary movement is imparted to the pulley 15, from the pulley through the spindle 5 to the rotary sharpening disk 8, and from the sharpening disk through the annular friction disk 45 and friction roller 37 to the shaft 29. The rotation of the shaft 29 swings the clasp 51, carrying the blade 52 toward the face of the annular thickness 12 of razor sharpening material on the rotating sharpening disk 8 and in the direction of movement of the disk bringing one edge 60 of the blade into engagement with the sharpening material, and at a suitable angle with the face of the material, the edge of the blade being substantially parallel to the axis of the shaft 29, which is arranged diametrically of the sharpening disk, and therefore, the action between the surface of the sharpening material and the edge of the blade is in a direction oblique to and away from the edge of the blade which is the most favorable direction for this action, as

is well known, as it avoids forming a wire edge upon the blade and gives the keen smooth edge desired. After the edge of the blade has been thus brought into contact with the sharpening material, the holder shaft 29 is held against rotation by the blade, and the roller 37 driving the shaft, is permitted to rotate with respect to the shaft between the friction washers 38 and 39, the friction between the washers and the roller being so adjusted by the nut 43 that the shaft is thus held stationary on the application of such pressure between the surface of the sharpening material and the edge of the blade as is desirable for sharpening purposes.

Upon the reversal of the rotation of the sharpening disk 8 by the reversed movement of the handle 4 in the hand of the operator, it is evident that the blade will be rotated away from its position of contact with the sharpening material upon one side of the shaft 29, and will be brought down into contact with the sharpening material upon the other side of the shaft, and the edge of the blade will be again sharpened, but upon the opposite side from that affected by the action first described. When it is desired to sharpen the other edge, 61, of the blade, it is simply necessary for the operator to grasp the clamping plates 55 holding the blade and rotate them upon their journals through half a turn, and then proceed as before.

Although only a single embodiment of this invention and a few modifications thereof have been shown herein, it is obvious that many changes might be made in the construction set forth without departing from the spirit of this invention, or the scope of the appended claims.

Having thus fully described my invention, I claim and desire to protect by Letters Patent of the United States:

1. In a sharpening machine, the combination with rotary sharpening means, of means for holding a blade, means to give said sharpening means an alternating rotary motion, and yielding means continuously rotated by the continuous rotation of said sharpening means to give an intermittent limited rotary alternating movement to said blade holding means by the alternating rotation of said sharpening means.

2. In a sharpening machine, the combination with a rotary sharpening disk, of a blade holder, means to give said disk an alternating rotary motion, and a friction roller yieldingly contacting with said disk and continuously rotated by the continuous rotation of said disk to give an intermittent limited rotary alternating movement to said blade holder by the alternating rotation of said sharpening means.

3. In a sharpening machine, the combination with rotary sharpening means, of means

for holding a blade, means to give said sharpening means an alternating rotary motion, and a friction roller contacting with said rotary sharpening means and continuously rotated by the continuous rotation of said sharpening means for giving an intermittent limited alternating rotary movement to said blade holding means by the alternating rotary movement of said sharpening means.

4. In a sharpening machine, the combination with a rotary sharpening disk, of a blade holder, means to give said disk a rotary motion, and a friction roller yieldingly held in contact with said disk and continuously rotated by the continuous rotation of said disk for giving a limited rotary movement to said blade holder by the continuous rotation of said disk.

5. In a sharpening machine, the combination with rotary sharpening means, of means to rotate said sharpening means, a rotary shaft, a blade holder upon said shaft and roller rotatably mounted by the shaft and contacting with said rotary sharpening means to give the shaft a limited rotary movement upon the continuous rotation of said roller.

6. In a sharpening machine, the combination with rotary sharpening means, of means to rotate said sharpening means, a rotary shaft, a blade holder upon said shaft, a friction roller rotatably mounted upon the shaft between the shaft and said rotary sharpening means, and means to give the shaft a limited rotary movement in either direction by a continuous rotation of said roller in a corresponding direction.

7. In a sharpening machine, the combination with rotary sharpening means, of means to rotate said sharpening means, a rotary shaft, a blade holder upon said shaft, a member mounted upon the shaft and rotatable with respect thereto, and engaging said sharpening means, and means on said shaft adjacent said member to retard the rotation of said member with respect to said shaft.

8. In a sharpening machine, the combination with rotary sharpening means, of means to rotate said sharpening means, a rotary shaft, a blade holder upon said shaft, a member mounted upon the shaft and rotatable with respect thereto and rotated by the rotation of said sharpening means, and adjustable means on said shaft adjacent said member to retard the rotation of said member with respect to said shaft.

9. In a sharpening machine, the combination with rotary sharpening means, of means to rotate said sharpening means, a rotary shaft, a blade holder fixed upon said shaft, a member mounted upon the shaft and rotatable with respect thereto and rotated by the rotation of said sharpening means, and adjustable means on said shaft adjacent

said member to retard the rotation of said member with respect to said shaft, said last mentioned means comprising a washer on said shaft in contact with said member, and
 5 a nut threaded on said shaft to clamp said washer against said member.

10. In a sharpening machine, the combination with rotary sharpening means, of means to rotate said sharpening means, a
 10 rotary shaft, a blade holder fixed upon said shaft, friction roller mounted upon the shaft and rotatable with respect thereto, and rotated by the rotation of said sharpening means, and means on said shaft and engaging
 15 said roller to retard the rotation of said roller with respect to said shaft, comprising a collar rigid with said shaft upon one side of said roller, a washer longitudinally movable on said shaft but held against rotation
 20 with respect thereto upon the other side of said roller, and a nut threaded on said shaft outside of said washer.

11. In a sharpening machine, the combination with rotary sharpening means, of a
 25 blade holder, and means yieldingly held in contact with said rotary sharpening means to rotate said blade holder.

12. In a sharpening machine, the combination with rotary sharpening means, of
 30 means comprising a toothed pulley and a perforated ribbon engaging therewith to rotate said sharpening means.

13. In a sharpening machine, the combination with rotary sharpening means, of a
 35 yielding clasp, and means reversibly held by said clasp for clamping a two-edged blade in position.

14. In a sharpening machine, the combination with a spring clip, of a clasp removably supported by said clip, and means carried by said clasp for reversibly holding a
 40 two-edged blade.

15. In a sharpening machine, the combination with rotary sharpening means, of a
 45 blade clasp comprising a yoke having yielding bifurcated arms, each arm being provided with an oblong aperture between the two halves of the arm, and means having transversely oval trunnions adapted to engage in
 50 said apertures and to hold a blade.

16. In a sharpening machine, the combination with rotary sharpening means, of a
 blade clasp comprising a yoke having yielding bifurcated arms, each arm being provided with an oblong aperture between the
 55 two halves of the arm, and a pair of clamping plates having transversely oval trunnions adapted to engage in said apertures and to hold a blade.

17. In a sharpening machine, the combination with a yoke having two arms, of a
 60 spindle journaled transversely in said arms, a rotary disk sharpener fixed on one end of said spindle and outside of said yoke, a pair of oppositely disposed brackets carried

by said yoke, a rotary shaft journaled in said brackets, and a blade holder carried by said shaft.

18. In a sharpening machine, the combination with a yoke, of a handle rigid there-
 70 with, a spindle journaled in said yoke, means to rotate said spindle, a rotary disk sharpener fixed on one end of said spindle, resilient yielding brackets carried by said yoke, a rotary shaft journaled in said brackets,
 75 and means on said shaft for holding a blade.

19. In a sharpening machine, the combination with a yoke, of a handle rigid there-
 80 with, a spindle journaled in said yoke, means to rotate said spindle, a rotary disk sharpener fixed on one end of said spindle, brackets carried by said yoke, a rotary shaft journaled in said brackets, means on said shaft
 85 for holding a blade, and a member mounted on said shaft and rotatable with respect thereto and actuated by the rotation of said disk for rotating said shaft.

20. In a sharpening machine, the combination with a yoke, of a handle rigid there-
 90 with, a spindle journaled in said yoke, means to rotate said spindle, a rotary disk sharpener fixed on one end of said spindle, brackets carried by said yoke, a rotary shaft journaled in said brackets, a blade holder on
 95 said shaft, and a member mounted on said shaft and rotatable with respect thereto and actuated by the rotation of said disk for rotating said shaft, and adjustable means on said shaft and adjacent said member for
 100 retarding the rotation of said member with respect to said shaft.

21. In a sharpening machine, the combination with a yoke having two arms, of a
 105 spindle journaled transversely in said arms, a rotary disk sharpener fixed on one end of said spindle and outside of said yoke, a pair of oppositely disposed yielding brackets carried by said yoke, a rotary shaft journaled in said brackets, and a blade
 110 holder carried by said shaft.

22. In a sharpening machine, the combination with rotary sharpening means, of a
 115 rotary shaft, a blade holder carried by said shaft, a member mounted upon said shaft and rotatable with respect thereto, and means upon said shaft and adjacent said member to retard the rotation of said member with respect to said shaft.

23. In a sharpening machine, the combination with rotary sharpening means, of
 120 means comprising a toothed pulley, a perforated band engaging said pulley, and oppositely arranged idlers for holding said band in engagement with said pulley for
 125 rotating said pulley.

24. In a sharpening machine, the combination with rotary sharpening means, of a
 130 rotary shaft, spaced yielding bearings for said shaft, a blade holder carried by said

shaft, and a roller mounted upon said shaft and held yieldingly in contact with said rotary sharpening means to rotate said shaft.

- 5 25. In a sharpening means, the combination with a support, of a spindle journaled in said support, a rotary sharpener fixed to said spindle and adjacent one side of said support, a pair of resilient bifurcated

brackets carried by said support, a shaft 10 journaled in said brackets, and a blade holder carried by said shaft.

In witness whereof I have hereunto set my hand this 23rd day of July 1909.

PETER E. BIRD.

Witnesses:

A. IRWIN GARDNER,
ALEXANDER PARK.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

It is hereby certified that in Letters Patent No. 993,016, granted May 23, 1911, upon the application of Peter E. Bird, of Jenkintown, Pennsylvania, for an improvement in "Razor-Sharpening Machines," errors appear in the printed specification requiring correction as follows: Page 2, line 124, the word "lightly" should read *slightly*; page 4, line 89, the word "by" should read *upon*, and same page, line 92, the word "upon" should read *by*; 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 27th day of June, A. D., 1911.

[SEAL.]

C. C. BILLINGS,
Acting Commissioner of Patents.