B. A. BEARDSLEY.

Bark Mill.

No. 2,944. Patented Feb. 4, 1843.

Fig. 2.

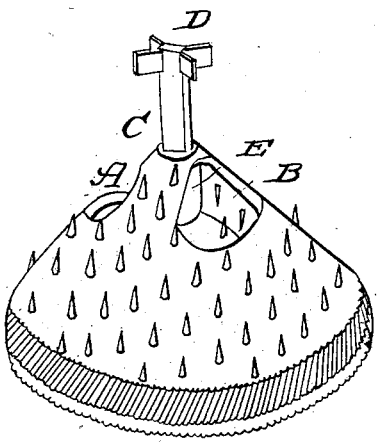


Fig. 3

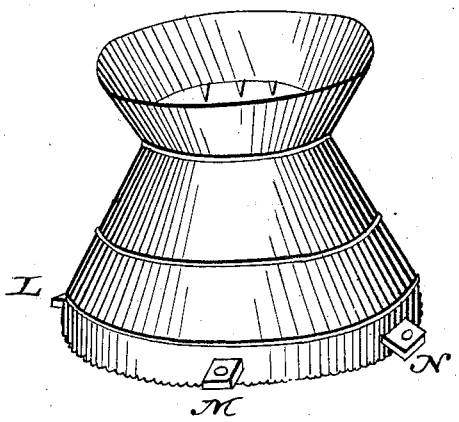


Fig. 1

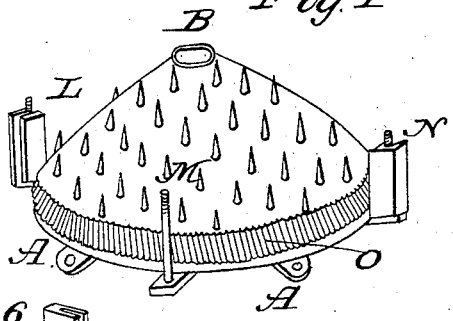


Fig. 6

Fig. 5

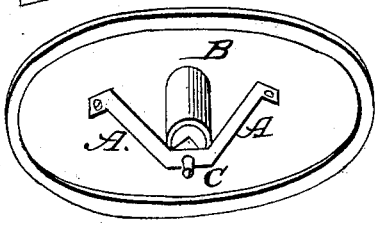
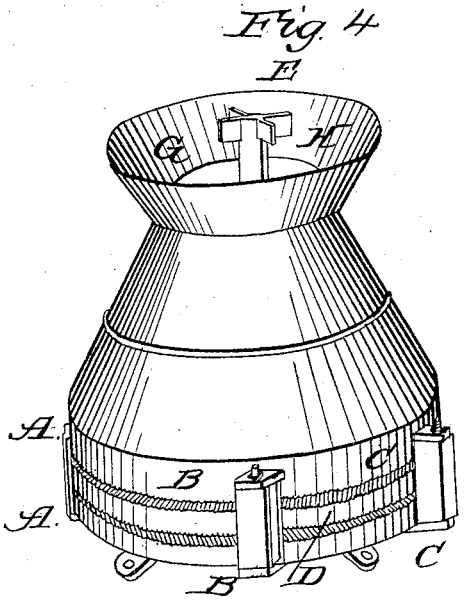


Fig. 4



UNITED STATES PATENT OFFICE.

B. A. BEARDSLEY, OF SANGERFIELD, NEW YORK.

MILL FOR GRINDING BARK.

Specification of Letters Patent No. 2,944, dated February 4, 1843.

To all whom it may concern:

Be it known that I, BACKUS A. BEARDSLEY, of Sangerfield, in the county of Oneida and State of New York, have invented a new and useful improvement in the machine commonly called a "bark-mill" or mill commonly used for grinding bark for tanning leather; and I do hereby declare that the following is a full and exact description.

This mill consists of three conical cast iron plates, with their appendages. They are shown in Figures 1, 2, 3, of the annexed drawings. Fig. 1, is the under plate, and is stationary, being bolted down upon the floor or platform on which the mill is erected for use. Fig. 2 is the grinder and is to be placed immediately over the plate Fig. 1, between which and the plate Fig. 3, it turns freely, grinding the bark as it passes down through the mill, both above and below the grinder.

The bottom plate Fig. 1, has a strip *o*, of about one and a half inches in width, which is cut into fine diagonal teeth, slightly raised above the surface, and which extends quite round at the base of its outer surface. This plate is bolted to the floor on which the mill is erected, through flanges, or ears, projecting horizontally from its base, two of which, A, A, are seen in the figure. The residue of its upper surface is studded with conical teeth, standing upright, and perpendicular to the plane on which the machine stands. These teeth vary in size, beginning at the bottom, of the length and diameter of half an inch, and increase in size toward the top, the upper ones being about two inches in length, and an inch in diameter at the base and taper to a point at the top. This plate as well as both the others is only of sufficient thickness to give the necessary strength, and the under side of it, when the machine is turned up, presents the appearance shown in Fig. 5, exhibiting the strap A A which is fastened to the under, or convex side, of the plate, and sustains the grinder, or movable plate, Fig. 2, which sets down upon it, its gudgeon, or shaft, passing through the orifice seen at its top B, Fig. 1, and through the cylindrical box B, Fig. 5, in which it is fitted to turn easily, and rests on its lower end on the top of the screw C, by which it is raised or lowered to adjust it properly. Its diameter is about twenty-seven inches at its base.

The movable plate, or grinder, Fig. 2, is of a shape, and dimensions, similar to the bottom plate, just described, being fitted as before mentioned, to set over the latter, and to stand on the end of its shaft upon the top of the adjusting screw, C, Fig. 5, before mentioned, coming so near only to the under plate as is necessary for grinding. This grinder as is seen upon its surface, has a like strip of diagonal teeth around its base, and the residue of its surface is also studded with perpendicular teeth similar to those described on the lower plate, Fig. 1, except that the diagonal teeth incline in a different direction on the surface. The inner surface of the grinder is also toothed precisely similar to the outer surface, so that when it is set over the lower plate, Fig. 1, the two surfaces of these plates that are presented to each other are prepared with similar teeth extending toward each other. Those on the grinder extending downward, and those on the plate below extending upward and presenting their points toward each other.

On two opposite sides of the grinder, and near the shaft, are the holes A and B, Fig. 2, of about seven inches in diameter, to admit the entrance of the unground bark to be ground in the lower grinding chamber of the mill. Through one of these holes at B, Fig. 2, are seen the teeth on the lower plate pointing upward, and the teeth on the inner surface of the grinder pointing downward, as they appear when these two plates are put together and before the outer plate, Fig. 3, hereafter described, is put on. These conical teeth on all the plates, are set in spiral lines winding around the cone from bottom to top as seen in the figure. This is done for the purpose of drawing in the bark and to enable the mill the better to feed and clear itself when in motion. On the grinder the lines in which the teeth are set tend downward in an opposite direction to its motion. On the lower as well as the upper plate hereafter described the lines of teeth descend in a contrary direction.

The shaft C D, Fig. 2, is short, being about fourteen inches in length, and is intended to be connected with a wooden shaft containing the wheel or lever through which the power is communicated to propel the grinder. The wings seen at D on the upper end of this shaft are let into the end of the wooden shaft in the ordinary way of connecting an iron gudgeon to a wooden shaft.

Its lower end, as at C, is square, and is inserted in a corresponding square mortise, cast in the upper end or apex of the conical grinder.

The shaft which sustains the grinder, and which is seen at E, Fig. 2, is not a continuation of the shaft C D seen in that figure, as the latter terminates in the square mortise at C. The shaft E is cast with the grinder, and extends perpendicularly from the top of its interior cavity nearly to the plane on which the mill stands, and rests on the top of the adjusting screw C inserted through the strap A A, as shown in Fig. 5, which, as before mentioned, exhibits the under side of the whole machine, or bottom plate Fig. 1.

The hollow cylindrical box B, Fig. 5 before described is cast on the interior of the bottom plate Fig. 1, and the passage through it, and in which the main shaft E Fig. 2 passes is a continuation of the orifice B Fig. 1. The grinder Fig. 2 being placed on the bottom plate Fig. 1, its shaft E Fig. 2 passing down through the orifice B Fig. 1 and resting on the adjusting screw C Fig. 5 as before described, the exterior plate, or outer shell Fig. 3 is put on and covers the whole, the entire machine then exhibiting the appearance shown in Fig. 4.

Fig. 3 is a conical shell, having a widening top, in the shape of an inverted cone to serve as a hopper in which is thrown the bark to be ground. The interior of this shell is also toothed like the interior of the grinder before described, and has a like strip of diagonal teeth corresponding to those on the upper side of the grinder, except that they incline on the surface in a contrary direction. The angle of inclination of the lower plate first described, and of the outer shell just mentioned, are such that the cavity between them, when they are put together, is wider at the top than at the bottom, and that of the grinder is still different, so that the sides of the grinder are alike distant from each of these plates at all points, in order that the bark, being in large pieces when introduced is easily admitted between the grinder, and the opposite plates, and as it is ground up it passes down through the more contracted passage, where the teeth are nearer together and finer, till it is finally cut sufficiently fine by the fine diagonal teeth between which it passes as it is discharged at the base of the mill.

At the base of the outer plate or shell Fig. 3 are flanges or ears L M N by which this plate is fastened down on the machine. This is done by the bolts L M N Fig. 1, passing through the holes seen in the ears L M N Fig. 3 as the outer shell is put on. And the wedges L and N Fig. 1, and that more clearly shown in Fig. 6, are slipped in between the ears here described, and similar ears on the bottom plate containing the bolts before mentioned. These wedges by a slot or mortise in front are made to stride the bolts, and by being driven up, or loosened, as occasion many require, raise or lower the upper plate, and thus the grinding in the upper chamber of the mill, that is, in the space between the grinder and the upper plate, is regulated by these wedges, and that in the lower chamber, or cavity, between the grinder and the lower plate, is regulated by the adjusting screw C Fig. 5, by raising or lowering the grinder as before described.

The three plates thus described, when put together and adjusted for use, present the exterior form, and appearance shown in Fig. 4, where the outer shell, or plate is put on, and adjusted by the wedges before described, and which are here seen inserted between the flanges cast on the upper, and lower plates at A A, B B, C C, and when so adjusted are screwed down and secured by the nuts upon the tops of these screws, as seen in the figure.

The machine thus put together, and the grinder, the edge of which is seen at D, being set in motion by a power applied to its shaft E, the bark lying in the hopper G H, is drawn into the respective chambers, both above and below the grinder. Into the latter by passing through the irregular holes in the upper part of the grinder, at A and B Fig. 2, and into the former by passing immediately down between the outer shell, and the upper surface of the grinder and is thus brought into contact with a very large amount of surface, extending, in each chamber from the center, or apex of the cone to the base, and the grinding is consequently rapid. The bark is introduced, and the large pieces broken up near the center, and adjoining the main shaft, where the circle of motion is small, and the greatest power is exerted. As the bark is broken up, it passes down into the more contracted portion of the respective chamber, where it is still held in contact with the grinding teeth, and finally is sufficiently pulverized, as it passes the still more contracted passage at the bottom of each chamber. The course of the bark in passing through the mill in both chambers, is outward from the center, and is therefore aided by the centrifugal force, created by the rapid circular motion of the grinder. The feeding, and discharge of the bark, is thus made easy and natural, and the mill does not clog or choke like those mills where the descent of the bark is perpendicular, or especially where the discharge is toward instead of from the center of motion.

If it is most convenient to apply the propelling power below the mill, this may be done by leaving off the strap A A Fig. 5, and lengthening out the shaft, allowing the same to rest on a step, at its lower end and applying a wheel, or lever at such point on the shaft, as may be convenient.

In the machine constructed for use, the diameter of each plate at the base is about twenty-seven inches, and the elevation of the whole machine exclusive of the hopper, is about eighteen inches. Leaving the space for the lower chamber, at the top, and adjoining the shaft, about five inches deep, and each of the chambers at the lower edge, or point of discharge, about one eighth of an inch, the orifice, or entrance at the bottom of the hopper is about fourteen inches in diameter.

I am aware that bark mills have been made with their grinding surfaces conical, and extending from the shaft outward, and that they have also been made with the runner having an inner and an outer grinding surface, but in the latter case the runner was not made conical, running outward from the shaft, and therefore I do not claim as my invention simply making the runner with an inner and outer grinding surface, nor do I claim making the grinding surface conical, irrespective of the double grinding surfaces, and I therefore claim as my invention—

1. Making the grinding surface of the runner inside and outside when it is conical, and extends from toward the shaft outward, as herein described.

2. And I also claim in combination therewith, admitting the bark to the inner grinding surface through holes made in the runner near to the shaft substantially in the manner described.

BACKUS A. BEARDSLEY.

Witnesses:
WILLIAM BAKER,
AARON HACKLEY.