

S. M. ALLEN.
Wood-Grinder for Making Paper-Pulp.

No. 226,013

Patented Mar. 30, 1880.

Fig. 1.

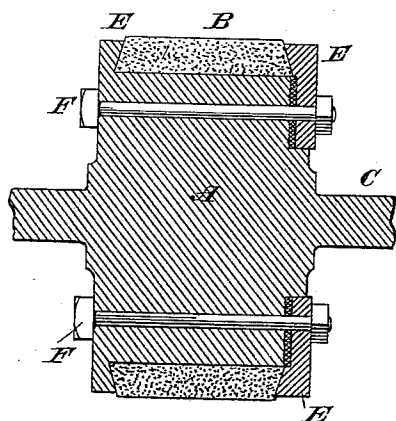
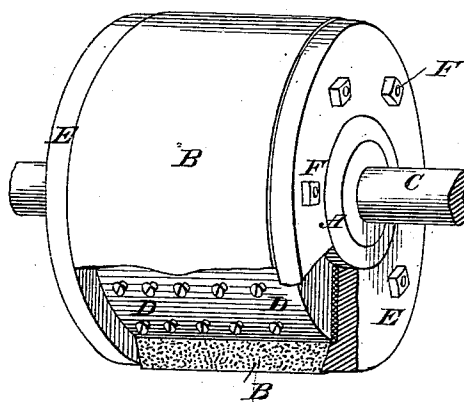


Fig. 2.



Witnesses:

R. F. Barnes.
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Stephen M. Allen
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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. 226,013, dated March 30, 1880.

Application filed February 14, 1880.

To all whom it may concern:

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

This invention relates to the manufacture of grinders of emery or artificial stone for reducing wood and other fibers. It is found that emery has certain advantages over natural stone or metal for this purpose; but a stone grinder of a practical size, when made in the ordinary way by tamping the paste into a suitable mold, is open to the objections that it is apt in use to burst and to wear unequally, owing to a want of homogeneity.

In order to overcome these objections and to manufacture an efficient and safe grinder, I have heretofore constructed the grinder or the grinding-surface thereof in sections, which are separately molded, compressed, and seasoned, so as to be perfectly homogeneous and compact, and then secured together in position, as described in Letters Patent No. 221,993, dated November 25, 1879, No. 223,304, dated January 6, 1880, and No. 224,623, dated February 17, 1880.

In this invention I apply a face of artificial stone, emery, corundum, flint, or other suitable material, which is consolidated upon a roll, cylinder, wheel, disk, or center of other suitable form, of wood, artificial or natural stone, metal, or other material, and consolidate and secure the facing firmly thereto. In this way the surface formed is continuous, without crack or seam, which for some kinds of paper is advantageous. It has been heretofore proposed to form grinders for different purposes in a similar way by covering a base with paste and allowing it to dry; but such grinding-surfaces wear easily and are dangerous to use, since the face is apt to crack and fly off.

Mechanical means have been employed, such as flanges, dovetails, or devices with enlarged heads, for retaining the grinding-face on the roll or cylinder, which serves as a base, the grinding material being applied in a plastic condition, and when it hardens enveloping the flanges or heads or filling the dovetailed

grooves; but these means, while serving to lessen the liability of the grinding-surface to fly off, do not apply pressure upon the grinding-surface, which pressure I find necessary or desirable when the material is in a green state, and also when perfectly dry. For this purpose I pack the paste of emery or other abrading material between dovetailed or inwardly-projecting clamps, which can be pressed toward each other by set-screws or bolts, so as to clamp the grinding material with more or less pressure, as required, and thus insure the compactness, solidity, and perfect adhesion to its base of the grinding-surface. With these adjustable clamps I sometimes combine screws or similar devices with heads, so that the latter are embedded in the abrading material. Moreover, provision is made, so far as possible, for the difference in gravity between the hub or center and the facing or periphery.

In order that the invention may be more readily understood, the manner in which the same is or may be carried into effect will now be described, reference being had to the accompanying drawings, which form a part of this specification.

Figure 1 represents, in section, a grinder constructed in accordance with my invention, having the adjustable dovetailed clamps; and Fig. 2 is a perspective view, with a portion of the grinding-surface removed, of a grinder in which screws are combined with the adjustable clamps.

The same letters indicate like parts.

A is the hub or center, B the grinding-surface or emery or artificial-stone facing, and C the shaft, of the grinder. D represents a number of screws with projecting heads, which are to be surrounded by the artificial stone; and E, side flanges or clamps with dovetailed or inwardly-projecting jaws.

The base or center may be of wood, stone, composition stone, or metal, such as wood drums, stones similar to an ordinary grinding-stone, or wheel-pulleys of suitable diameter and width across the face. The base should be preferably turned to give to it a true face. A paste or mortar of the proper consistency for molding and tamping is then prepared by mixing crushed and granulated emery, corundum

dum, quartz, flint, or other hard stone with a suitable cementing-liquid, such as now known and used. This paste or mortar is preferably prepared to have greater or less specific gravity, as will be readily understood by those skilled in the art, according to that of the base or center. It is applied to the surface of the latter to the depth or thickness required, and tamped, compressed, and clamped before drying, so that when dried upon the surface of the periphery it becomes firm and practically homogeneous with the central hub or base.

The great difficulty of drying a paste without pressure is that of keeping up the points of adhesion with the hub. A familiar illustration of similar action is found in the case of common glue, which will not itself retain two surfaces by adhesion unless the pressure is kept up till the same is fixed or set. This function is efficiently performed by the adjustable clamps E, aided more or less by the screws D, where they are used.

The emery or similar material, prepared as before explained, is applied to the periphery of the hub or center, studded or not with the screws D between the dovetailed clamps E, which are attached to the sides of the hub and project sufficiently beyond the periphery of the hub or center to hold the mass of paste under pressure. They can be drawn together by turning the nuts on the ends of the bolts F or by other suitable means which could be readily applied. The emery-paste may be applied in sufficient depth to project beyond the face of the clamps, or it may be kept wholly within the jaws of the clamps. The latter is generally preferred, since the grinding-surface will last longer, and is not so liable to crack or break off as when projecting. The clamps may form the sides of the whole wheel, or they may be bolted or otherwise attached thereto, as occasion may require; but in either case they are to be arranged so that they can be set together as may be necessary while the paste is green or drying, or after it is completely dry, so as to hold the mass intact and against the base or center, whereon it rests.

For some purposes sufficient pressure can be applied to the abrading material by tamp-

ing it between the hub and an outside rim and holding it intact until firmly consolidated, when the rim can be removed. Dovetailed grooves, screws, or similar devices on the hub or center may be employed for additional security.

The invention is specially applicable to cylindrical grinders, but may be used also for flat or conical grinders, and it is applicable to stationary stones or bed-plates as well as to running stones.

The manner of using grinders constructed in accordance with this invention for reducing wood and other fiber for paper-pulp will be readily understood by those skilled in the art, and need not here be described.

Having thus fully described my said invention and the manner in which the same is or may be carried into effect, what I claim, and desire to secure by Letters Patent, is—

1. The method of forming grinders of emery or artificial stone by applying upon the surface or periphery of a base or center a paste of granulated emery or like substance, and clamping and compressing the abrading material with pressure applied and continued during the drying operation, substantially as described.

2. An emery or artificial-stone grinder composed of a base or center of a suitable material and a facing or tire, constituting the grinding-surface, of emery or artificial stone compacted and confined thereon between adjustable dovetailed clamps, substantially as described.

3. The combination of the base or center of suitable material, the facing or tire of emery or artificial stone, the dovetailed side clamps, and means for tightening the same, as described, with screws attached to the base or center, and having their heads embedded in the emery or artificial stone, as set forth.

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

STEPHEN M. ALLEN. [L. S.]

Witnesses:

GEO. A. SAVAGE,
WALTER JONES.