Aug. 28, 1934. H. L. CHAPIN 1,971,478

BLACKING MACHINE

Filed May 6, 1931 3 Sheets-Sheet 1

Fig. 1.

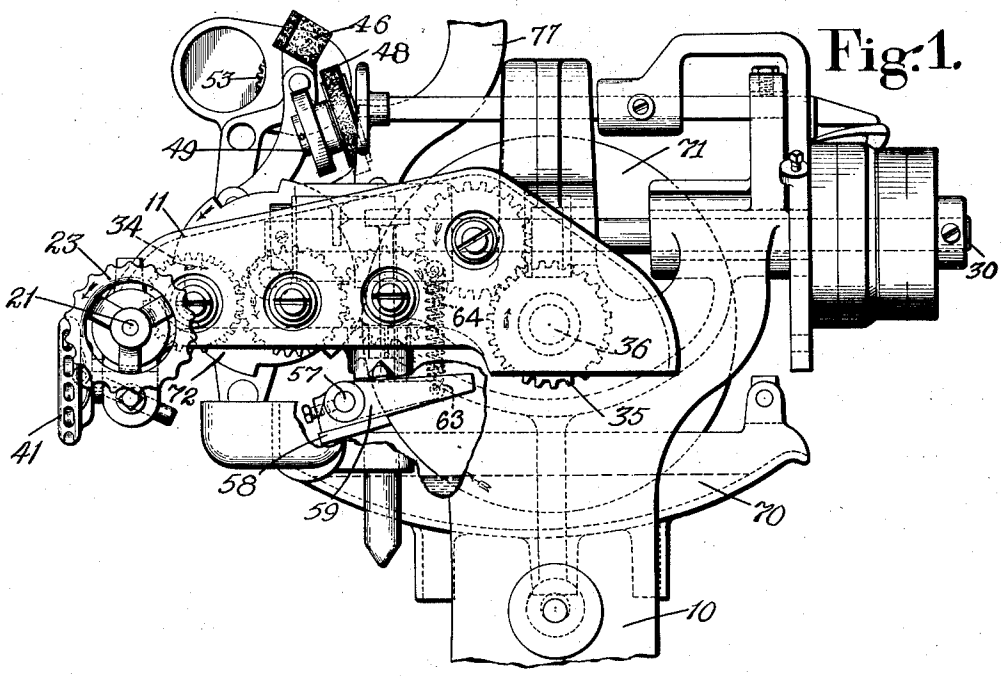



Fig. 2.

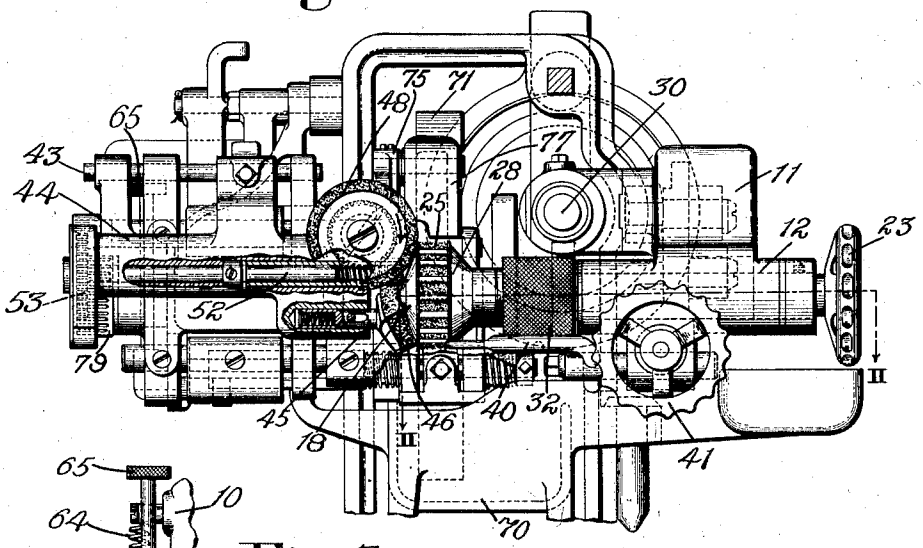
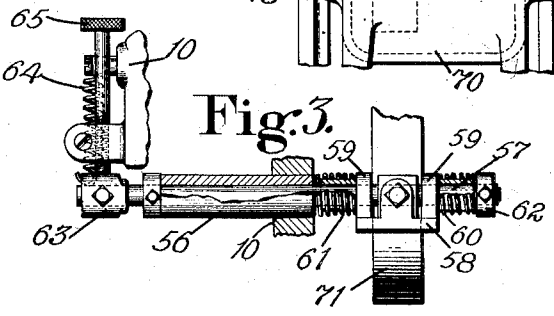



Fig. 3.




INVENTOR
Herbert L. Chapin
By his Attorney
Harlow M. Davis

Aug. 28, 1934. H. L. CHAPIN 1,971,478

BLACKING MACHINE

Filed May 6, 1931 3 Sheets-Sheet 2

Fig:4.

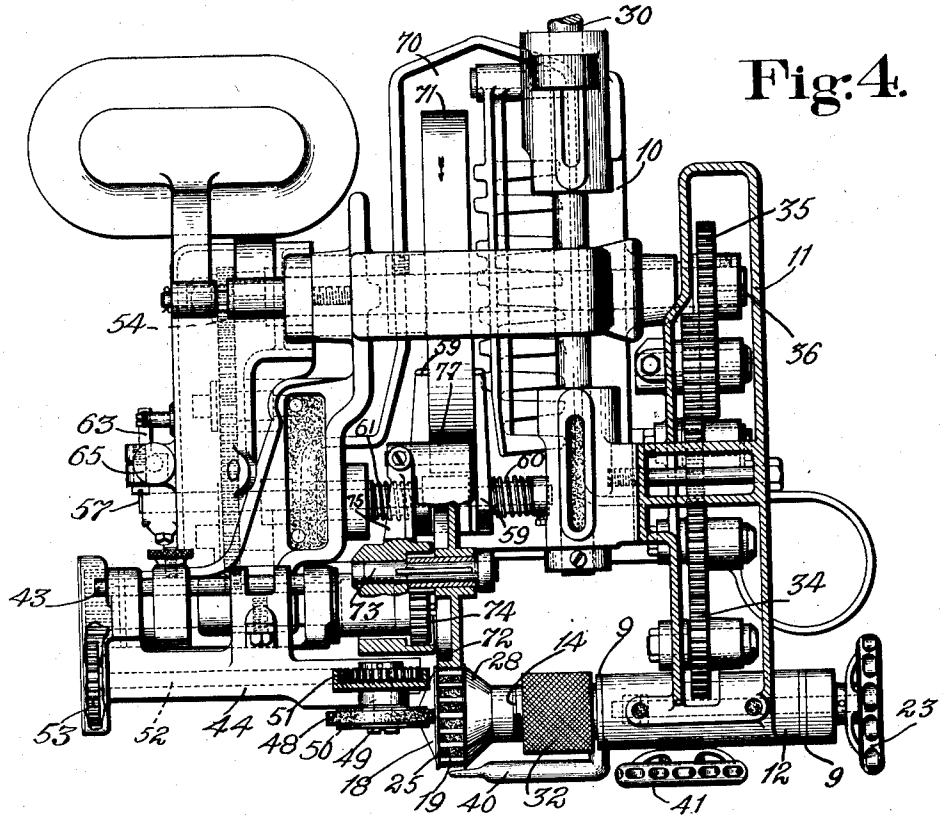



Fig:5.

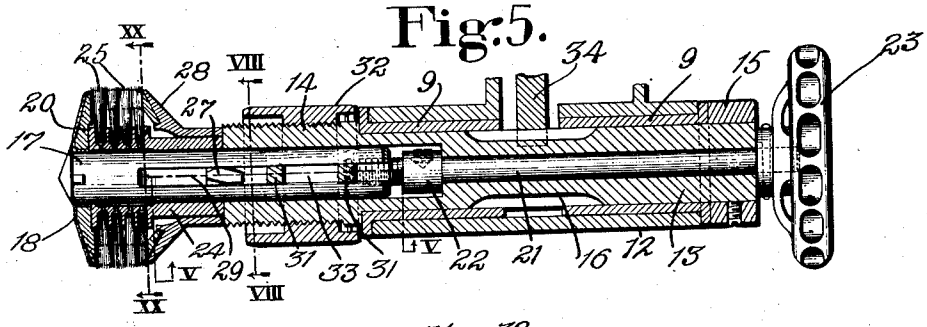
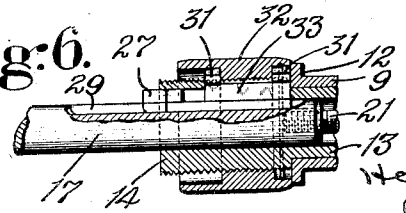



Fig:6.




INVENTOR
Herbert L. Chapin
By his Attorney,
Harlow M. Davis

Aug. 28, 1934. H. L. CHAPIN 1,971,478

BLACKING MACHINE

Filed May 6, 1931 3 Sheets-Sheet 3

Fig. 7.

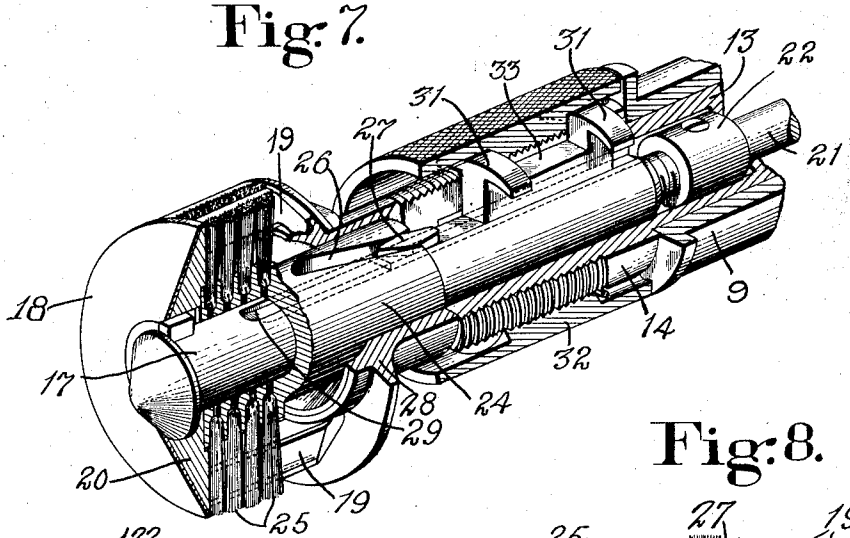



Fig. 8.

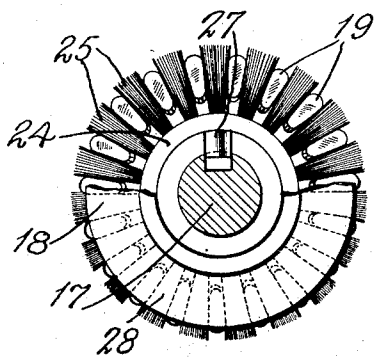



Fig. 11.

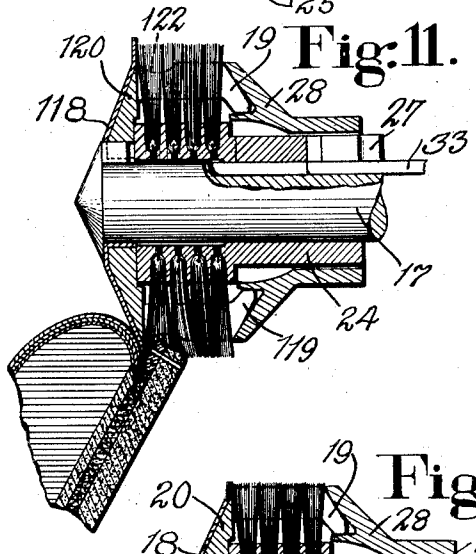



Fig. 9.

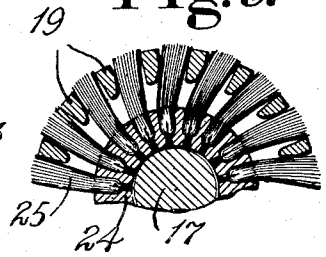
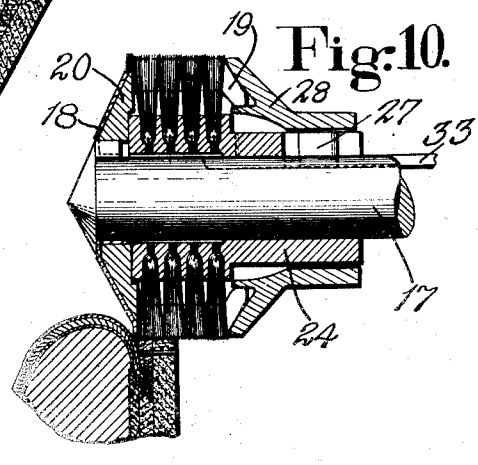



Fig. 10.




INVENTOR

Herbert L. Chapin

By his Attorney,

Harlow M. Davis

Patented Aug. 28, 1934 1,971,478

# UNITED STATES PATENT OFFICE

1,971,478

## BLACKING MACHINE

Herbert L. Chapin, Swampscott, Mass., assignor to United Shoe Machinery Corporation, Paterson, N. J., a corporation of New Jersey

Application May 6, 1931, Serial No. 535,467

32 Claims. (Cl. 12—31)

This invention relates to machines for applying a liquid coating of finish or the like to parts of boots and shoes. An important field of use is in connection with blacking machines of the general type disclosed in my prior Patent No. 1,760,115, granted May 27, 1930, and for purposes of illustration my invention will be described as embodied in such a machine.

In coating the peripheral surfaces of soles, heels, heel sections and welt edges, it is customary to apply the coating by a rotary brush operating in a definite zone and limited in its effective width by appropriate guard members. The part of the shoe to be coated is presented to the brush by the operator in a position accurately determined by suitable gaging elements and the problem involves the need of uniformly and completely coating sole or heel surfaces to a predetermined line and of protecting all other parts of the shoe from the coating material. In the case of sole edges, most of the work has been done manually, using a tooth brush, for example, and the work has been done reasonably well at a very small cost. In order for a machine to compete successfully with hand labor it must economically apply blacking or other liquids of varying consistency to work having different surface characteristics, under varying conditions of temperature and humidity, and carry out the work with the desired precision and rapidity.

Accordingly, an object of the invention is to provide an improved blacking machine which will coat peripheral shoe parts and especially sole edges economically and efficiently under varying conditions.

With this object in view, an important feature of my invention consists in a novel rotary assembly for applying blacking or stain to shoes characterized by a rotary applying member having spaced flexible applying elements, such as a brush, associated with a cage-like member the periphery of the spaced elements of which forms a surface of rotation, the applying elements projecting through the openings of the cage. The cage member is effective for several functions. In the first place, it acts as a limiting gage to determine the extent of the wiping action of the bristles upon the surface of the work and, accordingly, to limit the penetration of the work into the body of the brush. It also has an ironing or rubbing action upon the surface being coated and tends to beat the coating material into the finished surface. Further by providing means for relatively adjusting the cage and brush, I am enabled to regulate the effective diameter of the brush, compensate for wear, and vary the amount of wiping action of the bristles upon the surface to be coated.

The cage member may be of any desired construction but as herein shown it is mounted upon the brush shaft in association with a guard disk for the brush. The illustrated cage has arms which extend through the body of the brush between the bristles thereof and convenient manually-operated means are provided whereby the position of the cage angularly relative to the brush may be varied in order to deflect the bristles more or less from their normal radial position. In thus deflecting the bristles the effective diameter of the brush is reduced, the arms of the cage member are brought nearer to the periphery of the brush, and the wiping action of the bristles is correspondingly reduced. When the cage member is moved to a position allowing the bristles to stand in a radial position, the brush is in a condition of maximum effective diameter and the wiping action of the bristles is also at a maximum. The character of the engagement between the brush and the surface of the work may, accordingly, be varied from that in which the bristles make substantially only end contact therewith to that in which a substantial length of the bristles is drawn or wiped across the surface. This flexibility of adjustment is useful in meeting varying conditions of surface and coating material, as already explained.

My invention also includes within its scope a novel and convenient mechanism for adjusting the cage and brush members all included in the rotary brush assembly of the machine. As herein shown, the brush shaft contains a sliding member having a tongue and oblique slot connection with the brush. This may be moved longitudinally of the shaft by a concentric sleeve surrounding the shaft and carried thereby, and when so moved the brush is angularly displaced upon its shaft and in respect to the cage.

It is of great importance to keep clean and free of coating material those portions of the machine which are not relied upon in conveying or applying the coating material and this is particularly true of the guard which engages the upper of the shoe and runs in the welt or rand crease when the sole edge is being blacked. My invention includes as another feature improved means for cleaning such a guard disk or any rotary guard employed in a coating machine. This novel mechanism is characterized by a driven wiping disk arranged to make peripheral contact with the rim of the guard or with any other critical portion thereof, and to rotate in a plane at an angle to

the surface of the guard face to be cleaned. By presenting always a fresh moving surface to the guard face, the latter is adequately and reliably cleaned and danger of soiling the work obviated. As herein shown, the driven disk is supplemented by a stationary wiping member although this may not be necessary in all cases. In order to permit free removal of the guard and its associated brush for purposes of cleaning or replacement, the driven wiping disk is mounted upon an angularly-movable bracket which may be swung from an operative position, in which a driving connection to the disk is established, into an inoperative position out of line with the guard and its brush.

My invention includes as another feature improved means for cleaning the side faces of a blacking-conveying disk and for regulating the amount of blacking thereon. As herein shown, this comprises a scraping member disposed in adjustable relation to the rim of the disk and two edge-scraping members associated therewith and maintained independently in yielding contact with the side faces of the disk. The adjustment of the peripheral scraping member may be effected without disturbing the action of the side scrapers and thereby a compact and efficient organization is secured.

These and other features of the invention will be best understood and appreciated from the following description of a preferred embodiment thereof, selected for purposes of illustration and shown in the accompanying drawings, in which

Fig. 1 is a view of the machine head in side elevation, certain portions being broken away and with a wiper mechanism thrown to inoperative position;

Fig. 2 is a similar view in front elevation;

Fig. 3 is a detailed view in front elevation of wiping mechanism for the ink drum;

Fig. 4 is a plan view of the machine head;

Fig. 5 is a sectional view, as on the line II—II of Fig. 2 but on an enlarged scale, of the ink-applying brush;

Fig. 6 is a sectional detail view at right angles to that shown in Fig. 5 and on the line V—V of Fig. 5;

Fig. 7 is a perspective view, partly in section, of the brush assembly on a still larger scale;

Fig. 8 is a view, partly in section, on the line VIII—VIII of Fig. 5, of the brush assembly;

Fig. 9 is a similar view on the line XX—XX of Fig. 5, illustrating the cage in a differently adjusted position;

Fig. 10 is a view in longitudinal section of the brush assembly; and

Fig. 11 is a similar view showing a modified form of brush and guard.

The head frame 10 is designed to be supported at convenient height upon a column, not shown, and is provided with bearings for a main shaft 30 and a rotary edge-blacking brush comprising bristles 25. The frame is designed to contain a reservoir 70 for blacking, mechanism 71, 72 for conveying the blacking from the reservoir to the applying brush, and mechanism 46, 48 for cleaning or wiping those parts of the assembly which must be kept free of blacking, all of which will be described in more detail hereinafter.

Referring first to the rotary assembly in which the applying brush is included, it will be observed that the head frame 10 is provided with a gear casing or housing 11 (Figs. 2 and 4) extending forwardly in the machine and provided with an elongated bearing 12, preferably cast integral with the housing. The bearing 12 is provided with bushings 9 in which is journaled a horizontally-disposed shaft 13 having at its left end, as seen in Fig. 5, an enlarged head 14 provided with an axial bore and a shoulder which bears against the end of the left-hand bushing 9. At its other end the shaft 13 carries a collar 15 which bears against the outer end of the right-hand bushing 9 and thus the shaft 13 is confined against longitudinal movement by its shoulder and the collar 15. The shaft 13 is provided at an intermediate point with elongated gear teeth 16 with which meshes a pinion 34 (Fig. 4). The bearing member 12 is cut away to permit the pinion to make driving connection with the shaft 13 and, in the operation of the machine, the shaft is rotated uniformly at an appropriate speed for the blacking-applying brush which it carries.

Within the longitudinal bore in the enlarged head 14 of the shaft 13 is received a spindle 17 to the outer end of which are keyed a conical sheet metal guard disk 18 and a cage member 20. The cage member 20 conforms in shape to the inner face of the guard disk 18 and is provided with a series of spaced elements which are shown as axially-extending arms 19 spaced uniformly and circumferentially about the member 20 at a distance from the shaft 17. The periphery of the outer faces of these arms forms a surface of rotation, here a cylinder. The brush, which comprises an elongated hub 24 and a plurality of tufts of radially-disposed applying elements or bristles 25, is mounted upon the spindle 17 but is free for limited rotation thereon, as will presently appear. The arms 19 of the cage member extend through the body of the brush between adjacent tufts of bristles, as shown in Fig. 8. The side walls of the arms are somewhat divergent and in the position shown in Fig. 8 they do not interfere with the true radial position of the bristles 25. As appears from Fig. 9, these arms are relieved so that they do not unduly condense the bristles when adjusted to a deflected portion. Each arm 19 is formed at its rear end with an inwardly and obliquely-extending projection, the collective surfaces of which are conically disposed. A guard sleeve 28 surrounds the hub 24 of the brush in spaced relation thereto and is provided with a flanged inner conical surface which fits upon the inner ends of the arms 19 so that the guard 28 is centered concentrically with respect to the hub of the brush and maintained out of contact therewith.

The inner end of the spindle 17 contains an internally-threaded socket to receive the threaded end of a long clamping rod 21. The shaft 13 is provided with a longitudinal bore to receive this rod which is maintained against endwise movement therein by a collar 22 fast upon its inner end and a hand wheel 23 pinned to its outer end. It will be seen that by turning the hand wheel 23 to rotate the clamping rod 21 the spindle 17 may be drawn toward the right into its socket in the shaft 13. In its operative position the spindle 17 is drawn toward the right until the inner end of the hub 24 of the brush is brought into engagement with the end face of the head 14 of the shaft. The hub of the guard member 28 also engages the end of the head 14 and it will be apparent that a rigid, self-contained assembly is thus provided which is capable of rotating at high speed.

The brush is free for rotary adjustment upon the spindle 17, as already stated, and its angular position thereon is controlled by a tongue 27 (Fig. 7) which projects into an inclined slot 26

in the brush hub 24. The tongue 27 extends upwardly from the forward end of a key 33 which is mounted for longitudinal movement in a key-way 29 suitably provided in the spindle 17 and opening outwardly. At its rear end the key 33 extends above the key-way 29 through a key-way, opening inwardly of the hollow shaft 13 (Fig. 7), and carries a pair of studs 31 having curved transversely-extending heads which overlie the surface of the head 14 of the shaft 13. The head 14 is externally threaded to receive a knurled sleeve 32 which is internally shouldered at each end to receive the heads of the studs 31. Rotation of the sleeve 32 is, accordingly, effective to shift the key 33 longitudinally in the spindle 17 and to advance the tongue 27 into the inclined groove 26 in the hub 24 of the brush. Longitudinal movement of the key 33 is thereafter effective to rotate the brush upon the spindle 17 with relation to the cage member 20 and the arms 19. As relative rotation or twisting movement is produced between the arms and the brush, the bristles 25 thereof are deflected by the arms, as shown in Fig. 9, thus drawing in the bristles with respect to the arms and decreasing the effective diameter of the brush.

The arms 19 of the cage member serve collectively as a work supporting member or rest limiting the inward movement of the work and maintaining it when presented by the operator in the most advantageous position with respect to the brush for the work required of it. The arms forming, as they do, a surface of rotation also act to some extent to iron or rub the blacking into the surface of the work presented. They have the further function of determining the initial deflection of the bristles and of limiting the effective length of the bristles so that the wiping effect thereof may be regulated. Convenient and effective means have thus been provided for adapting the brush to the varying requirements of different surfaces and different coatings, and also to compensate for wear in the bristles.

The brush may be removed from its assembly for cleaning or replacement by turning the hand wheel reversely so that the spindle 17 is forced to the left and released from engagement with the threaded end of the rod 21. When this occurs, the spindle 17 with the brush and cage thereon may be easily removed, the tongue 27 passing freely out of the slot 27 in the hub 24 of the brush. When this is done, the key 33 is retained in place longitudinally by the engagement of the heads of the studs 31 with the shoulders of the knurled sleeve 32. The key is, moreover, prevented from falling out of place by the fact that the heads of the studs extending over the threaded surface of the end 14 of the shaft 13 act to suspend the key and hold it in the proper position to be engaged by the keyway 29 in the spindle 17 when the latter is again inserted.

The shaft 13 is driven by the pinion 34 which is journaled in the gear housing 11 of the head frame. The pinion 34 is in turn driven through the gear train shown in Fig. 4 from a driving pinion 35 fast upon one end of a transverse shaft 36 journaled in the frame 10. The shaft 36 is provided at an intermediate point with a worm wheel by which it is driven at a reduced rate of speed from a worm upon the main shaft 30 of the machine. The driving connections above described are disclosed in further detail in my prior Patent No. 1,760,115, to which reference may be had. A surface gage 40 is provided adjacent to the periphery of the bristles 25 of the brush. This is adjustably mounted in a bracket depending from the bearing member 12. It is adjustable toward and from the surface of the brush and also longitudinally, being maintained in the required position by a clamping screw terminating in a hand wheel 41.

It is of great importance to maintain the outer surface of the guard disk 18 entirely clear of blacking as otherwise the upper of the shoe would be soiled. To this end I provide novel wiping mechanism which will now be described. The frame 10 of the machine carries a bracket 44 which is provided with a longitudinal bore disposed opposite to the guard disk 20 and located substantially midway between its axis and its outer rim. Within the bore is provided a spring-pressed plunger 45 (Fig. 2) provided at its outer end with a head in which is formed a socket or receptacle for a block of felt 46 or other wiping material. This is positioned so that it bears fairly upon the conical surface of the guard disk 18 and is maintained yieldingly in contact therewith at all times. The pad will, therefore, follow the surface of the guard in its rotation and will compensate for any irregularity or eccentricity therein. It may be easily replaced in case it should become saturated, by pressing the plunger into its socket and then removing the block of felt.

In order to make certain that the guard disk is cleaned out to its periphery, there is provided a rotary wiper comprising a disk 48 of felt or similar material removably retained between suitable flanges by a clamping screw 49 threaded into the end of a short shaft 50 journaled to rotate in bearings provided in the bracket member 44. At its inner end the shaft 50 carries a worm wheel 51 which meshes with a worm formed upon the inner end of a shaft 52 (Fig. 4) journaled in the bracket member 44. At its outer end the worm shaft 52 carries a pinion 53 and this in turn is driven through a gear train leading to a pinion 54 on the left end of the shaft 36, already mentioned. The wiping disk 48 is thus driven slowly in a clockwise direction, as seen in Fig. 2, moving inwardly with reference to the guard disk 18 from its point of contact with the periphery thereof and thereby ensuring the removal of all blacking from the rim thereof.

The head frame 10 carries a blacking reservoir 70 into which dips the periphery of a blacking drum 71 which is carried by the shaft 36. The blacking picked up by the drum 71 is transferred to the brush by an intermediate transferring disk 72 and this, as shown in Fig. 1, is provided with alternate lands and depressions so that the blacking is supplied intermittently to the brush and given a chance to spread thereon. The transferring disk 72, as shown in Fig. 4, is keyed to a shaft 73 journaled in a portion of the head frame 10 and driven by suitable connection with a pinion 74 and the gear train last referred to. Extending to the rear from the frame bearing of the shaft 73 is an arm 75 (Fig. 4) at the rear end of which is pivotally supported a curved cover 77 for the transferring disk 72.

It is important to clean the sides of the blacking drum 71 and to regulate the amount of blacking carried thereby for delivery to the brush. To this end I provide novel wiping mechanism which will now be described. The head frame 10 is provided with an elongated bushing 56 (Fig. 3) in which is journaled a horizontal shaft 57 carrying at its inner end a rim-scraping member 58

which is rigidly secured thereto and also a pair of side-scraping members 59. These are loosely mounted upon the shaft 57 and held yieldingly against the side surfaces of the drum 71 by springs 60 and 61 respectively. The spring 60 is interposed between the right-hand scraping member 59 and a collar 62 secured to the outer end of the shaft 57. The spring 61 is interposed between the left-hand scraping member 59 and the end of the bushing 56. It will thus be seen that the side-scraping members are maintained independently in yielding engagement with the sides of the drum 71 so that they may accurately follow any irregularity or eccentricity in these surfaces. The rim-scraping member 58 is extended laterally (Fig. 3) so that it underlies (Fig. 1) a portion of the side-scraping member 59 and maintains the latter in the proper angular position.

At its outer end the shaft 57 is provided with a rearwardly-extending arm 63 (Figs. 3 and 4) to the rear end of which is secured a tension spring 64 normally tending to lift the arm 63 and swing the rim-scraping member 58 into engagement with the blacking drum 71. A vertically-disposed adjusting screw 65 is threaded into a boss in the head frame 10 and is arranged to bear upon the arm 63. When, therefore, the adjusting screw 65 is turned in, the shaft 57 is rocked and the rim-scraping member 58 carried away from the periphery of the drum 71, thus permitting a larger quantity of blacking to be delivered to the transferring disk 72 and the blacking-applying brush.

In Figs. 9 and 10 the adjustment of the cage with reference to the brush is such that the arms 19 are substantially in the outer circumferential line of the bristles 25. This represents one limit of adjustment and in this the wiping action of the bristles upon the surface of the work is reduced to nothing, and in case the edge of a sole is being blacked, as suggested in Fig. 10, the bristles will make scarcely more than end contact therewith since the sole is prevented by the action of the arms 19 from entering the body of the brush. By rotating the sleeve 32 the cage may be turned so as to permit the bristles 25 to assume the radial position illustrated in Fig. 8, the effective diameter of the brush is increased and a wiping action of the bristles takes place to an extent represented by the distance which the bristles project beyond the outer surface of the arms 19. This more pronounced wiping action is advantageous in applying blacking to a sole or other object having a shaped or molded contour, as suggested in Fig. 11. In this case the bristles are allowed to project substantially beyond the surface of the arms 119 on the cage 120, the work presented enters the body of the brush to an appreciable extent, and the bristles lap over the edges of the sole and follow the concave contour thereof so that the entire surface and edges of the sole are coated. In this case, a special guard disk 118 is provided having a pronounced flange intended to run in the rand crease of a shoe and protect the upper while permitting the blacking to reach the bottom of the crease. Grooves 122 are formed in the outer surfaces of the arms 119 to facilitate presenting a shoe in the tilted position shown in Fig. 11.

The disk 18, as well as the special disk 118 shown in Fig. 11, have been referred to as guard disks and their primary function is to guard the upper of a shoe when its sole or heel is presented to the action of the blacking-applying brush. It will be noted, however, that these disks may have the additional function of applying blacking to the upper face of the welt or rand, as suggested particularly in Fig. 11, and under these circumstances blacking will be applied to the inner face of the rim of the disk, as disclosed in my prior Patent No. 1,760,115.

The bracket member 44 is pivotally supported upon a horizontal pivot shaft 43 and is arranged to be moved axially to free the casing surrounding the pinion 53 from the gear 79 which drives it and to swing with its parts as a complete assembly from operative position shown in Figs. 2 and 4 to inoperative position, as shown in Fig. 1. In its operative position the pad 46 and the cleaning disk 48 are positioned in contact with the outer face of the guard disk 18 and the pinion 53 is in mesh with the gear 79 of the driving gear train. In its inoperative position the bracket member and all the parts carried thereby are removed out of line with the brush and its spindle 17 so that the spindle may be moved endwise and the brush detached without obstruction.

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

1. In a blacking machine, a rotary assembly including a brush having radially-disposed bristles, and an adjustable member for simultaneously deflecting the bristles about the entire circumference of the brush from their radial position.

2. In a blacking machine, a rotary assembly including a brush having radially-disposed bristles, and work-positioning elements arranged circumferentially about the body of the brush a predetermined distance within the outer circumference of the bristles.

3. In a blacking machine, a rotary brush, a cage rotatable with the brush and having axially-disposed arms extending through the bristles of the brush, and means for securing the brush and cage in different positions of angular adjustment.

4. In a blacking machine, a rotary shaft carrying a brush, a cage rotatable with the shaft and having arms penetrating the bristles of the brush, and means for determining the relative angular position of the brush and cage.

5. In a blacking machine, a rotary assembly including a brush having radially-disposed bristles, a cage having members normally passing through the bristles of the brush without deflecting the bristles thereof, and means for setting said members in bristle-deflecting positions.

6. In a blacking machine, a rotary assembly including a brush having a hub with radially-disposed bristles, and a head having spaced parallel arms extending between the bristles of the brush at a distance from the hub, the head being angularly adjustable with relation to the hub, whereby the effective diameter of the brush as a whole may be varied.

7. In a blacking machine, a rotary assembly driven as a unit and including a brush and a cage member associated therewith having bristle-separating elements, and means concentric with respect to the axis of rotation of the assembly for relatively adjusting said brush and cage member.

8. In a blacking machine, a driven shaft, a cage member fast thereon, a brush carried by the shaft in angularly-movable relation, and manually-operated means for twisting the brush with respect to the cage.

9. In a blacking machine, a driven shaft, a brush thereon, a cage member having arms extending through the bristles of the brush and forming collectively a tapering support, and a

guard positioned thereby in concentric relation to the brush.

10. In a blacking machine, a driven shaft, a brush member and a cage member mounted thereon, a key slidable in the shaft and having a tongue and oblique slot connection with one of said members, and an adjustable sleeve for moving the key.

11. In a blacking machine, a driven shaft, a brush spindle detachably secured thereto, carrying an angularly-adjustable brush and having a keyway therein, and a key movable in said keyway to position said brush and being supported in said driven shaft independently of the spindle.

12. In a blacking machine, a driven shaft, a circular brush thereon, a guard disk mounted upon said shaft at one side of the brush, a cage member supported on the shaft between the brush and said guard disk and having arms which extend through the bristles of the brush, and a second guard disk located upon the other side of the brush and supported upon said arms.

13. In a blacking machine, a driven shaft, a circular brush thereon, a cage member supported at one side of the brush and having arms which extend through the bristles thereof, and a guard supported upon the ends of said arms.

14. In a blacking machine, a driven shaft, a circular brush having an elongated hub adjustably mounted on the shaft, a cage member secured to the shaft at one side of the brush and having arms extending through the bristles of the brush, and a guard positioned by said arms at the other side of the brush out of contact with its hub.

15. In a blacking machine, a self-contained rotary assembly including a driven shaft, a brush spindle detachably clamped therein and carrying an adjustably-mounted brush, brush-adjusting mechanism mounted in the driven shaft and maintained in position therein to be operatively connected to the brush when the brush spindle is positioned in said driven shaft.

16. In a blacking machine, a rotary blacking-applying brush, a shield arranged to rotate therewith, and a wiping member rotatable in contact with the face of said shield for the rim inwardly toward the center for continuously cleaning the shield.

17. In a blacking machine, a rotary blacking-applying brush, a shield disposed concentrically therewith, and a driven wiping disk rotatable in peripheral contact with the surface of the disk and about an axis disposed at an angle to that of the disk.

18. In a blacking machine, a rotary assembly of blacking-applying devices including a guard arranged to make contact with the work, and a driven cleaning disk rotatable in peripheral contact with the guard about an axis disposed substantially at right angles to its face.

19. In a blacking machine, a rotary assembly of blacking-handling devices including a guard arranged to contact with the work, a wiping pad yieldingly maintained in engagement with the face of the guard, and a driven rotary wiping disk movable inwardly across the face of the guard adjacent to its rim.

20. In a blacking machine, a rotary blacking-applying brush having a concentric guard associated therewith, a pad maintained yieldingly in wiping engagement with the face of the guard, and a driven wiping disk rotatable about an axis at right angles to the axis of the brush and being maintained in wiping engagement with the face of the guard to supplement the cleaning action of said pad.

21. In a blacking machine, a rotary assembly including a brush and guard arranged to be detached by endwise movement, and a pivoted bracket having mounted therein a driven cleaning disk, said bracket being movable from a position in which said disk engages the guard to an inoperative position in which the disk is located out of line with the guard.

22. In a blacking machine, a rotary disk arranged to carry blacking upon its periphery, a rim-scraping device adjustably mounted adjacent to the periphery of said disk, and a pair of side-scraping devices slidably carried by the rim-scraping device and maintained independently in yielding engagement with the opposite side faces of the disk.

23. In a blacking machine, a rotary blacking-conveying disk, a shaft adjacent to the rim thereof, a scraping blade mounted on the shaft and arranged to act upon the periphery of the disk to regulate the amount of blacking thereon, side-scraping devices supported upon said shaft and maintained in yielding engagement with the side faces of the disk, and manually-operated means for setting said shaft and scraping blade in different positions of angular adjustment.

24. In a blacking machine, a rotary assembly including a cage and a brush mounted upon a spindle, said brush having its applying elements passing through the cage, a driven shaft associated with said spindle, a slidable key interposed between the spindle and shaft to cause one to rotate with the other, means to slide said key, and means operated by the sliding movement of the key to adjust the cage and the brush relatively to each other.

25. In a blacking machine, a driven hollow shaft having a keyway, opening inwardly, a brush assembly including a spindle adapted to be inserted in said shaft, said spindle having a keyway, opening outwardly, a key for interconnecting the shaft and the spindle engaging said keyways, and means to hold said key in position in the keyway of the shaft when the spindle is removed.

26. In a blacking machine, a driven hollow shaft having a keyway, opening inwardly, a brush assembly including a spindle adapted to be inserted in said shaft, said spindle having a keyway, opening outwardly, a slidable key for interconnecting the shaft and the spindle engaging said keyways, means to hold said key in position in the keyway of the shaft when the spindle is removed, said key having heads engaging the outer surface of the shaft to hold the key in position when the spindle is removed, and adjusting means for sliding said key engaging the heads thereof.

27. In a blacking machine, a driven shaft, a cage on said shaft, a brush member adjustably mounted on the shaft and having its applying elements projecting through the cage, and means rotatable with the shaft including a key and an inclined way for twisting said brush member with respect to said cage.

28. In a blacking machine, a rotary blacking applying member having flexible applying elements spaced around its periphery, and a cage-like work supporting member the elements of which are interspersed between the elements of the rotary applying member, said cage-like member being rotatable with said applying member

and limiting the distance to which the work may be pressed into the applying member.

29. In a blacking machine, a rotary applying brush, and a cooperating cage-like member through the openings of which the bristles of the brush project, said cage-like member having its periphery formed as a surface of rotation and forming a rest against which the work may be pressed as it is presented to the brush without unduly deflecting the bristles of the brush.

30. In a blacking machine, a rotary brush, a cage-like member rotatable with the brush with its elements interspersed between the brush bristles and forming a work limiting member the periphery of which is a surface of rotation, said cage-like member having a peripheral groove to receive the corner of a sole presented thereto.

31. In a blacking machine, a rotary applying brush, a cage-like member rotatable with said brush with the bristles of the brush projecting through the openings of the cage, said brush and said cage-like member being relatively adjustable, and means for adjusting the relation of said brush and said cage thereby providing initial deflection of the bristles in order to control the wiping action of the bristles upon work presented thereto.

32. In a blacking machine, a rotatable brush having projecting bristles, bristle-deflecting members lying between the bristles, and means for securing the brush and deflecting members in different positions of angular adjustment.

HERBERT L. CHAPIN.