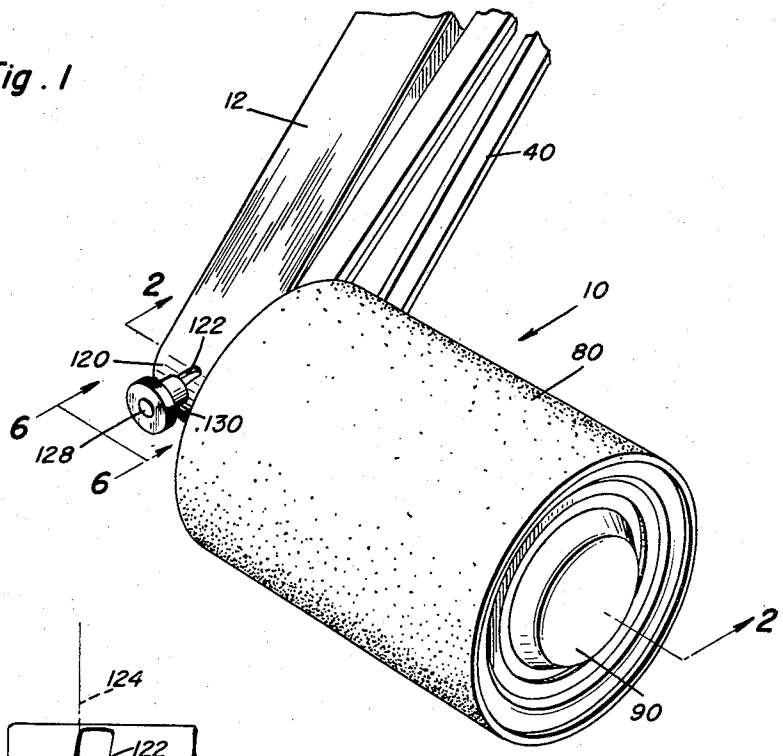
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EXPANDABLE SANDING DRUM

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Fig. 1



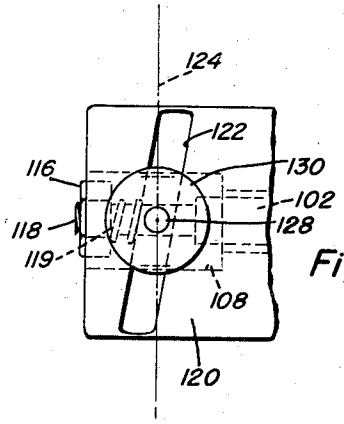


Fig. 6

Fig. 4

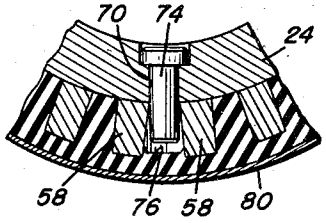
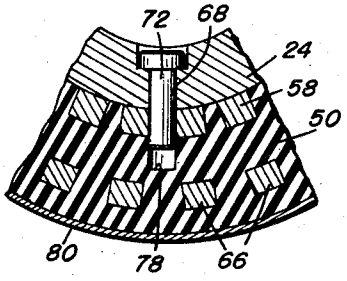


Fig. 5



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Fig. 2

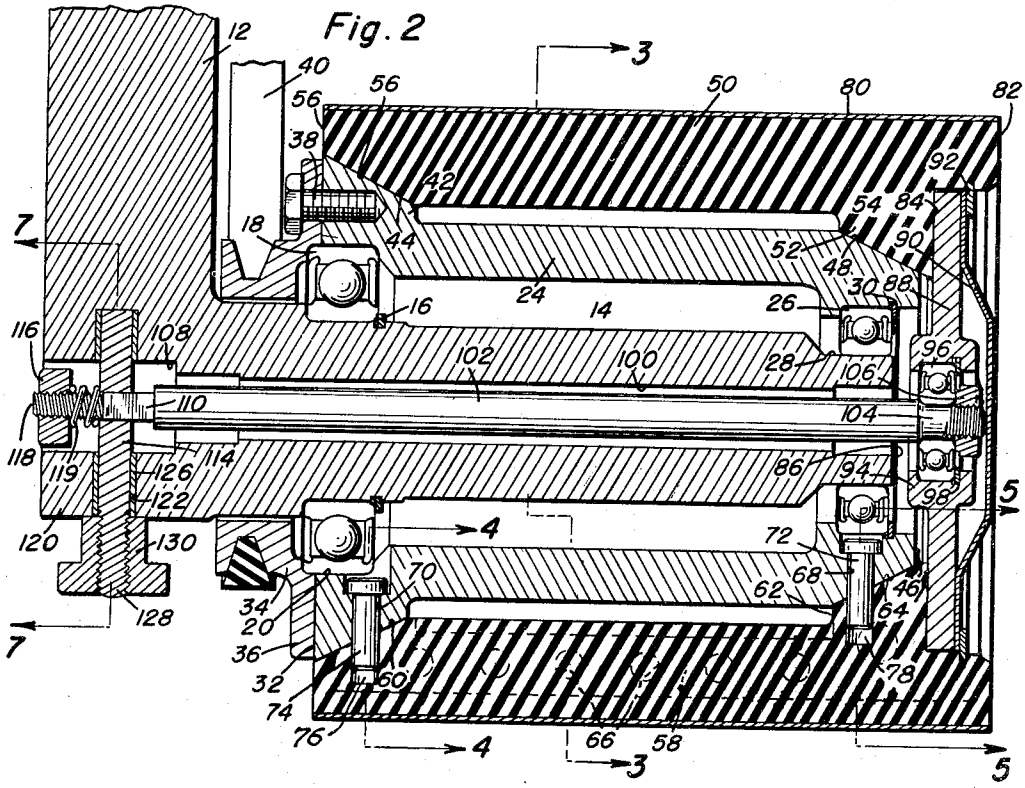
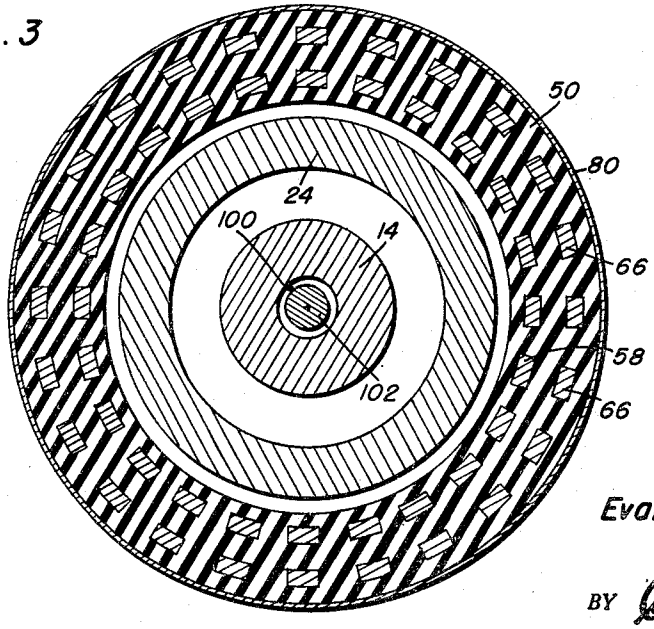


Fig. 3



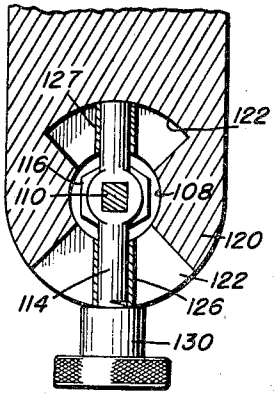


Fig. 7

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2,770,926

EXPANDABLE SANDING DRUM

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Application December 19, 1955, Serial No. 553,907

5 Claims. (Cl. 51—190)

This invention relates generally to abrading machines and is more particularly concerned with an expandable drum or cylinder providing for the ready removal and installation of abrading cylinders.

A primary object of this invention is to provide a power driven rotary hub journaled on a support spindle wherein said hub reciprocably supports an expansible cylinder upon which an abrading cylinder is retained, said hub and cylinder including complementary camming surfaces for expanding and contracting said cylinder in response to longitudinal movement of a force transmitting rod operatively connected to a pressure plate secured to the cylinder at one end and operatively connected to cam means at the other end wherein said cam means is carried on said spindle.

A further object of the invention in conformance with that set forth above is to provide a plurality of radially disposed reinforcing plate elements extending longitudinally through said cylinder wherein said plate elements include camming surfaces in engagement with complementary cam portions of the hub, and further including means for preventing relative rotary movement between the hub and said cylinder.

A further object of the invention in conformance with that set forth above is to provide an expandable abrading drum assembly of the character set forth which is readily and economically manufactured, easily used and maintained, and highly utilitarian for the purpose intended.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

Figure 1 is a perspective view of the novel expansible abrading drum;

Figure 2 is a sectional view taken substantially on the line 2—2 of Figure 1;

Figure 3 is a sectional view taken substantially on the line 3—3 of Figure 2;

Figures 4 and 5 are fragmentary sectional views taken substantially on the lines 4—4 and 5—5, respectively, of Figure 2;

Figure 6 is a fragmentary elevational view looking in the direction indicated by lines 6—6 of Figure 1; and

Figure 7 is a sectional view taken on the line 7—7 of Figure 2.

The novel expansible abrading drum assembly is indicated generally at 10 and includes a support member 12 terminating in a transverse or right angularly related support spindle 14.

The spindle 14 has suitably secured thereon by means of a lock ring element 16 a first bearing race 18 which is in engagement with a suitably conformed end portion 20 of a rotary support hub 24, said hub 24 including at its other end a second bearing race 26 suitably disposed upon

a reduced diameter portion 28 of the spindle 14, said bearing race 26 being retained in position by means of a suitable lock ring 30 secured in said hub.

The hub 24 has secured on the end portion 32 thereof a drive pulley member 34 which includes an annular flange portion 36 suitably apertured to align with apertured portions extending into the hub 24 for receiving therein suitable retaining screws 38 (only one being shown) whereupon a drive belt 40 journaled over the pulley member 34 will cause rotation of the hub 24 for a purpose to subsequently become apparent.

Adjacent the end 32 of the hub 24 is an annular flange element 42 which includes a peripherally tapered or camming surface 44 sloping toward the opposite end 46 of the hub 24. The hub 24 includes adjacent the end 46 thereof an annular tapered surface portion 48 which slopes toward the longitudinal axis of the hub in the same degree as the slope of the annular flange 42.

Circumposed on the hub 24 is a resilient or expansible cylinder member 50, of any suitable material, said cylinder member incorporating about the inner periphery thereof an annular extending flange portion 52 which has a complementary camming surface 54 conforming to the tapered surface 48 of the hub, and includes adjacent the end 56 thereof a conical or tapered annular recess 56 which conforms to the tapered surface 44 of the flange 42 of the hub, and thus longitudinal movement of the cylinder 50 relative to the hub 24 of the spindle 14 upon which the hub is journaled, will result in expansion or contraction of the cylinder 50.

The cylinder 50 includes therein a plurality of circumferentially disposed radially extending reinforcing plates 58 which include a tapered end portion 60 conforming to the tapered annular recess 56 of the cylinder 50, the plates also including laterally projecting lug portions 62 having a tapered end portion 64 conforming to the taper 54 of the cylinder. The plates 58 include a plurality of transverse apertures or hole portions 66 and are molded integrally with the cylinder 50 whereby the plates provide substantial rigidity to the cylinder 50 and yet permit expansion radially thereof.

As seen in Figures 2, 4 and 5 the hub 24 has extending laterally therefrom in suitable apertured portions 68 and 70, guide elements or pins 72 and 74, respectively, which extend between an adjacent pair of the plate elements 58, the cylinder 50 having formed therein longitudinally extending slots 76 and 78 in alignment with the pins 72 and 74, respectively, the pins 72 and 74 permitting relative reciprocating movement of the cylinder 50 with respect to the hub 24 but preventing relative rotary movement therebetween. Thus rotation of the hub 24 results in rotary movement of the cylinder 50 with said hub.

The cylinder 50 accommodates thereon a removable abrading cylinder 80 which may be of sandpaper or any other suitable material of sufficient strength and having predetermined abrading qualities, the expansion of the cylinder 50 resulting in retaining the abrading cylinder 80 thereon and the contraction of said cylinder permitting the ready removal of the cylinder 80 so that when it is worn it can be replaced.

The cylinder 50 includes adjacent its end portion 82 an annular abutment surface 84 which is disposed in longitudinal spaced relationship from the end 46 of the hub, and the end 86 of the spindle, said abutment shoulder having secured thereon a pressure plate 88, and a juxtaposed cover plate 90, the plate 88 and the cover plate 90 being secured to the cylinder 50 by means of a suitable lock ring 92. The pressure plate 88 includes an enlarged hub portion 94 in which is mounted a suitable third bearing race assembly 96, said assembly being retained therein by means of a suitable lock ring 98.

The spindle 14 incorporates a longitudinally extending

bore portion **100** through which extends a support and force transmitting shaft **102**, said shaft **102** having a reduced diameter end portion **104** extending through the bearing race **96** and being threaded at the end portion for accommodating thereon a retaining nut **106**. Thus the pressure plate **88** is rotatable on the bearing race **96**, and the pressure plate **88** is rotatable with the cylinder **50**.

The bore portion **100** of the spindle **14** terminates in an increased diameter portion **108** into which the reduced diameter end **110** of the rod **102** extends, said rod having secured thereon a lever element **114**, the reduced diameter end **110** being square, for example, to prevent relative rotation between the lever **114** and the portion **110**. The lever is retained on the rod **102** by means of a securing nut element **116** screwed on the threaded end **118** of the rod **102**, together with compression spring **119** interposed between nut **116** and lever **114**. This spring applies an axial force on shaft **102** to pull the shaft axially enough to take up slack in case the abrasive sleeve should stretch while in use, thereby preventing slipping on the drum.

The spindle portion **120** includes therein a diagonally disposed cam slot **122** which communicates with the chamber **108** of said spindle, said cam slot being disposed in an angular relationship to a transverse plane through said spindle.

The transverse plane is indicated at **124** in Figure 6 so that an equal amount of the cam slot **122** is disposed on opposite sides of said transverse plane. The lever element **114** extends into both parts of the cam slot **122** (Fig. 7) and has circumposed thereon rollers **126** and **127** for permitting ready rotation of the lever **114**, and rotary movement of the lever element **114** with respect to the cam slot **122** in the spindle portion **120** results in reciprocating movement of the force transmitting rod **102** thus applying or diminishing the pressure on the plate **88** for urging the cylinder into an expanding or contracting relationship relative to the hub **24**.

The member **114** includes on the threaded end portion **128** extending out of the spindle a securing nut element **130** which may be suitably knurled, said nut serving to retain the rod **102** in various positions of adjustment for increasing or decreasing the pressure applied on the plate **88** which controls the expansion and contraction of the previously mentioned expansible cylinder **50**.

Various positional directional terms such as "front," "rear," etc. are utilized here and have only a relative connotation to aid in describing the device and are not intended to require any particular orientation with respect to any external elements.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. In an abrading machine, a support spindle, a cylindrical hub journaled on said spindle, an annular flange extending around one end portion of the hub and including a peripheral tapered surface portion converging toward the opposite end of said hub, the opposite end of said hub including an annular tapered portion having the same degree of slope as the surface portion of the annular flange, a resilient cylinder circumposed about said hub, said cylinder including annular tapered portions extending around the inner periphery thereof, said tapered portions of the cylinder being complementary to those of the hub whereby relative longitudinal reciprocating movement of the cylinder toward the flange of the hub results in expansion thereof and movement in an opposite direction results in contraction of said cylinder, retaining means extending between said hub and cylinder permitting relative longitudinal movement therebetween and preventing relative rotary movement, a removable abrading sleeve circumposed about said cylinder, a pressure plate secured in transverse relationship across one end of the cylinder in spaced relation from the spindle and hub ends, the spindle including a longitudinal bore portion, a force transmitting support rod extending through the longitudinal bore portion of said spindle, one end of said rod being journaled to said pressure plate, cam means carried on said spindle in engagement with the other end of said rod for moving said rod and pressure plate longitudinally relative to the hub and spindle, and drive means secured to the hub for rotating the hub about said spindle and rod.

2. In an abrading machine as set forth in claim 1 wherein said resilient cylinder includes a plurality of radially disposed longitudinally extending plate elements molded in the cylinder, said plate elements including opposite end portions conforming to the annular taper about the inner periphery of said cylinder and engageable upon the complementary tapered portions of said hub, the retaining means extending between the hub and cylinder comprising a pair of longitudinally disposed laterally extending pin elements extending from the surface portion of said hub between a slot between defined by adjacent pairs of the plate elements.

3. In an abrading machine as set forth in claim 1 wherein said cam means comprises a cam slot portion extending through the spindle in concentric relationship to the other end of the support rod, said cam slot portion being equidistantly disposed in annular relationship redlative to a transverse plane passing through said spindle whereby opposite ends of said slot extend toward and away from the end of the rod upon which the pressure plate is journaled, a transverse lever element extending through the cam slot portion in fixed engagement with the force transmitting rod, and clamp means secured on the other end of said lever element for engagement on the outer surface of said spindle.

4. In an abrading machine, a power driven rotary hub journaled on a longitudinally bored support spindle, an expansible cylinder circumposed on said rotary hub, the hub and cylinder respectively including complementary tapered peripheral surface portions whereby relative reciprocable movement therebetween results in expansion and contraction of said cylinder, a pressure plate secured to one end of said cylinder, a force transmitting rod secured at one end to said plate, and cam means secured on said spindle in engagement with the other end of said rod for rotating the rod and reciprocating the same relative to the spindle.

5. In an abrading machine as set forth in claim 4 wherein said cylinder includes a plurality of radially disposed reinforcing plate elements extending about the circumference thereof, said plate elements including tapered end portions conforming to the complementary tapered peripheral surface portion of said cylinder, and retaining means extending between the hub and said cylinder for permitting relative longitudinal movement between said cylinder and hub and preventing relative rotary movement therebetween.

No references cited.