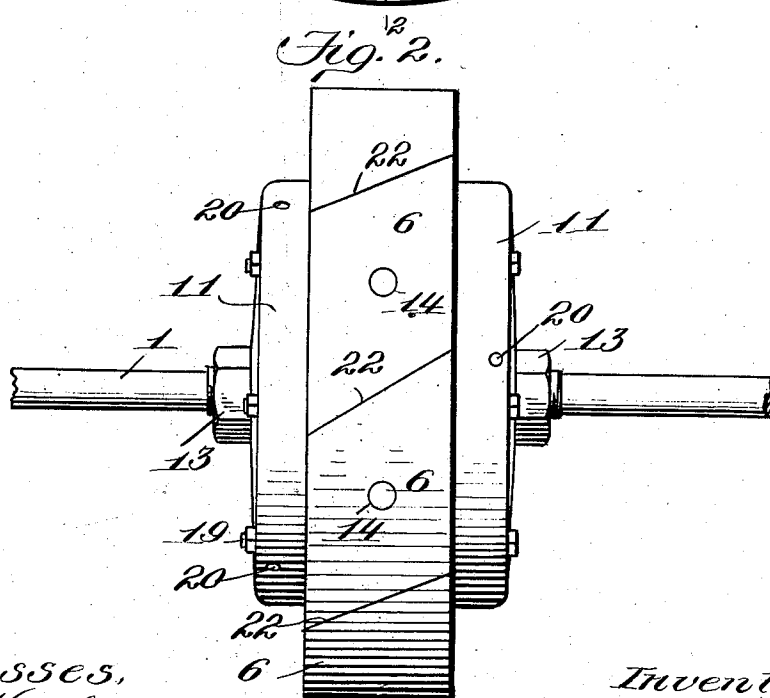
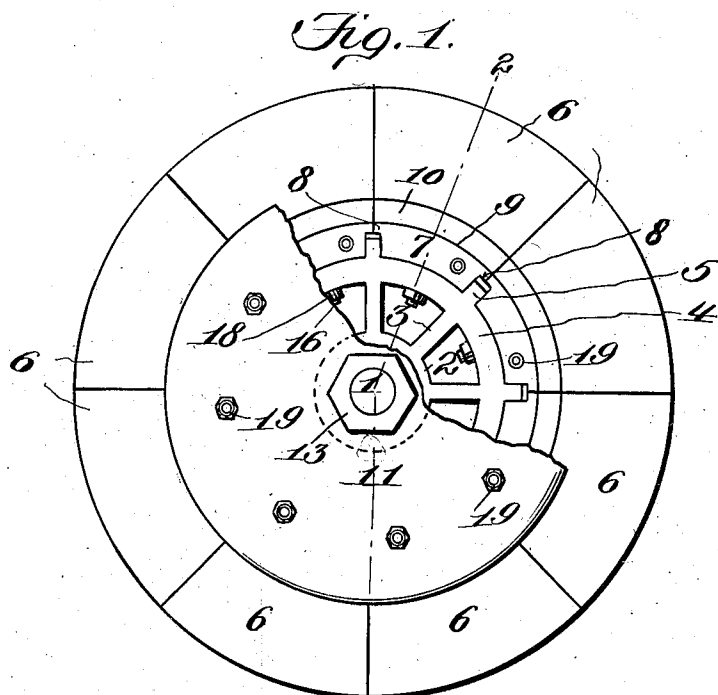


S. R. WAGG.
PULP GRINDER.
APPLICATION FILED JAN. 9, 1906.

933,603.

Patented Sept. 7, 1909.
2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 3.

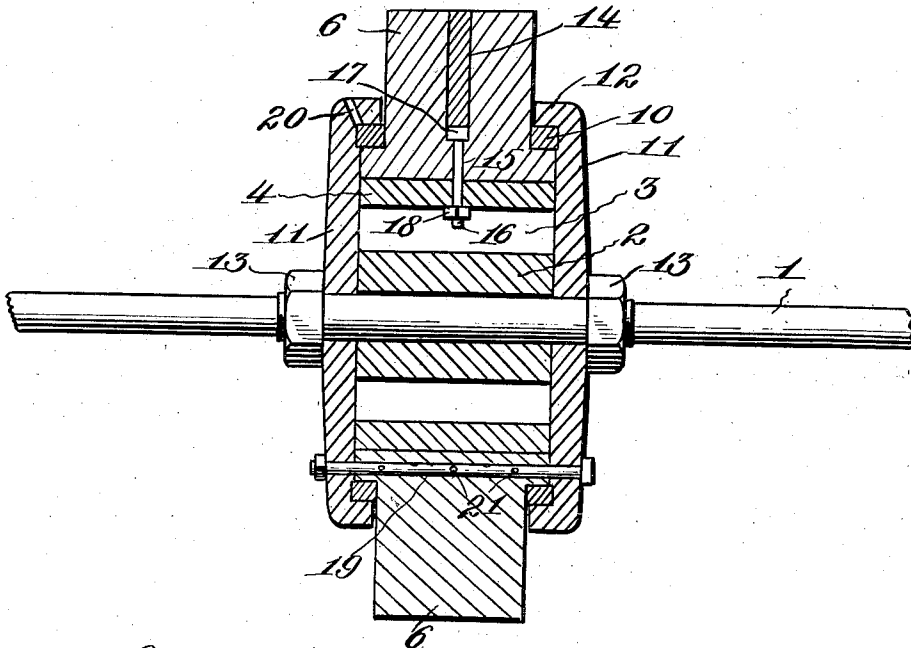


Fig. 4.

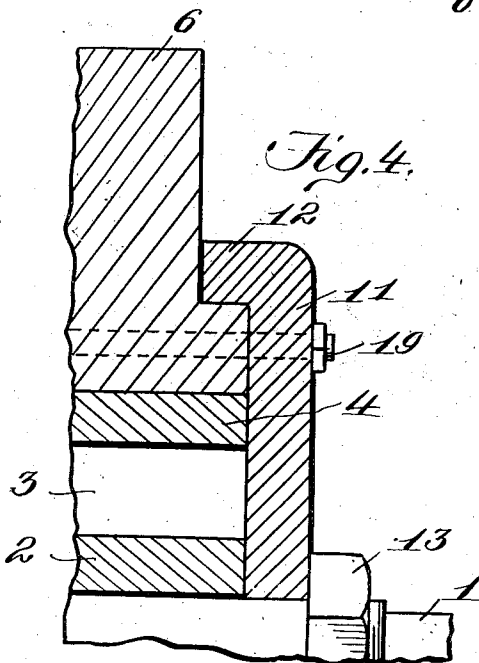
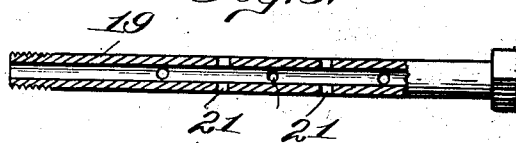


Fig. 5.



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SOLOMON R. WAGG, OF APPLETON, WISCONSIN.

PULP-GRINDER.

933,603.

Specification of Letters Patent.

Patented Sept. 7, 1909.

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To all whom it may concern:

Be it known that I, SOLOMON R. WAGG, a citizen of the United States, residing at Appleton, in the county of Outagamie and State of Wisconsin, have invented new and useful Improvements in Pulp-Grinders, of which the following is a specification.

This invention relates to pulp grinders, and has for its main object to provide a pulp grinder composed of segments of artificial or other stone which shall be securely locked to a central spider or core in such manner as to practically prevent the possibility of the segments, or any of them, being thrown off by centrifugal action.

It is well known that pulp-grinders, grindstones, or the like, which are made from a single block of stone, will frequently burst when revolved at a high rate of speed, killing or maiming the attendant and wrecking the machinery. Where the grinder is composed of segments or blocks of stone secured about a ring or core, the above danger will be minimized, but not entirely obviated, as, so far as I am aware, no means have been provided heretofore for securing segments of stone in position about a central spider or core in such manner as to practically prevent the possibility of the segments being thrown off. By the use of my invention, the element of danger from the rapid rotation of the grinder will be minimized to such an extent as to be practically negligible.

A further object of the invention is to provide a pulp grinder in which the segments shall present a novel character of grinding surface as regards the composition of individual segments and the relation of the segments to each other with respect to the grade of grit.

The invention is illustrated in the accompanying drawing, in which:

Figure 1 is a view in side elevation of a pulp grinder or grindstone, a part of one of the clamping plates being broken away to better illustrate the construction; Fig. 2 is a view in front elevation of the same; Fig. 3 is a transverse sectional view on the line 2-2 of Fig. 1; Fig. 4 is a broken sectional detail view illustrating a modification; and Fig. 5 is a detail view of one of the bolts.

Referring now to the drawings, 1 indicates an axle or shaft which is adapted to be rotated from any suitable source of power, not shown, and on which is mounted a spider or core, comprising a hub 2, spokes 3, rim 4, and

radial ribs 5 projecting from the perimeter of the rim 4 and extending longitudinally of the same from end to end thereof, or substantially so. The hub, spokes, rim and projections may all be formed as an integral casting, the hub and rim having the form of cylinders, as will be understood.

6 indicates stone segments, preferably constructed of carborundum. Each of the stone segments, as shown, is adapted to be seated between two of the ribs 5 and to this end their under sides are provided with a reduced portion 7 to fit snugly between the two projections 5 and shouldered portions 8 which extend half way over the ribs between which the segment is located. In this way the sides of adjacent segments may be brought into contact. The opposite ends of each of the stone segments 6 is cut away in its upper portion to provide a curved shoulder 9 which, when all the segments are placed about the spider or core, will form a circular shoulder, as will be understood, and on each of these circular shoulders I place a metal ring 10, which rings constitute one of the means I employ for preventing the segments being thrown off by centrifugal force. The second means I employ for this purpose consists of flanged clamp plates 11 which are applied to opposite sides of the stone and are provided with annular in-turned flanges 12 which are adapted to extend over and embrace snugly the rings 10. The said rings 10 of themselves constitute a very secure locking means for the stone segments, but, as it frequently happens that a given piece of metal will be weak in some point, I further strengthen the structure and guard against any danger resulting from weakness in the rings 10 by employing the clamp plates 11 in the manner described. These clamp plates are held firmly against the sides of the stone segments and at the same time fixedly secured to the axle or shaft 1 by means of lock nuts 13. The third means employed for locking the stone segments to the spider or core consists in providing interdental apertures 14, 15, one or more in each stone segment, the larger aperture 14 opening at the periphery of the segments, and the smaller aperture 15 continuing through the bottom.

The rim 4 is provided with apertures aligning with those formed in the segments and after the segments have been applied to the core I insert a bolt 16 in the apertures of

each segment, said bolt having a head 17 which is adapted to rest on the shoulders afforded at the bottom of the aperture 14 while its shank extends through the aperture 15 and the corresponding hole in the rim 4. Nuts 18 are then applied to the bolts 16 from the inside of the rim. After the bolts have been secured, the apertures 14 are filled up flush with the surface of the segments by pouring therein melted brimstone or other similar substance which will harden after being allowed to set.

In order to hold the clamp plates 11 at their peripheries in firm contact with the sides of the segments 6, as well as to furnish an additional means for holding the stones to the core, I extend through the clamp plates and segments at suitable intervals around the grinder, bolts 19, which, when nuts are applied thereto in the ordinary manner, will cause the clamp plates 11 to be drawn firmly against the sides of the stone segments and also will operate to securely connect the plates to the segments so as to prevent any relative movement between these parts. The holes in the segments for receiving the bolts 19 are made therein before the segments are burned, as carborundum being, as is known, extremely hard, it would be impracticable, if not practically impossible, to drill these holes after the segments have been burned.

It is desirable that the grinder as a whole shall operate as a solid integral structure; and to this end—that is, to prevent any relative movement between the parts—I provide apertures 20 in the flanges 12 of the clamp plates at suitable points about the peripheries of the clamp plates, into which apertures I pour melted brimstone which fills the interstices between the stone segments and the parts engaging the same. For the same reason each of the bolts 19, as shown in Fig. 5, is hollow and provided throughout its length with a series of apertures 21, and after all of the segments have been placed in position and the nuts applied to the bolts 19, I pour melted brimstone into these bolts which escapes through the apertures 21 and fills up any space between the bolts and the walls of the apertures through which they pass. Before pouring the melted brimstone into these bolts and through the apertures 20, the grinder as a whole may be heated to the required degree to facilitate the flow of the brimstone into the various apertures which may be left in building up the same.

As shown by Fig. 2, the meeting lines of the various segments extend diagonally across the face of the grinder or at an angle to the axis thereof, as indicated at 22, so that should one segment wear away more than another, or should there be any slight unevenness at the meeting edges of the segments, the inclined edges will give a shear-

ing cut to the wood, as will be clearly understood.

A grinder having a uniform grade of grit will, of course, produce fibers of substantially uniform length, and I have discovered that such fibers do not make the most satisfactory paper, but that the best results are obtained, as respects strength, and evenness, uniformity and smoothness of surface, by combining fibers of different lengths. To this end I contemplate making the segments 6 of varying grades of grit, that is to say, beginning with a given segment of relatively coarse grit, the succeeding segments around the entire grinder will be of successively less degrees of coarseness. As each segment will detach from the wood fibers of substantially uniform size, and as the size of these fibers will vary in accordance with the grade of grit of the segment, it follows that in each cycle of movement of the grinder a series of fibers of varying lengths will be detached from the wood and mixed together, and, as stated above, the paper produced from this mixture of fibers of various lengths will be much superior to paper produced from fibers of a uniform length. Furthermore, in the case of segments of the coarser grits, I contemplate having such segments composed of materials of different grits so that the interstices which occur between the projections in the coarser stones will be in a measure filled up, as it were. This course is adopted for the reason that I find that where coarse stones are employed they have a tendency to tear the fibers, and by having two, three or more grits combined in a single stone this tendency is, to a large extent, overcome. In the case of the finer stones, however, the segments may have a uniform grit throughout. Under any circumstances, however, I wish it understood that while a given segment may be composed of two, three or more grades of grit, the average grade of grit of the succeeding segments will increase or diminish, as the case may be.

It will be apparent to those skilled in the art that the employment of rings engaging annular shoulders on opposite sides of the grindstone is not confined to cases in which the grindstone is made up of segments, but that such shoulders may equally well be formed on opposite sides of a solid stone and the rings be applied to such shoulders. The same is true with respect to the clamp plates 11. I also contemplate employing the rings 10 without the clamp plates 11, or the clamp plates 11 without the rings 10 (which latter construction is shown in Fig. 4), either on a solid grindstone or one made up of segments as herein illustrated.

I claim:

1. A circular pulp grinder composed of a series of stone segments, the meeting edges of which extend diagonally in a transverse

direction across the face of the grinder, and means for holding the said segments in position.

2. A pulp grinder comprising a spider having a circular rim provided with radial longitudinal projections, a stone segment inserted between each two projections and rabbeted to fit into the same and to have their opposing faces in contact, an annular shoulder provided on opposite sides of said grinder, parts of which shoulders are formed on each segment, and annular means engaging said shoulders for the purpose described.

3. A pulp grinder comprising a spider having a cylindrical rim provided with bolt-holes, stone segments applied to said rim to form a circular grinding member, each of said segments having a shouldered aperture, a headed bolt inserted in each aperture and passed through one of the bolt-holes of said rim, a nut applied to the inner end of said bolt for binding the segment to the rim, and a filling inserted in said aperture above the head of said bolt.

4. A pulp grinder composed of a series of stone segments and provided on opposite sides with an annular shoulder, clamp plates secured to opposite sides of said grinder, hollow apertured bolts extending through said clamp plates and said segments, and a self-hardening material filling said bolts and the spaces surrounding the same.

5. A pulp grinder composed of a series of stone segments each of said segments being made up of a plurality of grits of different grades of coarseness, the average grade of coarseness of each segment being greater or less than that of the adjacent segment.

6. A pulp grinder composed of a series of stone segments the grade of coarseness of each of which is greater or less than that of the segment adjacent thereto.

7. A circular pulp grinder composed of stone and having on opposite sides an annular shoulder, clamp plates secured to opposite sides of said grinder and having annular-flange members adapted to cooperate with said shoulders, hollow apertured bolts extending through said clamp plates and stone, and a self-hardening material filling said bolts and the spaces surrounding the same.

8. A pulp grinder composed of a series of stone segments, each of which is made up of a plurality of grits of different grades of coarseness, the average grade of coarseness of each segment being greater or less than that of the adjacent segment, clamp plates engaging the segments, hollow apertured bolts extending through the segments and clamp plates, and a self-hardening material filling said bolts and the spaces surrounding the same.

9. A pulp grinder composed of a stone body portion provided with annular shoulders, annular clamping means cooperating with the shoulders, and a self-hardening filling material associated with the clamping means and shoulders to fill the interstices thereof.

10. A pulp grinder composed of a stone body portion provided with annular shoulders and clamping plates having means inclosing said shoulders, combined with a brimstone filling between the shoulders and the means whereby the plates and body portion are rigidly connected together.

11. A pulp grinder comprising a stone body portion, a rotatable element and clamping plates for connecting the body portion to the rotatable element, combined with a brimstone filling between the plates and the body portion for rigidly connecting the parts together.

12. A pulp grinder comprising a shouldered stone body portion, a rotatable element, a clamping means connected with the rotatable element and engaging the body portion and a brimstone filling for the interstices between the clamping means, the body portion and the shouldered part of the body portion whereby the said parts are rigidly connected together, said brimstone filling covering the shouldered part of the body portion.

13. A pulp grinder comprising a spider having a cylindrical rim provided with bolt holes, stone segments applied to said rim to form a circular grinding member, each of said segments having a shouldered aperture, a headed bolt inserted in each aperture and passed through one of the bolt holes of said rim, a nut applied to the inner end of said bolt for binding the segment to the rim, a filling inserted in said aperture above the head of said bolt, clamp plates for the segments, hollow apertured bolts extending through said clamp plates and segments, and a self-hardening material filling said bolts and the spaces surrounding the same.

14. A pulp grinder composed of a series of stone segments, the grade of coarseness of each of which is greater or less than that of the segment adjacent thereto, a spider, bolts extending radially through the segments and secured to the spider, a filling in each of the segments for inclosing its respective bolt, clamp plates engaging the sides of the segments, and bolts extending through the clamp plates and segments.

15. A circular pulp grinder comprising a spider, a body portion composed of stone abutting against said spider and provided on opposite sides with an annular shoulder, rings mounted on said shoulders, and circular clamp plates secured to opposite sides of said spider and body portion and having annular flange members engaging over said

rings, said grinder having the interstices between the body portion and the rings and the clamp plates supplied with a self-hardening material.

- 5 16. A pulp grinder comprising a segmental stone body having annular side shoulders, rings surrounding the side shoulders and clamping plates at the sides of the body and having means for engagement with the
10 rings.

17. A pulp grinder comprising a plurality of stone segments, clamping plates at each side thereof and means connecting the plates and the segments and consisting of

hollow apertured bolts and a self hardening 15
filler contained within the bolts.

18. A pulp grinder comprising a stone body having an annular shoulder, clamping means for coöperation with the shoulder and
brimstone filling means interposed between 20
the clamping means and the shoulder.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

SOLOMON R. WAGG.

Witnesses:

I. N. STEWART,
ORLANDO E. CLARK.