C. J. BRADBURY.

Grinding-Cylinder for Paper-Pulp Engines

No. 163,728. Patented May 25, 1875.

Fig. 1.

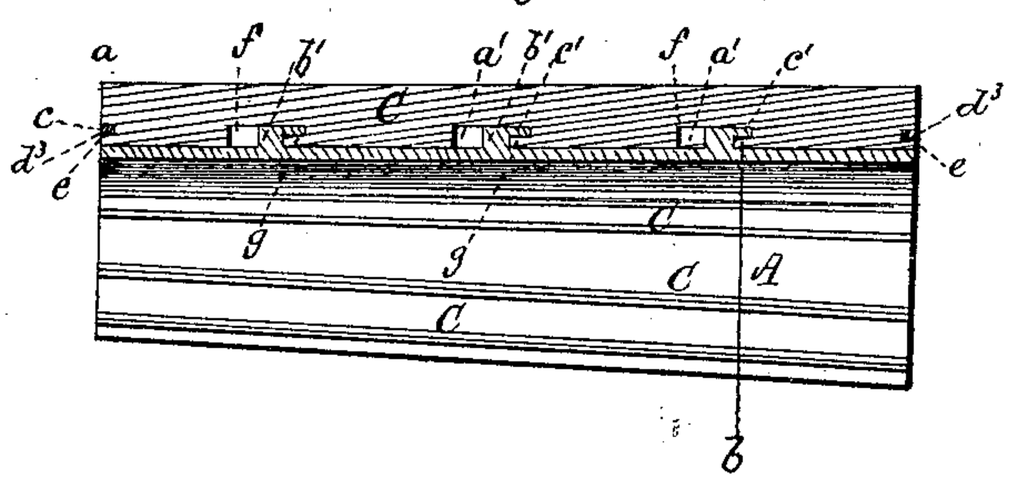


Fig. 2.

on line a.b. of Fig. 1.

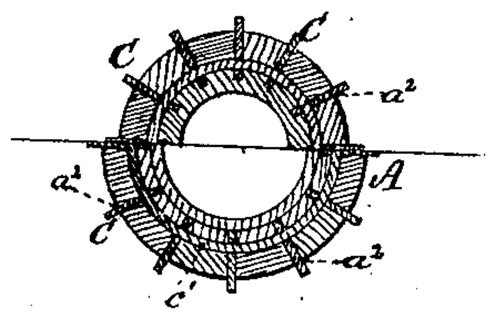


Fig. 3.

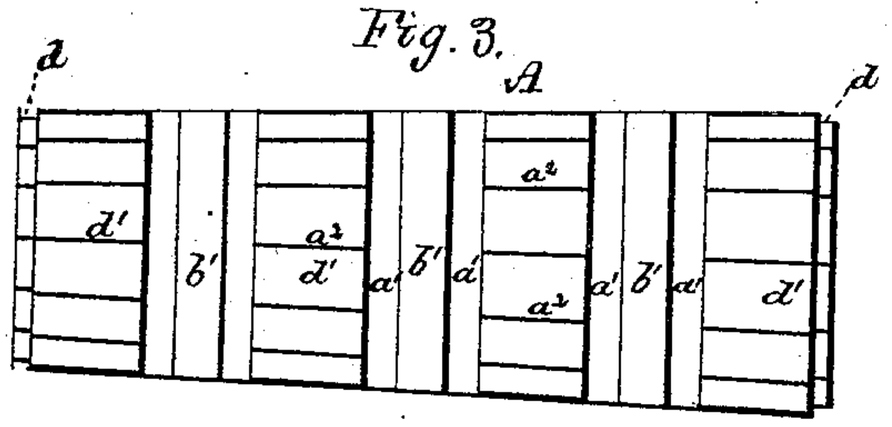
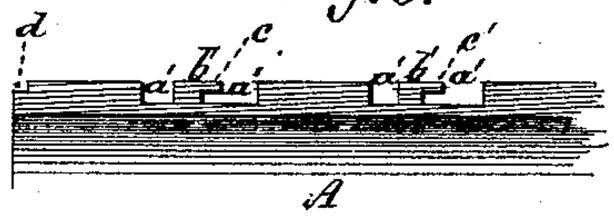


Fig. 4.

Fig. 5.



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UNITED STATES PATENT OFFICE.

CHARLES J. BRADBURY, OF LAWRENCE, MASSACHUSETTS, ASSIGNOR TO HIMSELF AND GEORGE W. RUSSELL, OF SAME PLACE.

IMPROVEMENT IN GRINDING-CYLINDERS FOR PAPER-PULP ENGINES.

Specification forming part of Letters Patent No. **163,728**, dated May 25, 1875; application filed April 26, 1875.

To all whom it may concern:

Be it known that I, CHARLES J. BRADBURY, of Lawrence, Essex county, Massachusetts, have invented certain Improvements in Grinding-Cylinders for Paper-Pulp Engines, of which the following is a specification:

This invention is based upon a class of pulp-engines shown in Letters Patent of the United States issued on the 18th day of May, 1858, to Joseph Jordan, Jr., and Thomas Eustice, and relates to means whereby the grinding-knives or blades of this or an analogous class of engines may be applied and removed very expeditiously and easily. The invention consists in confining the blades in place by a locking-attachment, substantially as hereinafter explained, and by bands or hoops shrunk upon the male grinder or shell, and inclosing the ends of the blades.

The drawings accompanying this specification represent in Figure 1 a sectional elevation, and in Fig. 2 a transverse section, of a portion of the roll or male grinder of a pulp-engine containing my invention. Fig. 3 is an exterior view of the roll A with blades removed, while Fig. 4 is a view of one of the grinding-blades, and Fig. 5 a section of a portion of roll A with the blades removed.

In these drawings, A denotes a frusto-conical cylinder or shell of a form and size adapted to the requirements of a paper-pulp engine, this tapering shell or male grinder being used in connection with and within a similarly formed cylinder, whose inner periphery is armed with a series of longitudinal blades or knives, after the manner of this class of pulp-engines as now extensively manufactured. The outer periphery of the male grinder or shell A is armed with a series of longitudinal blades, C C, &c., which entirely surround it, these blades operating with those of the outer or female grinder to grind or reduce the stock to pulp. Heretofore these blades C have been confined in place by being driven powerfully into longitudinal grooves cut in the periphery of the shell. When it becomes necessary to remove them, which usually occurs about twice in the year in a mill in constant use, they must each be driven out; and as they are originally driven into the grooves by great power, and become corroded after some use, it becomes a matter of great difficulty and loss of time to remove them, and in fact they are often broken off flush with the face of the roll or shell, and in such cases are extracted with great labor.

In carrying out my invention I create in the periphery of the shell A a series of longitudinal grooves, a^2, &c., substantially as now practiced, except that these grooves are of such width as to receive the grinding-blades loosely in lieu of very tightly, as heretofore, since in my case I only employ the walls of the grooves to obtain lateral steadiness of the blades, and not to hold the latter down in place. I next create in the periphery of the roll A a series of annular concentric channels, a^1, of a depth equal to that of the longitudinal grooves a^2, and undercut every other rib b' which intervenes between the channels, by which means I form an overhanging horizontal shelf or lip, c'. It will be seen that the grooves a^2 which receive the grinding-blades are continued through every alternate annular rib d^1, while the intervening ribs b' and their lips c' intercept or obstruct the said grooves. Upon one end of the male grinder or shell A I shrink a wrought-iron band or hoop, c, which is let into a rabbet, d, formed upon the shell, the diameter of this hoop c being such that a shallow space or notch, d^3, exists between the inner wall of the hoop and the bottom of each groove a. Upon each end of each blade or knife C I create a spur or lip, e, one of which enters and fills the notch d^3, the blades by this means being in part confined securely to the shell A. Furthermore, upon the lower edge of each blade or knife C I create a series of cross cuts or notches, f, upon one side of each of which is formed a tooth or shelf, g, the notches f serving to receive the spurs c', while the position of the teeth g are reversed end for end with respect to the spurs c', in order that the two series may intercept each other and interlock, as shown in the drawings.

The annular or peripheral channels a^1 constitute the means whereby the planer-tool

which plows the grooves a^2 is allowed to enter and leave such grooves without interfering with the ribs b'.

To apply the blades, they are laid in the grooves a^2, and pushed endwise in the proper direction until one end spur or lip e of each passes under the hoop c, and the two series of teeth g and c' intercept and interlock each other, and the blades are confined to the roll A. The opposite hoop c is now driven onto the rabbet in the opposite end of the roll and over the opposite lip e of each blade. A bar of wood is next driven between each bar, and the grinder is ready for use.

To remove the blades, the wooden fillings are first knocked off. It is then only necessary to give each blade a slight blow endwise, in a direction away from the stationary hoop, as this is all that is requisite to unlock the series of teeth g and c', and remove lip e of each blade from under the stationary hoop.

Heretofore the blades of these grinding-rolls have been composed of iron and steel welded, and are tapering in both directions transversely, and are produced at much cost, as one portion of the operation of producing them is to plane them in a planer. As they increase in thickness rapidly from the cutting-edge, they soon cease to grind effectively, and must often be removed and ground.

I produce my blades by punching them from thin steel of uniform thickness, and they retain their cutting-edges in the same condition, without removing or grinding, until worn out, and I thus effect a great economy of time and material. As my blades always present the same effective cutting or grinding edges the power required to drive the engine is always uniform, whereas in the tapering welded blade or bar the grinding-edge at once begins to increase in thickness, and to deteriorate, while, as a consequence, the power required to drive the engine must be increased.

I claim—

1. The blades C, formed with the notches f and shelves g, substantially as and for purposes stated.

2. The roll A, formed with the longitudinal grooves a^2, annular grooves a^1, and lips c', substantially as and for purposes stated.

3. The combination, with the roll A, provided with longitudinal grooves, as described, of the blades C, entering said longitudinal grooves, and provided with shelves or projections which engage in the undercut grooves, as shown and set forth.

4. The combination of the roll A, removable blades C, and hoops c c, substantially as and for purposes stated.

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Witnesses:

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