June 19, 1934. R. E. READ 1,963,247

GRINDSTONE

Filed April 3, 1928

Fig. 1.

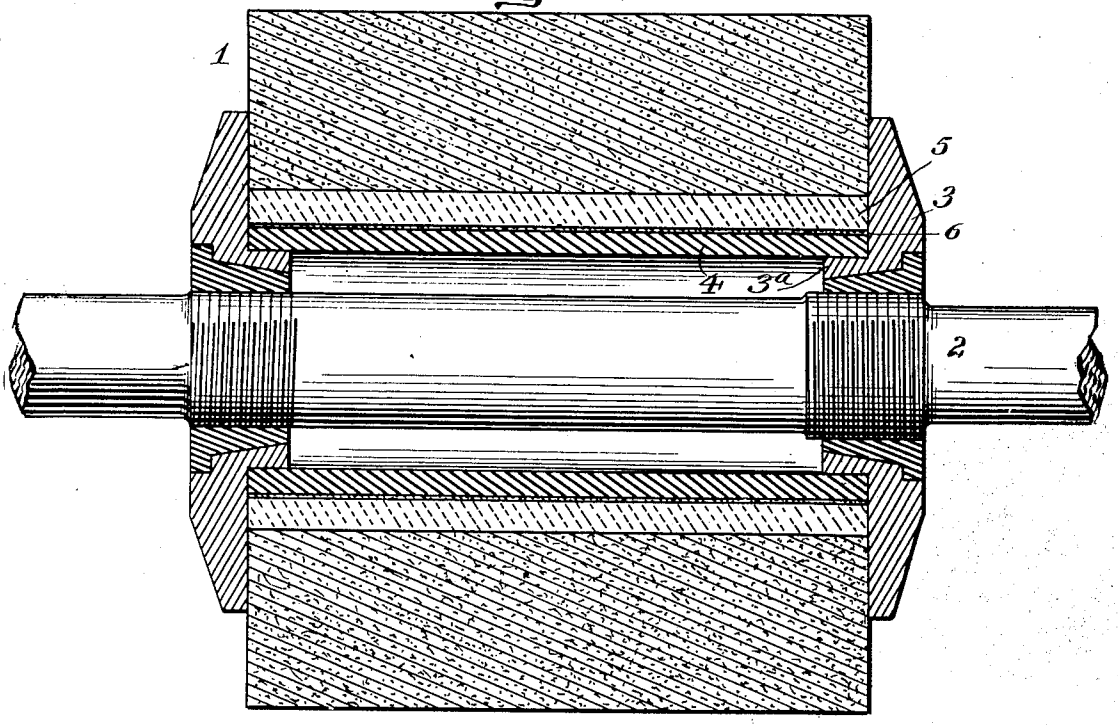
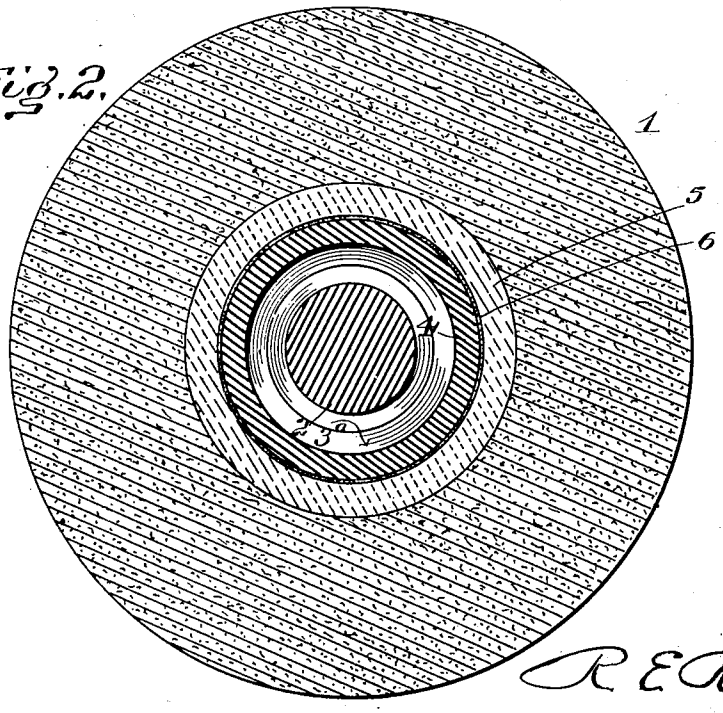


Fig. 2.



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Patented June 19, 1934 1,963,247

UNITED STATES PATENT OFFICE

1,963,247

GRINDSTONE

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Application April 3, 1928, Serial No. 266,923

3 Claims. (Cl. 51—206)

This invention relates to grindstones and more particularly to grindstones employed in the grinding of wood to produce wood pulp for use in the manufacture of paper. Such stones are massive in size, and to adapt them to be mounted on their carrying shafts, the stone is formed with a central axial bore which surrounds the shaft in spaced relation thereto, and is held effectually on the shaft by means of flanges mounted on the shaft and bearing against the ends of the stone.

Due to the great pressure which is brought to bear on the periphery of the stone by the pressure of the wood being ground, the so-called arch of the stone, i. e., the unsupported portion of the same between its ends in the line of the forces acting to press the wood against the stone, is subjected to severe and dangerous stresses, in many cases greater than the unsupported portion will bear, with the result that the stone frequently breaks.

It is the aim of this invention to overcome this objection and to so support the stone throughout its extent that it will withstand without breakage or injury, the severe stresses to which it is subjected in practice, and in carrying out this object I dispose within the bore of the stone, a reinforcing hollow core, and provide means whereby this core will give effectual support to the stone throughout the extent of its bore, so that the arch of the stone where the pressure of the wood is imposed thereon in the grinding operation, will be reinforced and the stone thereby prevented from breaking.

In the specification to follow the invention will be described in detail and the novel features thereof will be pointed out in the appended claims.

In the accompanying drawing:

Fig. 1 is an axial section through a grindstone and its supporting and driving shaft, the same having my invention embodied therein.

Fig. 2 is a transverse section through the same on the line 2—2 of Fig. 1.

Referring to the drawing:

In the embodiment of the invention illustrated there is a driving shaft 1, a grindstone 2, having an axial bore surrounding the shaft, and flanges or clamping members 3 screwed on the shaft and bearing against the ends of the stone so as to maintain the same in fixed driving relation to the shaft. Disposed within the bore of the stone, in accordance with my invention, is a reinforcing hollow core 4 of a diameter to surround the shaft. This core is of a material which will give effectual support to the stone, and is preferably of cast iron, although other materials possessing sufficient strength for the purposes of the invention may be employed without departing from the limits of the same. To enable the stone to receive support throughout the extent of its bore from the reinforcing core, a filler 5 of a suitable material, is tamped in between the exterior of the core and the interior of the bore so as to fill all portions of the intervening space and thus serve as a means for connecting the core and stone together in fixed relation. I prefer to employ for this purpose, a material which has the same or substantially the same coefficient of expansion as the material of the stone, such for instance as a mixture of sand and cement, although other materials possessing these characteristics may be employed without departing from the limits of the invention.

In order to compensate for the differences in the coefficients of expansion of the reinforcing core and stone, a bushing or packing 6 is applied to the exterior of the core. This bushing or packing is of a material which will yield slightly when subjected to pressure due to the expansion or contraction of the core and the parts supported thereby, and various materials which will answer this purpose may be employed. I have found as suitable for the purpose, a material composed of cellulose treated with oil.

From the foregoing description it will be seen that the reinforcing core, due to the filling between the exterior of same and the interior of the core, will give effectual support to the stone throughout its extent, and will prevent the severe stresses brought upon the stone by the pressure of the wood in the grinding operation, from imposing strains of sufficient magnitude to break the stone; and further it will be understood that due to the provision of the yielding bushing between the core and the stone, the differences in the coefficients of expansion of the two will be compensated for.

A stone constructed in accordance with the invention as above set forth, may be mounted on its carrying shaft in any suitable manner to cause the stone to be driven by the rotation of the shaft. In the accompanying drawing I have disclosed a form of such mounting suitable for the purpose in view, and comprising the flanges 3 screwed on the shaft and engaging the ends of the stone, the flanges being formed with inwardly extending bosses 3a which seat within the ends of the reinforcing core 4 and thus give support to the same.

In the foregoing description and accompanying drawing I have set forth my invention in the

particular detailed form and arrangement of parts which I prefer to adopt and which in practice have been found to answer to a satisfactory degree the ends to be attained. It will be understood, however, that the invention is not limited to these details, as they may be variously modified and changed within the skill of the mechanic without departing from the limits of the invention; and further it will be understood that the invention is not limited to any particular form or construction of the parts except insofar as such limitations are specified in the claims.

Having thus described my invention, what I claim is:

1. A grindstone adapted for connection to a rotary driving member, and comprising a grindstone proper having an axial bore, a reinforcing hollow core coextensive in length with said grindstone disposed in said bore and adapted to surround the driving member, said core having a different coefficient of expansion from that of the stone, a layer of granular material having substantially the same coefficient of expansion as said stone inserted between said stone and said core, a layer of oil-soaked cellulosic material in contact with said layer of granular material and said core and adapted to compensate for the difference in the coefficients of expansion of the stone and the core, and means to constrain said layers between said core and said stone.

2. A grindstone adapted for connection to a rotary driving member, and comprising a grindstone proper having an axial bore, a hollow metal reinforcing core coextensive in length with said grindstone disposed in said bore and adapted to surround said driving member and having a different coefficient of expansion from that of the stone, a filling material surrounding the core within the bore and having the same or substantially the same coefficient of expansion as that of the stone, and an annular bushing consisting of cellulose treated with oil between the exterior of the core and interior of the filling, said bushing and filling tightly filling the space between the interior of the bore and exterior of the core and thereby affording a support for the stone by the core throughout the extent of the former.

3. In combination with a rotary driving shaft, a grindstone having an axial bore surrounding said shaft, a reinforcing hollow core coextensive in length with said grindstone disposed in said bore and giving support to the stone throughout the area of its bore, said core having a different coefficient of expansion from that of the stone, annular means intermediate said core and stone of a form and material to compensate for the differences in the coefficients of expansion of the stone and core, the interior of said core being spaced from the exterior of the driving shaft, and means carried by the shaft and engaging the ends of the stone to form a driving connection between the two.

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