Sept. 18, 1934. A. N. EMMONS 1,974,136

ABRADING OR SURFACE FINISHING MACHINE

Filed March 21, 1931 3 Sheets-Sheet 1

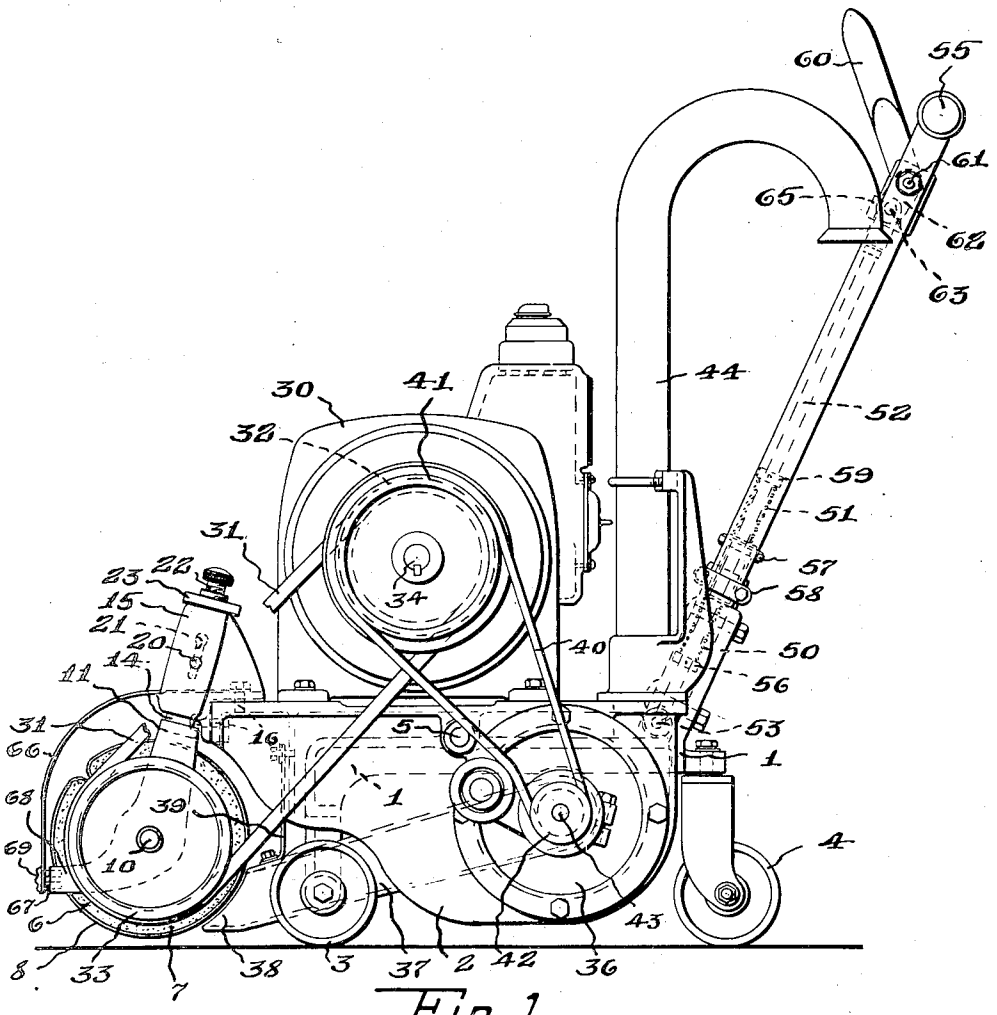


Fig. 1

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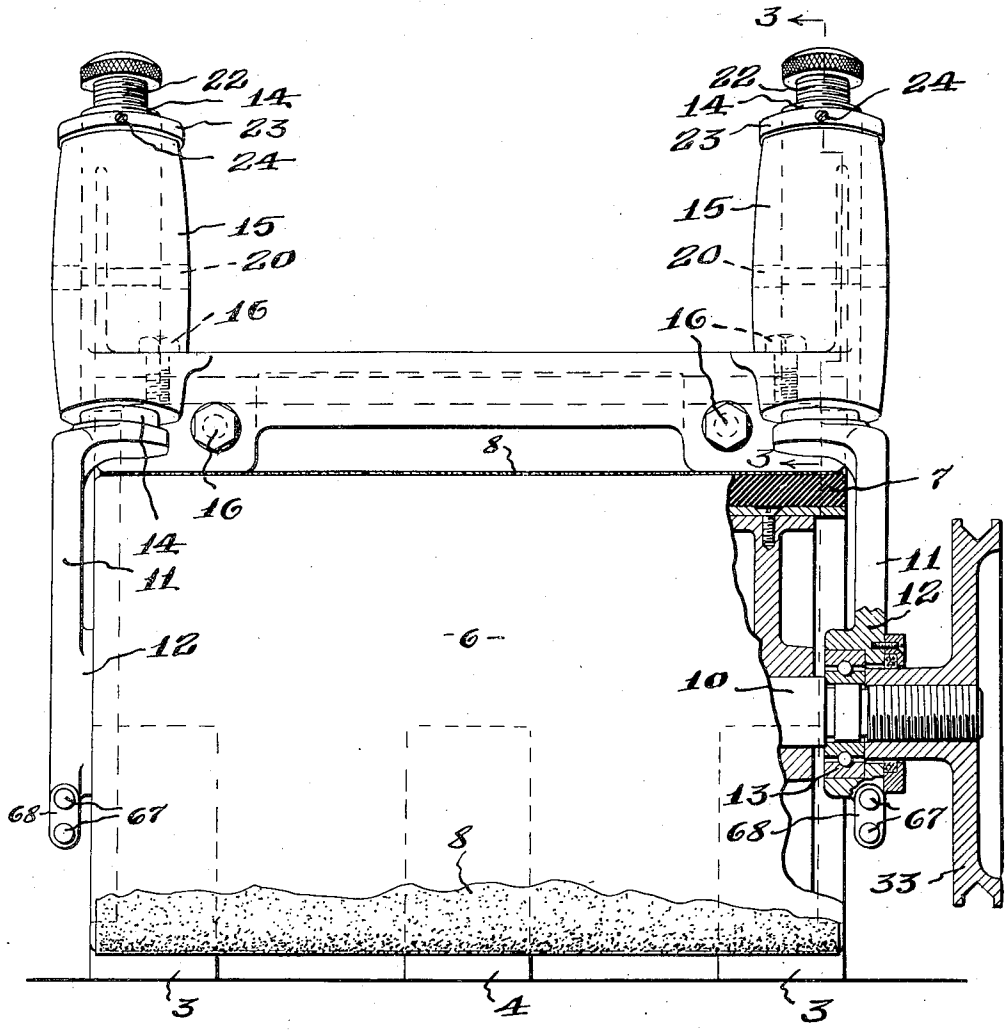


Fig. 2.

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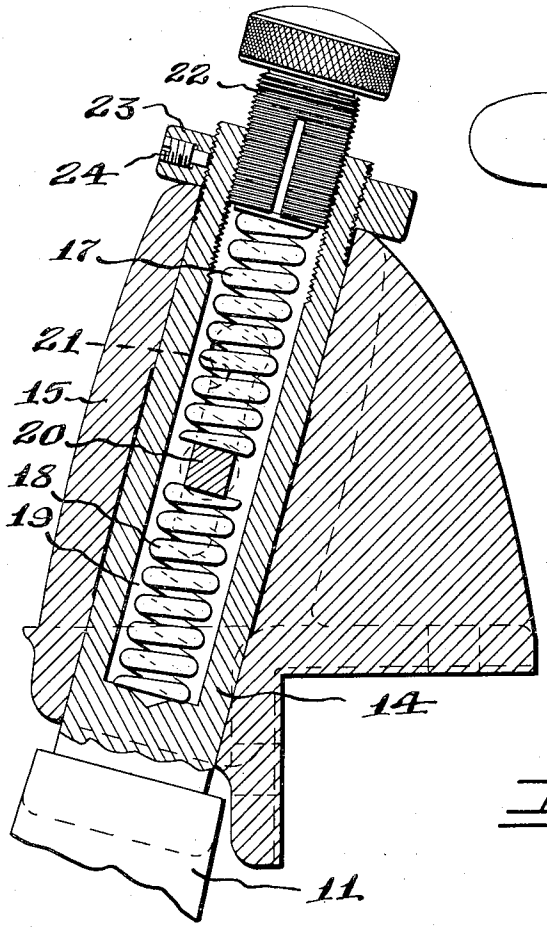


Fig. 3.

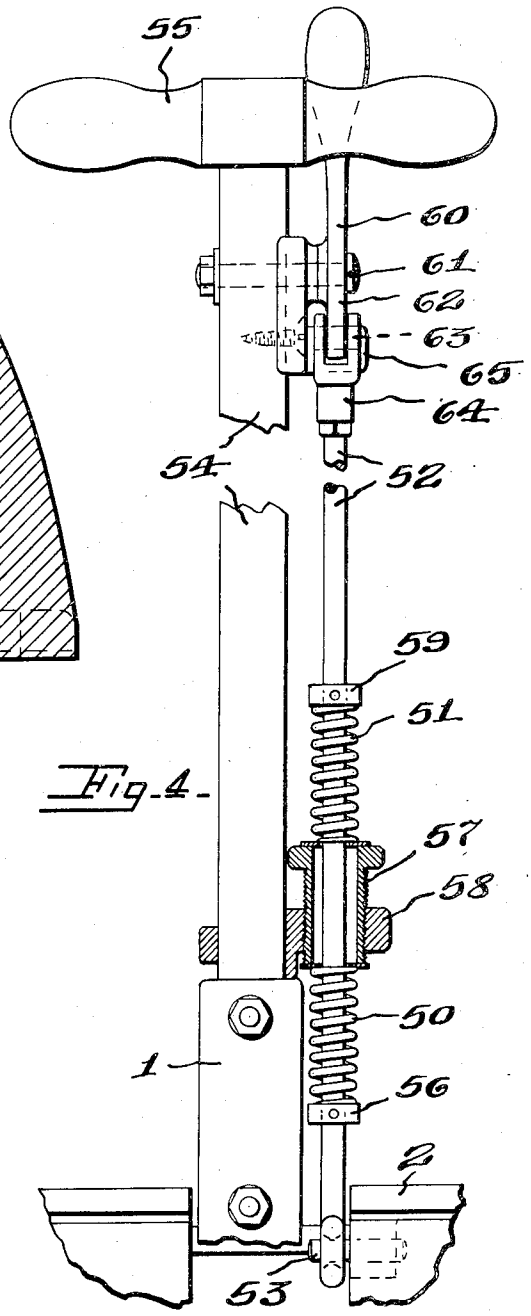


Fig. 4.

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UNITED STATES PATENT OFFICE

1,974,136

ABRADING OR SURFACE FINISHING MACHINE

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Application March 21, 1931, Serial No. 524,343

14 Claims. (Cl. 51—176)

This invention relates to abrading machines, particularly machines for finishing surfaces, as floors and the like, and has for its object, a particularly simple and efficient means of yieldingly supporting the abrading roller, and a particularly simple and efficient mechanism by which a predetermined pressure can be applied to the roller.

The invention consists in the novel features and in the combinations and constructions hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawings in which like characters designate corresponding parts in all the views.

Figure 1 is a side elevation of a machine embodying this invention.

Figure 2 is an enlarged, fragmentary elevation, parts being omitted, showing particularly the mounting for the abrading roller.

Figure 3 is an enlarged sectional view on line 3—3, Figure 2.

Figure 4 is a fragmentary rear elevation, partly in section, of the push handle for the machine and the means for adjusting the pressure applied to the roller.

This floor surfacing or abrading machine comprises generally, a suitable frame, an abrading roller, means for actuating it, and mechanism for supporting the roller from the frame including yieldingly resistant means acting in opposite directions to apply force in opposite directions to the roller and the frame, means for increasing the force of the resistant means in one or either direction, and decreasing the force in the opposite direction.

The machine further comprises yielding or spring means by which a predetermined pressure is applied to the roller.

In the illustrated embodiment of my invention, the frame of the machine includes a truck or chassis 1, and a carriage 2 movably mounted on the frame, the truck or chassis 1 having front and rear supporting wheels 3, 4, which run on the floor, the rear wheel 4 being a castor wheel. There are usually two front wheels 3, and one rear wheel 4. Preferably, the carriage 2 is pivoted at 5 to the chassis on a transverse pivot.

6 designates the abrading roller which is supported from the carriage 2 in front of the chassis 1. The roller may be of any suitable form, size and construction. It usually comprises a body or drum having a covering 7 of yielding material around which is wrapped a sheet 8 of abrading material. This sheet is removably secured to the roller in any suitable manner. The roller is mounted on an axle 10, the opposite ends of which are independently supported directly from the carriage 2 by supporting members 11 having hubs 12 on the ends of the axle 10, suitable antifriction bearings 13 being located between the hubs 12 and the ends of the axle 10. The supporting members 11 extend upwardly, and are provided with spindles 14 at their upper ends mounted in upwardly extending fixed bearings 15 at the front end of the carriage 2. These bearings 15 are in the form of a bracket which is secured to the carriage in any suitable manner, as by screws 16. The bracket together with the depending arms 11 and abrading roller 6 constitute a detachable abrading roller unit, the bracket constituting the sole means for supporting the abrading unit from the frame.

The yieldingly resistant means are preferably springs, which act in opposite directions on the supporting members 11, and are preferably compression springs acting in opposite directions on the spindles 14, and are here shown as located in the spindles 14.

17 and 18 designate the oppositely acting springs which are located in the hollow or tubular portion 19 of each spindle 14, these springs thrusting at their inner ends against an abutment 20 fixed relatively to the companion bearing 15 and extending transversely through the spindle 14 which is provided with diametrically opposite lengthwise slots 21 through which the abutment 20 extends. The spring 18 thrusts at its outer end against the bottom of the hollow portion of the spindle, and the spring 17 thrusts at its outer end against an adjustable member in the upper end of the spindle, as the screw 22. The downward movement of the spindle under influence of the spring 18 is limited by a nut 23, which I have called a leveling nut, threading on the upper end of the spindle 14 and thrusting against the upper end of the bearing 15. This nut is adjustable, and held in its adjusted position by a set screw 24. The supporting member 11, or the spindle 14 thereof, has a free upward movement within limits. It will be understood that there is a member 11 at each end of the roller, and each member 11 has opposing springs 17, 18, acting on an abutment 20, and the adjusting screw 22, and a leveling nut 23.

If both springs 17 and 18 are adjusted equally, opposite ends of the rollers will be floatingly supported. By unscrewing the screws 22, the tension of the springs 17 will be decreased relatively to the springs 18, and the springs 18 act with

greater force downwardly until the downward movement of the spindle 14 is limited by the leveling nut 23. By tightening the screws 22 so that the springs 17 exert a stronger force than the spring 18, the roller will have an easier floating effect than when the springs 17, 18 are balanced, or when the spring 18 overbalances the spring 17 as when the screw 22 is backed off so that the spring 18 can apply a greater force than the spring 17.

The antifriction rollers in the hubs 12 have sufficient looseness to permit up and down movements of opposite ends of the rollers independently of each other within limits.

The roller 6 is actuated by an electric motor 30 mounted on the carriage 2 with the greater portion thereof in front of the pivot of the carriage 2, so that the weight of the motor tends to tilt the front end of the carriage downwardly and apply the weight of the motor to the roller. The motion of the rotor of the motor is transferred to the roller through suitable motion transmitting means, here illustrated as a belt 31 running over pulleys 32 and 33 mounted respectively on the shaft 34 of the motor, and on one end of the axle 10 of the roller. As seen in Figure 2, the pulley 33 threads on one end of the axle 10 and thrusts against the inner ring of the anti-friction bearing 12. The shaft 34 of the motor is also connected to the rotor of a suction creating device or blower 36 carried by the carriage 2, the inlet side of the blower communicating with a conduit 37 having a nozzle 38 at its end arranged in juxtaposition to the rear side of the roller to receive the dust created by the roller. The conduit 37 is connected by a suitable coupling 39 to the carriage 2 to partake of the tilting movement of the carriage and thus hold the nozzle in juxtaposition to the roller in any adjusted position of the roller.

The motion of the motor shaft is transmitted to the rotor of the blower through suitable means as a belt 40 running over pulleys 41, 42 mounted respectively on the motor shaft 34, and the shaft 43 of the blower. The outlet end of the blower communicates with a suitable pipe 44, on the end of which a dust collecting bag, not shown, is mounted.

The means for yieldingly supporting the carriage 2 and to adjustably apply a predetermined pressure to the roller supported by the carriage, or to permit the weight of the motor 30 to be applied more or less to the roller 6, comprises yieldingly resistant means acting in opposite directions on the carriage, and means for increasing the force of the resistant means in one direction, and decreasing the force of the means in the other direction. The yieldingly resistant means are preferably oppositely acting springs, and the adjustment of the force of these springs is effected by decreasing the force of one spring, and increasing the force of the other.

50 and 51 designate springs acting in opposite directions on the rear end of the carriage 2, these springs encircling an operating rod 52 pivoted at 53 at its lower end to the rear end of the carriage 2, the rod extending lengthwise of a bar or tongue 54 fixed at its lower end to the chassis and having handles 55 at its upper end. The spring 50 is interposed between a shoulder 56 on the rod 52 and one end of an adjusting nut or sleeve 57 threading through a lug 58 fixed on the bar 54, and the spring 51 is interposed between a similar shoulder 59 and the other end of the nut or sleeve 57. The rod 52 may be operated by means of a lever handle 60 pivoted at 61 to the bar 54 near the upper end thereof so that the handle 60 is in juxtaposition to the handles 55, this lever having an angular arm 62 pivoted at 63 to the upper end of the rod 52, or a coupling 64 at the upper end of the rod 52.

When the lever handle 60 is pulled rearwardly into the position shown in Figure 1, the arm 62 pushes the rod 52 downwardly and thus tilts the carriage 2, so that its front end moves upwardly and holds the roller 6 off the floor, or other surface, the pivot 63 extending beyond a dead center line bringing the arm 62 against the stop shoulder 65 so that the arm 62 and rod 52 lock toggle fashion.

When the handle lever 60 is pushed forwardly, the arm 62 and arm 52 come out of a straight line, or the toggle folds, so that the front end of the carriage can tilt downwardly, letting the roller 6 engage the floor, or other surface, and the amount of pressure applied depends upon the difference in tension between the springs 50 and 51, the spring 50 tending to push the rod 52 downwardly and hence, elevate the front end of the carriage 2 and the roller 5, or to neutralize the weight of the motor 30 and the spring 51 tending to move the rod 52 upwardly and act in conjunction with the weight of the motor 30. The action of these springs can be adjusted by means of the nut or sleeve 57 which increases the tension of one, and decreases that of the other. By screwing the nut or sleeve 57 downwardly, the tension of the spring 50 is increased, and that of the spring 51 decreased, so that the pressure of the roller 6 is lessened. By unscrewing the sleeve or nut 57 upwardly, the tension of the spring 50 is decreased, and that of the spring 51 increased, so that the pressure applied to the roller is increased. By reason of the adjustment 57, the pressure of the roller can be varied from approximately nothing to maximum, which in this particular machine, is ninety pounds, and the operator can set the sleeve or nut 57 at the proper adjustment for the work to be performed, and need not apply the pressure on the roller by pressing on the handle 60.

Heretofore, it was necessary for the operator to not only guide the machine by means of the handle 55, but also hold the pressure applied by means of a handle similar to the handle 60. By means of the springs 50 and 51, the operator is relieved of applying and holding the pressure. Also, the springs 50 and 51 spring support the carriage 2 and act as buffer springs, or shock absorbers.

In some work, as for instance, in merely refinishing a floor, or removing a light coat of varnish, which floor might have undulations in it, the nut 57 is adjusted to apply a light pressure to the roller 6, so that the roller practically floats and follows the unevennesses in the floor, the springs 17 and 18 of the roller mounting also facilitating this floating action. For heavier work, such as removing a heavy coat of varnish, or resurfacing floors and bowling alleys and the like to an exact level, heavy pressure is desired, and the sleeve 57 may be adjusted to lessen the pressure on the spring 50 and increase the pressure on the spring 51, and also the screws 22 of the front roller mounting may be backed off to decrease the lifting tension of the spring 17 and permit the springs 18 to act with greater force, so that the abrading roller levels off all unevennesses or undulations in contradistinction to merely finishing the surface.

A cover or shield 66 is provided at the front of the frame, this being secured at one end to the carriage and curving forward and downward over the roller 6, and at its front end abuts against buffers 67 at the ends of forward extensions 68 of the supports 11. Thus, the shield does not interfere with the tilting of the carriage 2, or the up and down play of the roller 6. The lower edge of the shield is provided with a buffer strip 69.

In operation, the roller 6 is adjusted to have a floating action of various resistances by adjusting the screws 22, and in some cases, the leveling nuts 23, and the pressure to be applied by adjusting the nut 57. The motor is then started by throwing a suitable switch in a feed circuit, and the machine guided by means of the bar or tongue 54.

Having once adjusted the machine for the pressure for the particular work it is unnecessary for the operator to give any more attention to the pressure by manipulating the handle 60. The roller can be lifted off the floor at any time, regardless of the pressure adjustment, by operating the handle 60 so that the lever arm 62 and operating rod 52 are in a straightened toggle position.

What I claim is:

1. In an abrading machine, a frame formed with an upwardly extending bearing, an abrading roller, a support therefor having a spindle slidably mounted in said bearing, a spring abutment fixed to the bearing and oppositely acting springs thrusting in opposite directions against the abutment and the spindle, said springs being mounted within the spindle, and means for actuating the roller.

2. In an abrading machine, a frame formed with an upwardly extending bearing, an abrading roller, a support therefor having an upwardly extending spindle extending into the bearing, the spindle having a hollow portion and being formed with lengthwise slots, a spring abutment carried by the bearing and extending transversely of the spindle through the slots, springs within the spindle and thrusting at their inner ends against the spring abutment, and at their outer ends in opposite directions against the spindle, and means for actuating the roller.

3. In an abrading machine, a frame formed with upwardly extending bearings, an abrading roller, supports for carrying opposite ends of the roller, the supports having spindles extending into the bearings respectively, a spring abutment fixed to each bearing and extending through each spindle, said spindles being slidable in the bearings and on the abutments, and springs acting at their inner ends in opposite directions against each abutment, and at their outer ends in opposite directions against the spindle, and means for actuating the roller.

4. In an abrading machine, a frame formed with upwardly extending bearings, an abrading roller, supports for opposite ends of the roller, each support having a spindle extending into one of the bearings, each spindle having a hollow portion provided with lengthwise slots, a spring abutment extending transversely of each bearing and of the companion spindle through the lengthwise slots therein, springs located in each hollow portion and thrusting at their inner ends in opposite directions against the spring abutment, and at their outer ends in opposite directions against the spindle, and means for actuating the roller.

5. In an abrading machine, a frame formed with an upwardly extending bearing, an abrading roller, a support therefor having an upwardly extending spindle extending into the bearing, the spindle having a hollow portion and being formed with lengthwise slots, a spring abutment carried by the bearing and extending transversely of the spindle through the slots, springs within the spindle and thrusting at their inner ends against the spring abutment, and at their outer ends in opposite directions against the spindle, an adjusting screw threading in the upper end of the spindle and serving as an adjuster common to both springs, and means for actuating the roller.

6. In an abrading machine, a suitable supporting frame having an upright bearing, a support for the roller having a spindle formed with a hollow portion extending into the bearing and provided with lengthwise slots, a leveling nut threading on the upper end of the spindle against the upper end of the bearing, a spring abutment fixed to the bearing and extending transversely of the spindle through the slots, an adjusting screw threading into the upper end of the spindle, springs interposed respectively between the bottom of the hollow portion and the abutment, and between the abutment and the adjusting screw, and means for actuating the roller.

7. In an abrading machine, a chassis, a carriage pivotally mounted on the chassis, an abrading roller, means for supporting the roller from the carriage comprising springs arranged to apply their force in opposite directions to the roller and the carriage, and means for adjusting the tension of the springs to increase the tension of one, and decrease that of the other, means for actuating the roller mounted on the carriage in such position that the weight of the actuating means is applied to the roller, means for shifting the carriage on its pivot to raise and lower the roller including springs acting in opposite directions and arranged to apply their force in opposite directions to the carriage, and means for adjusting the tension of the last named springs by increasing the tension of one, and decreasing that of the other.

8. An abrading machine of the roller type including a frame, bearing members carried at each side of the frame, spindles slidably mounted in said bearing members, the abrading roller being journalled between the lower ends of said spindles, each of said bearing members having an abutment, springs acting in opposite directions between the abutments and the spindles to yieldingly support the spindles relative to the bearing members, said abutments also forming a guide means to prevent the spindles from rotary movement relative to the bearing members, and means for actuating the roller.

9. An abrading machine of the roller type including a frame, upwardly extending bearings carried by the frame, means for yieldingly supporting each end of the abrading roller and having spindles extending into said bearings, operable means common to and acting upon the yielding supporting means of the roller to move the roller in contact with the surface being finished and adjustable yielding means, which in conjunction with said operable means, effects a predetermined pressure between the abrading roller and the surface being finished, and means for actuating the roller.

10. An abrading machine of the type described comprising a frame, upwardly extending bearing members, a pair of spindles slidably mounted in said bearing members and extending downwardly

from said members, an abrading roller journalled between the lower ends of the spindles below said bearing members, said bearing members and spindles constituting the sole supporting means for the abrading roller, and means for detachably securing said bearings to the front of the frame to permit removal of the abrading roller, the spindles and bearings as a unit, and means carried by the frame for actuating the abrading roller.

11. In an abrading machine of the type described comprising a frame, an abrading unit detachably secured to the front of the frame, said unit including a supporting bracket extending across the front of the frame and being provided with a pair of spaced apart upwardly extending bearings, spindles slidably mounted in said bearings and extending downwardly from said bracket, an abrading roller journalled between the lower ends of the spindles, said bracket and spindles constituting the sole supporting means for the abrading roller, means for detachably securing the bracket to the frame, and means carried by the frame for actuating the roller.

12. An abrading machine of the type described comprising a frame, an abrading unit detachably secured to the front of the frame, said unit including a supporting bracket extending across the front of the frame and being provided with a pair of spaced apart vertical bearings, a spindle slidably mounted in each of said bearings and extending downwardly from each of said bearings, an abrading roller journalled between the lower ends of the spindles, said bracket and spindles constituting the sole supporting means for the abrading roller, means for detachably securing the bracket to the front of the frame, whereby upon detachment of said bracket, the bracket, spindles, and abrading roller are removed from the machine in a unit, and means carried by the frame for actuating the roller.

13. An abrading machine of the type described comprising a frame, an abrading unit detachably secured to the frame, said unit including a supporting bracket provided with a pair of spaced apart vertical bearings, a spindle slidably mounted in each of said bearings and extending downwardly from the bracket, an abrading roller journalled between the lower ends of the spindles, means cooperable with each spindle for adjusting the same toward and from the bracket, the bracket and spindles constituting the sole supporting means for the abrading roller, means for detachably securing the bracket to the frame, whereby upon detachment of said bracket, the bracket, spindles, and abrading roller are removed from the machine in a unit, and means carried by the frame for actuating the roller.

14. An abrading machine of the type described comprising a frame, an abrading unit detachably secured to the frame, said unit including a supporting bracket detachably secured to the frame and having depending spaced apart arms, an abrading roller journalled between the lower ends of said arms, means cooperable with said bracket for adjusting the angularity of the axis of the drum relative to the frame, said bracket constituting the sole supporting means for the abrading roller, and means carried by the frame for actuating the roller.

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