July 13, 1943. R. G. AMES 2,323,962

SANDING AND BUFFING TOOL

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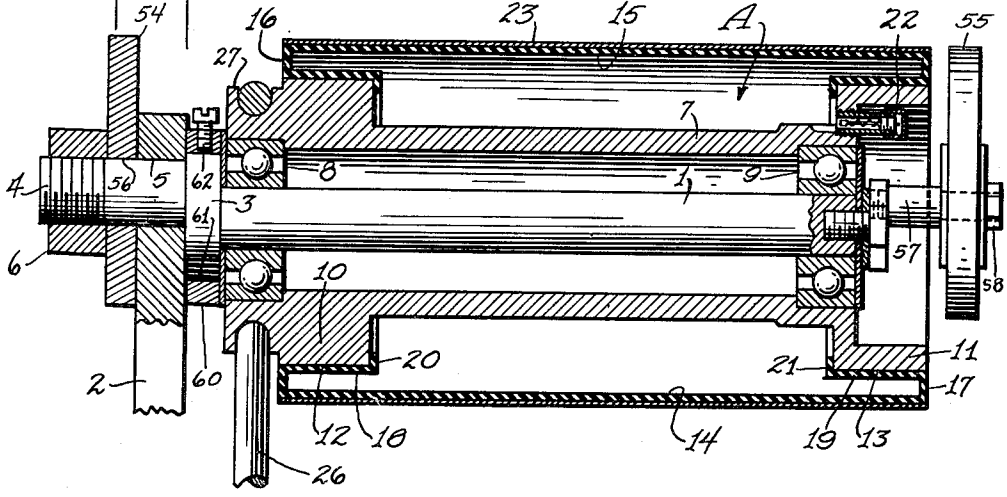
Fig. 1.



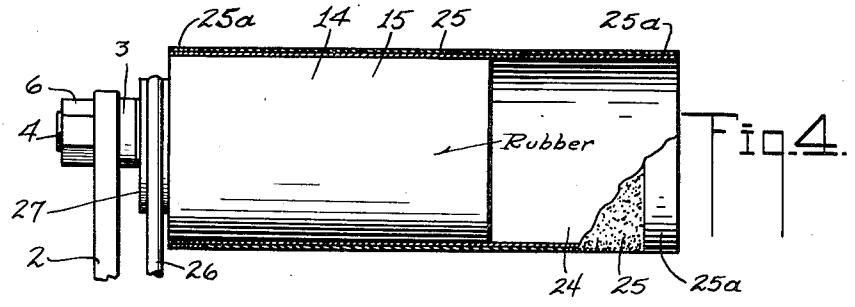




Fig. 4.

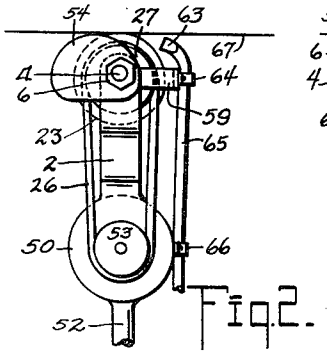



Fig. 2.

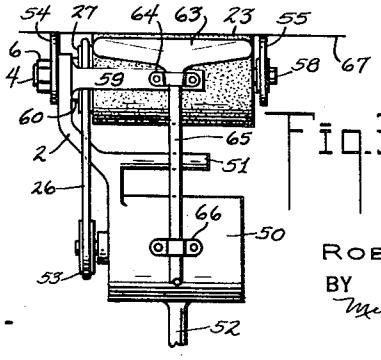



Fig. 3.

INVENTOR
ROBERT G. AMES
BY Mcnn, Liddy, Glaccum & Kane
ATTORNEYS

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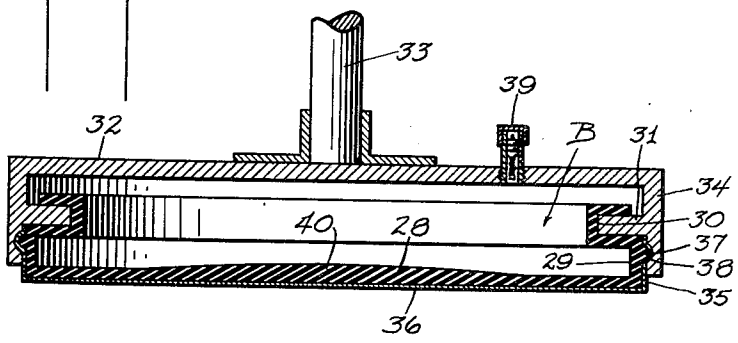
Fig. 5.



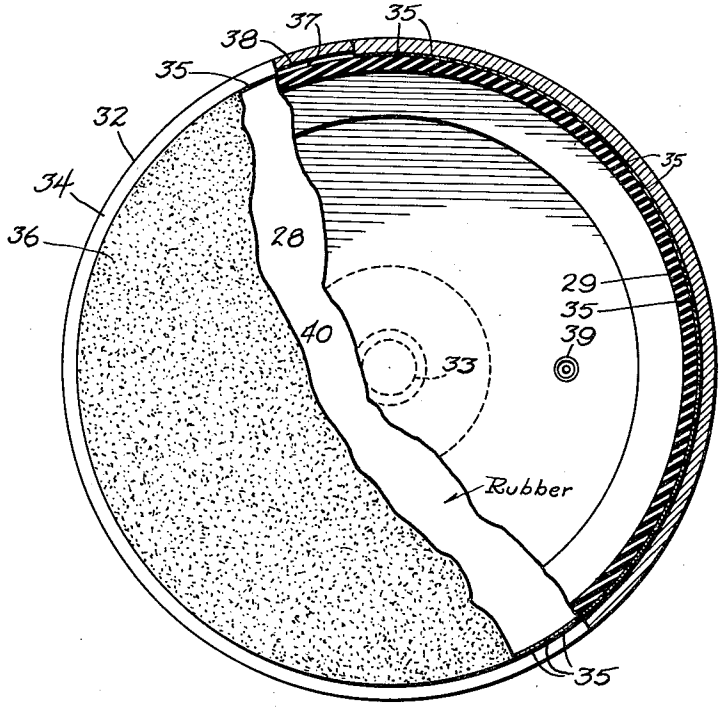




Fig. 6.

INVENTOR
ROBERT G. AMES
BY Mason, Liddy, Glaccum & Kane
ATTORNEYS

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# UNITED STATES PATENT OFFICE

2,323,962

## SANDING AND BUFFING TOOL

Robert G. Ames, Burlingame, Calif., assignor of one-half to George W. Williams, Burlingame, Calif.

Application July 25, 1941, Serial No. 404,033

10 Claims. (Cl. 51—192)

The present invention relates to improvements in a sanding and buffing tool and it consists of the combinations, constructions, and arrangements hereinafter described and claimed.

In the usual sanding device, a rigid cylinder made of metal supports a cylindrical piece of sandpaper which is secured thereto. When the sandpaper covered metal cylinder is revolved on a surface, there is no give to the sandpaper and cylinder should it encounter an unevenness in the surface, and this will cause the sandpaper cylinder to bounce or jump, resulting in the device chattering and marring the surface. Furthermore, one end of the cylinder may gouge into the work to a slightly greater extent than the other end if the cylinder axis is not maintained parallel to the work surface at all times.

The principal object of my invention is to provide a resilient and yielding support for the entire length of a cylindrical piece of sandpaper or buffing material. The cylindrical support will yield sufficiently when the sandpaper is applied to the working surface to prevent chatter should this surface be slightly uneven, and will also permit the cylindrical piece of sandpaper to align itself automatically with the working surface so that neither end will gouge into the surface more than the other. In addition to this, it is possible to change the air pressure within the pneumatic support to provide the required rigidity to the sandpaper for the particular work involved. Adjustable gages may be used.

Instead of mounting the sandpaper directly on the pneumatic cylindrical support, I can mount a rigid hollow cylinder on the support which has a sanding or buffing outer surface. This arrangement will provide a continuous unyielding sandpaper surface that extends substantially from end to end of the rigid cylinder, and at the same time will permit the cylinder to align its axis automatically in a parallel position with the plane of the work and thus prevent one end of the cylinder from gouging into the work more than the other.

In a modified form of the invention, I disclose a pneumatic support for a disc-shaped piece of sandpaper, and the air pressure for the support can be varied to provide the desired rigidity thereto. The resilient support extends to the periphery of the disc and therefore the entire sandpaper surface is resiliently supported.

Other objects and advantages will appear in the following specification, and the novel features of the device will be particularly pointed out in the appended claims.

My invention is illustrated in the accompanying drawings forming a part of this application, in which:

Figure 1 is a longitudinal section through the pneumatic cylindrical support, shown full size;

Figure 2 is an end elevation of the entire device on a reduced scale;

Figure 3 is a front elevation of the device illustrated in Figure 2;

Figure 4 illustrates the pneumatic cylindrical member supporting a rigid cylinder;

Figure 5 is a vertical section through a modified form of the invention; and

Figure 6 is a bottom plan view of Figure 5, a portion being broken away for clarity.

While I have shown only the preferred forms of my invention, it should be understood that various changes or modifications may be made within the scope of the appended claims without departing from the spirit of the invention.

In carrying out my invention, I will first describe the pneumatic cylindrical sandpaper support and then the machine for operating it. The support comprises a shaft 1 that is supported by an arm 2 of the machine. The shaft 1 has an integral eccentric portion 3 that in turn carries a threaded stud 4. The stud is passed through an opening 5 in the arm 2 and a nut 6 secures the stud to the arm. It will be seen from this arrangement that the shaft axis is eccentric to the stud axis and that the shaft may be revolved around the stud axis to adjust it to the desired position in a manner hereinafter described. Any other type of support for the shaft 1 may be resorted to without departing from the spirit and scope of my invention.

A drum 7 is rotatably mounted on the shaft 1 and is supported by ball bearings 8 and 9 at each end thereof. The drum has two flanged ends 10 and 11 that in turn have rims 12 and 13 respectively. It is obvious that the drum may be rigidly mounted on the shaft if desired and the latter rotated for rotating the drum.

A rubber cylinder 14 is mounted on the drum and has its outer cylindrical flexible wall 15 spaced from the rims 12 and 13. At each end of the rubber cylinder I provide inwardly extending integral flanges, and these are numbered 16 and 17. Cylindrical rim engaging members 18 and 19 are integral with the flanges 16 and 17 and in turn carry inwardly extending flanges 20 and 21. Figure 1 illustrates how the rubber cylinder is mounted on the drum and how an air tight seal is provided between the drum flanges 10 and 11 and the rubber rim engaging members 18 and 19.

This construction provides an air tight chamber A that extends from end to end of the drum and it will be noted that the walls of the air chamber are partly metal and partly rubber. No inner tube is necessary to obtain an air tight seal.

The drum flange 11 has an air valve 22 that communicates with the air chamber A. This valve may be of any type and I have indicated a standard tire valve for the purpose. An air hose or air pump, not shown, may be attached directly to the valve for delivering the desired quantity of air into the chamber A. The air pressure within the chamber can be varied by forcing any desired quantity of air into the chamber and in this way the flexibility of the outer cylindrical wall 15 may be changed at will. A cylindrical piece of sandpaper 23 is slipped over the cylinder 14 before the latter is pumped up.

In Figures 2 and 3, I illustrate one type of machine for rotatably carrying the pneumatic cylindrical sandpaper support and for removing sawdust resulting from using the device. I further illustrate a simple means for properly positioning the sandpaper cylinder with respect to the surface to be finished and for permitting the cylinder to be moved toward and away from the surface of the work with the cylinder axis at all times remaining parallel to the work surface. An adjustable two point contact is provided between the device and the wall surface and the device can be rocked on the two contacts for moving the abrasive member against the surface with the desired amount of force.

The arm 2 is of the shape illustrated in Figure 3 and extends from a motor casing 50. A handle 51 paralleling the cylinder axis of the abrasive member is carried by the arm 2, and a second handle 52 extends from the motor casing 50 and lies in a plane that coincides with both the sandpaper cylinder and motor axes. The motor has a pulley 53 operatively connected by a belt 26 to a pulley 27 that is integral with the drum 7. The belt may be tightened about the pulleys to the desired extent by adjusting the shaft 1 with respect to the arm 2 and then tightening the nut 6.

It is difficult to position properly a rotating cylinder with respect to the surface to be finished so that the contacting portion of the abrading cylinder is parallel to the work surface. I provide two eccentric supports 54 and 55 on the machine and these are arranged with respect to the abrader so as to contact initially with the work surface, after which the abrader can be moved against the surface. The eccentric support 54 has an eccentric opening 56 for receiving the stud 4. The eccentric 54 may be swung into the desired position and then locked in place by the nut 6. The other eccentric support 55 is similar to the eccentric support 54 and is adjustably mounted on a stud 57. A nut 58 locks the eccentric support 55 in adjusted position. The stud 57 is connected to the shaft 1 so that both of the studs 4 and 57 will have their axes aligned. Care is also taken to have the two eccentric supports 54 and 55 occupy the same positions at all times.

Before describing the operation of the eccentric supports 54 and 55, it is best to describe the suction nozzle and its support for holding the nozzle close to the abrading member so that the sawdust will be removed as rapidly as it is formed. An adjustable arm 59 has a ring 60 whose plane extends at right angles to the arm. The ring has an opening 61, see Figure 1, for receiving the eccentric 3 and a set screw 62 adjustably connects the ring to the eccentric. Figures 2 and 3 illustrate a suction nozzle 63 as being clamped to the arm by a clamp 64 and a suction hose 65 extends from the nozzle to a vacuum producing device, not shown, which may slide over the floor. If desired, the hose 65 may be secured to the motor housing 50 by a clamp 66.

From the foregoing description of the various parts of the device, the operation thereof may be readily understood.

In using the device, the sandpaper cylinder is first mounted on the deflated rubber cylinder 14 after which air is forced into the chamber A to a point where the sandpaper cylinder will be securely held by the rubber cylinder. The eccentric supports 54 and 55 are correctly positioned and then are locked in place. The operator now grasps the two handles 51 and 52 and moves the device until the eccentric supports contact the work surface which may be a wall 67. This will position the abrader axis parallel with the surface 67. The device may now be rocked for bringing the rotating abrader against the surface. During the rotation of the sandpaper cylinder on the work, there is sufficient yield in the rubber cylinder to cause the sandpaper cylinder also to yield and compensate automatically for any irregularities in the surface of the work. The entire sandpaper cylinder is buoyantly supported from end to end by the air within the chamber A and this will prevent either end from gouging into the work. The pressure of the rotating abrader against the work can be varied by rocking the device on the eccentric supports 54 and 55. The suction nozzle 63 will remove the sawdust as rapidly as it is formed. It is easy to remove a worn piece of sandpaper from the device and apply another, and this is accomplished by first deflating the rubber cylinder to permit the whole sandpaper cylinder to be removed therefrom and a new sandpaper cylinder to be mounted in its place, after which air again is forced into the air chamber A to inflate the rubber cylinder to the desired extent.

When using the device on a vertical wall, the rotation of the abrader is such as to tend to carry part of the weight. When the device is used on a ceiling, the rotation of the abrader is in a direction to act as a brake or a drag on the movement of the device. This especially adapts the device for sandpapering the mastic that joins two wall board sections together.

In Figure 4, I show the rubber cylinder 14 used for supporting a rigid hollow cylinder 24 rather than the sandpaper cylinder 23. The metal cylinder 24 may have a length equal to or greater than the rubber cylinder. On the outer surface of the metal cylinder, I mount a piece of sandpaper 25 which preferably does not extend throughout the length of the metal cylinder. The end portions of the cylinder 24 are smooth as indicated at 25a, and the purpose is to prevent the cylinder ends from gouging into the work. The inflation of the rubber cylinder 14 will connect the metal cylinder 24 thereto so that both will rotate as a unit. The rubber cylinder 14 permits the metal cylinder 24 to align its axis so that it will at all times be parallel with the plane of the surface being sanded. Should the cylinder 24 strike an obstruction and be held against rotation, the rubber cylinder 14 will rotate within the metal cylinder and therefore no damage will be done to the motor that operates the device.

In Figures 5 and 6, I show a slightly modified form of the invention. In this form of the device, the resilient support is for a disc rather than

for a cylinder. A rubber head 28 takes the place of the rubber cylinder 14. The head 28 has a flanged periphery 29 provided with an annular groove 30 that receives an inwardly extending flange 31 carried by a cup-shaped member 32. The member 32 is carried by a shaft 33 and is rotated thereby.

A disc-shaped piece of sandpaper has its rim provided with radial cuts so that the portions 35 formed thereby may be bent at right angles to the plane of the sandpaper disc 36 and received between the peripheral flange 29 of the rubber head 28 and the circumferential flange 34 of the member 32. In order to fasten securely the portions 35 of the sandpaper between the flanges 29 and 34, I provide an annular rubber rib 37 on the rubber flange 29, and this rib forces the portions 35 into an annular groove 38 formed on the inner surface of the metal flange 34. The member 32 and the rubber head 28 form an air compartment B that receives air through a valve 39. The walls of this air compartment are part rubber and part metal. Sufficient air may be delivered to the compartment to create the desired air pressure therein and this will force the flange 29 against the flange 34 for holding the portions 35 in place. In addition to this, the disc-like end 40 of the rubber head will afford sufficient stability to the sandpaper 36 to support it in a flat plane. The plane of the sandpaper will give slightly for any irregularities in the work being sanded, and this will prevent the machine from vibrating or chattering. I prefer to thicken the central portion of the end 40 to prevent the bulging of the head when under air pressure. The thickened center is indicated in Figure 5.

The operation of the modified form of the device is self-evident. The shaft 33 when rotated by a motor, not shown, will rotate the sandpaper disc. The disc is applied to a surface which is to be sanded.

I claim:

1. A device of the type described comprising a rotatable drum having flanged ends, a hollow rubber cylinder having a length coextensive with the drum length and overlying the flanged ends, said cylinder having inwardly extending rubber flanges forming cylindrical portions for gripping and making an air-tight seal with the drum ends, whereby the drum and cylinder form an air retaining chamber, valved means for delivering air to the chamber, and an abrading cylinder receiving the rubber cylinder and being yieldingly supported thereby, the portions of the rubber cylinder that extend over the drum ends being inflatable and communicating with the main chamber, whereby the abrading cylinder is buoyantly supported from end to end.

2. A device of the type described comprising a rotatable drum having flanged ends, a hollow rubber cylinder having an outer cylindrical wall and inwardly extending cylindrical flanges spaced from the outer cylindrical wall and making an air tight fit with the drum flanged ends, whereby an air compartment is formed by the drum and cylinder that extends over the drum flange ends, means for holding air in the chamber at the desired pressure, a rigid hollow cylinder enclosing the rubber cylinder and being supported thereby, whereby the rigid cylinder is yieldingly secured to the drum and is rotated thereby, the outer surface of the rigid cylinder being covered with sandpaper excepting a small surface at each cylinder end which is smooth.

3. A device of the type described comprising a cup-shaped member having an inwardly extending flange, a rubber head having a circumferential flange receivable within the cup-shaped member and an outwardly extending flange engaging with the first-named flange to form an air-tight seal, whereby an air compartment is formed by the cup-shaped member and rubber head, valved means for permitting air to enter the compartment and be held under pressure, and an abrading member overlying the rubber head and having portions receivable between the cup-shaped member and the rubber head circumferential flange.

4. A device of the type described comprising a cup-shaped member having an inwardly extending flange, a rubber head having a circumferential flange receivable within the cup-shaped member and an outwardly extending flange engaging with the first-named flange to form an air-tight seal, whereby an air compartment is formed by the cup-shaped member and rubber head, valved means for permitting air to enter the compartment and be held under pressure, and an abrading member overlying the rubber head and having portions receivable between the cup-shaped member and the rubber head circumferential flange, and means for securing the abrading member flange in place and including an annular rib carried by the rubber head circumferential flange, said cup-shaped member having an annular groove for receiving the abrading member portions and rib.

5. A device of the type described comprising a rotatable drum, a hollow rubber cylinder having a straight length coextensive with the drum length and being removably secured to the drum, the peripheral wall of the rubber cylinder having an air space between it and the drum throughout the length of the drum, whereby both ends of the peripheral wall will have an air cushion support, and valve means for receiving and holding the desired amount of air pressure in the rubber cylinder for buoyantly supporting the cylindrical wall from end to end thereof.

6. A device of the type described comprising a rotatable drum, a hollow rubber cylinder having a straight length coextensive with the drum length and being removably secured to the drum, the peripheral wall of the rubber cylinder having an air space between it and the drum throughout the length of the drum, whereby both ends of the peripheral wall will have an air cushion support, valve means for receiving and holding the desired amount of air pressure in the rubber cylinder for buoyantly supporting the cylindrical wall from end to end thereof, and a cylindrical abrading member supported by the peripheral wall of the rubber cylinder.

7. A clampless pneumatic support for a cylindrical abrading member comprising a rotatable drum, a hollow rubber cylinder having a length coextensive with the drum length, the peripheral wall of the rubber cylinder having an air space between it and the drum throughout the length of the drum, whereby the extreme ends of the peripheral wall have an air cushion support, a cylindrical abrading member having a diameter permitting the ready telescoping of the abrading member over the rubber cylinder, said rubber cylinder receiving and holding an amount of air to cause the peripheral wall of the rubber cylinder to frictionally engage with the abrading cylinder thus causing the two to rotate as a unit, the air also giving the abrading cylinder the desired rigidity.

8. A device of the type described comprising a frame, a shaft carried thereby, a cylindrical abrading member rotatable on the shaft, two adjustable eccentrics mounted at the ends of the abrading member for initially contacting with the surface to be finished, said abrading member being rockable on the eccentrics to vary the pressure applied by the member against the surface being sanded, said eccentrics maintaining the axis of the member parallel with the plane of the surface at all times.

9. A device of the type described comprising a cylindrical abrading member, a frame including a shaft for rotatably supporting the member, two adjustable contact members, one being disposed adjacent to each end of the abrading member for initially contacting with the surface to be finished, said frame being rockable on the contact members for causing the abrading members to be maintained parallel with the surface during its movement toward and away from the surface.

10. In a device of the type described, an abrading member, a frame for rotatably supporting the abrading member, two adjustable contacting members for engaging with the surface to be finished and initially spacing the abrading member from the surface and holding it parallel therewith, said frame being rockable on the contacting members for moving the abrading member against the surface, and a suction nozzle adjustably positioned with respect to the abrading member for carrying away the material that is removed from the surface by the abrading member.

ROBERT G. AMES.