Aug. 4, 1942. G. W. JACKSON ET AL 2,291,629

ABRADING MACHINE

Filed July 28, 1941 3 Sheets-Sheet 1

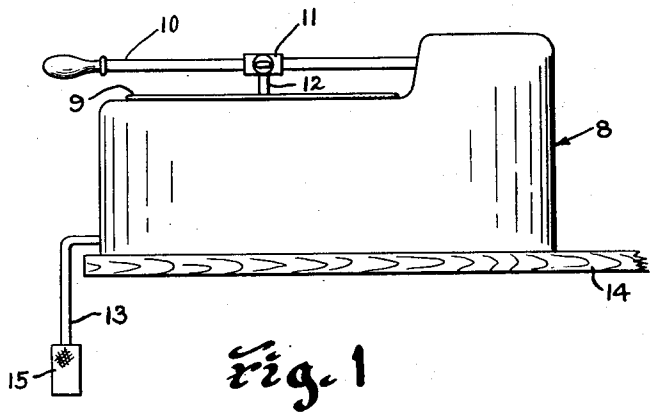


Fig. 1

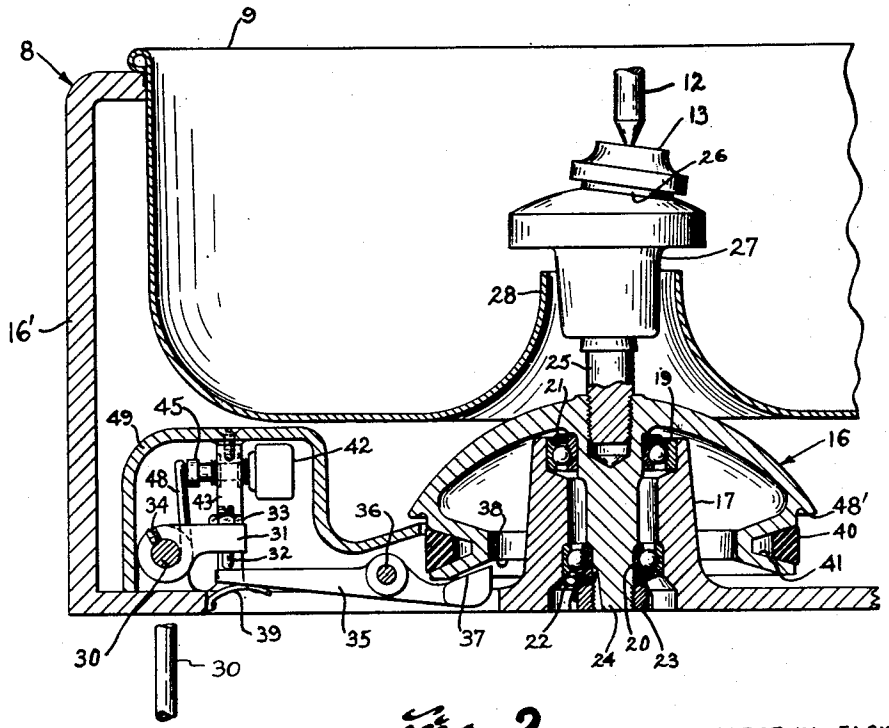


Fig. 2

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Filed July 28, 1941 3 Sheets-Sheet 2

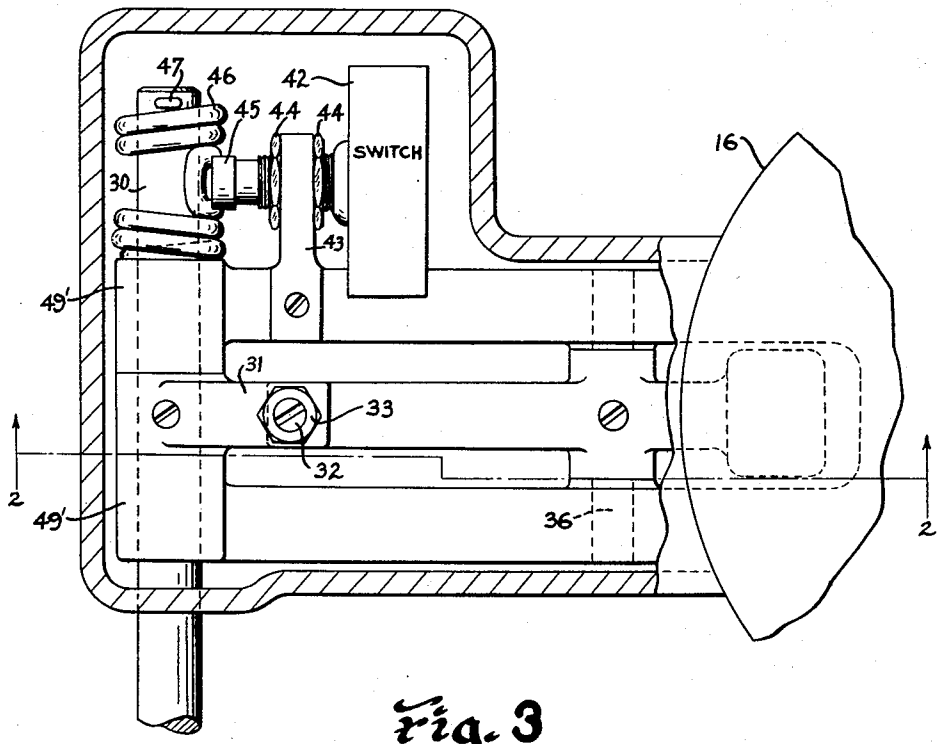


Fig. 3

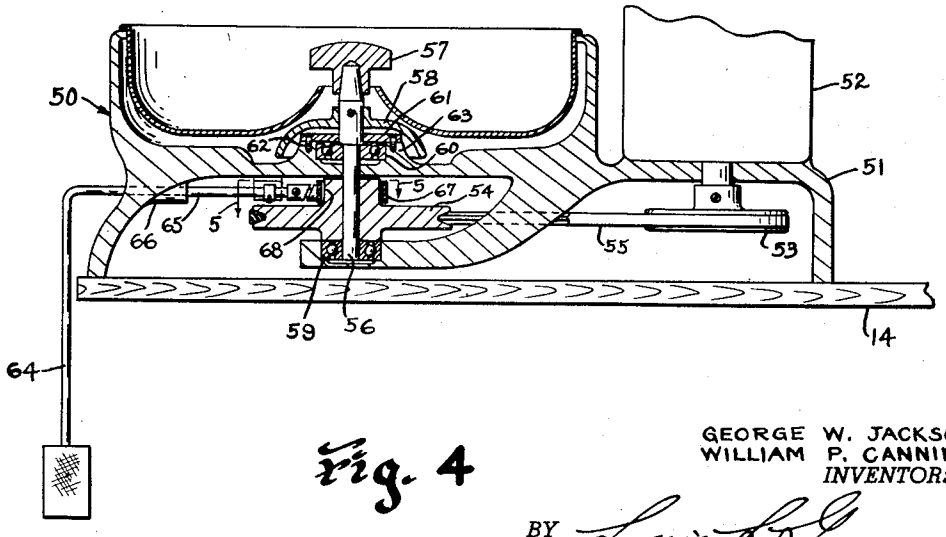


Fig. 4

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Filed July 28, 1941 3 Sheets-Sheet 3

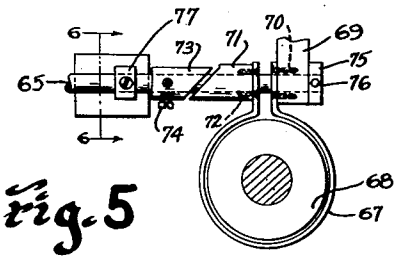


Fig. 5

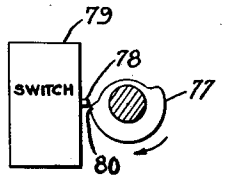


Fig. 6

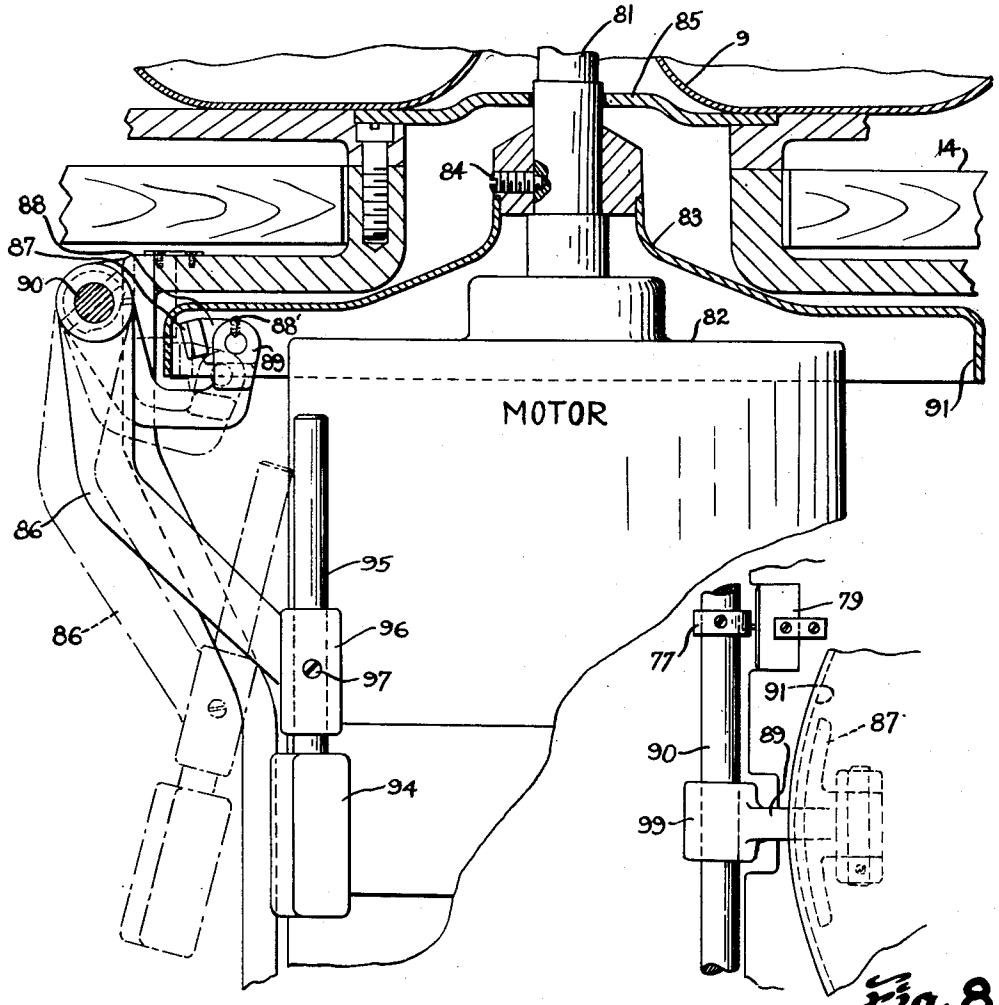


Fig. 7

Fig. 8

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Patented Aug. 4, 1942

2,291,629

UNITED STATES PATENT OFFICE

2,291,629

ABRADING MACHINE

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Application July 28, 1941, Serial No. 404,340

9 Claims. (Cl. 51—131)

This invention pertains to surfacing devices and more particularly to hand surfacing machines such as are used in surfacing lenses in the ophthalmic industry.

Heretofore, devices of the type described herein employed a means of initiating power supply to rotate a lens lap but did not employ a braking method for retarding and stopping the rotation of the lap after the driving power was disassociated from the lap. Further, no braking mechanism was used in conjunction with a power control, such as an electric switch connected to a motor so that by a single manipulation, the motor controlled switch and braking mechanism would be actuated.

A slinger on a surfacing machine has been used heretofore but said slinger was in no instance combined with a pulley or a brake drum surface in a single unitary mounting.

The present invention combined the desirable features referred to hereinbefore and it is therefore an object of the present invention to provide a surfacing machine of the class described wherein braking means are employed to retard and more readily stop the rotation of the lens lap when the driving power is disassociated from the lens lap.

A further object is to provide a manually operable switching mechanism for cutting off energy to the motor which causes rotation of the lens lap, in combination with a braking mechanism for readily stopping rotation of the lens lap after the energy is cut off from the lens lap driving motor.

A further object is to provide a slinger for a surfacing machine, which slinger has sufficient diameter to provide a greater braking surface to increase the effectiveness of the braking action.

A further object of the invention is to provide a unitary structure of a surfacing machine and motor in combination with a braking mechanism having slinger means located thereabove to prevent undesirable particles of dirt and dust from falling into the bearings of the lens lap support.

A further object of the invention is to provide a surfacing machine with a unitary member which is in fact a combination pulley, slinger, and braking surface.

A further object is to provide a more compact, more efficient surfacing machine.

Further and other objects may be and may become apparent to those skilled in the art from a perusal of the drawings and the annexed specification, and it is to be understood that the present disclosure is by way of illustration only and it is not intended that the present disclosure be regarded as limitations as changes, modifications, and equivalents may be used without departing from the spirit of the subjoined claims.

In the drawings:

Fig. 1 is a side view of the complete surfacing machine;

Fig. 2 is an enlarged cross sectional view partly broken away taken substantially along lines 2—2 of Fig. 3 with the unitary combination slinger-pulley brake drum shown in proper relation into the lens lap spindle.

Fig. 3 is an enlarged plan view partly broken away showing the arrangement of the braking and switching parts of Fig. 2;

Fig. 4 is a sectional view of a modification showing a different braking mechanism with a driving pulley connected by a belt to a motor;

Fig. 5 is a sectional view of the braking mechanism taken substantially along lines 5—5 of Fig. 4;

Fig. 6 is a modification of a cam operated switching mechanism taken along lines 6—6 of Fig. 5;

Fig. 7 is a further modification partially broken away and shown partially in cross section by showing the wide diameter slinger in conjunction with a modified braking mechanism.

Fig. 8 is a plan view of the arrangement of the switching and braking parts of Fig. 7.

Referring to the drawings and more particularly to Fig. 1 a surfacing machine 8 has a pan 9 inserted therein with a movable operating lever 10 having a slidable connection 11 on the operating lever. A lens block pin 12 extends downwardly into the pan to engage a lens block. The operating lever 10 is movably connected to the machine 8 in any conventional manner. A brake lever 13 extends below the bench top 14 so that the brake lever 13 may be operated by pressing a knee against the knee pad 15 which in turn operates a brake and electric switch. Referring to Fig. 2, the hand surfacing machine 8 has a supporting frame 16' which supports the pan 9.

A combination slinger, pulley, and braking drum are combined in one element 16 which will be hereinafter referred to in connection with Figs. 2 and 3 as a slinger. The slinger 16 is mounted on a hub 17 and has upper and lower ball races, 19 and 20 respectively, with sealing pads 21 and 22 for the upper and lower races. A lock nut 23 is threadedly connected on the threaded end of the stud portion of the slinger and holds the ball races in operative position.

The lower ball race 20 is used for centralizing the stud 24 and provides upward and radial thrust bearings. The upper ball race 19 provides downward and radial thrust bearings. Both of said bearings engage suitable shoulders to retain said ball races in their respective positions. A spindle 25 is threadedly connected into the upper portion of the slinger 16 and supports a lap 27 which engages a lens 26, which lens is secured to a lens block 13 in any conventional manner. The lap 27 extends through an opening in the protrusion 28 in the center of the pan 9.

Referring to Fig. 3 in combination with Fig. 2 a switching and braking assembly may be seen wherein a shaft 30 is rotatably mounted in journals 49' to permit the shaft 30 to move when pressure is applied to the knee pad 15. An adjustable lever arm 31 has an adjusting pin 32 which is locked in position by a nut 33. The adjusting lever is connected to the shaft 30 by means of the screw 34. A brake arm 35 is pivotally connected to the pin 36 having a braking surface 37 on one end of the brake arm, which braking surface 37 engages a brake drum 38. The opposing end of the brake arm is pressed upwardly by a spring 39 which normally keeps the brake arm out of engagement with the brake drum while the upward movement of the brake arm is restricted by the pin 32 of the adjustable lever 31. A belt 40 is shown in section, which belt engages the groove of the pulley portion 41 of the slinger.

A unidirectional switch 42 is mounted on a support 43 and is locked in position by nuts 44. A switch arm 45 is movable within the switch 42 to make and break the circuit when the switch arm is operated. A spring 46 is shown as a resilient member which is connected to one end of the shaft 30 by any suitable means such as the portion 47 which extends through a hole in the shaft and is flared at the end thereof. Any suitable means may be provided for holding the resilient member or spring 46 with one end thereof in fixed relation to the shaft so that the spring extension 48 may resiliently engage the switch arm 45. The purpose of the resilient spring member 46 with its extension 48 is to permit a clockwise rotation of the shaft 30 to urge the extension 48 against the switch arm 45 to operate the switch in its initial movement, and to permit a continued clockwise rotation of the shaft 30 to cause the pin 32 to depress the brake arm 35 and press the braking surface 37 against the brake drum surface 38. After the initial movement of the shaft 30, whereby the switch 42 is operated, the spring 46 will have its extension 48 bent. In this way, once the switch 42 is actuated by pressing the extension 48 against the switch arm 45, the extension 48 will have a tendency to slide over the head of the switch arm.

From the above description of Figs. 2 and 3, it will be seen that during the operation of the hand surfacing machine 8 the motor which is housed in the right side of the machine shown in Fig. 1 will cause the belt 40 to be moved and revolve the slinger. If any of the dust or lapping compound gets between the lap and the protruding portion 28 having the opening therein, the lapping compound will fall on the slinger which is rotating, and the lapping compound will be thrown outwardly therefrom by centrifugal force. A shoulder 48' extends outwardly on the lower portion of the slinger and provides a shield for the belt and braking surface, to prevent the lapping compound or other undesirable material from coming in contact with the pulley groove and the braking surfaces. The protective guard 49 houses the switching and braking mechanism so that no undesirable particles engage the switching and braking mechanism to hinder proper operation thereof.

Referring to Fig. 4 a modification is shown wherein a hand surfacing machine 50 is shown having a framework 51 which supports a motor 52 having a pulley 53 connected on the shaft thereof to drive a lap pulley 54 by means of a belt 55. A tapered spindle 56 has a lens lap 57 on one end thereof with a slinger 58 connected to the tapered spindle just below the lens lap so that rotation of the pulley 54 will also cause rotation of the slinger 58. A ball race 59 engages the lower portion of the shaft 56 and provides a radial thrust bearing therefor. Another ball race 60 is provided for the upper portion of the tapered spindle and is a radial and axial thrust bearing. A sealing cap 61 is connected by means of screws 62 to the hub 63. The sealing cap is an additional means to the slinger for keeping dirt and lapping compound away from the ball bearings in the ball race and may be of felt, leather, or other suitable material having a hole therein to permit the spindle to extend therethrough with the hole of sufficient size to frictionally engage the spindle and provide a suitable bearing surface thereon for excluding dirt and undesirable particles without appreciably retarding the rotational effort of the tapered spindle. A braking arm 64 has a shaft 65 which is journalled in a bearing 66 and has a brake band 67 which grips the hub 68 of the pulley 54.

For a better understanding of the braking and switching mechanism an enlarged view is shown in Fig. 5 wherein the hub 68 has the brake band 67 therearound with one portion securely connected to a block 69 by screws 70. A camming member 71 is connected by means of screws 72 to the opposing end of the brake band 67 and the camming member 71 is slidable axially on the shaft 65. The camming member 73 is securely connected to the shaft 65 by means of a screw such as 74. A collar 75 fits on the end of the shaft 65 and has a pin 76 extending through the collar and the shaft to provide an end bearing which permits the shaft 65 to be rotated. When the shaft 65 is rotated the inclined surface of the camming member 73 will rotate and engage the inclined surface of the cam member 71. Since the camming member 73 is stationary axially in relation to the shaft 65, the camming member 71 will be forced away from the camming member 73 and consequently draw the two ends of the brake bands together thereby causing the brake band to frictionally engage the hub 68 of the pulley 54 causing a braking action to take place.

A cam 77 is shown in an enlarged view in Fig. 6 for engaging a switch arm 78 of a unidirectional switch 79.

When the brake lever 64 is operated as shown by the arrow direction in Fig. 6, the shoulder 80 will engage the switch arm 78 causing the unidirectional switch to be actuated. Continued movement of the cam 77 will permit the switch arm 78 to ride on the raised portion of the cam so that no additional pressure is exerted on the switch arm due to further rotation of the cam 77.

Referring to the modification shown in Figs. 4, 5 and 6, it will be seen that when it is desirable

to operate the machine, pressure on the brake lever 64 will cause the cam 77 to actuate the switch 79 and start the motor. Thereupon the brake lever is released and the operation of the machine continues. When it is desirable to stop the machine, pressure on the brake lever 64 will again cause the cam lever 77 to actuate the unidirectional switch 79, and shut off the motor. A continued pressure on the brake lever 64 will cause the camming members to engage each other thereby urging the brake band 67 against the pulley hub 68 causing a braking operation to slow down and ultimately stop the machine from rotation.

A furthher modification of the invention is shown in Figs. 7 and 8 wherein the pan 9 has a spindle 81 extending through the central opening in the pan 9. An electric motor 82 is connected to the spindle 81 to cause rotation thereof. A slinger 83 is connected to the shaft 81 and held in position by a screw 84, or other suitable means. A sealing cap 85, made of leather, metal, or the like, is also provided above the slinger to assist in keeping out the lapping compound and other undesirable material. A brake arm 86 is shown in solid lines in its inoperative position having a brake shoe 87 which is securely connected to the brake shoe arm 88. The brake shoe arm is shown as an extension of a lever 89 which is connected to the shaft 90. The lever 89 and the brake shoe arm 88 are shown in two pieces since, it may be desirable to adjust the brake shoe arm 88 by means of a pin 88' in relation to the lever 89 so that the brake shoe may be varied in relation to the brake drum surface 91 of the slinger 83. A knee pad 94 is shown connected to a shaft 95 which extends through a journal 96 and is adjustably connected thereto by a screw 97. The brake lever 86 and certain of its interconnecting parts are shown dotted in its operative position wherein the brake shoe 87 is in engagement with the brake drum surface 91. The enlarged view in Fig. 8 shows the brake shoe 87 connected to the lever 89, which lever 89 is connected to the shaft 90 by means of the journal 99. A cam 77 is shown in engagement with a switch arm of the switch 79. The switch 79 in Fig. 8 is a unidirectional switch with the camming surface being substantially the same as shown in Fig. 6.

A unidirectional switch is shown in all instances since it is to be understood that a single actuation of the switch will cause the contacts to close and energize the motor while a following single actuation will cause the switch operation to open and deenergize the motor.

The slinger shown in Fig. 7 has a diameter which is appreciably greater than the diameter of either of the other slingers shown. The advantage in this particular case is not only to provide a slinger with a brake drum portion but to provide a brake drum portion so that the increased diameter thereof will provide a greater leverage in the braking action which takes place between the shoe and the enlarged diameter slinger. The modification shown in Figs. 7 and 8 concerns particularly the braking mechanism, but also utilizes a unidirectional switch as is shown in Fig. 6.

The entire invention not only embraces the particular arrangement of parts in an assembly as shown but it is particularly concerned with the combination of a lever arm for operating a switching and braking mechanism.

The preferable assembly and arrangement of parts is presented in Fig. 2 having a single machine element which has a combined slinger surface, pulley to receive a driving element, and brake drum surface for engagement with a brake shoe surface such as 37. This particular arrangement is compact and efficient. The protection guard 49 is shown extending to the combination slinger element and is shown terminating below the umbrella-like or mushroom type pulley protector. It is to be understood that the protection guard may extend entirely around and above the belt while being located below and within the confines of the mushroom type slinger element.

The brake band 67 in the application has been set forth as being fitted around the hub 68. It is to be understood that the brake band may be made of any resilient metal so that when the camming members 71 and 73 are disengaged, the resiliency of the brake band 67 will tend to expand and disengage the hub 68. The brake band 67 may be of metal or a suitable fiber, or a combination of a metal and fiber may be used in lieu of a single element brake band.

In Fig. 2, the preferable showing of the invention is presented with a unitary member which is referred to in the specification as a slinger member. This unitary member comprises three elements namely, a slinger, a brake drum, and a pulley. It is to be understood that while a single element has been fabricated comprising means for performing the three distinct functions, three separate elements may be used and interconnected so as to operate as a single element or any two elements may be interconnected with the third element so that the three elements are mechanically secured together to operate as a single unitary member.

While certain specific elements and arrangements of parts are presented herein, it is to be understood that the disclosure is by way of illustration only and that other equivalent elements and arrangements of parts may be utilized without departing from the spirit of the invention as presented in the subjoined claims.

Having described the invention, we claim:

1. A hand surfacing machine of the class described having a rotatable spindle and a lap on said spindle, a unitary member on said spindle for rotating said spindle, said unitary member comprising a pulley, a slinger, and a brake drum, driving means connected to said pulley, a brake arm pivotally connected to said surfacing machine having a brake shoe thereon disposed to engage the brake drum, a motor and a switch therefor, and control means for actuating said motor switch and said brake arm by a single manipulation thereof.

2. A hand surfacing machine of the class described having a rotatable spindle and a lap on said spindle and a unitary member on said spindle revolubly mounted for rotating said spindle, said unitary member comprising a slinger surface on the upper portion thereof, a pulley, and a brake drum; a brake lever pivotally connected to said hand surfacing machine having one portion thereof engageable with said brake drum, one portion of said brake lever being manually operable to cause said brake lever to engage said brake drum, and a motor connected to said pulley for rotating said hand surfacing machine.

3. A hand surfacing machine of the class described having a rotatable spindle and a lap on said spindle, pulley means connected to said spindle to cause rotation thereof, said pulley in-

cluding a slinger element and a brake drum, an electric motor for driving said pulley, a switching mechanism for controlling operation of said motor and a braking mechanism having a brake shoe for engaging said brake drum, said braking mechanism being used for substantially simultaneously operating said switching mechanism with the braking mechanism.

4. A device of the class described comprising a spindle having a lap thereon and a pulley mounted on said spindle for revolving said spindle and lap, said pulley including a slinger surface located substantially thereabove and a brake drum, means for rotating said pulley and braking means engageable with said brake drum for retarding movement of said pulley.

5. A device of the class described having a lap and a motor for causing rotation of said lap, slinger means driven by said motor and located below said lap, said slinger means having a continuous cylindrical portion forming a brake drum, a brake shoe engageable with said cylindrical brake drum portion of the slinger, and manually operable lever means for urging said brake shoe against said brake drum.

6. A device of the class described having a lap and a motor for causing rotation of said lap, slinger means driven by said motor and located below said lap, said slinger means having a continuous cylindrical portion forming a brake drum, a brake shoe engageable with said cylindrical brake drum portion of the slinger, manually operable lever means for urging said brake shoe against said brake drum, and an electric switch for controlling operation of said motor, said electric switch being substantially simultaneously operable by actuation of said manually operable lever means.

7. A surfacing machine of the class described having a rotatable spindle with a lap adjacent one end thereof, a pulley mounted on said spindle, a motor connected to said pulley to cause rotation thereof, a slinger connected to said spindle and disposed below said lap, a brake drum connected to said pulley, a brake shoe for engagement with said brake drum, switching means for controlling operation of said motor, and manually operable lever means for actuating said switching means and substantially simultaneously causing said brake shoe to grip said brake drum.

8. A device of the class described comprising a freely rotatable spindle, a lap mounted adjacent one end of said spindle, slinger means disposed below said lap and connected to said spindle, pulley means located below said slinger means and connected to said spindle, braking means associated with said pulley for retarding movement of said spindle, an electric motor connected to said pulley for driving said spindle, switching means for controlling operation of said motor, a control lever having camming members thereon for engaging and disengaging the brake shoe with the brake drum, and means on said control lever for actuating said switching means, to the end that an initial movement of the control lever will actuate the switching means and energize the motor, and after the motor is in operation another initial movement of the control lever will actuate the switching means and deenergize the motor while continued movement of the control lever in the same direction will cause said camming members to urge the brake shoe against the brake drum.

9. A device of the class described having a rotatable spindle having a lap thereon and a pulley mounted for revolving said spindle and lap, said pulley having a slinger located thereabove and a brake drum, motor means for rotating the pulley, braking means engageable with said brake drum for retarding movement of said pulley, switching means for controlling energization of said motor means, and lever operable means for substantially simultaneously operating said switching means and said braking means.

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