(No Model.)

G. WERNER.

MANUFACTURE OF WOOD PULP.

No. 252,983. Patented Jan. 31, 1882.

Fig. 1.

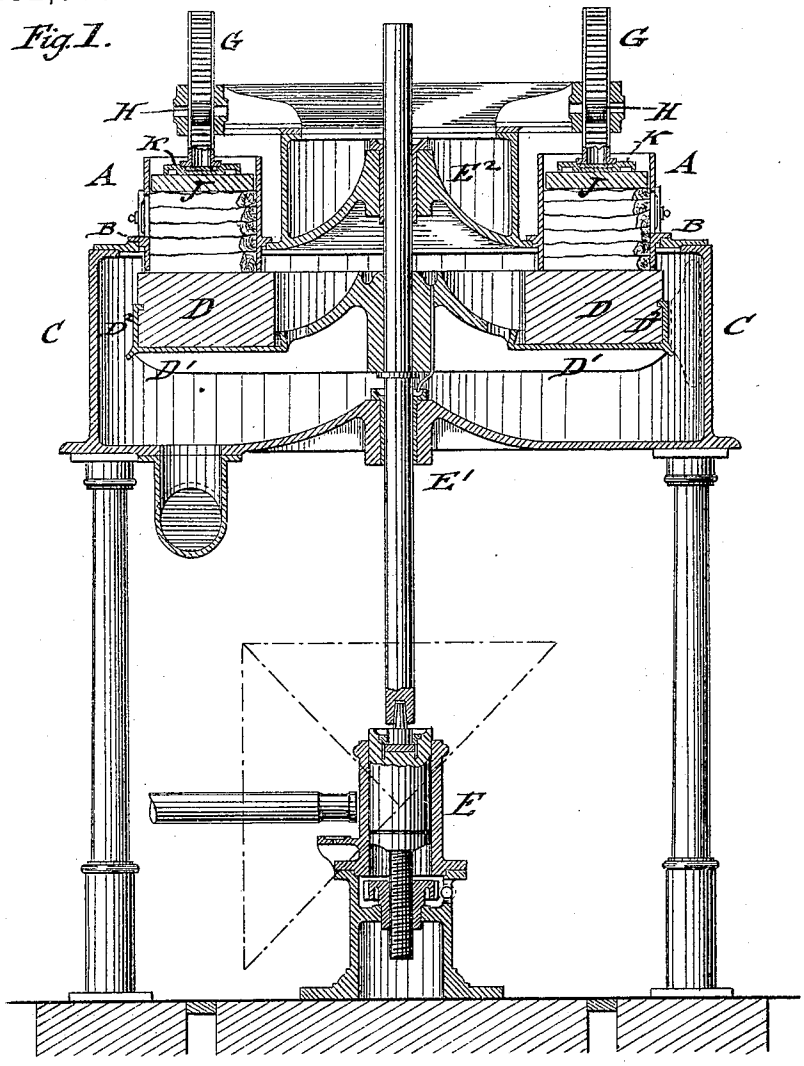
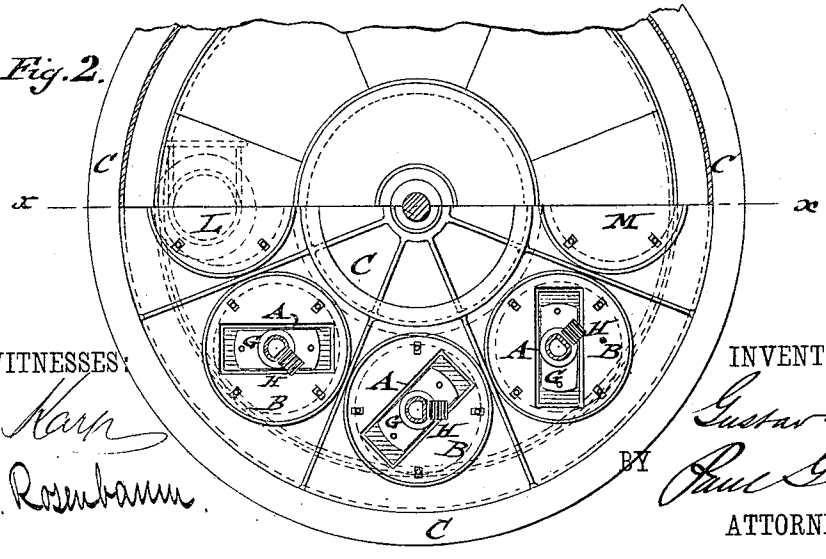


Fig. 2.



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MANUFACTURE OF WOOD PULP.

SPECIFICATION forming part of Letters Patent No. 252,983, dated January 31, 1882.

Application filed September 19, 1881. (No model.)

To all whom it may concern:

Be it known that I, GUSTAV WERNER, of Taisnach, in the Kingdom of Bavaria, Germany, have invented Improvements in the Manufacture of Wood Pulp, of which the following is a specification.

In the manufacture of wood pulp for paper it has been always customary to grind the wood by pressing it with the fibers in a position at right angles to the grinding-surface at the outer circumference of the vertically or horizontally revolving grindstones. Attempts have also been made to grind the wood by feeding it to the surface of the grindstone with the fibers parallel thereto, which method has been mentioned in the original patent for wood-grinding, taken by H. Voelter; but this method did not give good results, and was consequently abandoned.

The object of this invention is to furnish an improved method of grinding wood, which stands midway between the two methods mentioned, and by which the wood is fed vertically downward on the top surface of a horizontally-revolving grindstone, but in such a position that the fibers form an acute angle of inclination toward the direction of motion of the stone, it being based on the well-known fact that it is very difficult to rasp a piece of wood transversely or parallel to its fibers, while the rasping or grinding is accomplished with comparative ease with the tool at an angle of forty-five degrees to the direction of the fibers. Experience also has shown that by the first method the fibers are apt to be torn and injured, while by the second method long fibers and by the third method thin, long, and soft fibers are obtained.

The invention consists, therefore, first, of a method of grinding the wood by feeding it in vertical direction toward the top surface of a horizontally-revolving grindstone with the fibers at a suitable acute angle to the direction of motion of the same; and, secondly, of an apparatus for grinding wood pulp, which is provided with a number of vertically-supported and axially-adjustable receiving-boxes, having disk-shaped flanges, which flanges are set into openings of the top-plate of the apparatus. The grindstone is composed of a number of pieces which are fitted together and rigidly supported on a flanged ring-frame. As the stone is worn out its relative position to the receiving-boxes is made vertically adjustable by means of a vertically-adjustable step-bearing, as will appear more fully hereinafter.

In the accompanying drawings, Figure 1 represents a vertical central section of my improved apparatus for making wood pulp, on line *x x*, Fig. 2; and Fig. 2 is a plan view of the same.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A represents a number of oblong receiving-boxes, which are provided with disk-shaped flanges B, the smoothly-ground circumferences of which are guided in similarly-ground seats of the top openings of the casing C of the apparatus, so that the boxes A may be readily set at any desired angle toward the direction of motion of the stone. The lower edges of the receiving-boxes A are accurately fitted to the upper surface of the horizontally-revolving grindstone, so as to prevent the too coarse grinding of the wood. The pieces of wood which are to be exposed to the grinding action of the stone are pressed down upon the surface of the same by means of vertical racks G G and pinions H, which racks are either weighted separately for each box or for all the boxes jointly in the same manner as customary in apparatus of this class. The racks G G are not attached directly to the followers J J, but are screwed to intermediate pieces K K, which are capable of following with the followers J J the axial motion of the boxes A A whenever the latter are set so as to assume a different angular position toward the direction of the motion of the stone.

The grindstone D is composed of a number of carefully-selected pieces, of uniform grain and hardness, which are supported on a ring-shaped frame, D′, having an exterior retaining-flange, D^2, as shown clearly in Fig. 1. By this construction of the grindstone the cracking or other injuring of the stone, which happens frequently with stones made of one piece, is entirely avoided. A compound grindstone of the construction described has, furthermore, the advantage that it has a far better grinding-surface, without any soft portions, and that it

can be obtained more easily and at less expense than the large-sized grindstones heretofore in use, the surface of which was never of uniform texture and grain throughout. The consequence was that the surface showed the wear at the softer parts and had to be frequently redressed, so that the stone was in most cases injured more by the dressing made necessary by the unequal character of its surface than by the actual work accomplished.

The wood to be ground is fed by the receiving-boxes to the top surface of the stone and ground by contact therewith. The ring-shaped frame D′ of the stone D is secured by a center hub to a vertical central shaft which revolves at the lower end in a step-bearing, E, at its middle part in a bearing, E′, of the casing C, and at the upper part in a bearing, E^2, as shown in Fig. 1.

The water required for grinding is thrown in a spray from the center toward the wood to be ground, and carried by centrifugal power to the grinding-surface between the wood and stone, by which the grinding process is accelerated in a higher degree than with the apparatus heretofore in use, in which the wood is pressed against the grinding-surface of the stone at its outer periphery, and in which the water is carried away, instead of toward the grinding surfaces, by the centrifugal force.

To keep up the revolving grindstone at the proper relative position to the receiving-boxes, even when the grinding-surface gradually wears down, the step-bearing E is made vertically adjustable, in a similar manner as the runner of a flour-grinding mill, by means of a pinion meshing with a gear-wheel of a screw-nut that engages the threaded shank of the step bearing. The step bearing E itself is guided in a fixed upright cylindrical casing, as shown in Fig. 1.

For dressing the stone two openings, L and M, are provided in the casing C of the apparatus, which openings are nearly equal in size to the openings for the receiving-boxes.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The method herein described of grinding wood into pulp, which consists in feeding the pieces of wood vertically downward upon the top surface of a horizontally-revolving grindstone and holding them in such a manner thereon that the fibers form an acute angle of inclination to the direction of motion of the grindstone, substantially as set forth.

2. The combination, with a horizontally-revolving grindstone, of an inclosing casing having circular top openings, of vertical receiving-boxes having disk-shaped flanges guided in seats of the openings, and of mechanism whereby the wood in the receiving-boxes is pressed down upon the stone, said boxes and the feed mechanism being adapted to be axially set at any angle toward the direction of motion of the grindstone, substantially as specified.

3. In an apparatus for grinding wood into pulp, a grindstone composed of a number of jointed sections, in combination with a ring-shaped supporting-frame having an exterior retaining-flange, substantially as set forth.

4. In an apparatus for grinding wood into pulp, the combination of the fixed exterior casing having circular top openings, vertical receiving-boxes having exterior disk-shaped flanges guided in seats of the top openings, a horizontally-revolving grindstone below the boxes, and means for adjusting the same vertically toward the lower end of the receiving-boxes, substantially as specified.

5. In an apparatus for making wood pulp, the combination of the fixed receiving-boxes with a revolving grindstone and with means for adjusting the same vertically toward the lower end of the revolving boxes, substantially as specified.

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

GUSTAV WERNER.

Witnesses:

FRIEDRICH VOITH,

OTTO GRIMBERGER.