Dec. 19, 1944. R. A. FONTAINE 2,365,462

ROTARY ABRADER

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Fig. 1.

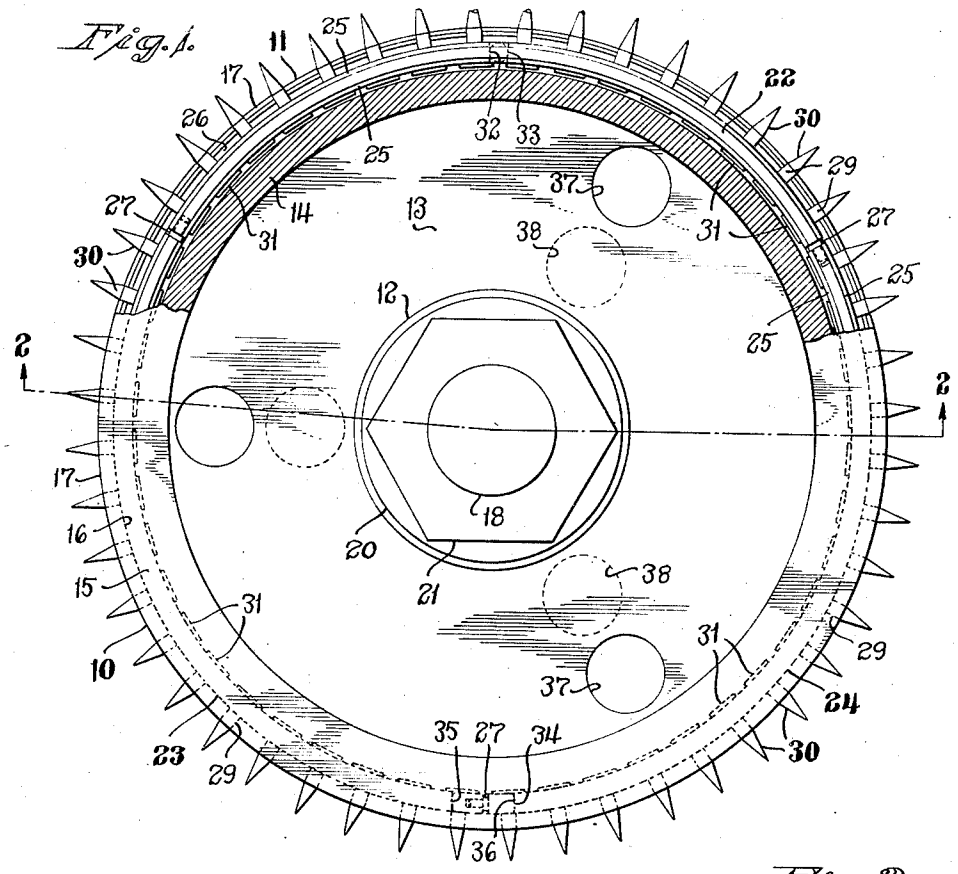
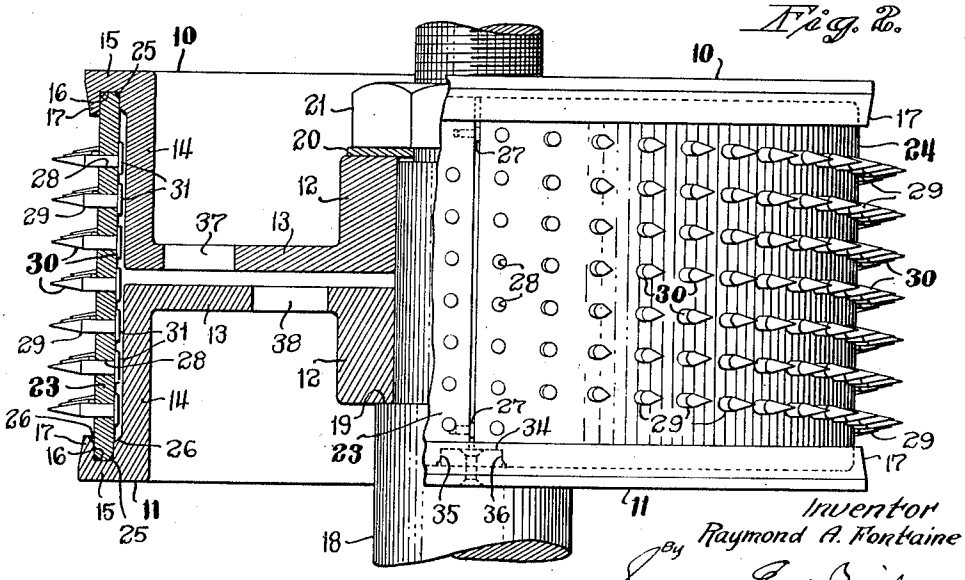


Fig. 2.



Inventor
Raymond A. Fontaine
By Seymour Earle Nichols
Attorneys

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Fig. 3.

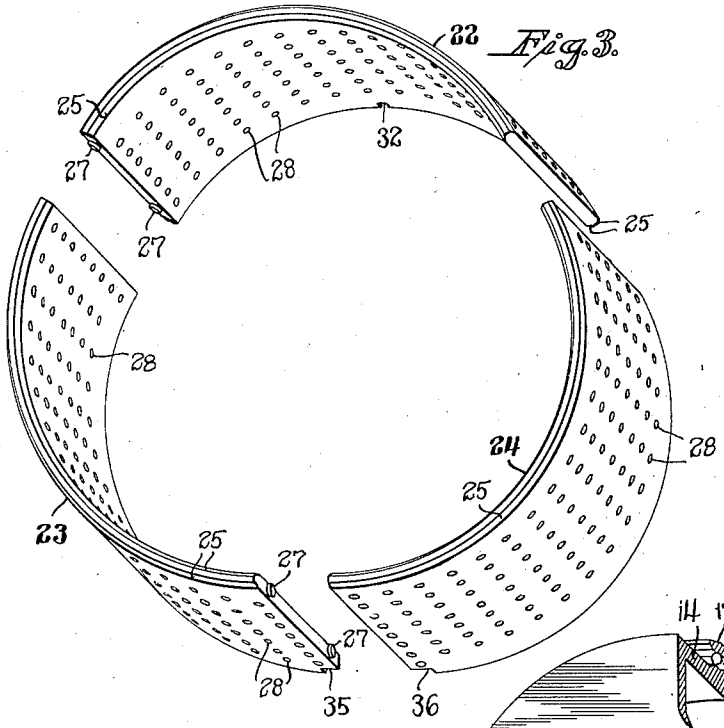


Fig. 6.

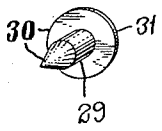


Fig. 4.

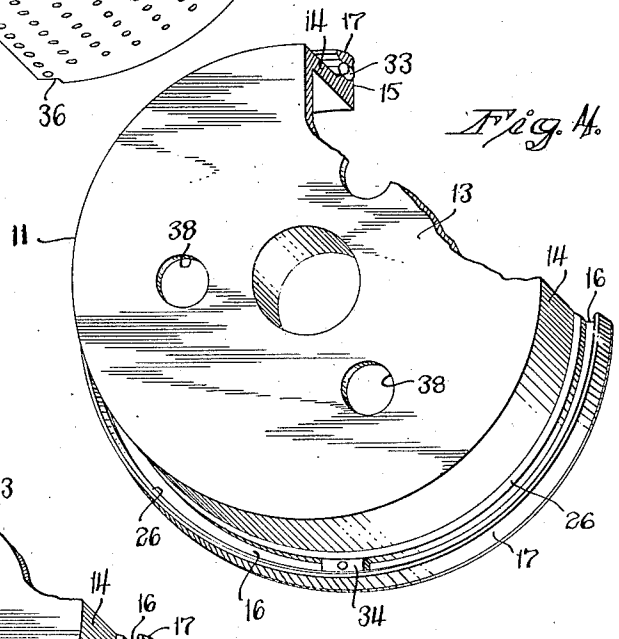
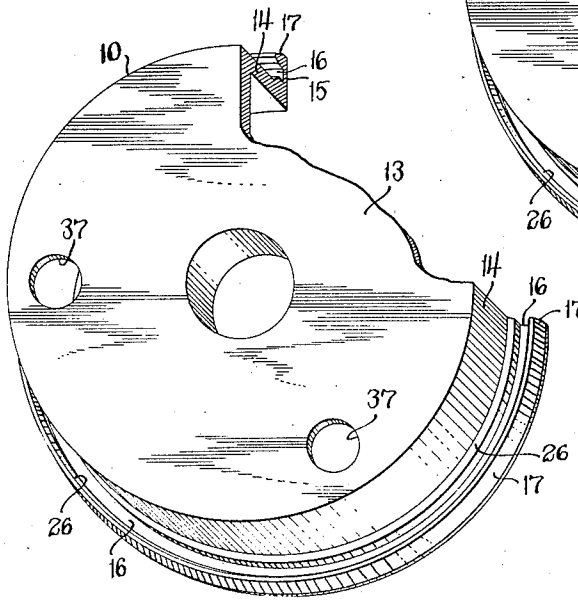


Fig. 5.



Inventor
By Raymond A. Fontaine
Seymour Earle Nichols
Attorneys

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UNITED STATES PATENT OFFICE

2,365,462

ROTARY ABRADER

Raymond A. Fontaine, Hamden, Conn., assignor of one-half to Nathan E. Cooper, New Haven, Conn.

Application September 22, 1943, Serial No. 503,311

4 Claims. (Cl. 29—78)

The present invention relates to improvements in rotary abraders of the type suitable for roughening the surfaces of tire casings, though available for use in connection with other work requiring a roughening or rasping action.

One of the objects of the present invention is to provide a superior rotary abrader having a multiplicity of removable abrading-elements and so constructed and arranged as to render convenient and rapid the removal and replacement of the said multiplicity of abrading-elements.

Another object of the present invention is to provide a rotary abrader or rasp which includes a plurality of mounting-members each mounting a multiplicity of abrading-elements, together with supporting-means for the said mounting-members, the abrader having a superior construction and arrangement of parts whereby the mounting-members may be conveniently separated from the supporting-means and whereby each of the said mounting-members may have its multiplicity of abrading-elements rapidly and conveniently removed and replaced.

With the above and other objects in view, as will appear to those skilled in the art from the present disclosure, this invention includes all features in the said disclosure which are novel over the prior art.

In the accompanying drawings, in which certain modes of carrying out the present invention are shown for illustrative purposes:

Fig. 1 is a view partly in side elevation and partly in section of one form of rotary abrader embodying the present invention;

Fig. 2 is an edge view thereof partly in section on the line 2—2 of Fig. 1;

Fig. 3 is a perspective view of the group of mounting-plates or -members;

Fig. 4 is a perspective view of one of the supporting-wheels, viewing the same mainly from its inner face;

Fig. 5 is a similar view of the complemental supporting-wheel; and

Fig. 6 is a perspective view of one of the abrading-elements.

The particular rotary abrader chosen for purposes of illustrating one form of the present invention includes two substantially-corresponding supporting-wheels respectively designated by the reference characters 10 and 11. Each of the said supporting-wheels includes a centrally-apertured hub 12, a radially-extending web 13 projecting from one end of the said hub and a felly-like flange or rim 14 located at the outer end of the web 13 and extending therefrom in the same direction as the hub 12 and hence in a direction generally parallel with the axis of the given supporting-wheel or -member 10 or 11 of which it forms a part. The features 12, 13 and 14 are preferably integral, and also integral with the outer end of the flange 14 is a radially-extending seat-flange 15 formed in its inner face with an annular groove 16. The location of the groove 16 results in the formation on the seat-flange 15 of a retaining-flange 17 spaced outwardly from the outer surface of the felly-like flange 14 and extending in substantial parallelism with the axis of the device in a direction generally toward the web 13.

The two complemental supporting-wheels 10 and 11 may be jointly mounted for rotation in any suitable manner such, for instance, as by having a driving-spindle or -arbor 18 extended through their respective hubs 12—12 as is especially well shown in Fig. 2. The driving-spindle 18 is formed with an annular shoulder 19 against which the outer face of one of the hubs 12 is normally seated. The hub 12 of the complemental supporting-wheel is engaged by a washer 20 which, in turn, is pressed against the adjacent hub 12 by a clamping-nut 21 threaded upon the adjacent portion of the driving-spindle 18.

Supported by the two complemental supporting-wheels 10 and 11 are three (more or less) arcuate mounting-plates or -members 22, 23 and 24, each having the inner face and outer face of its respective opposite side edges chamfered as at 25 for purposes as will hereinafter appear. The opposite side edges of each of the mounting-plates 22, 23 and 24 are respectively entered into the respective annular grooves 16—16 of the supporting-wheels 10 and 11, so as to lie beneath the respective retaining-flanges 17—17 thereof. Each of the grooves 16—16 has both of its respective inner and outer walls chamfered or tapered as at 26, to act in conjunction with the chamfered edges of the said mounting-plate to facilitate the assembly of the parts.

The arcuate mounting-plates 22, 23 and 24 are preferably produced by first preparing a metal tube of the required diameter, thickness and width, and then after producing the chamfers 25, dividing the plate into the three (more or less) parts by sawing or the like. The metal removed as a result of the sawing operation would normally permit a slight degree of endwise play between the ends of the mounting-plates 22, 23 and 24, and to guard against this, each of the said plates is provided in one of its

ends with one or more spacing-pins 27 mounted with a drive-fit.

Each of the mounting-plates 22, 23 and 24 is formed with a multiplicity of radial holes 28 in each of which is mounted the shank 29 of one of a multiplicity of abrading-elements 30. Each of the particular abrading-elements shown is of tack-like form and includes, in addition to its shank 29, a head 31 having its under face normally seated against the inner face of the particular mounting-plate in which the abrading-element is mounted. The shank 29 of each of the abrading-elements 30 is pointed at its outer end and its body-portion is preferably proportioned so as to fit its complemental hole 28 with a drive-fit. As thus mounted, the head 31 of each of the abrading-elements is located between the inner face of the arcuate mounting-plate in which it is mounted and the outer face of the felly-like flange 14 of the adjacent supporting-wheel 10 or 11.

To facilitate the assembly of the mounting-plates 22, 23 and 24 in the predetermined desired relationship and guard against their displacement in a circumferential direction, each is provided with a feature interfitting with a feature in one of the supporting-wheels, as will now be described. The arcuate mounting-plate 22 is formed in one side edge about midway of its length with a notch 32 adapted to fit over a locating-pin or -abutment 33 rigidly mounted in the seat-flange 15 of the supporting-wheel 11 in position to project from the bottom of the groove 16. Diametrically opposite the locating-pin 33 is positioned a locating-block or -abutment 34 rigidly mounted in the bottom of the groove 16 of the supporting-wheel 11. To fit the locating-block 34, the arcuate mounting-plates 23 and 24 are respectively formed in their adjacent corners with notches 35 and 36.

The web 13 of the supporting-wheel 10 is formed adjacent the complemental felly-like flange 14 with three (more or less) apertures 37, while the web 13 of the complemental supporting-wheel 11 is formed with three (more or less) apertures 38 located, however, adjacent the hub 12 of the said supporting-wheel 11. By the described arrangement, the said apertures 37 and 38 in one supporting-wheel will not register with the apertures in the complemental supporting-wheel in any relative rotational position of the two said supporting-wheels. In disassembling the supporting-wheels 10 and 11 from the arcuate mounting-plates 22, 23 and 24 and from each other, a tool inserted through any one of the apertures 37 or 38 may be brought into engagement with a solid surface of the web 13 of the opposite supporting-wheel to enable the two said supporting-wheels to be driven apart.

The assembled rotary abrader will, as is well known in the art, be rotated at high speed by means of the driving-spindle or -arbor 18, with the result that in addition to the frictional engagement of the shank 29 of each abrading-element 30 with its complemental hole 28, centrifugal force will tend to maintain the said abrading element in the position shown in the drawings. Should, for any reason, an abrading-element become loose, it cannot drop out of its mounting-plate, since the felly-like flange 14 adjacent thereto will prevent such action. It is preferred that the outer radii of the felly-like flanges 14 be sufficiently smaller than the radii of the inner faces of the mounting-plates 22, 23 and 24 to avoid the jamming of the heads 31 of the abrading-elements.

By providing a plurality of arcuate mounting-plates rather than one continuous rim, the abrading-elements 30, or their equivalent, may be readily installed in and removed from a given one of the said mounting-plates. The abrading-elements 30, or their equivalent, are driven into their respective holes 28, as before noted, with a tight force-fit, and since each mounting-plate is merely arcuate form, rather than a continuous circle, the workman has free access for driving the said abrading-element into place and for prying or driving the same loose. It is to be borne in mind in this connection, that abrading-elements such as 30 become worn and require replacement at frequent intervals. By means of the present invention, the previous tedious and time-consuming operation of removing and replacing abrading-elements is rendered both convenient and rapid.

The invention may be carried out in other specific ways than those herein set forth without departing from the spirit and essential characteristics of the invention, and the present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive, and all changes coming within the meaning and equivalency range of the appended claims are intended to be embraced therein.

I claim:

1. A rotary abrader, including in combination: an annular series of physically-distinct arcuate mounting-plates arranged end-to-end to jointly form a substantial ring, each of the said mounting-plates being formed with a multiplicity of substantially-radial holes; a multiplicity of removable and replaceable abrading-elements extending outwardly through the respective holes of each of the said arcuate mounting-plates and projecting beyond the outer periphery thereof, each of the said abrading-elements having stop-means engageable with the inner periphery of a given mounting-plate; and supporting-means adapted to be propelled by a spindle or the like and constructed and arranged to support the said annular series of arcuate mounting-plates in the described end-to-end relationship and including means to hold the said series of arcuate mounting-plates against radial displacement under the urge of centrifugal force when the abrader is rotated, and means underlying the respective inner ends of the multiplicity of abrading-elements to limit the inward displacement thereof when work is forced against the projecting outer ends of the said abrading-elements.

2. A rotary abrader, including in combination: an annular series of physically-distinct arcuate mounting-plates arranged end-to-end to jointly form a substantial ring, each of the said mounting-plates being formed with a multiplicity of substantially-radial holes; a multiplicity of removable and replaceable abrading-elements extending outwardly through the respective holes of each of the said arcuate mounting-plates and projecting beyond the outer periphery thereof, each of the said abrading-elements having stop-means engageable with the inner periphery of a given mounting-plate; and a pair of complemental supporting-wheels adapted to be propelled by a spindle or the like and constructed and arranged to jointly support the said annular series of arcuate mounting-plates in the described end-to-end relationship, each of the said supporting-wheels including means coacting with

the respective opposite side-edges of each of the said series of mounting-plates to hold the same against radial displacement under the urge of centrifugal force when the abrader is rotated, and means underlying the respective inner ends of the multiplicity of abrading-elements to limit the inward displacement thereof when work is forced against the projecting outer ends of the said abrading-elements.

3. A rotary abrader, including in combination: an annular series of physically-distinct arcuate mounting-plates arranged end-to-end to jointly form a substantial ring, each of the said mounting plates being formed with a multiplicity of substantially-radial holes; a multiplicity of removable and replaceable abrading-elements extending outwardly through the respective holes of each of the said arcuate mounting-plates and projecting beyond the outer periphery thereof, each of the said abrading-elements having stop-means engageable with the inner periphery of a given mounting-plate; and a pair of complemental supporting-wheels adapted to be propelled by a spindle or the like and constructed and arranged to support the said annular series of arcuate mounting-plates in the described end-to-end relationship, each of the said supporting-wheels including a retaining-flange extending over the outer periphery of each of the said series of mounting-plates adjacent the side-edges thereof to hold the same against radial displacement under the urge of centrifugal force when the abrader is rotated, and means underlying the respective inner ends of the multiplicity of abrading-elements to limit the inward displacement thereof when work is forced against the projecting outer ends of the said abrading-elements.

4. A rotary abrader, including in combination: an annular series of physically-distinct arcuate mounting-plates arranged end-to-end to jointly form a substantial ring, each of the said mounting-plates being formed in a side-edge with a locating-abutment; a multiplicity of removable and replaceable abrading-elements carried by each of the said arcuate mounting-plates and projecting beyond the outer periphery thereof; a pair of complemental supporting-wheels adapted to be propelled by a spindle or the like and each formed with a radially-projecting seat-flange located adjacent its outer face and provided with a groove opening toward the similar groove in the seat-flange of the complemental supporting-wheel; a plurality of locating-abutments located in the groove in the seat-flange in one of the said supporting-wheels and respectively engaging with the respective locating-abutments of the said mounting-plates, the respective opposite side-edges of each of the said mounting-plates being entered into the groove in the seat-flange of one of the said supporting-wheels.

RAYMOND A. FONTAINE.