

(No Model.)

J. H. HORNE.

METHOD OF SECURING THE KNIVES IN PAPER PULP GRINDING ENGINES.

No. 294,387.

Patented Mar. 4, 1884.

Fig. 1.

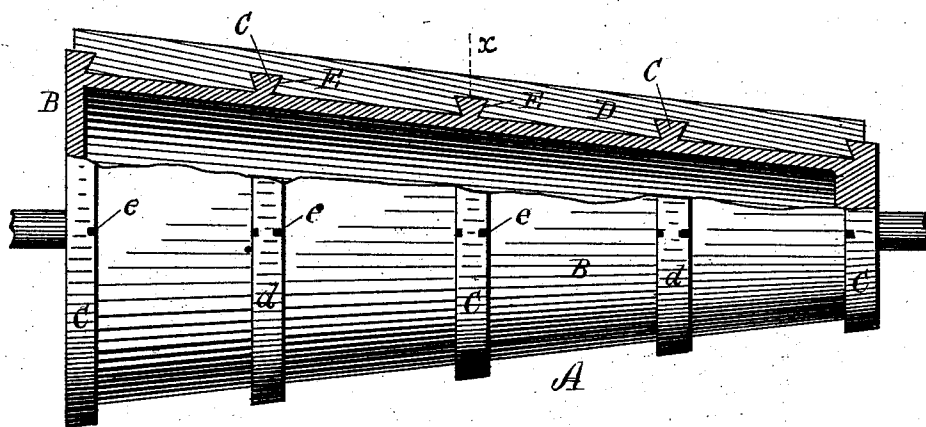
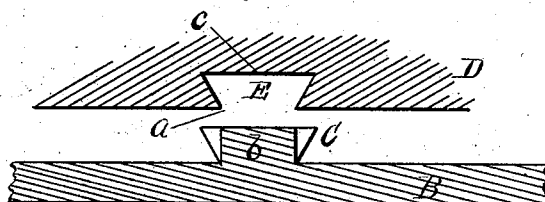


Fig. 2.



Witnesses.

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METHOD OF SECURING THE KNIVES IN PAPER-PULP-GRINDING ENGINES.

SPECIFICATION forming part of Letters Patent No. 294,387, dated March 4, 1884.

Application filed December 19, 1883. (No model.)

To all whom it may concern:

Be it known that I, JOHN HENRY HORNE, a citizen of the United States, residing at Lawrence, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in the Method of Securing the Knives in Paper-Pulp-Grinding Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

The object of this invention is to provide improved means for securing the knives to the grinding-rolls of pulp-engines; and the said invention consists in the peculiar construction and combination of the bar and the annular ribs, by means of which said knives are attached to the roll, as well as to the manner of inserting and locking said bars.

The class of engines to which this invention particularly applies—though it can be adapted to any shaped roll—consists of a shell in the form of a frustum of a cone, the inner periphery of which is furnished with knives, and a “plug” or cone of corresponding shape, but somewhat smaller, whose external periphery is likewise provided with knives. This cone fits into the shell above mentioned, and is capable of lateral adjustment therein.

Hitherto there have been various methods of attaching knives to grinding-rolls. Prominent among them are—

First. One in which the knives are secured to the plug or cone by a sliding bayonet-catch, and necessitates the cutting of parallel annular grooves with undercut slots upon the surface of the shell.

Secondly. The knives are provided with a series of lips, and the ribs upon the plug are recessed both radially and laterally to combine and unite with the lips on the knives; hence knives of different thickness cannot be inserted, as their thickness is limited by the width of the radial slots in which each fits.

Thirdly. The annular ribs are undercut and correspond to the bevel of the knife, but the knives extend only between two adjacent ribs.

This is in order to slip and lock them in place, and to so do the knife is held diagonally to the axis of the roll until it can be inserted between two ribs. It is then pushed up until it lies at a right angle to the ribs, by which means it is locked.

I will now proceed to describe in detail my method of securing the knives of grinding-rolls.

The drawings accompanying this specification represent, in Figure 1, a sectional elevation of a grinding-roll embodying my invention, and in Fig. 2 an enlarged vertical cross-section through one of the annular ribs at the point where the knives are inserted.

In such drawings, A represents the roll or “plug,” so called, of an engine belonging to the class above described. Upon this roll or cone is fitted a shell, B, of iron, brass, or other suitable material, upon which are cast ribs C C, &c., integral therewith; but I prefer in many cases to shrink on these ribs, which are cast or turned with a certain degree of under cut or bevel. To make this prominent, the bevel is somewhat exaggerated in the drawings, as it really is but very slight. These annular ribs are continuous and extend entirely around the surface of the cone, and there may be as many as thought necessary to securely fasten the knives to the roll. The knife, which is shown at D, is of steel and of the ordinary thickness of grinding-bars of this description; but its lower edge is provided with slots, in number equal to the number of ribs upon the roll, and are dovetailed or beveled to snugly fit the bevel on the ribs, that when the knife is in place it shall firmly rest on the shell B, while the ribs hold it from moving radially, and the usual wood filling prevents any lateral displacement arising from jars or blows incidental to work of this kind.

In order to introduce and lock the knives upon the roll, I take any point upon the ribs and draw a line in direct alignment with the longitudinal axis of the roll. At these points where said line cuts the ribs, I cut slots of any desired width, sufficient to admit a knife of the very heaviest description, these slots are to be all of the same width, and are not to be cut through the rib, but simply as shown in Fig. 2.

As shown in the drawings, the width of the openings *a a* on the knife corresponds nearly—but slightly larger—with the width *b b* of the ribs, where they unite with the shell *B* of the roll. The width of the upper portion, *c c*, of the slots *E E* in the knife corresponds with the greatest width of the ribs *C C*, as shown at *d d*, &c.; hence it is only necessary to cut away the rib, so that its narrowest portion shall extend to its outer surface. To insert the knife in the roll, it is now held in alignment with that point on the ribs, as shown in the drawings at *e e e*, &c., as cut away. It is then lowered gradually until its lower edge rests upon the surface of the shell, and any movement laterally in either direction locks it upon the roll. The knife is now pushed along until it is in its proper position, resting against a piece of wood filling, previously inserted, when a second knife is slipped in and wood filling laid between the two, and so on until the roll is completely filled.

To expedite the filling, I cut, diametrically opposite the first row of slots, a second row; hence, in filling, the first bar or knife inserted is pushed but ninety degrees or quarter around, when it reaches its proper position.

By this mode of fastening, I do away with a large amount of labor now expended in securing the knives to rolls by planing slots laterally and radially through the ribs, and hence can produce a finished roll much more expeditiously and cheaply. Moreover, by this method I can take any old roll, as heretofore made, turn off the slotted ribs, shrink on new ones, beveled in the manner described, insert new knives, and complete a roll to all intents and purposes new. Furthermore, the slots in the knives being made of a uniform shape to correspond to the shape of the ribs, any knife will fit any roll, provided they are of the same length, and, new knives being shipped, the roll can be filled at the mill.

It will be seen that a further advantage is obtained by my method, as it is evident that knives of any thickness can be inserted in the roll, as their introduction is dependent on the width of the slot *e*, and not on each individual slot, as heretofore. I therefore take the precaution to make the slot *e e* sufficiently wide at first to permit the insertion of the heaviest kind of knives.

I omitted to mention that in filling rolls of this type, in which one end is larger than the

other, it is found necessary to insert a short bar between each long one. This short bar extends to the middle of the roll. I therefore propose, in certain cases, to cut the long bars in the center, as shown in Fig. 1 by the dotted line *x*; hence all the bars will be of the same length and can be put in indiscriminately, the smaller end of the roll containing just half as many knives or bars as the large one, when filled and ready for use. Every other bar at the large end rests at the center of the roll in alignment with each bar at the small end, and forms, to all intents and purposes, an integral bar. By this means a roll can be filled more expeditiously.

I am aware that it is not new to attach grinding bars or knives to the exterior of a cone or roll used in paper-grinding by means of dovetailed recesses in said knives and dovetailed and slotted ribs on said roll, the knives or bars being introduced into the slots of said ribs and spring laterally, so that the dovetailed surfaces will engage and interlock. I am also aware that knives or bars have been fitted upon ribs, (some of the ribs and recesses in the knives being dovetailed,) clamping devices being used in addition to hold said knives or bars on the cone.

I claim—

1. A pulp-grinding cone having a series of dovetailed annular ribs cast therewith or shrunk thereon, each rib being recessed on the same longitudinal line, so as to leave its external width at that point no greater than the width of its base or line of junction with said cone, substantially as set forth.

2. A series of bars for the knives of a pulp-grinder, each bar being provided with a series of dovetailed or inwardly-flaring slots or recesses, in combination with a grinding device having a series of dovetailed annular ribs corresponding, respectively, in position to said slots, each rib being recessed on the same longitudinal line, so as to leave its width at that point uniform from the outside to the base, said width corresponding to the width of the neck of corresponding slot or recess in the bars, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN HENRY HORNE.

Witnesses:

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A. F. HAYDEN.