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T. LARSSON

SEGMENTAL GRINDING WHEEL

Filed Oct. 24, 1924

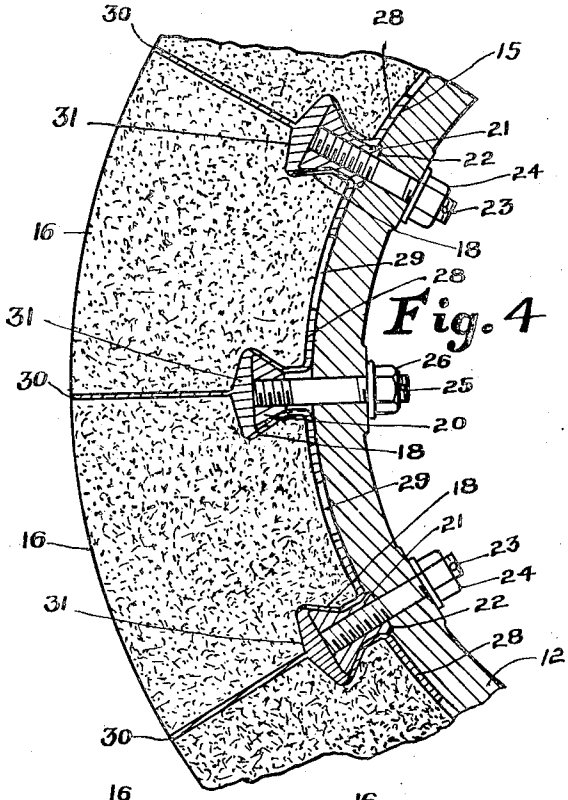


Fig. 4

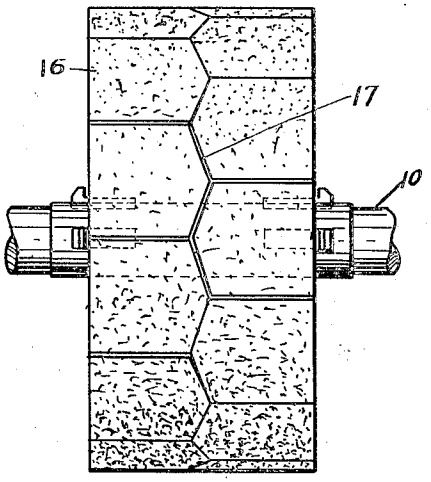


Fig. 2

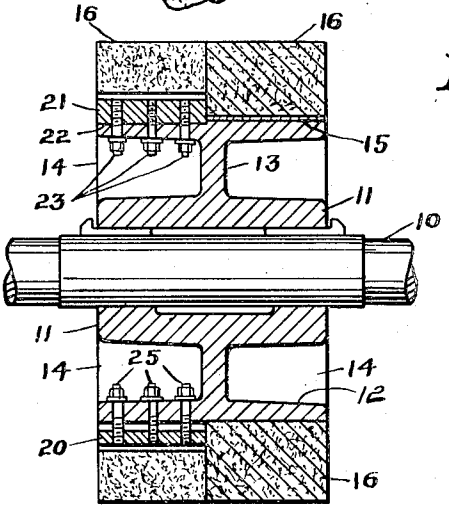
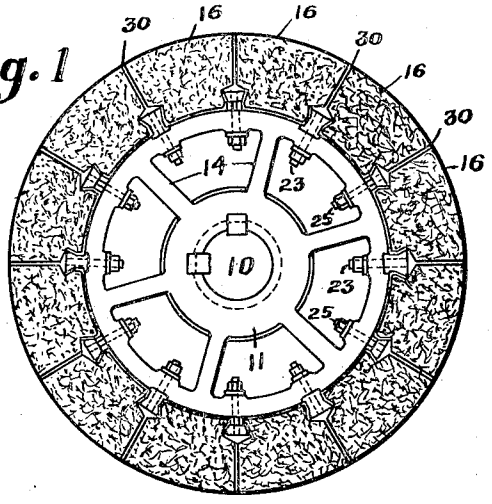


Fig. 3

Fig. 1



Witnesses

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UNITED STATES PATENT OFFICE.

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SEGMENTAL GRINDING WHEEL.

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This invention relates to abrasive wheels and more particularly to segmental grinding wheels of artificial abrasive bonded with ceramic material which is particularly adapted for grinding wood pulp.

In the manufacture of paper pulp, various efforts have been made to employ a grinding wheel of the type used in the metal industries, but heretofore this has not proven successful. A wheel as large as is normally required for grinding wood pulp efficiently is difficult to manufacture, and the firing of such a large piece in commercial kilns is likely to produce a wheel not properly annealed and therefore susceptible of breakage during use.

It has been found that a pulp grinding wheel should be made of segments mounted on a metal drum and held in place by suitable means. Due, however, to the fact that abrasive segments are ordinarily rough surfaced and crudely shaped, it is not easy to clamp the segments in position on a drum in such a manner as to prevent cracking of loosening, and it is difficult to align the surfaces of the segments so as to present a proper grinding face.

It is accordingly the main object of this invention to overcome such difficulties and to provide a satisfactory pulp grinding wheel made of segments of bonded artificial abrasive which will be efficient and long lived in its service and capable of standing up under the requirements of the grinding operation, and particularly to provide a simple and efficient means of fastening the abrasive segments to a drum and of minimizing the danger of breakage thereof.

With this and other objects in view as will be apparent to one skilled in the art, my invention consists of the combination of parts set forth in the specification and covered by the claim appended hereto.

Referring to the drawings which illustrate one embodiment of my invention:

Figure 1 is an end view of a wood pulp grinding wheel ready for mounting on its grinding spindle;

Fig. 2 is a front elevation of the wheel mounted on the spindle and showing one arrangement of the segments;

Fig. 3 is a vertical section through the wheel; and

Fig. 4 is an enlarged fragmentary detail in cross section showing the manner of mounting the segments.

In accordance with my invention, I propose to make pulp grinding wheels of segments of artificial abrasives, such as crystalline alumina and silicon carbide, bonded with suitable bonds, such as vitrified ceramic materials. These segments are shaped to fit on a drum and have grooves arranged to receive fastening blocks which hold the segments in position. In order to permit the blocks to be readily assembled and quickly aligned or drawn into position, I arrange these blocks in two alternately disposed sets, one set of blocks being rigidly mounted on the drum and the other set removably and adjustably positioned.

Referring to the drawings which illustrate one suitable shape of segment and a simple means of mounting the segments on a drum, I have there shown a driven spindle 10 to which is keyed the hub 11 of a drum 12, supported on a central web 13 and radial flanges 14. This drum 12 has an outer cylindrical surface 15, which is preferably shaped fairly accurately. The segments 16 are so shaped that when mounted on the drum, they fit against the surface 15 and form an outer cylindrical abrasive surface. In order to make a wide wheel, it is preferable to employ more than one row of segmental blocks on the cylinder, and these may be shaped as illustrated to form staggered joint lines 17 which will minimize the tendency for slivers to be carried past in the crevices between the rows of segments.

Each segment is provided with a groove 18 within which a fastening block may be mounted, and this is preferably under cut or dovetailed so that a wedge block may be employed to clamp the segment to the drum. A simple form of fastener therefore comprises locking members 20 adjustably mounted on the drum and arranged alternately with members 21 rigidly fixed to the drum. This arrangement is such that the fixed blocks 21 accurately locate the segments and the movable blocks 20 serve to hold the segments against the fixed blocks and on the drum.

The fixed blocks may be properly located by means of grooves 22 in the drum surface. These blocks are preferably wedge shaped to fit against the dove-tailed portion 18 of the segments, and their under portions are suitably shaped to fit in the groove 22. They may be held in place by studs 23 passing through the drum and held in place by nuts 24, or if desired these fixed members may be cast as an integral part of the drum or otherwise

fixed thereto. The blocks 20 are adapted to be adjustably fastened to the drum 12 by means of threaded studs 25 and are secured thereto by nuts 26 on their inner ends. The outer end of each stud 25 is screw threaded into the wedge block 20, so that the block may be drawn down to a given position and there be fixed in place. When the wedge block 20 contacts fully with the abrasive segment, its under side is spaced from the drum, this separation serving to permit suitable adjustment therefor.

In order that the abrasive segments may make proper contact with the cylindrical surface of the drum and with the wedge faces of the clamping blocks, I prefer to provide each segment 16 with a smooth facing or shoe 28, which has been shaped in a mould or otherwise to fit accurately against the drum and wedge faces. This shoe is preferably made of a soft metal such as lead or babbitt, which will flow easily into the surface pores of the segment and thereby fasten the shoe firmly in position. A soft metal moreover will provide a safer support for the segment and flow sufficiently as required by any unevenness in the drum surface to position the block correctly.

It will therefore be seen that the segments may be accurately positioned in accordance with the shape of the metal faces, and that the fastening blocks merely serve to clamp the fitted surface portions securely in place and do not cause any strain which would break the segments. It is often desirable that the metal faces do not extend throughout the full width of the under surface, hence a slight space 29 may be left for the metal to flow when under the pressure of clamping and after the segments are positioned. The crevices 30 between the segments are preferably filled with a composition, such as a tough Babbitt metal, capable of resisting abrasion under the pressure of the logs against the wheel and of wearing away at substantially the same rate as the segments. The composition used to fill the crevices should be resistant to the action of heat and water and capable of being poured at a temperature which would not be detrimental to the wheel. I prefer to employ Babbitt metal because of its characteristic wearing qualities, and I prefer to so shape the parts that the alloy will run down the crevices between the segments and fill completely the space 31 left between the segments and the wedge blocks, thereby insuring a solid foundation for the segments and preventing their working loose on the drum.

The advantages inherent in this construction will be apparent. Moreover, it will be understood that this invention is not limited in its broader aspects to any particular shape of wheel and that the term "segment" as herein employed, is intended to cover disk sections or other shapes which may be mounted on a rotatable spindle to form a large grinding wheel. Various other changes may be made in this construction within the scope of the claim appended hereto.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

A grinding wheel comprising a rotatable drum having a cylindrical surface, abrasive segments which have dove-tailed portions providing faces fitting on the drum and extensive angularly arranged plane clamping faces, a set of alternately arranged locating and clamping blocks on the drum positioned between adjacent pairs of segments, said blocks having extensive faces contacting with said clamping faces of the segments, means for holding the locating blocks fixedly in position to locate the segments therebetween and means for adjusting the positions of the clamping blocks to draw the segments securely against the locating blocks and fasten them securely on the drum.

Signed at Worcester, Massachusetts, this 22nd day of October, 1924.

THURE LARSSON.