

Jan. 26 , 1926.

1,570,664

H. AMOS

ARTIFICIAL STONE ABRASIVE WHEEL

Filed August 31 , 1925 2 Sheets-Sheet 1

Fig. 1.

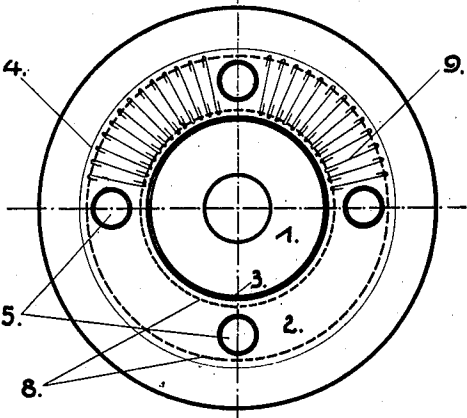


Fig. 2.

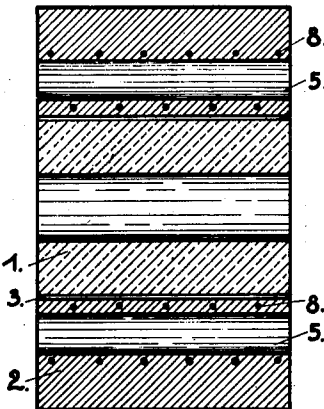


Fig. 3.

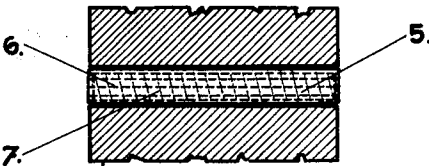


Fig. 4.

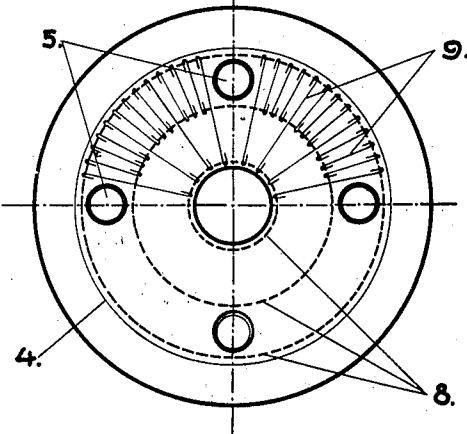
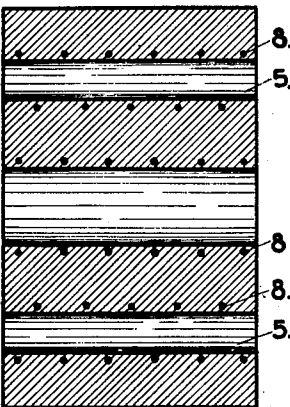


Fig. 5.



Inventor
Hermann Amos
By
Max W. Krauss
att

Jan. 26 , 1926.

1,570,664

H. AMOS

ARTIFICIAL STONE ABRASIVE WHEEL

Filed August 31 , 1925

2 Sheets-Sheet 2

Fig. 6.

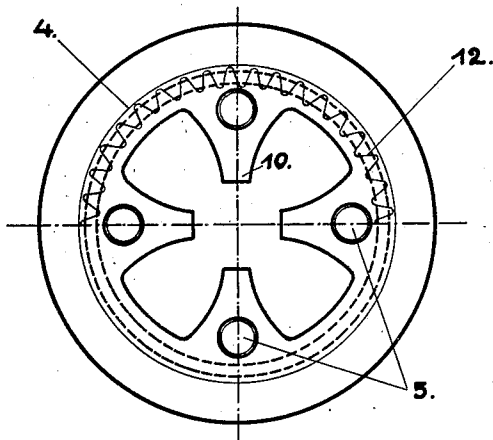


Fig. 7.

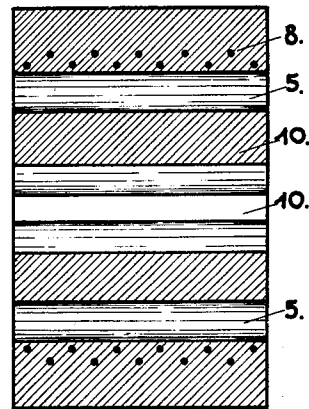


Fig. 8.

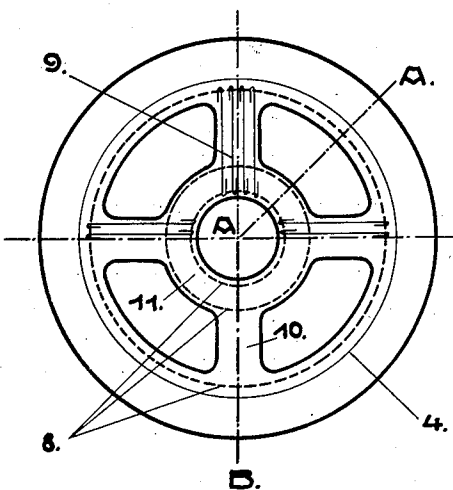
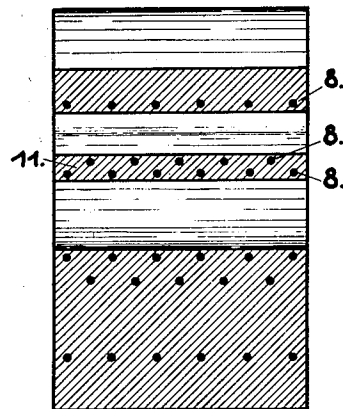


Fig. 9.



Inventor
Hermann Amos
By
Max V. Dreyer
att

UNITED STATES PATENT OFFICE.

HERMANN AMOS, OF DOLTZSCHEN, NEAR DRESDEN, GERMANY.

ARTIFICIAL-STONE ABRASIVE WHEEL.

Application filed August 31, 1925. Serial No. 53,622.

To all whom it may concern:

Be it known that I, HERMANN AMOS, a citizen of Germany, residing at Doltzschen, near Dresden, in the county of Saxony and State of Germany, have invented certain new and useful Improvements in Artificial-Stone Abrasive Wheels, of which the following is a specification.

Stone abrasive wheels for the production of powdered wood are subjected to very heavy stresses, particularly in the case of the present-day construction of such wheels of very large dimensions and for very high powers, in the first place by torsional stresses produced by rotating the wheel from the axis and by the powerful braking resistance of the work pressed against the wheel, and in the second place by the centrifugal force arising from the rapid rotation of a great mass; and not inconsiderably also by the axial compressive stresses which are produced by clamping the stone body of the wheel between the clamping discs. In this latter connection it is known that the relative loosening of the clamping discs arising from the thermal expansion of the shaft leads to an automatic tightening thereof, as the externally screw-threaded shaft advances relatively to the internally screw-threaded clamping discs mounted thereon, so that the clamping discs owing to relative rotation between the external thread and the internal thread, are screwed forward against the flanks of the wheel. This phenomenon is the more important in consequence of the fact that it can never be counterbalanced by an opposite tendency but always proceeds in the direction of a tighter clamping of the wheel. Internal stresses also which arise during the drying of the concrete body, and may arise and become dangerous all the sooner in the case of large dimensions, cannot be obviated with complete certainty notwithstanding every care in the manufacture and notwithstanding the manufacture of the wheel out of an annular body forming the abrasive wheel itself and a core piece specially stamped and then cemented in, and these stresses, in conjunction with the other forces, help to endanger the cohesion of the stone mass. Then again cracks occur first at the edges, and these spread further and finally extend throughout the breadth of the grinder and give rise to the flaking off of

large fragments of stone. The reinforcements of the stone wheel body hitherto employed are not capable of completely and reliably counteracting the said stresses, and in fact with an unfortunate arrangement of the reinforcement they seem rather to promote the loosening of parts of the wheel body in an annular zone by weakening the cohesion of the stone masses in the said zone. Finally the great weight of the stone wheels is also a hindrance in handling them, in manufacturing them, in transporting them and in erecting them. It also makes the freight more expensive.

The object of the present invention is to remedy these defects by means of various improvements which can be combined in one and the same stone wheel or else employed separately. By embedding in the stone body, parallel to its axis, struts consisting either of metallic members of considerable compressive strength, such as tubes or bars, or of compression columns of reinforced concrete, the stone body as such, in that part which is stressed by the clamping discs, is relieved of the harmful excessive stress produced by the said discs. Substantially radial reinforcing members acting as ties and extending as far as the limiting zone set apart for wear, connect the outer parts of the stone mass with the inner parts and counteract the injurious centrifugal stresses. The subdivision of the innermost part of the body of the wheel into radial spokelike bridge pieces which terminate inwards in free extremities or may be connected to a hub-like hollow cylinder, prevents the occurrence of the harmful internal stresses that arise during drying in the case of solid stone of large and uniform radial thickness, even when the stone is not made up of an annular body and a core cemented into it, and thus promotes the uniform setting and hardening of the stone mass, diminishes its weight, and enables the stone to be accurately centered upon its shaft without employing special iron disc-shaped centering and supporting bodies.

The accompanying drawing illustrates various constructional forms of the invention, Figures 1, 4, 6 and 8 being sections or elevations perpendicular to the axis of the shaft and Figures 2, 5, 7 and 9 being sections parallel to the axis of the shafts.

In Figures 1 and 2, 1 is the core member and 2 the annular member of a stone abrasive wheel, these members being cemented or moulded together at 3. The circle 4 indicates the size of the clamping discs applied to the flanks of the stone. 5, 5 are struts according to the invention, consisting of solid bars or of tubes or of special reinforced concrete columns.

Figure 3 shows one construction form of the concrete columns. Out of iron bars 6 parallel to the axis and collectively forming a polygon in cross section, and out of wires 7 wound helically upon them and in them, is formed a cage-like casing which yields in a known manner, by ramming or centrifugally, with a mass of concrete, a cylinder of the requisite structure. Finally it is inserted in a somewhat wider hole left for the purpose in the stone wheel body, and the joint filled in and moulded with mortar.

Around the said cylinders of smaller and larger diameter are wound wires 8, which are radially connected with one another by means of wire hooks 9. Thus Figure 1 combines the means, according to the invention, for relieving axial pressure by means of struts 5 and for obtaining radial strength by means of reinforcement 8, 9, to counteract centrifugal force.

Figures 4 and 5 likewise illustrate struts, and a reinforcement against the stress arising from centrifugal force made even stronger than that of Figure 1. Some of the tension wires 9 extend nearly to the axial hole, as the stone in this case consists of one piece.

Figures 6 and 7 again show the struts 5. In addition the inner parts of the body of the stone abrasive wheel is reduced by cavities parallel to the axis to spoke-like radial bridge pieces 10 for the purpose of reducing weight and mass. These bridge pieces may terminate in the direction of the axial hole in free ends, as shown in Figure 6. They may however be connected at their ends by means of a hub-like hollow cylinder 11, as shown in Figure 8. The preliminary centering during the mounting of the wheel before fitting on the clamping discs may be effected by means of easily inserted keys or wedges. The wires 8 of Figure 4 are here shifted nearer to the margin of the wheel and run at a smaller distance from one another. Consequently the connections corresponding to the wires 9 of Figure 4 are replaced by a single wire 12 which is wound zigzag around the wires 8.

Figures 8 and 9 show the connection already mentioned of the bridge piece 10 by means of a hub-like hollow cylinder 11. In Figure 9 the section below the centre line is taken on the plane A—B in Figure 8, and above the centre line on the plane A—A.

The constructional members, which may be employed in a variety of combinations, of which the figures enumerated only show a selection, are designated in all the figures by the same reference numerals.

What I claim is:—

1. An abrasive wheel for the production of wood powder, made of artificial stone and adapted to be mounted on a shaft between clamping plates, said wheel comprising struts embedded in the artificial stone parallel to the axis of the wheel at a distance from said axis not exceeding the radius of the clamping plates.

2. An abrasive wheel as claimed in claim 1, said struts being cylindrical metallic members.

3. An abrasive wheel as claimed in claim 1, said struts being hollow cylindrical metallic members.

4. An abrasive wheel as claimed in claim 1, said struts being cylindrical metallically reinforced concrete members.

5. An abrasive wheel made of artificial stone for the production of wood powder, comprising substantially radial tensile reinforcing members extending outwardly as far as the inner boundary of the zone of the wheel to be worn away by use.

6. An abrasive wheel made of artificial stone for the production of wood powder, comprising circumferential reinforcing members of different radii and substantially radial tensile reinforcing members engaging over and under said circumferential reinforcing members.

7. An abrasive wheel made of artificial stone for the production of wood powder, comprising circumferential reinforcing members of different radii and tensile reinforcement extending backwards and forwards in an approximately radial zigzag direction between said circumferential reinforcing members.

8. An abrasive wheel made of artificial stone for the production of wood powder, said wheel being divided towards its inner part by cavities parallel to its axis into spoke-like bridge pieces.

9. An abrasive wheel as claimed in claim 8, further comprising a hollow cylindrical hub member with which said spoke-like bridge pieces are connected.

10. An abrasive wheel made of artificial stone and adapted to be mounted on a shaft between clamping plates, said wheel comprising struts embedded in the artificial stone parallel to the axis of the wheel at a distance from said axis not exceeding the radius of the clamping plates, and said wheel further comprising substantially radial tensile reinforcing members extending outwardly as far as the inner boundary of the zone of the wheel to be worn away by use.

11. An abrasive wheel as claimed in claim 10, said struts being located in gaps between said radial reinforcing members.

12. An abrasive wheel made of artificial stone and adapted to be mounted on a shaft between clamping plates, said wheel comprising struts embedded in the artificial stone parallel to the axis of the wheel at a distance from its axis not exceeding the radius of the clamping plates, and said wheel being divided towards its inner part by cavities parallel to the axis into spoke-like bridge pieces.

13. An abrasive wheel as claimed in claim 12, said struts being embedded in said spoke-like bridge pieces.

14. An abrasive wheel as claimed in claim 5, said wheel being divided towards its inner part by cavities parallel to its axis into spoke-like bridge pieces.

15. An abrasive wheel as claimed in claim 10, said wheel being divided towards its inner part by cavities parallel to its axis into spoke-like bridge pieces.

In testimony whereof I affix my signature.

HERMANN AMOS.