(No Model.)

F. KURTZ.

MACHINE FOR GRINDING PAPER STOCK.

No. 343,714. Patented June 15, 1886.

Fig. 1.

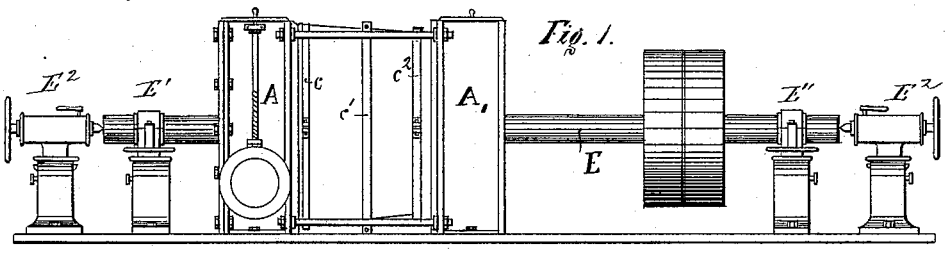


Fig. 2.

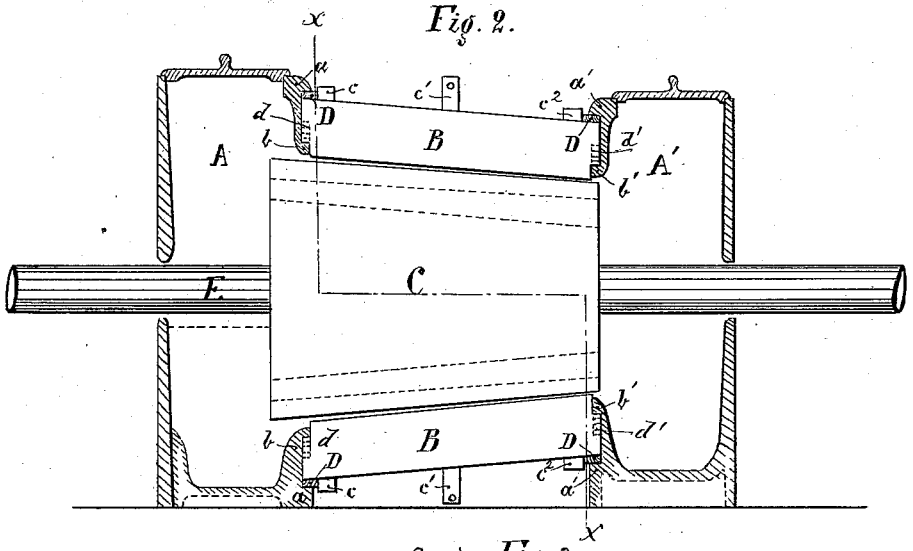
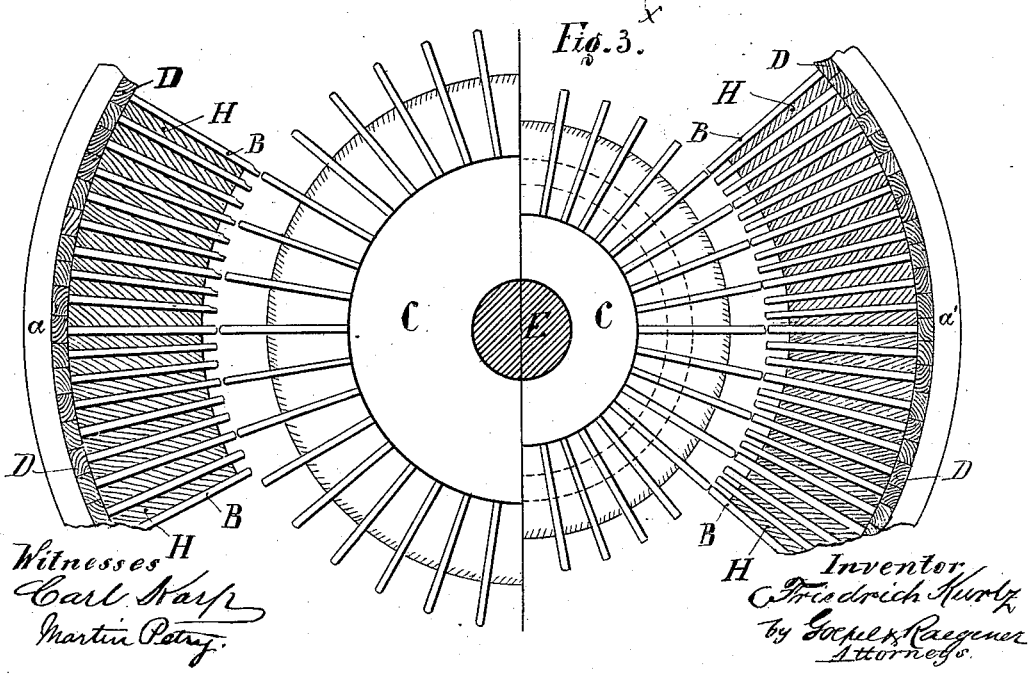


Fig. 3.



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UNITED STATES PATENT OFFICE.

FRIEDRICH KURTZ, OF NIEDER-MARSBERG, WESTPHALIA, PRUSSIA, GERMANY.

MACHINE FOR GRINDING PAPER-STOCK.

SPECIFICATION forming part of Letters Patent No. 343,714, dated June 15, 1886.

Application filed October 8, 1885. Serial No. 179,313. (No model.)

To all whom it may concern:

Be it known that I, FRIEDRICH KURTZ, of Nieder-Marsberg, in the Duchy of Westphalia, Prussia, Empire of Germany, have invented certain new and useful Improvements in Machines for Grinding Paper-Stock, of which the following is a specification.

This invention relates to an improved machine for grinding paper-stock; and the invention consists of the combination of an interior rotary cone having radial cutters and a surrounding shell provided with cutters, said cutters being retained by intermediate wooden blocks, and adjusted by wedge-keys. The shell is supported by flanged rings of upright casings, through openings of which the shaft of the cone passes. The cutters of the shell are reset by means of interposed supporting-rings when worn out, as will be more fully described hereinafter, and finally be pointed out in the claims.

In the accompanying drawings, Figure 1 represents a side elevation of my improved machine for grinding paper-stock. Fig. 2 is vertical longitudinal section of the grinding-cylinder drawn on a larger scale; and Fig. 3 is an enlarged vertical transverse section of the same on line *x x*, Fig. 2.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A and A′ represent two upright casings, the inner walls of which are provided with circular openings, surrounded by ring-shaped flanges *a a′* and *b b′*.

Between the flanges *a a′* and *b b′* are supported a number of steel or bronze cutters, B, which are held radially in position by means of intermediate tapering blocks of wood, H, so as to form a shell or casing that surrounds concentrically an interior rotary cone, C. The cutter B and the intermediate blocks, H, are rigidly secured to the flanges *a a′ b b′* by wooden keys D, and the entire shell bound together by the hoops *c c′ c²*. The outer flanges, *a a′*, are provided at the top of the casings A A′ with small recesses, (not shown in the drawings,) through which the cutters B and blocks H are inserted for being placed in position. The wooden blocks H are shorter than the cutters B, so that the latter project at their inner ends beyond the blocks. The wooden blocks H and keys D are placed in position and driven home while in a dry state, so that when the wet stock is supplied to the machine they begin to swell, and form thereby a conical shell, that is as firm and tight as if it were made of one piece. The interior rotary cone, C, is provided with radial cutters, that are arranged with a suitable degree of inclination to the longitudinal axis of the cone. The cone C is attached to a shaft, E, that passes through circular openings in the outer walls of the casings A A′, and turns in suitable journal-bearings, E′, and adjustable centers E², as shown in Fig. 1, by which latter the shaft is longitudinally adjustable, so that the position of the cone can be accurately set toward the surrounding shell. The wear of the steel cutters B is slow; but in case they are worn out by long use they can be utilized by recessing their ends and moving them inwardly, which requires, however, the driving in of thicker keys D for the rigid fastening of the cutters. The readjustment of the cutters B can also be accomplished in such a manner that several concentric rings are placed in position on the inner flanges, *b b′*, to which the recessed ends of the cutters B are fitted, as shown in dotted lines in Fig. 2. As the cutters are worn off, the rings are gradually removed, whereby all the cutters are brought closer to the cone C. The outer wall of the casing A is screwed to the body of the casing, so as to permit the removing and replacing of the cone C and its proper adjustment to the shell. The casings A A′ are connected by longitudinal steadying-bolts, as shown in Fig. 1. The end walls of the casings A A′ are cast in such a manner that the parts above the shaft-openings are thicker than the parts below the same, the upper being made tapering in upward direction and the lower parts tapering toward the shaft-openings, so that both sections of the end walls are of greater thickness at the lower ends, as shown in Fig. 2. By this arrangement the paper-stock is directed toward the center of the trough-shaped lower parts of the casings A A′, and its adhering to the end walls obviated. The casings A A′ form chambers at both ends of the grinding cone and shell, in which the stock is collected, without

requiring stuffing-boxes for the shaft E, which has the advantage that the stock is not mixed with lubricating material and deteriorated thereby.

Some kinds of stock employed in the manufacture of paper require a quicker grinding action, which is effected by a more inclined adjustment of the cutters of the cone toward the axis of the same. For grinding up the common stock, that is mostly used, it is best to round off the edges of the cutters of the cone C and shell, which has the effect that the stock is pulled apart to some extent, instead of being cut up. The supply of stock has to be so regulated that it remains always a short distance below the shaft E, as indicated by the dotted line in Fig. 2.

The advantages of my improved mill for grinding paper-stock are as follows: A considerable saving of space, as a number of rag-engines are dispensed with; an increased capacity and uniform grinding of the stock, whereby finer and better interfitting fibers and fewer lumps in the stock, and thereby a uniform paper with less waste, are obtained.

Another advantage consists in the facility by which the grinding-machine can be taken apart for being cleaned, and by which it can be adjusted so that the stock can be ground in any manner, short or long, and quick or slow, as desired.

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

1. The combination of a rotary grinding-cone having radial cutters, supporting-casings forming chambers at both ends of the cone, and a stationary shell surrounding the cone and provided with longitudinal cutters, substantially as set forth.

2. The combination of a rotary grinding-cone having radial cutters, casings forming chambers at both ends of the cone, and a stationary shell supported by flanges of the casings and formed of longitudinal cutters, intermediate wooden blocks, and locking-keys, substantially as set forth.

3. The combination of the casings A A′, having ring-shaped flanges *a b* and *a′ b′* at their inner ends, and stationary shell formed of longitudinal cutters B, intermediate blocks, H, and keys D, substantially as specified.

4. The combination of the casings A A′, having ring-shaped flanges *a b* and *a′ b′* at their inner ends, and a stationary shell supported by said flanges and formed of cutters B, having recessed ends, intermediate blocks, H, locking-keys D, and exterior hoops, *c c′ c²*, substantially as described.

5. The combination of the casings A A′, having ring-shaped flanges *a b* and *a′ b′*, longitudinal cutters B, having recessed ends, intermediate blocks, H, keys D, and rings *d d′*, interposed between the inner flanges, *b b′*, and the shoulders of the cutters, to permit the forward adjustment of the same, substantially as set forth.

6. In a machine for grinding paper-stock, the casings A A′, open at their inner ends, and having shaft-openings in their outer walls, said casings forming chambers for collecting the stock, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

FRIEDRICH KURTZ.

Witnesses:

CARL SCHMIDT,

CARL AUG. SCHMIDT.