

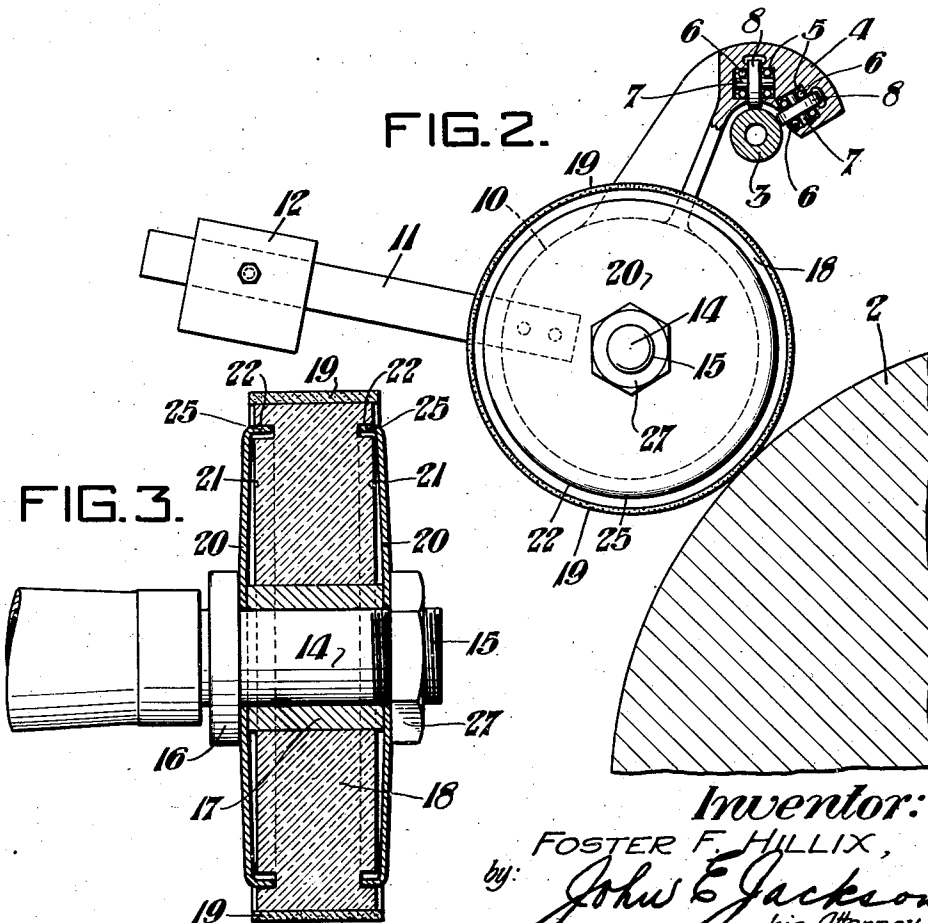
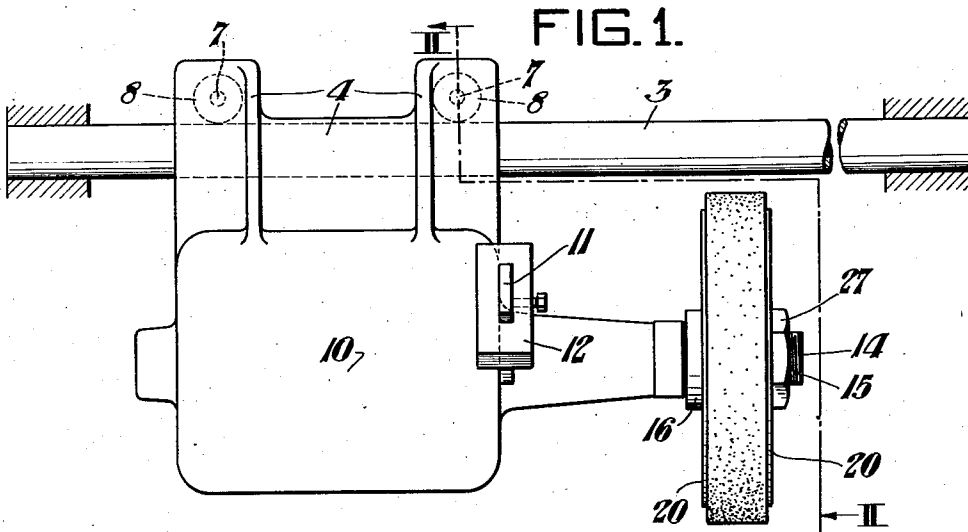
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ABRADING WHEEL

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ABRADING WHEEL

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1 Claim. (Cl. 51—191)

This invention relates to abrading wheels such as are used to grind or polish a great variety of materials.

At the present time, a great many grinding or polishing operations are carried out by the use of a rotary tool in the form of a wheel which is secured to the driving-shaft of a stationary or portable electric motor. These rotary tools or wheels are provided on their peripheries with suitable working surfaces, such as, for example, a strip of sand paper or the like.

One form of rotary tool or abrading wheel which is quite popular is composed of rubber and used in combination with a peripherally disposed endless band carrying abrasive. The endless band carrying the abrasive is made to fit the periphery of the abrading wheel when the latter is uncompressed and at rest, and is held thereto by compressing the wheel axially to hold the abrasive band firmly in place due to radial expansion of the rubber body which comes about because of the compression. Such a wheel, when rotated, would be caused to expand still further in a radial direction by centrifugal force, which force was unrestrained, uncontrolled, and often resulted in the wheel's departing from true circular shape, and this, in turn, often caused the abrasive band to "chatter" against the surface of the work-piece. This, in turn, would result in uneven abrasions.

In order to change the abrasive on wheels of this type, it has heretofore always been necessary to unfasten or detach some of the elemental parts of the wheel in order to release the compression under which the body of the wheel is maintained to hold the band in place. This required the expenditure of a considerable amount of time and labor in changing the bands to maintain the wheels in the proper cutting condition.

It is among the objects of the present invention to provide a wheel of the class described having an abrasive band in association therewith that may be removed and replaced without undoing any fittings or fastenings and without the necessity of performing any special operation whatsoever.

It is another object to provide a rotary abrading wheel in which centrifugal distortion has been minimized to the point of being inappreciable, and the tendency for the wheel to chatter on the work's surface has, accordingly, been obviated.

It is another object to provide a wheel with a changeable abrasive band, which is adapted to be held to the wheel during the rotation of the latter solely by centrifugal force acting to expand

the wheel, and adapted to be removed therefrom when the wheel is at rest.

It is another object to provide a device of the class described which may be easily and cheaply manufactured and mounted on driving equipment of conventional or special design.

The foregoing and other objects will be apparent after referring to the drawing in which:

Figure 1 is an elevation of a portable electric motor mounted for reciprocatory movement, and provided on its driving-shaft with a rotary abrading wheel made in accordance with the teachings of the present invention;

Figure 2 is a view on the line II—II of Figure 1; and,

Figure 3 is an enlarged sectional view of the device of the invention.

Referring more particularly to the drawing, the numeral 2 designates a work-piece to be ground or polished and is shown in the form of a cylinder, such as a roll of a rolling mill. The work-piece 2 is mounted on suitable supports (not shown) which enable its ready rotation. Immediately adjacent the work-piece 2 is mounted a co-axially extensive rod 3 which serves as a support for a motor hanger 4. This motor hanger 4 is provided with a pair of recesses 5 in each of which there is disposed a pair of co-axially aligned anti-friction bearings 6. Each pair of co-axially aligned anti-friction bearings 6 is adapted to support a freely rotatable shaft 7 upon which there is carried a roller 8. As will be clearly seen in Figure 2, these rollers 8 are adapted to rest on the rod 3 and rotate axially thereover, whereby the motor hanger 4 may be readily reciprocated.

In addition, it will also be noted that the rollers 8 are disposed at angles of approximately 60 degrees with respect to each other, which enables them to carry an evenly distributed load.

Referring to Figures 1 and 2, the motor hanger 4 carries a suitable electric motor 10 which is provided with a radially projecting lever 11 to which there is adjustably secured a counterweight 12. The driving-shaft of the electric motor 10, designated at 14, is shown as provided with a threaded extremity 15 together with a collar 16 which is inwardly spaced with respect thereto.

According to the teachings of the present invention, the rotary abrading wheel comprises a circular body portion 18 composed of rubber or the like, each of the side faces of which is provided with a continuous annular recess 22 adjacent the periphery thereof. A circular flange

plate 20 is concentrically arranged with respect to the driving shaft 14 of the electric motor 10 so as to overlie each of the side faces 21 of the circular body portion 18. Each flange plate 20 is slightly conical or concavo-convex in form with its base terminating in a peripheral flange which is adapted to register with the continuous annular recess 22 in the body portion 18.

The circular body portion 18 of the wheel is mounted on the driving shaft 14 of the electric motor 10 by means of a bushing 17 which is affixed to the shaft for rotation therewith. This bushing 17 is, in length, an amount greater than the thickness of the body portion 18 so that when the flange plates 20 are tightened, as will hereinafter be described, to assume their positions most proximate to the body portion 18, they will be brought into engagement with the bushing 17, which will serve to maintain a clearance between the flanges and the body portion so that the former may not bind nor compress the latter.

It will be seen that the body portion 18, and its accompanying flange plates 20, are held to the shaft 14 by means of a nut 27 which is adapted to be screwed upon the end of the shaft threaded for that purpose. The nut is opposed by a shoulder 16 remote from the end of the shaft against which the body portion and adjacent flange plate is pushed by the tightening of the nut 27. Such tightening action is effective in springing the flange plates 20 inwardly toward each other from their normally conical, or outwardly convex, shape, to a flatter, disc-like shape, wherein they are caused to bear against the bushing 17. This flattening of the flange plates effects a slight diametric increase therein, which pushes the peripheral flanges 25 on each against the outermost wall of its respective annular recess 22. This is effective in locking the body portion 18 of the wheel securely to the shaft 14, and, also, provides slight clearance between the inner faces of the peripheral flanges 25, and the inner walls of the annular recesses 22, so that, upon being rotated, the centrifugal force at work on the body portion 18 is free to expand the latter outwardly in a direction radially of the wheel an amount corresponding to the clearance between the peripheral flanges and the inner walls of the recess. Nevertheless, such centrifugal expansion is controlled and limited by the flanges 25, and, since these are truly circular, the body of the wheel is retained in a truly circular shape.

An endless band 19, of abrasive material, is arranged to slip over the peripheries of body portion 18 of the wheel when the latter is at rest. Upon being rotated, the band is held securely to the wheel by the slight centrifugal expansion thereof rendered possible by the clearance between the peripheral flanges 25 and the

inner walls of the recess 22. To renew the abrasive band, it is but necessary to stop the rotation of the wheel, which, due to its elasticity, tends to contract so that all the clearance of the annular recess 22 is on the inside of the flange 25. This shrinkage of the body portion 18 permits of slipping a band off and on the wheel as may be desirable to get a different grade of face, or a sharper free-cutting band. In the past, bands have been held in the periphery of elastic abrasive wheels by the expansion of the latter attendant upon compressing them between opposed plates. To renew the band it was necessary to relieve the compression and thus effect the shrinkage of the wheel, which could be done only by loosening set screws, nuts or the like. This consumed much time and labor, particularly where change of bands was necessary frequently throughout any one cutting operation. In the present case, as soon as the wheel is stopped, the band may be changed without unfastening or undoing any devices, and yet a band is securely held during the rotation of the wheel at all times. Similarly, though centrifugal force is employed to hold the band in place, it will be observed that such centrifugal force is always controlled to maintain the wheel in true circular position, and thus to obviate lopsidedness and its attendant disadvantages of chattering, etc.

While I have shown and described one specific embodiment of the present invention, it will be seen that I do not wish to be limited exactly thereto, since various modifications may be made without departing from the scope of the invention as defined by the following claim.

I claim:

An abrading wheel comprising a shaft bushing; a radially expansible and contractible annular body concentrically disposed about and secured to said bushing; abrasive carried on the periphery of said annular body; the side faces of said annular body having like concentric annular grooves adjacent the periphery thereof; a pair of substantially rigid circular side plates provided adjacent their peripheries with annular flanges; one of said side plates being arranged upon one side of said annular body with its annular flange disposed in the groove therein, and the other of said side plates being arranged upon the other side of said annular body in a corresponding manner; the greatest diameter of said annular grooves being approximately equal to the greatest diameter of the annular flanges of said side plates; the least diameter of said annular grooves being less than the least diameter of the annular flanges of said side plates to provide for radial expansion of said annular body, whereby the periphery of said annular body is at all times maintained truly circular.

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