(No Model.)

S. M. ALLEN.

Wood Grinder for Making Paper Pulp.

No. 229,513. Patented July 6, 1880.

Fig. 1.

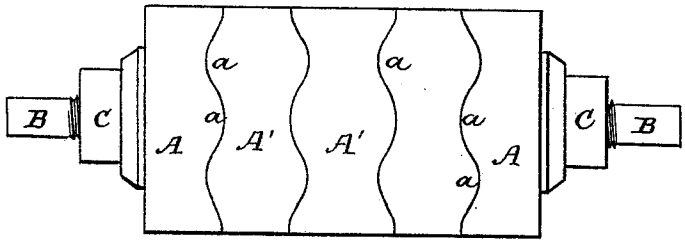


Fig. 2.

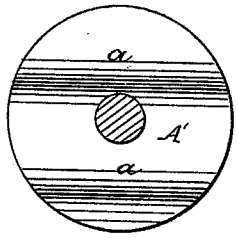


Fig. 3.

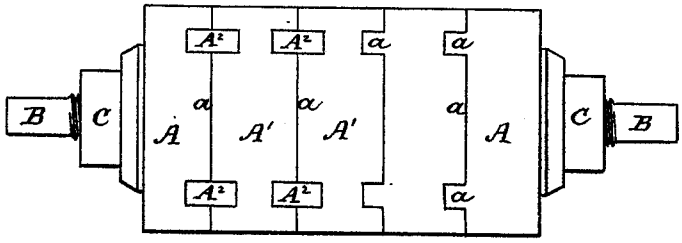


Fig. 4.

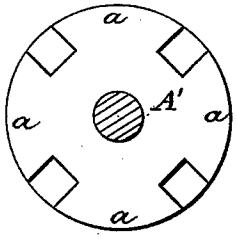


Fig. 5.

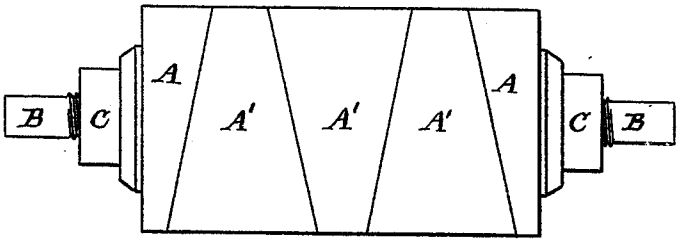
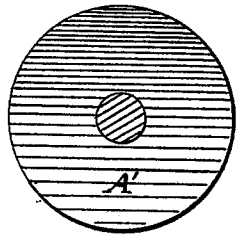


Fig. 6.



Witnesses.

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UNITED STATES PATENT OFFICE.

STEPHEN M. ALLEN, OF DUXBURY, MASSACHUSETTS.

WOOD-GRINDER FOR MAKING PAPER-PULP.

SPECIFICATION forming part of Letters Patent No. 229,513, dated July 6, 1880.

Application filed May 20, 1880. (No model.)

To all whom it may concern:

Be it known that I, STEPHEN M. ALLEN, of Duxbury, Massachusetts, have invented a new and useful Wood-Grinder for Making Paper-Pulp, which invention is fully set forth in the following specification.

This invention relates to artificial stone or emery grinders for reducing wood or other fiber to pulp for paper-making or other purpose, in which the abrading or grinding surface or the whole body of the grinder is formed in sections which are separately molded or compressed and then united.

In Letters Patent heretofore granted to me, numbered and dated, respectively, 221,993, November 25, 1879, 223,304, January 6, 1880, and 224,623, February 17, 1880, such grinders and the manner in which the same can be made and used are fully described. The advantages which they possess over grinders made in the ordinary way, by molding the artificial stone in a single block, are set forth therein at length.

The present invention has reference more particularly to the grinders formed of a series of comparatively thin disks confined upon a suitable shaft, as shown in my first-named patent; and it consists, first, in forming an interlocking joint between the sections by means of a series of projections extending from opposite sides across the jointing-line. These projections have their edges parallel with and at right angles to the axis of the cylinder, or they may be oblique. The projections bind together and prevent the motion of the sections independently of one another; and, furthermore, they insure that the fiber is ground off evenly from the side of the block of wood.

In using a roll having the joint between the disks extending directly around the cylinder in a plane perpendicular to the axis the wood is apt to be creased or furrowed, so as to leave projections which break or chip off unground and enter into the pulp as little lumps. Such lumps interfere considerably with subsequent treatment of the pulp.

It is evident that with a cylinder having interlocking-joints between the sections this action does not take place, inasmuch as the slight space between the sections does not remain always opposite the same portion of the wood, and any fiber which should be left at any point by such space would be immediately removed by the following grinding-surface.

When the joints between the sections are formed by oblique lines there is obviously more or less tendency to move the block lengthwise. In order that this may not interfere with the feeding of the wood I make the joint so that the oblique lines on the same side of the cylinder run in opposite directions, and thus counteract the effect of one another. This arrangement is applicable to sectional grinders generally having the joints oblique to the axis.

In sectional grinders there is a liability of sections being thrown off singly, and pulp or water is also apt to penetrate the joints. To overcome these objections I cement the sections together, and thus thoroughly unite them, and also fill the cracks, so as to exclude all foreign matter, and at the same time impart a smoother surface to the grinder.

The cementing of the sections is applicable as well to grinders of any of the forms described in my before-mentioned patents as to grinders composed of disks united so as to break joints.

The following description, in connection with the accompanying drawings, which form a part of this specification, will enable my invention and the manner of carrying the same into effect to be more fully understood.

Figure 1 is a view, in side elevation, of a grinder constructed in accordance with my invention; and Fig. 2, a view, in end elevation, of one of the sections. Figs. 3 and 4 are similar views of a grinder in which the projections are rectangular in shape, and Figs. 5 and 6 of a grinder composed of wedge-shaped sections with their ends plane and the oblique joining-lines on the same side of the cylinder running in opposite directions.

The same letters indicate like parts on all the figures where they occur.

A represents the end disks or sections, A′ the intermediate disks or sections, and B the shaft upon which the disk-sections are supported, being clamped by nuts C.

A^2, Fig. 3, are pieces let into the face of the stone.

The disks A A′, Figs. 1, 2, 3, and 4, are shown provided with a series of projections, *a*, for interlocking.

The difference between the end and the intermediate sections is that in the former the projections are on one side only, while in the latter they are formed on both sides.

Referring to Fig. 1, it will be seen that the oblique lines which form the sides of the projections *a* at any portion of the periphery extend toward opposite ends of the grinder. In Fig. 5 the same arrangement of oblique lines will be seen, although there is no series of projections.

Referring to Fig. 3, the blocks A^2 are preferably dovetailed and inserted into similar recesses in the disk-sections.

The shape of all the sections is clearly shown in the drawings. There are, it is obvious, various other forms of projections which can be adopted. They may be triangular or polygonal, instead of curved or rectangular, as shown. They may be radial, as in Fig. 4, or parallel, as in Fig. 2.

The invention is not limited to any particular number of projections. As shown in Figs. 1, 2, 3, and 4, each section is provided with four; but the number could be increased, or three or two only could be used.

The disks may be of different sizes and thickness, but are usually from four to six inches. The thickness should not be greater than can be thoroughly compacted.

The grinder may be made as follows: The material is prepared by mixing crushed and granulated emery, corundum, quartz, flint, or other hard stone with a suitable cementing liquid or paste to the consistency required for molding, and it is then cast and compressed in molds of suitable size and shape. The rollers or disks are partially dried and usually waterproofed, and then dried and turned off. The disks or sections are then placed in position on a shaft or mandrel, B, on which they are secured and clamped by nuts C, or by other suitable means. A cementing paste or liquid, such as are well known to those skilled in the art, is then applied to the contiguous sides of the sections, and they being clamped and held together, it unites and binds them firmly. The spaces between the sections are filled.

Instead of clamping the sections together on the mandrel or shaft they may be confined in a suitable press, and after being united can be removed and mounted on the shaft.

The number of sections or disks may be odd or even, and is regulated by the thickness of the disks and the length of the cylinder required.

A grinder constituted as described is of great solidity, has practically a uniform grinding-surface, and is not liable to the objections for want of durability and safety urged against cylinders formed by molding in one piece.

The particular advantages of the several improvements in this invention have been already sufficiently indicated.

The cementing of the sections, as has been stated, is not limited to grinders composed of a number of disks with ends plane or provided with interlocking projections.

In order to apply it to the manufacture of grinders such as shown in Patent No. 223,304, January 6, 1880, before mentioned, the contiguous surfaces of the logs or staves are covered with cementing paste or liquid and confined and held together in suitable clamps or molds, after being placed in position on the base or center, until thoroughly united.

It is obvious that various means or mechanical devices could be used for clamping logs, staves, or other form of sections.

In using the grinders hereinbefore described the wood is presented sidewise, endwise, or in any ordinary or suitable way.

Having thus fully described my said invention and the manner in which the same is or may be carried into effect, I would observe, in conclusion, that I do not claim herein, broadly, the construction of the disks of a sectional grinder, so that the lines of junction are broken or arranged oblique to the axis of the grinder, as this forms the subject-matter of a separate application; but

What I do claim, and desire to secure by Letters Patent, is—

1. A grinder of artificial stone, emery, or corundum composed of sections or disks provided on their contiguous end surfaces with interlocking projections of rectangular, curved, or other suitable shape, substantially as described.

2. In a grinder of artificial stone, emery, or corundum composed of disk-sections with their edges bounded by lines oblique to planes perpendicular to their axes, the disks constructed and combined with each other and with a shaft or center and with clamping or retaining devices, substantially as described, so that the oblique lines at the junctions of the disks are not all parallel, but are inclined toward opposite ends of the grinder, as set forth.

3. A grinder of artificial stone, emery, or corundum having the sections forming the grinding or abrading surface or the whole body of the grinder cemented to each other, substantially as described.

4. The combination, with a shaft, of an abrading or grinding surface of emery, corundum, or artificial stone formed of sections cemented to one another, and means for securing or clamping the said surface upon the aforesaid shaft, or upon a center attached thereto, substantially as described.

5. The method of forming grinders of artificial stone, emery, or corundum or suitable material by casting and compacting separately a number of sections, then cementing and clamping the same in position on a suitable base, center, or shaft, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

STEPHEN M. ALLEN.

Witnesses:
WALTER JONES,
GEO. A. SAVAGE.