May 3, 1938. A. W. MALL 2,116,272

ABRASIVE WHEEL

Filed Oct. 26, 1936

Fig. 1

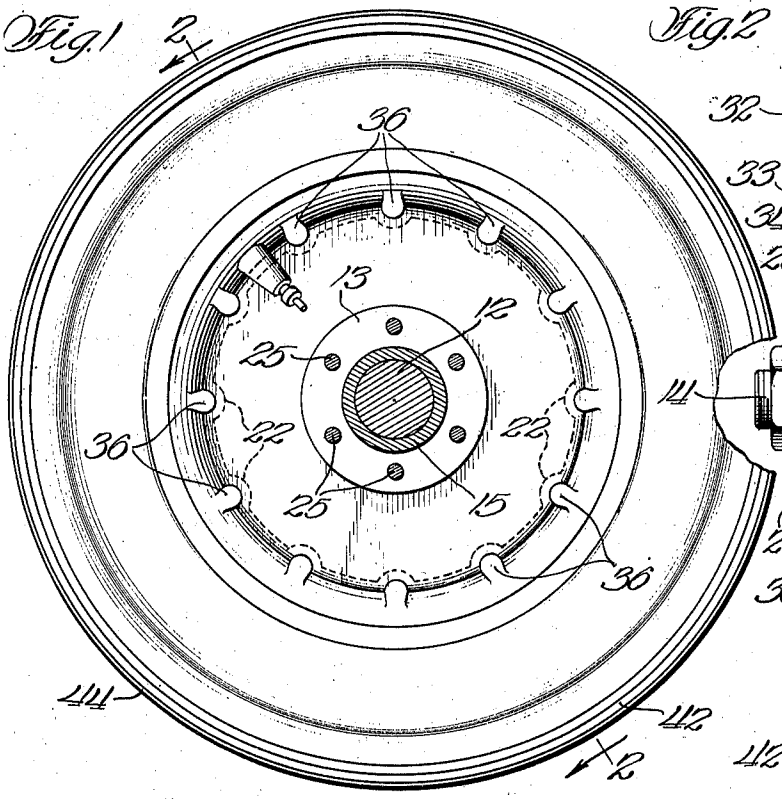


Fig. 2

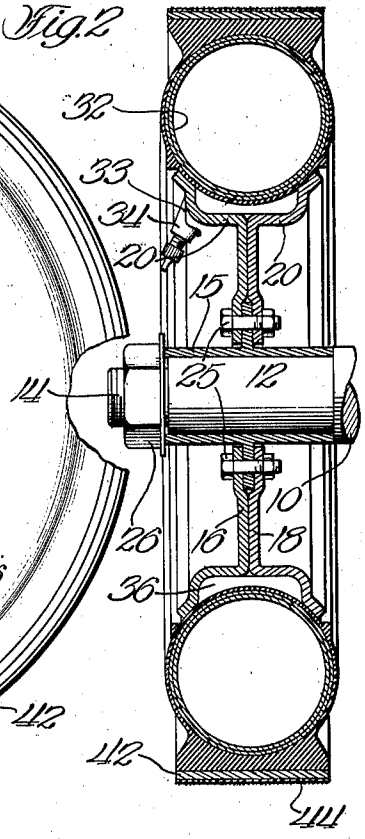


Fig. 3

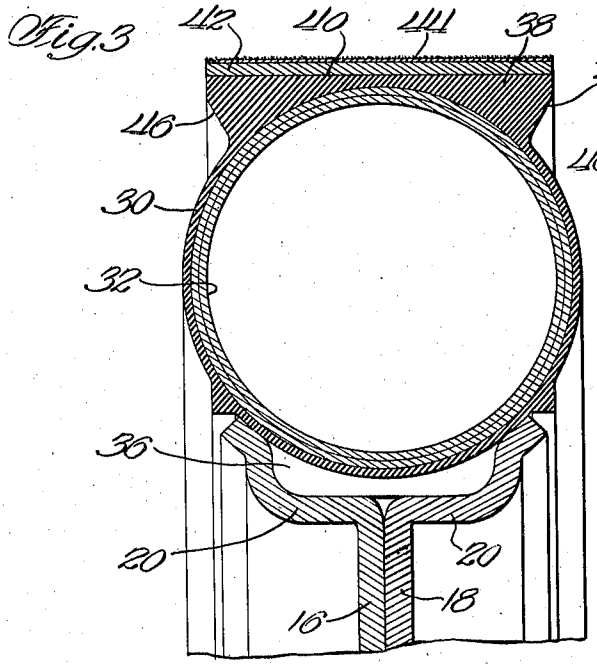
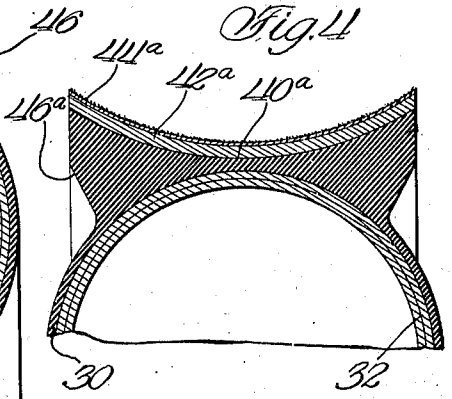


Fig. 4



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ABRASIVE WHEEL

Arthur William Mall, Chicago, Ill.

Application October 26, 1936, Serial No. 107,612

4 Claims. (Cl. 51—192)

My invention relates to improvements in abrasive wheels, sanding drums and like devices.

My invention relates more particularly to improvements in devices of the type mentioned whereby more effective polishing and sanding may be done, particularly on objects which are of irregular configuration.

In the past, drum sanders, buffers and polishing devices have been provided with a somewhat flexible grinding or polishing surface. These have usually been provided with a flattened rubber bag or core capable of receiving a small amount of air to inflate the same slightly and thus provide some degree of flexibility to the sanding, buffing or polishing surface.

The principal object of my invention is to provide an improved sanding, buffing or polishing drum having a pneumatic backing or mounting for the abrasive band so that the same is capable of flexing during use.

A further object of my invention is to provide an improved pneumatic backing for an abrasive drum in the form of a cylindrical tire member. With a backing of this type, the drum is not distorted by centrifugal motion and in fact has a tendency to revolve more smoothly than any of the devices of the prior art.

A further object is to provide an improved pneumatic backing member capable of easy inflation or deflation and also capable of easy removal or assembly on a driving spindle.

A further object is to provide an improved abrasive wheel construction whereby all of the parts are capable of being easily dissembled by simply permitting the air to escape from the backing member and easily assembled by placing all of the parts in their proper position and then inflating said backing member.

A further object is to provide an improved pneumatic backing in the form of a cylindrical tire member having a surface configuration of any desired shape.

Other objects and advantages will be more apparent from the following description wherein reference is had to the accompanying sheet of drawings upon which:

Fig. 1 is a front elevational view of my improved abrasive wheel with the front tire support removed and the shaft and hub shown in section;

Fig. 2 is a vertical section view taken generally on the lines 2—2 of Fig. 1;

Fig. 3 is a fragmentary sectional view on an enlarged scale; and

Fig. 4 is a similar fragmentary view of a modified form of my improved device.

In the embodiment of my invention which I have chosen to illustrate, I provide a driven shaft 10 having a reduced portion 12 and a screw-threaded portion 14. A hub member 15 is mounted on the reduced portion 12 of the drive shaft 10 and held in place by the nut 26. This member has a peripheral flange 13 formed thereon to provide means for fastening the mounting plates 16 and 18. The mounting plates 16 and 18 are generally similar to disc wheel members and are provided with a cylindrical band portion 20 formed with a plurality of transverse, radially spaced arcuate grooves 22. The backing plates have offset portions 24 capable of being positioned over the flange 13 of the hub portion and adapted to be held in place as shown by a plurality of bolt members 25. The backing plates are adapted to engage and confine between the band portions 20 thereof, a pneumatic tire member 30. The tire member may be of the usual fabric, cord and rubber construction and may contain an inner cylindrical chamber 32 capable of inflation or deflation. An air valve 34 communicating with chamber 32, passes through an opening 33 in plate 16 and provides for connection with a suitable bicycle pump or other means for inflating the same.

The tire member is formed with a plurality of transverse and radially spaced semi-cylindrical ridge portions 36 complementary to and adapted to engage in the grooves 22 of the backing plates. In this manner the tire is securely mounted on the backing plates and will revolve with the same.

The tire is built up as shown at 38 to provide a flat cylindrical wall portion 40 upon which an abrasive band is adapted to be mounted. In the usual construction I provide a canvas backing strip 42 which is adapted to be sized with glue and emery and then have a comparatively thin abrasive band 44 mounted thereon. It will be noted that the flat peripheral surface 40 is amply supported from edge to edge, the tire being built up as shown at 46 to provide rigid support adjacent the edges.

To assemble the abrasive wheel upon the shaft 10 it is only necessary to mount the tire member as described between the backing plates 16 and 18, place the backing strip and adhesive band upon the cylindrical surface 40, and inflate the tire with the desired number of pounds of air. After this has been done and the nut member 26 mounted upon the threaded portion

14 of the shaft, the abrasive wheel is assembled and is ready for use.

From the foregoing description it can be seen that a comparatively simple abrasive wheel has been provided, one that will be extremely effective in polishing or sanding objects with irregular configurations. The grinding surface may be rendered as flexible as desired, depending entirely upon the amount of air pressure provided in the tire member.

The removal or replacement of abrasive bands is rendered exceedingly simple, due to the fact that the air may be permitted to escape from the tire member, whereby the same can be flexed as desired to effect the removal and replacement of new abrasive bands.

In Fig. 4 I have illustrated a modified form of my invention, wherein I provide a concave exterior surface 40*a* to the tire member 30. In this construction I also provide a concavely shaped backing member 42*a* and a similar abrasive band 44*a*, adhesively secured to the face of the backing. Due to the built-up portions 46*a*, the abrasive wheel rigidly retains the shape shown when driven at high speed. This is due to the fact that the cylindrical chamber is charged with air under pressure and this chamber supports the working surface.

From the foregoing it will be obvious that any desired face configuration may be rigidly supported by a tire member of the kind I provide. I contemplate that convex, arcuate, irregular or sharp cornered surfaces of any kind may be provided, depending entirely upon the purpose for which the wheel is employed.

While I have illustrated and described a preferred embodiment of my invention, and a modification thereof, it will be apparent to those skilled in the art that changes and modifications may be made in the exact details shown, and I do not wish to be limited in any particular; rather what I desire to secure and protect by Letters Patent of the United States is:

1. An abrasive wheel of the class described, comprising a shaft, a pair of similarly shaped mounting plates secured together and on said shaft, each of said plates having a disc portion and a right angle flange portion, a plurality of transverse, radially disposed grooves in said flange portions and a pneumatic tire mounted on the flange portions of said plates, said tire having its inner periphery formed with transverse radially disposed lug portions complementary to and engaging in the grooves in said flange portions.

2. An abrasive wheel of the class described, comprising a shaft, a pair of similarly shaped mounting plates secured together and on said shaft, each of said plates having a disc portion and a right angle flange portion, a plurality of transverse, radially disposed grooves in said flange portions and a pneumatic tire mounted on the flange portions of said plates, said tire having its inner periphery formed with transverse radially disposed lug portions complementary to and engaging in the grooves in said flange portions, said tire having a flat cylindrical surface on the outer edge thereof, a backing member in the form of a ring mounted thereon, and an abrasive band held to said backing member.

3. An abrasive wheel of the class described, comprising a shaft, a pair of similarly shaped mounting plates secured together and on said shaft, each of said plates having a disc portion and a right angle flange portion, a plurality of transverse, radially disposed grooves in said flange portions and a pneumatic tire mounted on the flange portions of said plates, said tire having its inner periphery formed with transverse radially disposed lug portions complementary to and engaging in the grooves in said flange portions, said tire having a flat cylindrical surface on the outer edge thereof, a backing member in the form of a ring mounted thereon, an abrasive band held to said backing member, and an air valve associated with said pneumatic tire.

4. An abrasive wheel of the class described, comprising a shaft, a pair of similarly shaped mounting plates secured together and on said shaft, each of said plates having a disc portion and a right angle flange portion, a plurality of transverse, radially disposed grooves in said flange portions and a pneumatic tire mounted on the flange portions of said plates, said tire having its inner periphery formed with transverse radially disposed lug portions complementary to and engaging in the grooves in said flange portions, said tire having a flat cylindrical surface on the peripheral edge thereof, a backing member in the form of a flexible ring mounted on said surface and an abrasive band held to the exterior of said backing member.

ARTHUR WILLIAM MALL.