Jan. 23, 1934. F. RICKS ET AL 1,944,302

BUFFING TOOL

Original Filed April 17, 1926 2 Sheets-Sheet 1

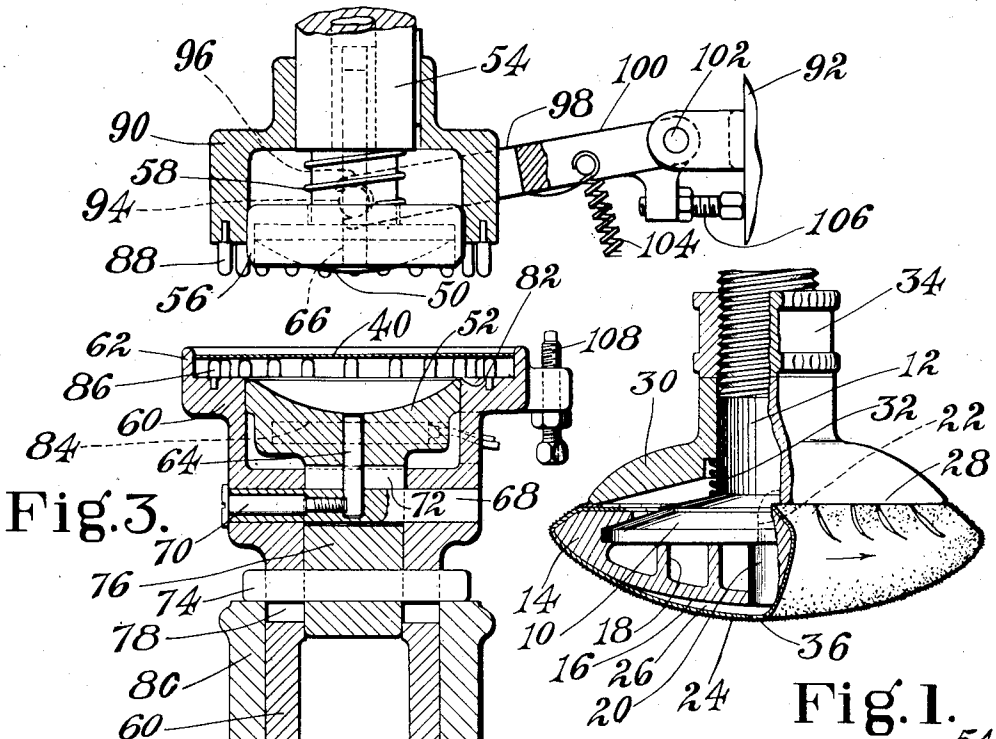


Fig. 3.

Fig. 1.

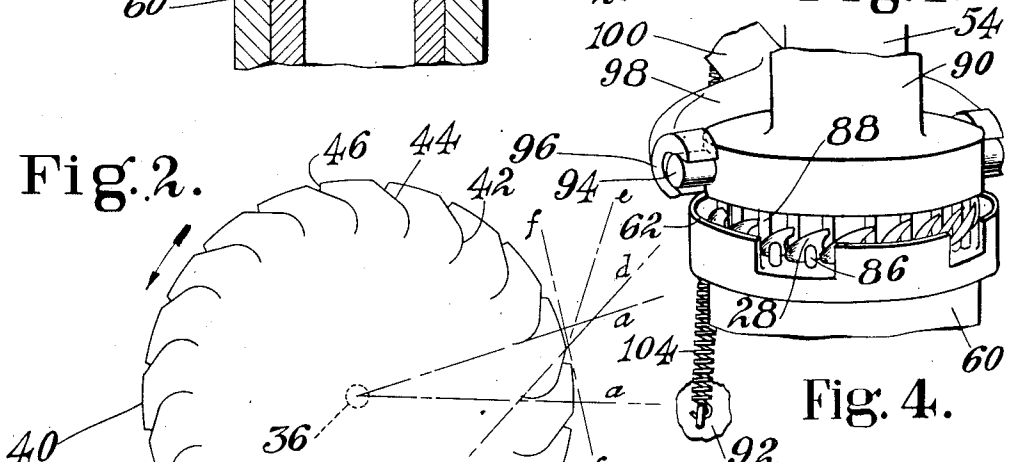


Fig. 4.

Fig. 2.

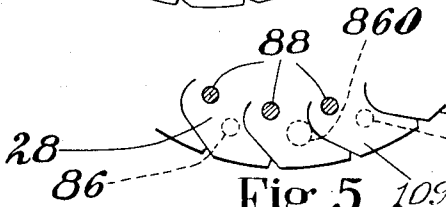


Fig. 5.

INVENTORS.
Fred Ricks
Edward F. Townsend
By their Attorney
Nelson W. Howard

Jan. 23, 1934. F. RICKS ET AL 1,944,302

BUFFING TOOL

Original Filed April 17, 1926 2 Sheets-Sheet 2

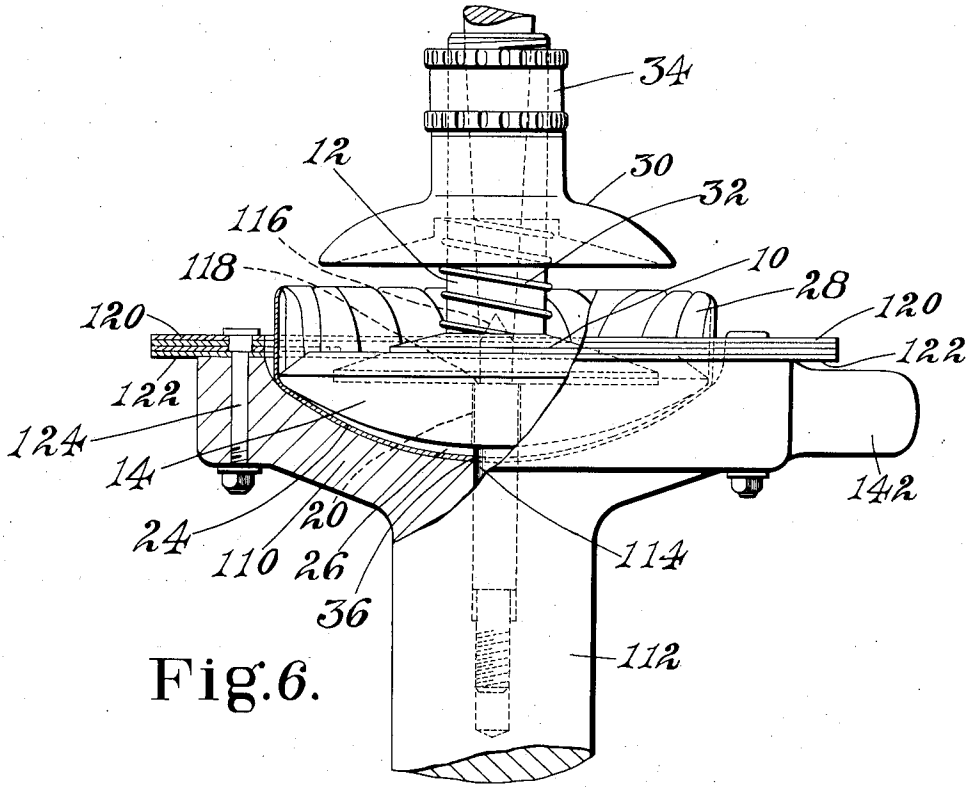


Fig.6.

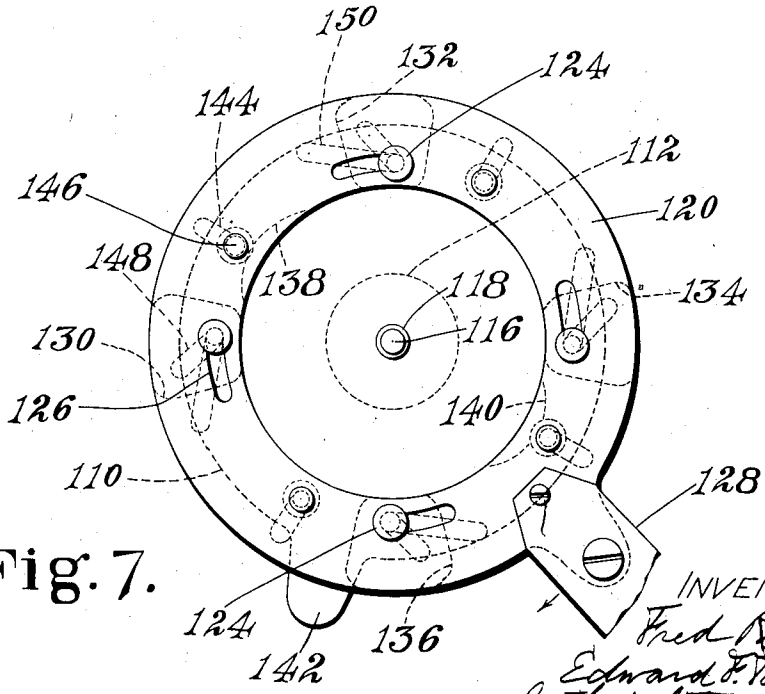


Fig.7.

INVENTORS.
Fred Ricks
Edward F. Townsend
By their Attorney
Nelson M. Howard

Patented Jan. 23, 1934 1,944,302

UNITED STATES PATENT OFFICE

1,944,302

BUFFING TOOL

Fred Ricks and Edward Frederick Towndrow, Leicester, England, assignor to United Shoe Machinery Corporation, Paterson, N. J., a corporation of New Jersey

Application April 17, 1926, Serial No. 102,688, and in Great Britain April 25, 1925. Renewed June 30, 1932

10 Claims. (Cl. 51—197)

This invention relates to buffing apparatus and is exemplified in its application to tools of the type known as Naumkeag pads used extensively in buffing the bottoms of boots and shoes and to the production of such tools.

A Naumkeag pad comprises a disk-shaped, resilient support mounted to rotate at right angles to the axis of a supporting shaft, usually at the lower end of a vertical shaft. The abrasive cover for such a pad comprises a disk of abrasive material such as sandpaper, emery cloth or the like, extending over the exposed end of the tool and having its margin turned inwardly above the upper side of the tool and clamped or otherwise secured in position thereon. Commonly the outer surface of the pad is convex and the pad covers are molded prior to their application to the pads to provide an upturned margin and a centrally disposed, active surface the contour of which corresponds to the contour of the pad to which it is to be applied.

For best results such pads must be very resilient, and while such resilience may, with one type of pad, be secured by inflating the pad with air, another type of pad which is non-inflated depends for its characteristic resilience upon the nature and design of the material of the pad itself. This type of pad is preferred in some instances because of its simplicity and consequent lessened cost of manufacture and upkeep. Mechanical devices have been provided for applying such pad covers to the pads, these devices comprising means for positioning the cover upon the pad and for turning in the marginal portions into a position to overlap the upper surface of the pad beneath a clamping device. It has been found, however, that covers which are manually applied to non-inflated pads give superior results to those obtained when the cover is applied mechanically. Apparently this results from the fact that the cover-applying device produces rather too exact and tight a fit of the cover upon the pad and thus reduces the resiliency. When the covers are applied manually, such a tight fit cannot readily be secured and a considerably softer action results.

Any cover which is to be manually applied, however, must have a comparatively wide marginal portion to be turned inwardly for clamping in order that it may be so applied without the exercise of excessive care or the expenditure of an undue amount of time by the operator of the machine. This results in requiring the use of disks of abrasive material of a comparatively large diameter, which is greater than that required when the covers are mechanically applied, with consequent waste of material.

An object of the present invention is to provide an improved Naumkeag buffing tool having an abrasive cover which is mechanically applied with resultant economy of material, but which, in softness of action, is equal or superior to such a tool having a manually applied cover.

To this end the illustrated novel pad cover is molded to give its active central surface a radius of curvature shorter than that of the corresponding surface of the resilient pad, with the result that when the pad cover is applied to the tool, its central portion is spaced a substantial distance from the resilient supporting pad even though the marginal portions are drawn up tightly and clamped to the tool, thereby producing the desired relatively soft action.

In the illustrated tool the tool body is provided with a rigid abutment which cooperates with a device for applying an abrasive cover to the tool. This cover-applying device operates to center the abrasive cover in such a manner as to avoid pressing the central portion of the abrasive cover against the pad. To render the rigid abutment accessible to the applying device, the central portion of the pad and of the abrasive cover, respectively, are perforated.

In accordance with another feature of the invention the illustrated abrasive cover is cut from a circular sheet of abrasive material having up-standing molded tabs about its margin formed by non-radial slits. When these tabs are bent upwardly and then laterally over the upper surface of the pad, they assume an overlapped relation which greatly reduces the danger of damage to the pad cover from accidental contact of the work with the marginal portion and allows an even folding in of the margin and a firm clamping thereof upon the tool. In the illustrated construction, the non-radial slits comprise both straight cuts and curved extensions. When the cover has been applied to the tool, the direction of overlapping of the tabs is contrary to the direction of rotation of the cover so that any accidental engagement with the slit portion of the margin of the cover results simply in pressing the tabs against one another and the tool. When such covers are applied mechanically to the pads, they may be made of very much smaller diameter than those which are to be applied manually, and a saving of abrasive material results which may be as great as thirty per cent.

These and other features of the invention are

described in the following specification and illustrated in the accompanying drawings in which,

Fig. 1 is a side elevation, partly in section, of our novel buffing tool;

Fig. 2 is a plan view of a disk of abrasive material which has been slitted to provide the marginal tabs;

Fig. 3 is a vertical section through a molding apparatus by means of which the disk of abrasive material shown in Fig. 2 may be molded to convex shape with its marginal tabs turned upwardly ready for application to the tool;

Fig. 4 is a perspective view of a portion of this molding apparatus;

Fig. 5 is a diagram illustrating the position of certain parts of the molding apparatus with respect to the marginal tabs of the cover;

Fig. 6 is a side elevation, partly in section, of an applying device in position ready to fold inwardly the marginal tabs of the cover over the upper surface of the tool; and

Fig. 7 is a plan view of such an applying device in detached position.

The tool illustrated in Fig. 1 is a Naumkeag pad of the non-inflated type shown in United States Letters Patent No. 1,227,622, granted May 29, 1917, upon the application of Ernest Hope. In this tool a rigid, circular, disk-shaped head or support 10 is secured to or formed upon the lower end of a threaded stem 12 by means of which the tool may be rotatably mounted in a machine. Upon this head 10 is mounted a circular pad 14 of rubber or the like provided with a convex working face 16. This face is supported by means of a plurality of intersecting ribs 18 formed upon the inner surface of the pad to provide a series of polygonal pockets or cells completed by the end surface of the disk 10 as the upper edges of the ribs 18 bear against said disk. A hole 20 is provided at the center of the pad for a purpose to be later explained and registering with this hole is a concentrically disposed recess 22 formed in the head 10 and of smaller diameter than the hole 20. It will be observed that an abrasive cover 24 has been applied to said pad engaging it tightly around the periphery but spaced therefrom, as at 26, a substantial amount.

The marginal portion of the cover is folded over the upper surface of the pad with the tabs 28 of said cover in overlapping relation and gripped against the upper surface of the pad by means of a clamping cover plate 30. A spring 32 is interposed between the disk 10 and the cover plate 30 for a purpose which will later appear, and a clamping nut 34 is provided upon the stem 12 by means of which the cover plate may be clamped firmly against the marginal tabs of the cover to grip them upon the pad 14. The abrasive cover is provided with a central opening 36 which registers with the hole 20. The tool is intended to rotate in a counter-clockwise direction when viewed from above as indicated by the arrows in Figs. 1 and 2 respectively, and it will be seen that the pad cover, when applied to the tool, has minimum of such local protuberances of folded or bent up material at the end of the slits as would promote undue wear of the cover. Furthermore the overlapping relation of tabs 28 of the cover at or immediately adjacent to the edge of the tool is in such relation to the rotation of the tool that any contact of a piece of work with the tool at this portion tends to lay the tabs down on each other rather than to tear them apart.

To promote this result the cover is preferably formed from a disk 40 of abrasive material shaped as in Fig. 2. Such disks 40 are preferably first cut from sheets of abrasive material such as emery cloth by properly shaped knife edged dies in a press in the usual manner, the dies employed having portions projecting inwardly at intervals to cut slits in the margin of the disk which form the tabs to be folded over the pad. The slits in the disks to be used with the tool above described are preferably cut as shown in Fig. 2 in the form of more or less curved slits 42 which start from their inner ends substantially along radii *a* of the disk and curve round into lines *e* forming straight cuts 44 disposed at an angle of some 30° with tangents *f* to the disks at the points where the slits emerge from the edge of the disk. A line *d* joining the beginning and end of the slit makes an angle of some 45°–60° with such a tangent. The angle between adjacent radii, *a*, *a* is preferably 18°, giving twenty tabs. The pointed tabs produced by slitting in the above manner would have sharp tips produced by the junction of the slits with the circular cut defining the periphery of the disk. Since such tips have no value and may in practice be apt to bind in the knife, they may be cut off at 46, the outline of the knife employed being circular with a series of small indentations therein as indicated by the outline of the disk shown in Fig. 2. The central perforation to be later produced is indicated at 36.

After such disk-shaped pieces have been cut out, they are molded so that the central active portion or operative face of the cover has a curvature the radius of which is less than the radius of the corresponding face 16 of the pad and the marginal tabs of the disk are turned in upright position in proper overlapping relation, as shown in Fig. 6, ready for the application of the cover to the pad.

To this end, there is provided a molding apparatus shown in Figs. 3 and 4 comprising an upper, fixed, convex die 50 and a lower concave die 52. The upper die is carried at the lower end of a fixed vertical shaft 54 and is provided with a ring 56 adapted to engage the disk 40 of abrasive material to be molded at a distance within its outer edge represented approximately by the radial measurement of the tabs. The ring is pressed downwardly by a spring 58 and retires as the dies approach, as will be described.

The lower die 52 is carried within a plunger 60 adapted to be raised, by power applied through a strong spring (not shown), towards the upper die 50. The plunger 60 is provided with an upstanding rim 62 forming within it a circular recess by which the unmolded disk 40 may be accurately centred. Fixed to the plunger 60 and projecting through the centre of the die 52 is a pin 64 adapted to enter a central hole 66 in the upper die. This pin 64 is supported in a cross piece 68 and held in position by a screw 70. The die 52 is slotted at 72 to receive the cross piece 68 and has a cross pin 74 fast in a stem 76 on the die with its ends traversing a slot 78 in the plunger of greater vertical dimension than the pin 74. As shown in Fig. 3 the ends of the pin 74 rest, when the dies are separated, upon the upper end of a standard 80 in which the plunger 60 reciprocates. When the plunger first rises the die remains stationary until picked up as the pin 74 contacts with the bottom of the slot 78 and then the die 52 and plunger 60 move upwardly to-

gether. Assuming that a disk of abrasive cloth or the like has been placed inside the rim 62, it will be gripped primarily as the dies approach one another between the lower bevelled edge of the ring 56 and the inner edge 82 of the plunger, this grip acting both to prevent any lateral displacement of the disk and partially to turn up the tabbed margin of the disk. As the plunger 60 rises further the spring 58 yields until the dies 50 and 52 themselves grip and mold the disk. The central perforation in the cover will have meantime been punched in the gripped disk by the pin 64. The lower die 52 may conveniently be heated by any usual means such as an electric heating cartridge 84.

Within the rim 62 is a series of vertically upstanding pins 86 of less height than the rim and arranged in a circle of diameter roughly half way between that of the central uncut portion of the cover and that of the cover disk in its flat condition, as indicated in Fig. 5, one pin being provided for each tab which is to be folded up.

A complemental set of pins 88 projecting vertically downwards is mounted upon a sleeve 90 surrounding the top die 50. These pins 88 are disposed on a circle slightly smaller than the circle of the pins 86 and are arranged to contact with the tabbed portions of the cover disk at points approximately midway between the points engaged by the first pins, as indicated in Fig. 5. The sleeve 90 carrying the second set of pins 88 is slidably mounted on the upper die-carrying stem 54 which projects downwardly from the upper and overhanging end (not shown) of a column 92 of the apparatus and is connected to the column by diametrically disposed trunnion pins, of which one is shown at 94 on said sleeve 90 in position to engage the slotted ends 96 of arms 98 (embracing the sleeve 90) of a lever 100 pivoted at 102 to the column 92. A spring 104 is provided to hold the lever 100 normally down in a position in which the pins 88 on the sleeve 90 project well below the bottom edge of the spring pressed ring 56 on the upper die 50. An adjustable stop screw 106 mounted on the lever contacts with the column 92 in this position. During the latter stage of the cover molding operation the lever 100 and sleeve 90 are lifted, as will be described, by contact of the lever with a second stop screw 108 mounted on the rim 62 between the lower die 52 and the column 92. In operation a flat cover disk 40 placed within the rim 62 will in fact at first be supported by the lower ring of pins 86. The position of the disk may be fixed, as regards rotation inside the rim, so that its tabs occupy the desired relation to the pins, by turning down one tab 109 (see Fig. 5) by hand and positioning its edge against one pin 860 (see Fig. 5) of the lower pins 86 which may be made of larger diameter than the others to act as a locator. In this desired relation the lower pins 86 touch the faces of the tabs near their concavely curved edges while the upper pins 88 will each be vertically over a portion of each tab near its convexly curved edge as shown in Fig. 5. When the apparatus is set in operation the rising of the plunger 60 causes the disk to be engaged first by the two sets of pins 86 and 88 with the result that the tabs 28 are twisted, their points being bent upwardly and inwardly as shown in Fig. 4, thus ensuring that the tabs are bent in a manner that brings the point of each well inside the next tab before the margin of the disk is sharply bent up by the ring 56 and brought into vertical position during the final gripping of the central portion of the cover between the convex and concave dies 50 and 52. Since, as stated, the cover margin is to be turned up into a vertical position (the convex die 50 entering within the part of the plunger 60 surrounding the concave die 52 during the latter portion of the latter's travel for this purpose) it is necessary that the pins 88 be removed from within the space encircled by the turned up tabs. Such removal is obtained at the proper time by the contact of the screw 108 with the lever 100 above referred to, the sleeve 90 carrying the upper ring of pins 88 being moved upwardly at a greater rate than that at which the lower die rises by reason of the fact that the screw 108 is between the axis of the centres and the pivot 102 of the lever 100 and lifts said lever at about its midpoint. The sleeve 90, being actuated by the free end of the lever, therefore moves upwardly at about twice the rate at which the lower die moves after the screw 108 contacts with the lever and thus lifts the upper set of pins 88 entirely clear of the molding members and of the upturned margin of the cover.

The novel features embodied in the above-described molding apparatus are not claimed herein but are claimed in our divisional application Serial No. 592,351, filed February 11, 1932.

A pad cover such as has been described may be applied to a Naumkeag pad of the type illustrated in Fig. 1 by means of a device such as is illustrated in Figs. 6 and 7, comprising a cup-shaped member 110 provided with an axial stem 112 serving as a handle. The cup-shaped member 110 is recessed with an internal curvature which is complemental to the convex curvature of the pad cover 24 and said cover may be readily positioned within the cup of the applying device by means of a centrally located pin 114 arranged to engage the central perforation 36 of the cover and adjustably threaded into the stem 112, as shown in Fig. 6. This pin is provided with a pointed and reduced end 116 forming between the two portions of the pin a shoulder 118 so that as the pin is introduced into the hole 20 of the pad and the corresponding recess or socket 22 of the rigid plate 10 the shoulder 118 will contact with said plate and space the applying device from the resilient pad 14 a predetermined amount so that there is an intermediate space 26 which may be, for example, one-eighth of an inch between the central part of the cover and the pad. The portion of the head 10 adjacent to and surrounding the recess 22 thus serves as a rigid abutment which co-operates with the shoulder 118 of the pin 114 of the applying device to prevent the central portion of the abrasive cover 24 from being forced against the pad 14. The design of the recess in the applying device 110 is such that when the shoulder 118 of the central pin 114 contacts with the rigid portion 10 of the buffing tool the edges of the recess in the cup-shaped member 110 will press the peripheral portion of the cover firmly against the corresponding portion of the pad with the marginal tabs in upstanding relation as indicated in Fig. 6. These tabs 28, as indicated in Figs. 1 and 6, overlap each other progressively in a direction opposite to the direction of rotation, and the applying device, after it has positioned the cover 24 as above described, is constructed and arranged to fold these tabs 28 in over the upper face of the pad 14 in order that they may be engaged by the cover plate 30, which, for

the purpose of this operation, is held up by a spring 32.

To this end, vertical, superposed rings 120 and 122 are mounted upon the upper face of the applying device 110 and retained in position thereon by means of headed pins 124, four of which are provided about the device. The upper plate 120 is provided with circumferential slots 126 surrounding said pins 124 so that it may be moved concentrically about the axis of the applying device for a limited distance. For this purpose a handle 128 is provided upon the upper ring 120. The lower ring 122 is clamped upon the applying device 110 by means of the bolts 124. Between the ring-shaped plates 120 and 122 four segmental plates 130, 132, 134 and 136 are provided each of which is longer than a quadrant of the device so that the plates 130 and 134 overlap respectively the adjacent plates 132 and 136 at each end. The upper plates 130 and 134 are provided with thickened portions 138 and 140 at the center of their inner peripheries, which portions, when the segments are in closed position as will later be described, serve to make a more nearly continuous ring-like surface contacting with the tabs 28 of the cover. The arrangement of the device is such that rotative movement of the upper ring 120 under actuation of the handle 128, which operation may be facilitated by the provision of a thumb piece 142 upon the applying device 110, is effective to produce a combined rotative and radial movement of the various segmental plates 130 to 136, inclusive. To this end, each of said segmental plates is provided with a radial slot 144. Each slot is engaged by a depending pin 146 secured to the under side of the ring 120. One end of the segment 130 is provided with a sharply inclined slot 148 while the other end of said segment is provided with a longer, less sharply inclined slot 150. Each of the other segmental plates is provided with corresponding slots at its respective ends. These slots surround the respective pins 124 and guide the ends of the segmental plates inwardly as they are rotated by movement of the handle 128. During this movement the action of the respective slots 148 and 150 of the various segmental plates is such that the trailing end of each of the segments moves inwardly faster than does the forward end, thus producing an inward wiping action against the outer surface of the upstanding tabs 28 which, in combination with the wiping action of the plates due to their component of rotary movement, is calculated to deflect these tabs inwardly in their preferred overlapping arrangement as initiated by the molding apparatus. After the handle 128 of the applying device has reached the limit of its movement it may be allowed to remain in this position holding the tabs down against the upper face of the pad 14 and supporting the weight of the applying device itself so that the operator's hands are freed to depress the cover plate 30 and to bring down the clamping screw 34 to hold said plate against the various tabs. When the cover has been clamped in position upon the pad, the applying device may be removed by a reverse movement of the handle 128.

The novel features embodied in the above-described cover applying device are not claimed herein but are claimed in our divisional application Serial No. 499,528, filed December 2, 1930.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent of the United States is:

1. A buffing tool comprising a rotatable support, a resilient pad secured to the end of said support in a plane transverse of the axis of rotation and provided with a convex face, a molded abrasive cover overlying said resilient pad with its edges folded over the edge of the pad, said cover having a convex working face, the inner surface of said abrasive cover being spaced from the convex face of the resilient pad and the abrasive cover having its margin bent around the periphery of the pad, and secured tightly to the pad, whereby an air space is provided between the central part of the pad and the central part of the cover to increase its resiliency and soften its action upon the work, a portion of said support being constructed and arranged to constitute a rigid abutment for co-operation with an applying device to prevent the central portion of said cover from being forced against said pad, and said pad and said cover being constructed and arranged to render said rigid abutment accessible to the applying device.

2. A buffing tool comprising a rotatable support provided with a rigid end portion, a resilient pad overlying said end portion perforated adjacent to its center to expose the end surface of said rigid end portion and formed to provide a convex face transverse to the axis of rotation of the support, and a molded cover of abrasive sheet material having its margin folded over the edge of the pad and secured to the rear face thereof, said cover being provided with a central opening registering with the perforation in the pad and molded so that its face is curved about a shorter radius than is the face of the resilient pad thereby to provide a predetermined normal separation between the cover and the face of the pad which may be accurately determined with reference to the rigid end portion of the support by means inserted through the central opening of the cover and through the perforation in the pad and engaging the end surface of the rigid end portion of said support.

3. A tool for buffing boots and shoes comprising a rotatable pad, a disk-shaped piece of abrasive material secured adjacent to its edge to said pad, said disk-shaped piece having a bulging face to provide a normal separation between a considerable portion of the cover and the pad, whereby the softness of action of the tool upon the work is improved, and means constructed and arranged for co-operation with a cover-applying device to center the cover-applying device and to limit the approach of the cover-applying device toward the central portion of the pad to prevent pressing the bulging face of the cover against the pad, said pad and said cover being constructed and arranged to render said centering and limiting means accessible to the cover-applying device.

4. A buffing tool comprising a resilient disk-shaped pad having a convex face, and a cover for said pad having a convex working face and being adapted to be superposed upon the convex face of the pad, the radius of curvature of the face of the cover being less than the radius of curvature of the face of the pad so that there will be a normal separation between the central part of the cover and the central part of the pad, and a rigid member supporting said pad, said rigid member having a recessed abutment constructed and arranged for co-operation with a cover-applying device to prevent the applying device from pressing the central part of the cover against the pad.

5. An abrasive cover comprising a circular

sheet of abrasive material having upstanding molded peripheral tabs formed by non-radial slits around the periphery of the disk.

6. An abrasive cover for a Naumkeag pad comprising a disk of abrasive material having a series of non-radial slits about its periphery to form a series of pointed tabs, the tips of the points of said tabs being removed.

7. An abrasive cover for a Naumkeag pad comprising a disk of abrasive material having a series of tabs around its periphery which are adapted to be bent up and folded over the edge of the pad, said tabs being formed by means of a series of slits comprising non-radial straight cuts having curved extensions adjacent to the periphery of the disk.

8. An abrasive cover for a Naumkeag pad comprising a disk-shaped sheet of abrasive material having a series of tabs around its periphery the edges of which extend, when the sheet is flattened, for a part of their length substantially radially and then toward their outer ends at a substantial inclination to the radius.

9. An abrasive cover for a Naumkeag pad having a slitted periphery providing a plurality of tabs around the periphery, said tabs overlapping one another in the same direction around the whole periphery of the pad, said cover having a central perforation to accommodate a centering pin to facilitate attachment to the pad.

10. A buffing tool comprising a Naumkeag pad, an abrasive cover for the face of said pad, said cover being attached at its periphery to said pad and being so shaped, in relation to the shape of the pad as to provide a space between the respective centers of the cover and of the face of the pad, and means associated with said pad constructed and arranged for co-operation with a device for applying the cover to the pad to prevent the device from pressing the central part of the cover against the pad, said pad and said cover being constructed and arranged to render said associated means accessible to the cover-applying means.

FRED RICKS.
EDWARD FREDERICK TOWNDROW.