Jan. 28, 1930. L. SCHULTE 1,744,807

GRINDING AND POLISHING APPARATUS

Filed April 26, 1926 2 Sheets-Sheet 1

Fig.1.

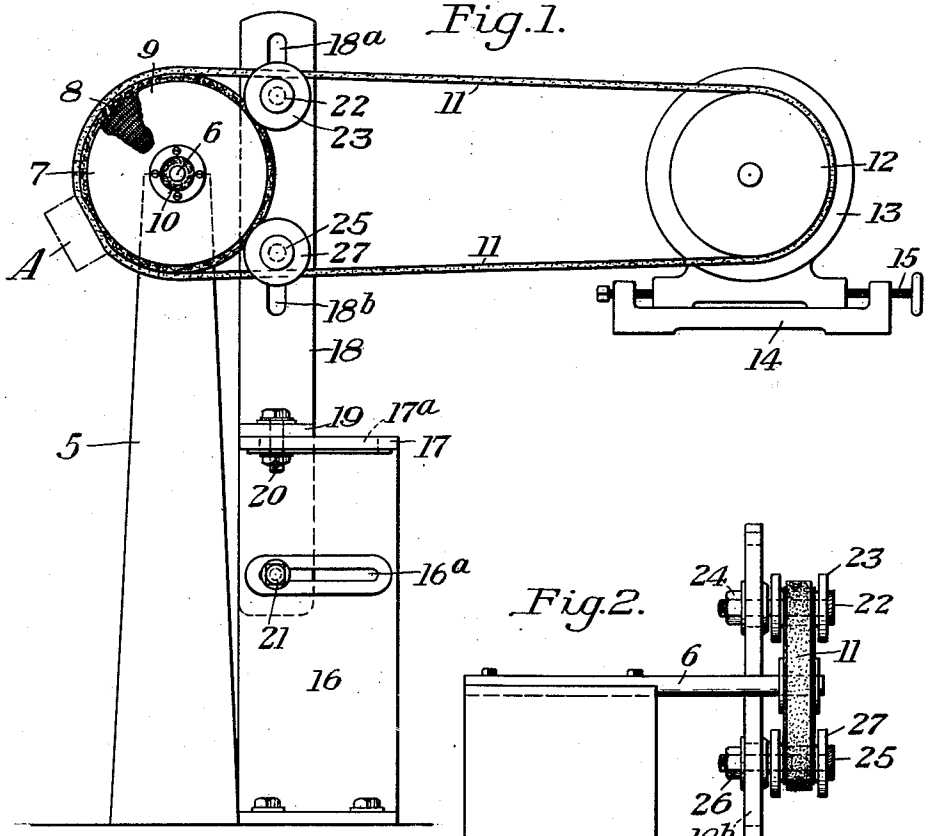
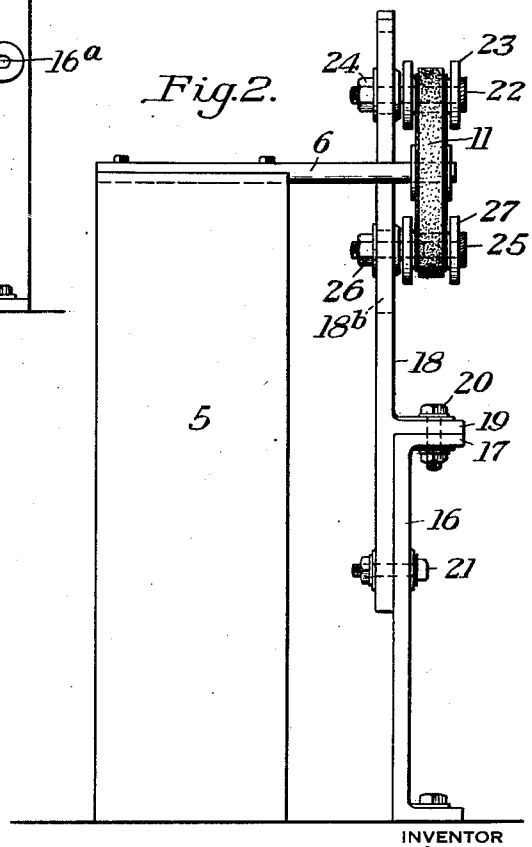


Fig.2.



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Fig.3.

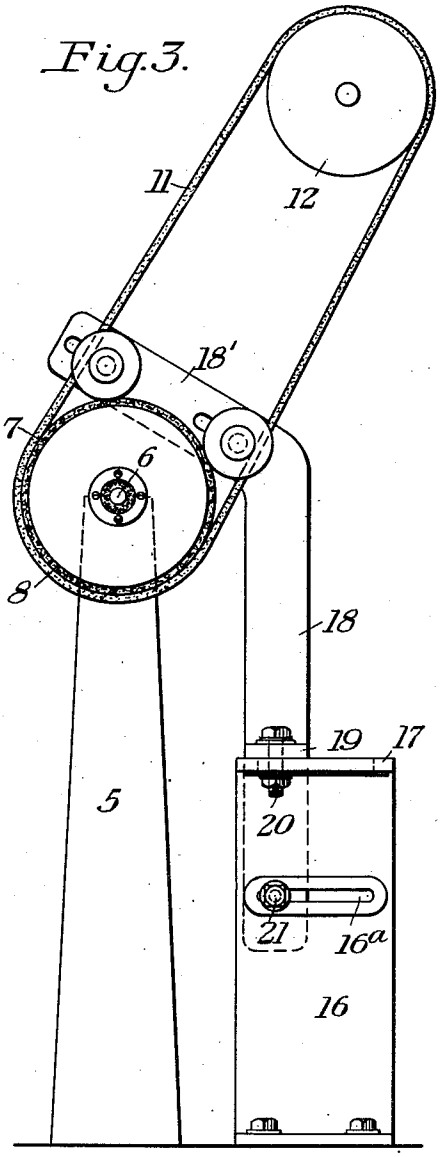
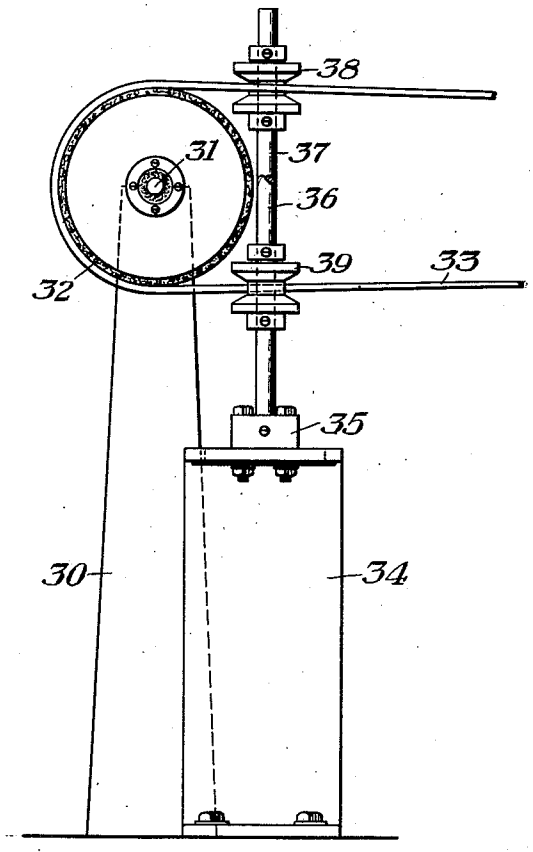


Fig.4.



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UNITED STATES PATENT OFFICE

LOUIS SCHULTE, OF CLEVELAND, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO ALLEGHENY STEEL COMPANY, OF BRACKENRIDGE, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA

GRINDING AND POLISHING APPARATUS

Application filed April 26, 1926. Serial No. 104,570.

The present invention relates to the art of grinding and polishing, and more particularly to an apparatus for grinding and polishing articles of various kinds wherein the grinding or polishing element is in the form of an endless belt passing over two or more pulleys.

Various devices have heretofore been proposed for grinding and polishing wherein the grinding and polishing element is in the form of an endless belt, but one difficulty with such machines has arisen from the fact that when an article to be ground or polished is pressed against the belt traveling at high speed, the belt has a tendency to move to one side or the other of the pulleys over which it is traveling and ride off the pulleys. With such machines it has not, therefore, been practicable to hold the article to be polished or ground against the belt at the point where the belt passes around one of the pulleys. This has been especially true in machines wherein a relatively narrow belt is employed.

Another difficulty arising from machines of this type as heretofore proposed is the fact that the belt is not supported by a proper kind of flexible element at the point where the work is pressed against it. Some machines have been proposed wherein one of the pulleys around which the belt passes has a padded periphery, but such a periphery quickly becomes compacted and uneven and does not yield to the irregularities in the surface of the object being ground or polished.

An important feature of the present invention is the provision of means for guiding the belt immediately adjacent one of the pulleys so that the article to be ground may be pressed against the belt where it passes over the pulley without danger of the belt slipping sideways on the pulley and flying off.

A further important object of the present invention is to provide a pulley of a more or less deformable nature over which the belt passes, this pulley being of a type that does not readily compact and which does not become readily deformed, and which is sufficiently yieldable to give flexibility to the belt at the point of grinding.

Other objects of the invention are to provide a grinding or polishing apparatus which is free running and which eliminates the troublesome vibration so detrimental to the ordinary forms of grinding and polishing wheels, and the provision of means whereby adjustments may be made to accommodate the belt to pulleys of various diameters according to the particular needs of a given machine.

The invention may be readily understood by reference to the accompanying drawings in which Figure 1 represents a side elevation of an apparatus embodying my invention;

Figure 2 is a front elevation of the device shown in Figure 1;

Figure 3 shows a slightly modified form for adaptation to an apparatus where one of the driving pulleys is located overhead;

Figure 4 is a view similar to Figure 1 showing slightly modified form of belt guiding and retaining means.

In the drawings, 5 designates a standard, which may be the usual pedestal or standard of an ordinary grinding or buffing unit. Carried on the top of the pedestal or standard 5 in any suitable way is a shaft 6 which supports one of the pulleys 7. This pulley is in the form of an ordinary buff wheel made up of laminated discs of fabric 8. These discs are preferably stitched together in the usual way and are confined between side plates 9. This laminated fabric structure extends down between the plates 9 to the hub of the wheel. The hub of the wheel preferably has ball-bearings therein so that it may run freely on the shaft 6. The ball-bearing hub is designated 10.

Passing over the pulley 7 is a belt 11. The other end of the belt passes over a pulley 12 of any usual or preferred construction. The pulley 12 is the driving pulley and it may be driven from any suitable source of power, such for instance as a motor 13 adjustably carried on a base 14 and adjustable by the operation of a screw 15 in a manner well understood in the art. The belt 11 may be of any desired construction but is preferably of a fairly flexible nature and may have a coating of abrasive grains applied to the outer surface thereof or may have its surface covered with felt on which there is spread a

polishing composition of any preferred nature.

Fixed to the floor immediately adjacent the pedestal 5 is an upright plate 16 having a horizontal flange 17 thereon. Supported on this plate is an upright 18 having a flange 19 thereon which rests on the flange 17. In the side of the plate 16 is a slot 16^a and in the flange 17 is a similar slot 17^a. A bolt and nut 20 serves to connect the flange 19 to the flange 17 and a bolt 21 with a securing nut serves to secure the lower end of the post 18 to the side of the plate. By reason of the slots 16^a and 17^a the bolts 20 and 21 can be moved along in their respective slots so that the post 18 may be adjusted toward and away from the pedestal 5. In the upper part of the upright or post 18 are two slots 18^a and 18^b. Passing through the slot 18^a is a pin 22 on which is a flanged roller 23. The pin is adjustably secured in position in the slot by means of a nut 24 cooperating therewith. The flanged roller 23 is in the shape of a spool having a central portion over which the belt 11 passes and having end flanges which confine the belt against any substantial sidewise movement. For the purpose of illustration the drawing shows the flanges on the roller 23 as being spaced further away from the belt than they will be in actual practice, as the distance between the flanges on the spool 23 will be just slightly greater than the width of the belt. Passing through the slot 18^b is a pin 25 similar in all respects to pin 22 and having a nut 26 corresponding to nut 24. On the pin 26 is a second flanged roller 27 which is entirely similar to the spool 23. The belt 11 passes under the roller 27.

The arrangement herein disclosed shows a construction which is readily adaptable to buffing stands or grinding units of the present type. In the operation of the apparatus an article to be polished, such as the block A in Figure 1 is pressed against the surface of the belt where it passes over the deformable pulley or buff wheel 7. The laminated fabric of the buff wheel will yield sufficiently to let the belt flatten out, as illustrated, so that the belt will contact with a considerable area of the article instead of having merely a tangential point of contact therewith. The article A can be manipulated against the belt in the same way that an article can be held at different angles against the usual form of grinding or buffing wheels, and the belt will not run off the pulley 7 because such movement will be prevented by the flanged rollers 23 and 27.

By moving the post 18 away from the pedestal 5 and suitably spreading the rollers 23 and 27 the apparatus can be adapted to use with buff wheels of larger diameter than that shown. In this way the machine is adaptable to the use of deformable pulleys of different diameters according to the particular needs of a given unit.

The arrangement shown in Figure 3 is one wherein the belt may operate between two pulleys, one of which is an overhead pulley, such as a line shaft, or a motor suspended from the ceiling or mounted on an elevated bracket. The only difference between the construction shown in this figure and that described in connection with Figures 1 and 2 is that the post 18 has an offset angular extension 18′ thereon and the pins 22 and 25 with their respective guide rollers 23 and 27 are mounted on this angular extension 18′. The apparatus is otherwise the same as that previously described and similar reference characters have been used to designate the corresponding parts.

The modification shown in Figure 4 illustrates a form of apparatus wherein the belt operates between edge rollers at opposite sides thereof instead of between flanged rollers as previously described. In this figure, 30 designates the pedestal, 31 the supporting shaft, 32 the wheel which is similar to the wheel 7, and 33 is the grinding or polishing belt. There is a plate 34 provided at the base of the pedestal which carries an adjustable block 35 on its flanged upper end portion. This block supports a pair of parallel upright posts 36 and 37, one of which is located at each side of the belt. Each post has an upper vertically disposed roller 38 thereon. These rollers preferably being flanged, and these rollers serve to engage the edges of the belt to prevent sidewise movement thereof. Intermediate the ends of the posts 36 and 37 are similarly arranged rollers 39. The operation of the device is the same as that described in connection with Figure 1, the only change being the arrangement of the retaining rollers 38 and 39.

The advantages of the invention reside in the use of a buff wheel or similar deformable pulley for one end of the belt, such wheel being of a nature that it can yield to the extent necessary to conform more or less to the shape of the article being ground and to the irregularities in the surface thereof but which is not of a nature to become permanently distorted. By using laminated discs which extend from the hub of the wheel out to the periphery the desired flexibility is obtained and the wheel is not apt to easily become permanently distorted. The metal discs at each side of the laminated cloth structure merely serve to retain the form of the wheel and give it the necessary rigidity and may be adjusted in clamping relation thereto to vary the flexibility of the wheel made up of laminated cloth disks.

If a greater deformation of the laminated disks is desired, it is only necessary to decrease the diameter of the metal side plates 9.

Further advantage of the invention resides in the provision of the guide rollers to

prevent the belt from traveling sidewise on the pulley 7 and coming off this pulley.

Further advantages of the invention reside in the provision of the adjustments by means of which the machine can be adapted to use with buffing wheels of different diameters and by the provision of a supporting structure for the guide rollers which permits of the use of the invention with standards or pedestals of the type commonly in use at the present time.

The character of the work done by a machine embodying the present invention will be improved because of the fact that the belt can yield to irregularities therein and because the vibration which characterizes the use of ordinary forms of grinding wheels is eliminated.

While I have illustrated certain preferred embodiments of my invention, it will be understood that various changes and modifications may be made within the spirit of and contemplation of my invention.

I claim:

1. A grinding or polishing apparatus including a belt, a pair of pulleys around which the belt passes, one of the pulleys being formed of laminated flexible disks.

2. In a grinding or polishing apparatus, an endless belt, spaced pulleys around which said belt passes one of said pulleys being a driving pulley and the other being formed of laminated flexible disks.

3. In a grinding or polishing apparatus, an endless flexible belt, a pair of spaced pulleys around which said belt passes, one of said pulleys being formed of laminated flexible disks and side retaining members the other of said pulleys being adjustable toward and away from the pulley formed of laminated disks.

4. In a grinding or polishing apparatus, an endless flexible grinding or polishing belt, a pair of spaced pulleys around which said belt passes one of said pulleys being a driving pulley and the other being formed of laminated flexible disks, means for adjusting the driving pulley toward and away from the other pulley and means for preventing the belt from moving sidewise off the laminated pulley.

5. In a grinding or polishing apparatus, an endless flexible grinding or polishing belt, a pair of spaced pulleys around which said belt passes one of said pulleys being a driving pulley and the other being formed of laminated flexible disks, means for adjusting the driving pulley toward and away from the other pulley and flanged guide rollers adjacent the laminated pulley for preventing the belt from moving sidewise off said pulley.

6. In a grinding or polishing apparatus, an endless flexible grinding or polishing belt, two spaced pulleys over which said belt passes, one of said pulleys being a driving pulley and the other being a backing pulley against which the polishing or grinding takes place, said backing pulley being formed of laminated flexible fabric disks held in place between retaining plates and means for holding the belt in position on the backing pulley.

In testimony whereof I have hereunto set my hand.

LOUIS SCHULTE.