Nov. 7, 1933. R. E. DUPLESSIS 1,933,665

LEATHER BUFFING MACHINE

Filed Dec. 23, 1927 2 Sheets-Sheet 1

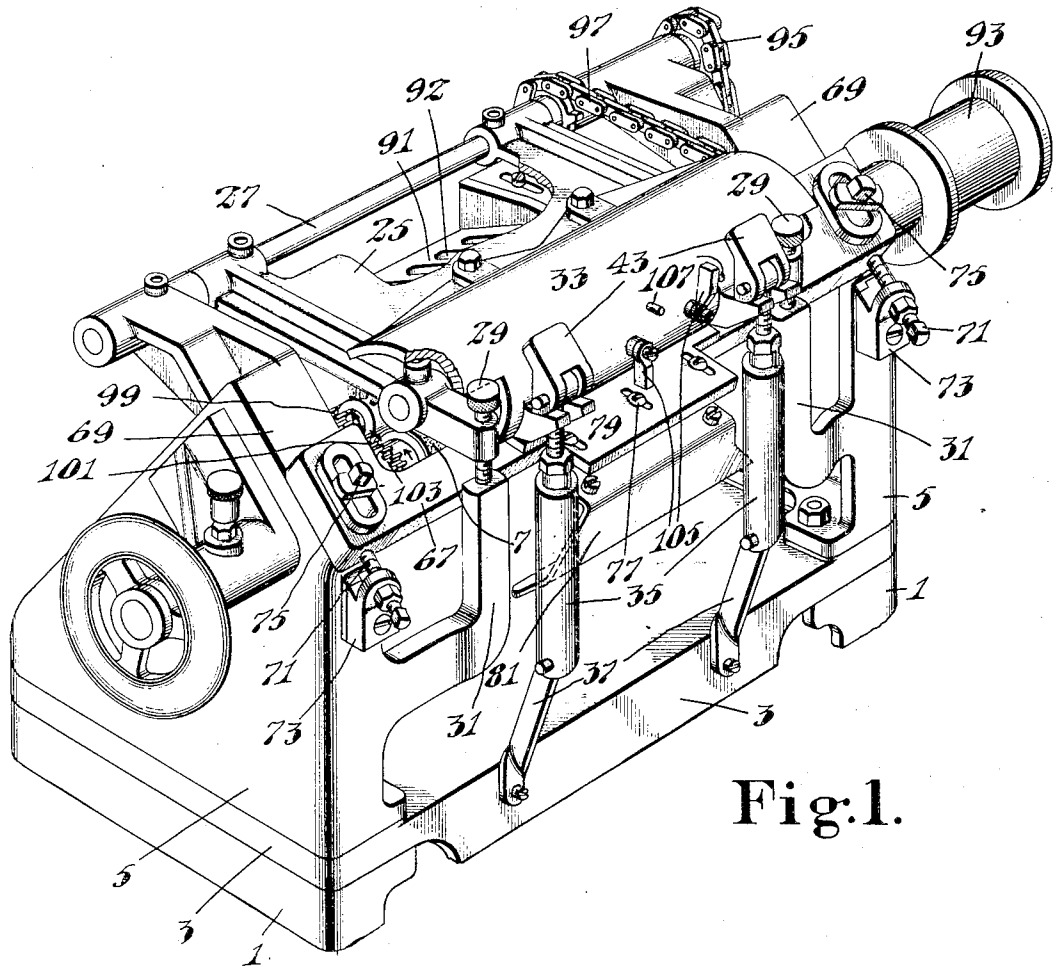

Fig. 1.

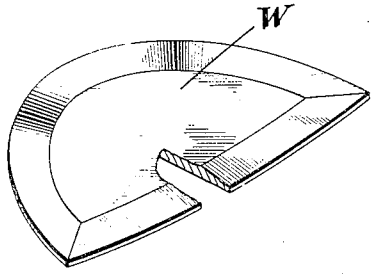

Fig. 4

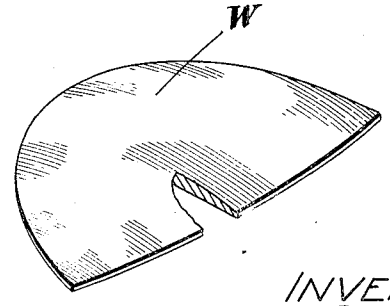

Fig. 5.

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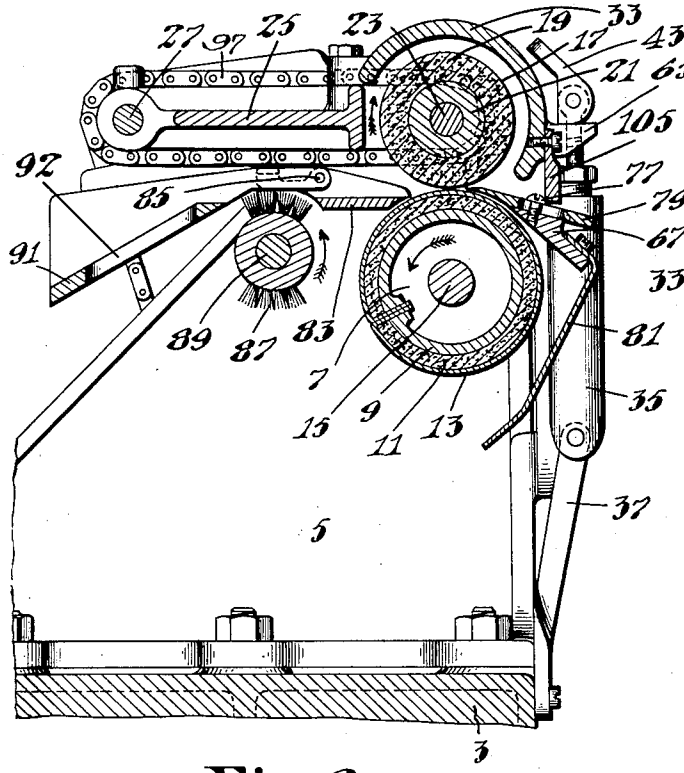

Fig. 2.

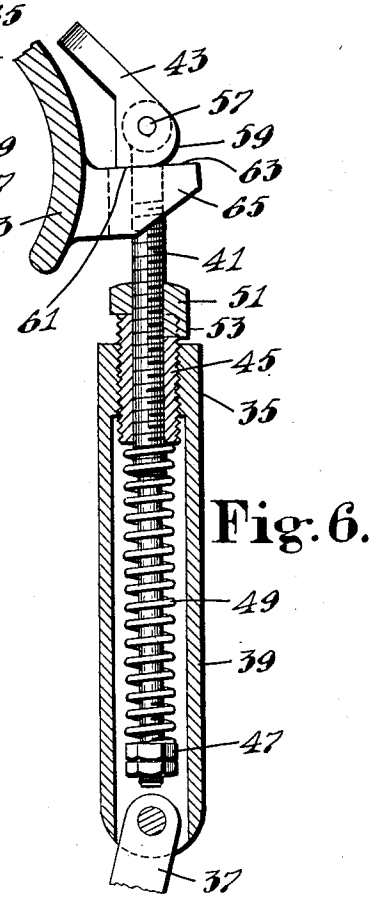

Fig. 6.

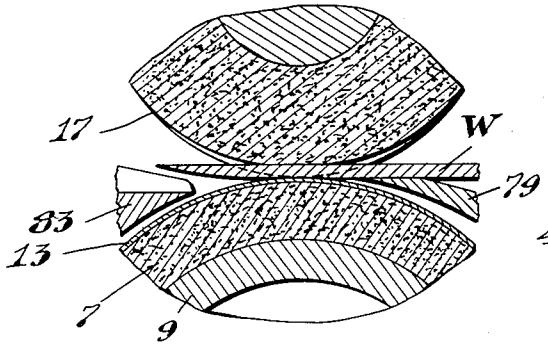

Fig. 3.

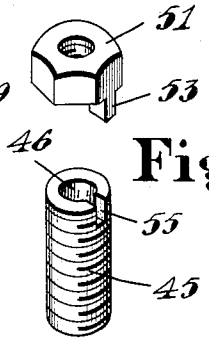

Fig. 7.

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UNITED STATES PATENT OFFICE

1,933,665

LEATHER BUFFING MACHINE

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Application December 23, 1927
Serial No. 242,141

14 Claims. (Cl. 51—78)

This invention relates to leather buffing machines and is illustrated as embodied in a machine of the type disclosed in United States Letters Patent No. 1,147,819, granted July 27, 1915, on the application of J. R. Scott, for buffing articles of leather such as box toe pieces, counter stiffeners, soles, and the like.

Machines of the type above mentioned comprise an abrading tool and means for pressing the work against and for feeding it past the abrading tool. The abrading tool (such as the ordinary buffing roll, for example) is usually a roll carrying an abrasive cover of sheet material, such as emery paper, and such an abrasive cover requires frequent renewal. The abrading tool should therefore be readily accessible. As the several kinds of work operated upon present a wide variation in thickness, as will be evident upon comparing, for example, a relatively thin box toe piece with a relatively thick sole blank, it is desirable to provide for adjustment of the clearance between the pressing and feeding means and the abrading tool. It is likewise desirable, because of the varying character of the work, to provide for holding the work against the abrading tool with varying degrees of pressure; thin or delicate materials are usually held lightly to avoid tearing, while thick, heavy materials may be treated with a relatively heavy pressure.

One of the objects of this invention is to provide an improved buffing machine having the desirable characteristics above described.

With this in view, the invention provides a buffing machine in which an abrading member and a presser member, one of which is carried in a movable frame, are relatively urged toward each other by a resilient link acting upon the frame, the link being disengageable, and the frame being so mounted as to enable the members, upon disengagement of the resilient link, to be separated to a much greater extent than is permitted merely by the yielding of the link. Such relatively wide separation is convenient when access to the abrading member is desired for any reason, such as for replacing an abrasive cover upon the abrading member. In the illustrated machine, the two members are an abrading roll and a presser roll, respectively, the presser roll being carried in the frame. The resilient link above referred to and herein illustrated is formed in two parts which are extensible with respect to each other, the extension of the link being opposed by a spring normally under stress. A novel attaching device for this link is also provided which is constructed and arranged both detachably to secure the link to the related parts and also to transfer the stress of the spring to the rolls.

In addition to the features of the invention above referred to, the present invention also consists in certain devices and combinations of devices hereinafter described and claimed, the advantages of which will be obvious to those skilled in the art.

The various features of the present invention will be clearly understood from the following description read with reference to the accompanying drawings, in which

Fig. 1 is a perspective view showing the head of a buffing machine embodying the present invention;

Fig. 2 is a transverse section of the parts shown in Fig. 1;

Fig. 3 is a transverse section showing the passage of a piece of work between the rolls;

Fig. 4 shows a box toe blank before being subjected to the operation of the machine;

Fig. 5 shows the same blank after having been passed through the machine;

Fig. 6 is a longitudinal section through the roll tensioning device; and

Fig. 7 is a detail of certain parts shown in Fig. 6.

The illustrated buffing machine comprises a pair of standards 1 which support a base plate 3 carrying side plates 5 of the machine frame. The side plates 5 and the base plate 3 are secured together and to the standards 1 by bolts passing through the plate 3 and flanges on the plates 5 and standards 1. The illustrated buffing tool 7 is in the form of a roll which may be of any usual or suitable construction. As illustrated, the roll 7 consists of a rigid core 9 of wood, a yielding covering pad 11 of felt and an abrasive covering 13 of sandpaper. The buffing tool 7 is fixed to and rotates with a shaft 15, journaled in the side frames 5.

A feed and presser roll is indicated at 17, and comprises a body portion of yielding resilient material in the form of a rubber sleeve 19 supported upon a metallic core 21. The core 21 is secured to a shaft 23 journaled in bearings in the forward portion of a frame 25 which is loosely mounted at its rear end for tilting or swinging movement of considerable extent upon a shaft 27 secured in the side frames 5.

As will be observed upon inspection of Fig. 2 of the drawings, the feed roll 17 is positioned above the buffing roll 7 and, by virtue of the pivotal mounting of the frame 25, the feed roll

17 may be allowed to come as close as desired to the buffing roll 7. It is desirable in ordinary operations to provide a minimum original clearance or normal spacing between the rolls; and this is accomplished positively by means of a pair of stop screws 29 threaded in the forward ends of the frame members 25 and adapted to engage upstanding projections 31 of the side frame members 5, whereby the normal clearance between the rolls may be adjusted to any desired amount. When desired, the frame 25 may be swung upwardly and rearwardly about its pivotal bearing away from the position of the operator to permit a wide separation between the rolls so as to afford access to the buffing roll 7 for changing the abrasive covering 13 thereof, or for any other reason. A delivery plate 91, to be described later, serves to support the frame 25 when the latter has been swung past inverted position. A protective casing 33, secured to the frame 25, covers the forward and upper sector of the feed roll 17, being curved to conform to the curvature of the feed roll and being spaced therefrom by a suitable clearance.

During the operation of the machine, the feed roll 17 is yieldingly urged toward the buffing roll 7, to the position of clearance determined by the stop screws 29, and is allowed to yield to accommodate variations in the thickness of the work when the latter is passed between the rolls against the tension of a pair of like stressing members 35 in the form of resilient links anchored at their lower ends to the forward edge of the base plate 3 by means of fixed rods 37 which constitute abutments for the stressing members. One of the stressing members 35 is shown in detail in Figs. 6 and 7. The member 35 in the form illustrated is designed to transmit tension and is therefore termed a tensioning member. It consists of an extensible two-part link, comprising a casing 39 pivoted at its lower end to the upper end of the rod 37 to permit it to swing forwardly and away from the frame 25, and a rod 41 in telescoping relation with the casing 39 and carrying at its upper end a convenient attaching device 43, whereby the tensioning device 35 may readily be attached or detached from the frame 25, together with a spring and adjusting means presently to be described. The casing 39 and the rod 41 are connected by members presently to be described, and they are therefore referred to in the claims as two associated members each having an end adapted for connection respectively with a part of the machine. Because of the telescoping relation of the rod 41 and the casing 39, the upper end of the former and the lower end of the latter are called the outer ends of the respective members; the opposite ends being called respectively the inner ends. Threaded into the upper end of the casing 39 is a sleeve or plug 45 having a smooth central bore 46 to receive freely the rod 41, which extends through the bore 46 down into the interior of the casing 39 and carries at its lower end a nut 47, together with a lock nut therefor. Surrounding the lower portion of the rod 41 is a helical spring 49 adapted to be compressed between the nut 47, serving as its lower abutment, and the bottom face of the sleeve 45, serving as its upper abutment. The intermediate portion of the rod 41 is threaded and carries a nut 51 adapted to abut against the upper or outer face of the sleeve 45 and having a depending lug 53 adapted to engage a corresponding slot 55 in the sleeve 45, thus effecting an interlocking engagement of the nut 51 and the sleeve 45 whereby rotation of the former will cause rotation of the latter. The threads on the sleeve 45 are equal in pitch to those on the rod 41 and have the same direction, so that when the nut 51 is rotated it will advance along the rod 41 a distance equal to the advance of the sleeve 45 with respect to the casing 39. Rotation of the nut 51, therefore, will cause no relative movement between the rod 41 and the casing 39, but will cause movement of the sleeve 45 with respect to the rod 41, thereby compressing the spring 49 if the nut 51 is turned in one direction, and permitting the spring 49 to expand to relieve its compression if the nut 51 is turned in the opposite direction. Since the links 35 need yield only a distance sufficient to accommodate such separation between the rolls 7 and 17 as is occasioned by the maximum thickness of the work to be treated, the springs 49 and therefore the links 35 may be made conveniently short.

It will be apparent that the tensioning member or link 35 is not permitted to contract fully to relieve the stress of the spring 49, by reason of the nut 51 abutting the outer face of the sleeve 45. The length which the link 35 will thus assume under the stress of the spring 49, in the absence of any force tending to extend the link, is definite and is termed its normal or effective length, because the link becomes effective to exert a tension only when extended, as by stretching, beyond this length. The link, when relieved of tension, will always assume its effective length, regardless of the stress still remaining in the spring. The effective length of the link 35 may be adjusted by detaching the attaching device 43, presently to be described, from the frame 25, and then rotating the rod 41. In performing this operation, it is found that the friction of the threads of the sleeve 45 is sufficient to hold the sleeve 45 and the nut 51 stationary against rotation. The position of the rod 41 is thus varied with respect to the nut 51, and therefore to the sleeve 45 and the casing 39. The length of the tensioning member or link 35 is thus adjusted, in practice, with reference to the thickness or range of thicknesses of a given lot of pieces of work to be passed through the rolls; for thin pieces, or with pieces having skived edges, the effective length of the link is made less, while for thick pieces it is made greater; in general it is adjusted to cause the rolls to press upon all parts of the work passing between them.

The stress of the spring 49 prior to the stretching of the link 35 beyond its effective length is called its normal stress. The normal stress of the spring 49 may be adjusted as desired, independently of the effective length of the link, by rotating the nut 51 as above described, thereby compressing or relieving the compression of the spring 49 without altering the relation of the rod 41 to the casing 39, i. e., without altering the length of the link 35. In practice, the effective length of the link 35 is first adjusted by rotation of the rod 41; the latter is then held against rotation, as by attaching it to the frame 25, and the normal stress of the spring 49 is then adjusted by rotation of the nut 51.

The attaching and detaching devices 43 are pivoted to the respective upper ends of the rods 41 at 57 and are both alike, each having a rounded surface 59 generated by an increasing radius vector taken from the pivot point 57 and merging into a flat bearing surface 61 adapted to seat upon the surface 63 of a pair of separated ears 65 extending from the forward portion of the

protective casing 33 on the frame 25. The rod 41 passes up between the ears 65, and the device 43, when the tensioning member 35 is swung into attaching position, extends over the ears. The curvature of the surface 59 may be circular and eccentric with respect to the pivot point 57, and when rotated about the pivot it will exert a camming effect to stretch the tensioning member 35 so as resiliently to hold the frame 25 in the position determined by the stops 29; in other words, to transfer the stress of the tensioning member 35 to the frame 25 and eventually to the presser roll 17. The attaching devices 43 thus cooperate with the ears 65 simultaneously to stress the tensioning members or links 35 and to attach them to the frame 25, and the detaching of the devices 43 serves to relieve the frame 25 from the action of the tensioning members 35 to permit wide separation of the rolls. The links 35, of which the devices 43 are a part, thus constitute detachable, readily replaceable tensioning members interconnecting the tilting frame 25 and the fixed frame of the machine, comprising the standards 1 and the base plate 3. The cam surfaces 59 are designed to extend the links 35 by an amount which is small in proportion to the total range of extension of the links 35 as occasioned by the passage of work between the rolls, and therefore the actuation of the cam surfaces 59 will not substantially vary the stress of the springs 49. When it is desired to renew the abrasive covering 13, the devices 43 may be readily detached to relieve the frame 25 from the tension of the links 35 and to permit a considerably greater degree of separation between the rolls 7 and 17 than would otherwise be permitted by the links 35.

In adjusting the machine for any given variety of work, the screws 29 are first set to provide the desired minimum clearance between the buffing and feed rolls. Before attaching the tensioning members 35, the effective lengths of these members are adjusted by turning the rods 41 to such a position as to extend them just sufficiently for easy attachment and so that when the attaching devices 43 are snapped into position over the ears 65, the camming effect of the attaching devices will compress the springs 49 slightly, thereby tensioning the tensioning members 35 and holding the frame 25 down to the position of minimum roll clearance as determined by the stops 29.

When the tensioning members 35 are attached as above described to the frame 25 they stand in substantially upright position and act, through the frame 25, upon the presser roll 17 to urge the latter toward the buffing roll 7.

A plate 67 extends across the front of the machine in tangential relation, except for an ample clearance space, with the buffing roll 7, and rests at either end upon a forwardly and downwardly sloping surface 69 formed upon each of the side plates 5. The plate 67 may be adjusted in relation to the surfaces 69 by means of screws 71 bearing against the lower edge of the plate 67 and threaded in extensions 73 of the respective side plates 5. The plate 67 is secured in adjusted position by means of clamping screws 75 extending through elongated slots in its respective ends. The upper face of the plate 67 is bevelled to provide a surface of less downward slope than that of the surfaces 69, and adjustably secured to this upper face by means of screws 77 is a presser plate 79, the rear edge of which is bevelled and extends into close proximity, so as to be very nearly tangent, to the feed roll 17 very close to the point where the latter presses the work against the abrading roll 7. The work is fed between the presser plate 79 and the feed roll 17, and the presser plate 79 serves to force the articles to be operated upon against the feed roll 17. Where the articles, such as box toe pieces, have skived edges, their thick central portions are thus pressed more deeply into the yielding material of the feed roll 17 than are their edge portions while the surface to be treated is always presented flat and in a predetermined relation to the abrading roll 7 regardless of the position assumed by the yielding of the feed roll 17 to accommodate inequalities in the thickness of the work, thus insuring a proper finish to the entire surface. Depending from the forward edge of the plate 67 is a guard plate 81 for the buffing wheel 7.

A horizontally disposed work supporting plate 83 (Fig. 2) extends rearwardly from a point below and behind the bite of the rolls, and adjacent to the buffing roll 7 in substantially tangential relation thereto. The work supporting plate 83 is pivoted at its rear end at 85 to the respective side plates 5, whereby it may be swung or tilted upwardly to facilitate obtaining access to the buffing roll 7. The work supporting plate 83 and the frame 25 are thus mounted independently for tilting movement away from the roll 7. A rotary brush 87 mounted on a shaft 89 journaled in the side plates 5 is disposed rearwardly of the rear edge of the work supporting plate 83 and in a position to engage the buffed under side of the work as the latter passes over it. The brush 87 operates to effect the removal of dust from work which has been buffed, as will be explained. A delivery plate 91, sloping downwardly and rearwardly, is disposed with its forward end in position to receive the work from the brush 87.

One end of the shaft 15 of the buffing roll 7 extends beyond its bearing in one of the side plates 5 and carries a pulley 93 (Fig. 1), whereby the buffing roll 7 is driven at a relatively high rate of speed, preferably and as illustrated at a rate higher than that of the work and in the direction of the work feed. One end of the shaft 27 extends beyond its bearing in one of the side plates 5 and carries a sprocket wheel driven by a chain 95 from any convenient source of power. A chain 97, meshing with aligned sprockets mounted on the shafts 23 and 27 respectively, and positioned between the side plates 5 and adjacent to one of them drives the feed roll 17. As the frame 25 is pivoted about the shaft 27, the swinging movement of the frame 25 will in no way interfere with the above described driving means for the feed roll 17. The feed roll 17 is driven at a relatively low rate of speed and in the direction of the feed of the work. Any suitable power connection for the two rolls 7 and 17 such as that disclosed in the above-mentioned United States Letters Patent No. 1,147,819, may be used. The brush shaft 89 carries a gear 99, driven through an idler gear 101 by a gear 103 secured to the buffing wheel shaft 15, and rotates the brush 87 in a direction to assist the feed of the work.

A suction apparatus similar to that disclosed in the above-mentioned United States Letters Patent No. 1,147,819 is employed for carrying away the fine dust produced by the action of the buffing roll upon the work. The delivery plate 91 has a plurality of slits 92 formed there-

in through which air may be drawn downward by the suction apparatus. This construction insures that a sufficient volume of air will be drawn through the machine to convey away all of the particles of matter removed from the work by the buffing roll.

The length of the feed and buffing rolls 17 and 7, respectively, is divided into four equal parts by three lugs 105 pivoted to the forward part of the protective casing 33. The purpose of these lugs 105 is to define the respective paths of a plurality of work pieces of sheet material as they are fed simultaneously side by side along the length of the rolls, and thus, by guiding the operator, to insure that one piece of work will not be fed in a position to overlap another piece of work. The lugs 105, by thus dividing the path for pieces of work into a plurality of channels, assist in avoiding the presentation of pieces of work to the rolls in overlapped relation. When operating upon box toe pieces, for example, the center lug 105 only is employed, the two other lugs 105 being swung up out of the way, being thus held by pins 107 which engage the lugs 105 when the latter are swung past a vertically upright position, and the box toe pieces may be fed two at a time, one on either side of the center lug 105 which is allowed to remain in depending position. When operating upon counters, all three lugs are left down, and the counters may be fed four at a time without danger of overlapping. When operating upon large pieces of work, all three lugs are swung up out of the way. The lugs 105, when in depending or operative position, hang loosely so as not to interfere with the feed of the work by accidental contact therewith.

The passage of a piece of work W between the rolls is illustrated in Fig. 3. The piece W, such as the box toe blank with skived edges shown in Fig. 4, is presented by hand, being fed along the presser plate 79 until the leading edge of the piece is caught by the feed and presser roll 17. The piece W is pressed against roll 17 by the plate 79, the thick central portion of the piece W being pressed more deeply into the yielding material of the roll 17 than the thin edge portions, so that all of the surface to be finished will be presented with substantial uniformity to the buffing wheel 7. The rotation of the feed and presser roll 17 advances the piece W past the buffing roll 7, across the work supporting plate 83 and over the brush 87, which rotates in the same direction as the roll 17 to assist the progress of the work. The brush 87, having bristles on alternate sectors, serves to flap the piece W up and down, thus shaking off the dust which has been loosened by the bristles. The finished piece W, now having a smoothly rounded surface, as illustrated in Fig. 5, slides down the delivery plate 91 and may be received in a suitable container.

It should be noted that the roll 17 serves both as a feed and as a presser roll, thus exemplifying elements identified in the claims in terms of either function, according to the nature of the particular combinations for which protection is sought.

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

1. In a buffing machine, an abrading member, a presser member for pressing the work against said abrading member, a relatively movable frame carrying one of said members, and constructed and arranged to permit a wide separation between said members to afford access to said abrading member for the purpose of renewing the abrasive material, and a resilient link adapted to be interposed between said movable frame and a fixed part of the machine for relatively urging said members toward each other, said link being movable out of said interposed position for setting said frame free from the influence of said link and allowing free movement of said frame to permit said wide separation of said members.

2. In a buffing machine, an abrading member, a presser member for pressing the work against said abrading member, a relatively movable frame carrying one of said members and constructed and arranged to permit a wide separation between said members to afford access to said abrading member for the purpose of renewing the abrasive material thereof, a fixed abutment, a resiliently extensible link mounted for movement to and from interposed position between said fixed abutment and said frame for relatively stressing said members toward each other, a stop for determining a clearance between said members, and detachable attaching means for one end of said link whereby said frame may be relieved of stress for movement to permit said wide separation of said members, said link and said attaching means being constructed and arranged to prevent any stressing effect upon said frame when said link is moved into said interposed position prior to attachment, and to render said link operative to exert stress upon said frame by the actuation of said attaching means in attaching said link in said interposed position.

3. In a buffing machine, an abrading member, a presser member for pressing the work against said abrading member, a frame carrying one of said members, said frame being pivotally mounted at a point rearwardly of said members and being movable upwardly and downwardly, disengageable resilient means positioned forwardly of said members and acting downwardly upon said frame for stressing said members relatively toward each other, and an adjustable stop positioned forwardly of said members and adjacent to said resilient means for engaging said frame to determine the clearance between said members.

4. In a buffing machine having a buffing member and a cooperating presser member, carriers for said members, one of which is mounted for movement with respect to the other, a tension link for interconnecting said carriers to urge them relatively toward each other, and pivotal means for connecting the ends of said link with said respective carriers, one of said connecting means being readily detachable.

5. In a buffing machine having a buffing member and a cooperating presser member, carriers for said members, one of which is mounted for movement with respect to the other, means for spacing said carriers, stressing means for interconnecting said carriers to urge them toward one another, said stressing means comprising an extensible two-part link, means adjacent to each end of said link for attaching said link to said members, said link having a spring normally under stress prior to the extension of the link, and means for adjusting said normal stress without varying the distance between said attaching means.

6. In a buffing machine, a buffing member and a cooperating presser member, one of which is

mounted for movement relatively to the other member, a stressing member for interconnecting said buffing member and said presser member, and pivoted means for attaching said stressing member to one of said members constructed and arranged upon pivotal movement to transfer the stress of the stressing member to said buffing and said presser members to urge them toward one another.

7. In a buffing machine, a buffing member and a cooperating presser member, one of which is mounted for movement relatively to the other member, an extensible stressing member including a spring normally under stress for interconnecting said cooperating members, and pivoted means for detachably connecting said stressing member to one of said members, constructed and arranged upon pivotal movement to extend the stressing member an amount which is small in proportion to the total range of extension of the stressing member, thereby to transfer the stress of the stressing member to the movable member without varying substantially the stress of the spring of the stressing member.

8. In a buffing machine, an abrading tool, a pivoted frame, a presser member carried in said frame for holding the work against said abrading tool, an extensible tensioning device connected at one end to a stationary part of the machine and adapted at its opposite end for attachment to said frame, said device having a definite length and being constructed and arranged, when extended beyond said length, to exert a tension upon said frame for urging said presser member toward said tool, and means for adjusting the tension of said device while maintaining constant the definite length thereof.

9. In a buffing machine, an abrading tool, a pivoted frame, a presser member carried in said frame for holding the work against said abrading tool, an extensible tensioning device connected at one end to a stationary part of the machine and adapted at its opposite end for attachment to said frame, said device having a definite length and being constructed and arranged, when extended beyond said length, to exert a tension upon said frame for urging said presser member toward said tool, and means for adjusting the definite length of said device and for adjusting the tension of said device while maintaining constant the adjusted length of said device.

10. In a machine of the class described, a device for relatively urging two parts of the machine toward each other, comprising two associated members having ends adapted for connection respectively with said parts of the machine, a spring interposed between the opposite ends of said members, means associated with said members for limiting their relative movement in one direction under the stress of said spring, and means for adjusting the stress of said spring while automatically maintaining constant the relative position of said members as determined by said limiting means.

11. In a machine of the class described, a device for relatively urging two parts of the machine toward each other, comprising two associated members having ends adapted for connection respectively with said parts of the machine, a spring interposed between the opposite ends of said members, means interposed between said members for limiting their relative movement in one direction under the stress of said spring, and means for adjusting the stress of said spring while maintaining constant the relative position of said members as determined by said limiting means, said adjusting means being constructed and arranged also independently to afford adjustment of the relative position assumed by said members under the stress of said spring.

12. In a machine of the class described, a device for relatively urging two parts of the machine toward each other comprising a casing adapted at one end for connection to one of said parts of the machine, a rod adapted at one end for connection to the other of said parts of the machine, a sleeve in threaded engagement with said casing, means for turning said sleeve, a helical spring interposed between said sleeve and said rod for stressing said casing and said rod, and an abutment on said rod for engaging said sleeve to prevent relative movement in one direction between said casing and said rod under the stress of said spring.

13. In a machine of the class described, a device for relatively urging two parts of the machine toward each other comprising a casing having its outer end adapted for connection to one of the said parts of the machine and having its inner end threaded, a sleeve having threads in engagement with said threaded end of said casing and having a central bore, means for turning said sleeve, a rod passing freely through the bore of said sleeve and having an abutment on its inner end, the outer end of said rod being adapted for connection to the other said part of the machine, a helical spring surrounding the inner portion of said rod and arranged for compression between said abutment and said sleeve, and a nut threaded on the outer portion of said rod and adapted to abut said sleeve to limit the inward movement of said rod under the stress of said spring.

14. In a machine of the class described, a device for relatively urging two parts of the machine toward each other comprising a casing and a rod having their respective inner ends in telescoping relation and their respective outer ends adapted for connection to the respective said parts of the machine, a sleeve in threaded engagement with the inner end of said casing and having a central bore, said rod passing freely through said bore and having an abutment on its inner end, a helical spring surrounding the inner portion of said rod and arranged for compression between said abutment and said sleeve, and a nut threaded on the outer portion of said rod and adapted to abut said sleeve to limit the inward movement of said rod under the stress of said spring, said sleeve and said nut being constructed and arranged for relatively non-rotative interlocking engagement and having their respective threads of equal pitch, whereby rotation of said nut will rotate said sleeve to adjust the compression of said spring without varying the effective length of the device, and whereby rotation of said rod will adjust the effective length of said device.

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