

No. 820,522.

PATENTED MAY 15, 1906.

H. G. SAECKER.  
PAPER STOCK REFINING ENGINE.  
APPLICATION FILED OCT. 9, 1905.

2 SHEETS—SHEET 1.

Fig. 2.

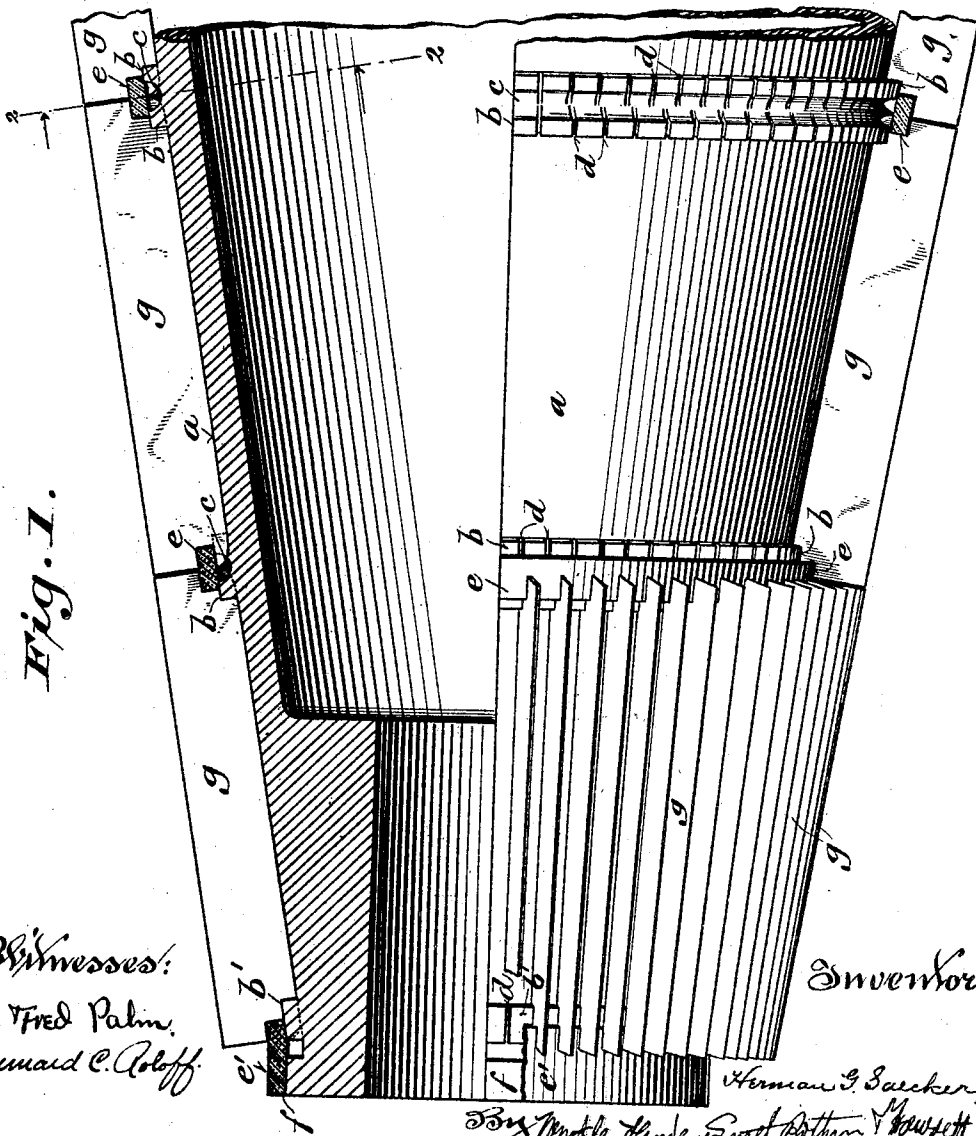
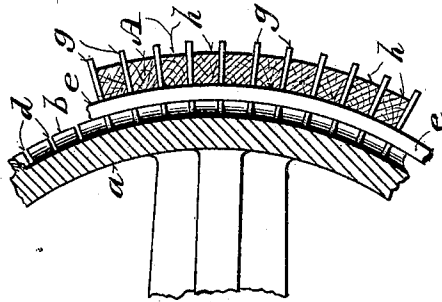


Fig. 1.

Witnesses:  
Fred Palm,  
Bernard C. Coloff.

Inventor:

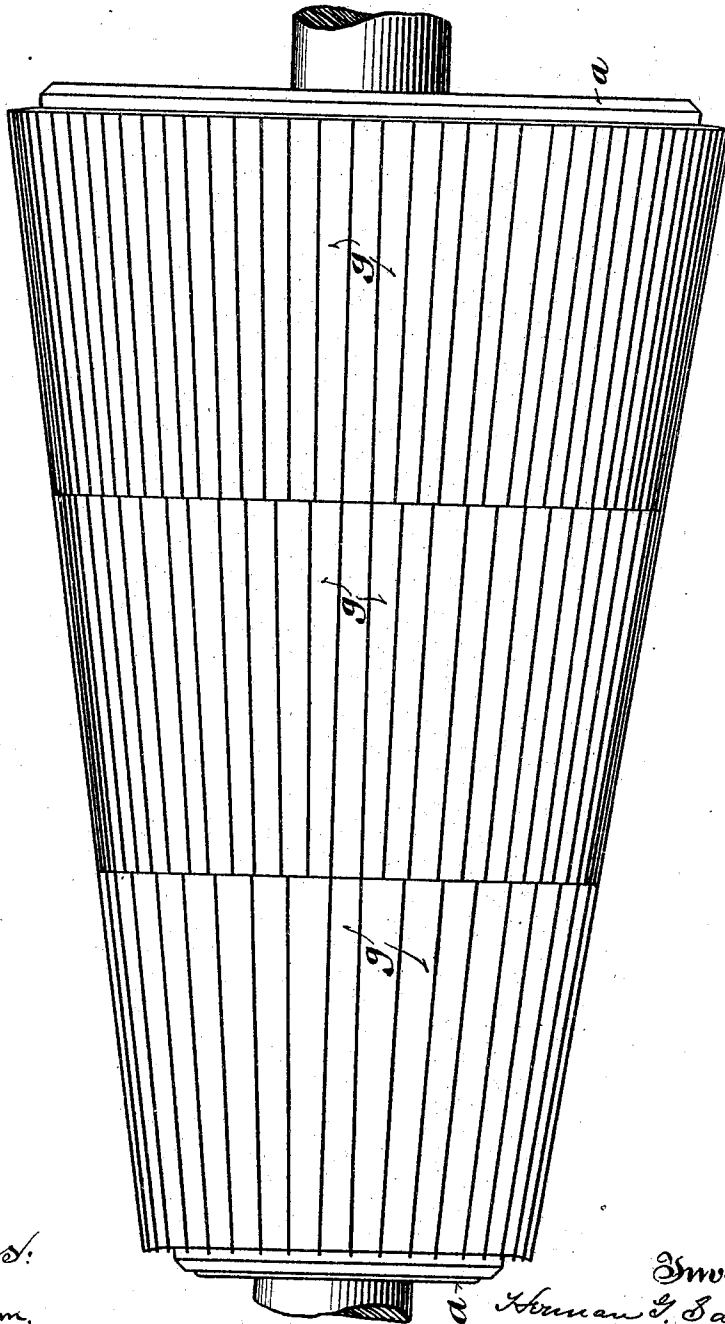
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2 SHEETS—SHEET 2.



*Fig. 3.*

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*Fred Palm.*  
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# UNITED STATES PATENT OFFICE.

HERMAN G. SAECKER, OF APPLETON, WISCONSIN.

## PAPER-STOCK-REFINING ENGINE.

No. 820,522.

Specification of Letters Patent.

Patented May 15, 1906.

Application filed October 9, 1905. Serial No. 282,062.

To all whom it may concern:

Be it known that I, HERMAN G. SAECKER, a citizen of the United States, residing at Appleton, in the county of Outagamie and State of Wisconsin, have invented certain new and useful Improvements in Paper-Stock-Refining Engines, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

This invention relates more particularly to the arrangement of the knives or blades and the means of securing them in place upon the conical cores of machines for reducing paper-pulps to a finely-comminuted condition. Its main objects are to increase the capacity of machines of this class having cores of a given size, to facilitate arranging and fastening the blades in place on the cores, and generally to improve the construction and operation of such machines.

It consists in certain novel features of construction and in the peculiar arrangement and combinations of parts, as hereinafter particularly described, and pointed out in the claims.

In the accompanying drawings like letters designate the same parts in the several figures.

Figure 1 is a view, partly in longitudinal section and partly in elevation, of a portion of the conical core of a paper-stock-refining engine embodying the invention, the spacing-pieces between the knives and a part of the knives being omitted. Fig. 2 is a fragmentary cross-section on the line 2 2, Fig. 1; and Fig. 3 is a diagrammatic elevation of the core, showing the arrangement of the knives.

*a* designates the core, which is formed at intervals between the ends and at the ends with outwardly-projecting annular belts *b* and *b'*. The intermediate belts between the ends of the core are formed in their outer faces with central longitudinal channels *c* and with cross-grooves *d* running lengthwise of the core, the grooves on each side of the central channel in each belt breaking joints with those on the opposite side except at one point in the belt, and there being a greater number of grooves on that side, which is of the greater diameter. Annular knife-retaining bands *e*, preferably of rectangular cross-section, as shown, are fitted upon the belts *b* over the central channel *c* therein, the outer faces of the belts being tapered to correspond with the tapering surface of the core between the belts, as shown in Fig. 1.

The end belts, in which a single set of knives are held, have, unlike the intermediate belts, but a single set of cross-grooves, and at the smaller end of the core a cylindrical belt *f* is formed, corresponding in height with the adjacent belt *b'* and separated therefrom by a space or groove. An annular band *e'*, fitted upon the cylindrical end belt *f*, is made to partially overlap the adjacent tapering belt *b'*.

*g g* are the knives or blades which are arranged in several series or sets around the core between the several belts and bands *b* and *e*. They are fitted and held at their inner edges or backs and at their ends in the cross-grooves of the belts *b* and *b'* and are notched in the ends to engage with the retaining-bands *e*.

In assembling the parts the largest band is driven into place or shrunk upon the belt at the larger end of the core. The knives of the first set or series are set in position in engagement at one end with said band and at both ends with corresponding cross-grooves *d* in the proper belts, and the next smaller band *e* is then forced into place or shrunk upon the next smaller belt in engagement with the converging ends of the assembled knives. The knives of the succeeding sets are arranged and secured in position in like manner, the last set being fastened by the band *e'* at the smaller end of the core. In this way the knives of the several series or sets are properly spaced, easily and quickly assembled, and securely fastened and held in place on the core, with their backs or inner edges resting firmly against its conical or tapering faces between the annular belts, the grooves *d* corresponding in depth with the height or thickness of the belts.

Spacing strips or blocks *h*, of wood or other suitable material, inserted between the knives, as shown in Fig. 2, stiffen and support them laterally between the belts and bands, by which they are secured at their ends.

In machines of this kind the core is inclosed in a casing which is of corresponding form and is provided on the inside with longitudinal blades or knives, and the paper-stock which is to be refined is fed into the smaller end of the machine between the opposing knives on the core and in the case and is discharged from the larger end of the machine. On account of the divergence of the knives and the increasing space between them toward the larger end of the core the greater part of the work is done

by the ends of the knives, which converge or approach each other. It has been customary heretofore to arrange the knives on the cores in continuous lengths or rows extending from end to end and in half lengths or rows extending from about the middle to the larger end of the core midway between the other rows. With this arrangement the greater part of the work of refining the paper-stock is done by comparatively short portions of the knives adjacent to the smaller end and to the middle of the core, while the remaining portions along the greater part of the length of the core have done very little work. By arranging the knives, as shown in Fig. 3, in several sets or series around the core, so as to break joints at their ends, and by increasing the number of knives in the successive sets or series from the smaller toward the larger end of the core the work is more evenly distributed and the capacity of a machine of any given size is materially increased, the paper-stock being subjected at comparatively short intervals as the core enlarges to the action of an increasing number of knives.

The several sets or series of knives or blades may for convenience of construction and assemblage be started, as shown in Fig. 3, in line with each other on one side of the core; but they may be otherwise arranged, and any desired number of series or sets of knives breaking joints at more or less frequent intervals in the length of the core may be employed.

Various changes in the minor details of construction and arrangement of parts may be made within the principle and intended scope of the invention.

I claim—

1. In a paper-stock-refining engine, a conical core formed with outwardly-projecting annular belts which are grooved at intervals lengthwise of the core, annular bands fitted on said belts, and knives fitting into the grooves in said belts and notched in the ends to engage with said bands, substantially as described.

2. In a paper-stock-refining engine, a conical core formed at intervals in its length with outwardly-projecting annular belts which are formed with longitudinal channels in their outer faces and on opposite sides thereof with grooves running lengthwise of the core, grooves on opposite sides of the channel in

each ring breaking joints with each other, annular knife-retaining bands fitted on said belts, and knives fitting at their backs and ends into grooves in said belts, and notched in the ends to engage with said bands, substantially as described.

3. In a paper-stock-refining engine, a conical core formed at intervals in its length with outwardly-projecting annular belts which are formed at intervals with cross-grooves running lengthwise of the core and extending to the depth of the surface of the core between said belts, annular knife-retaining bands fitted upon said belts, and knives fitting at their backs and ends into said grooves and notched at the ends to engage with said bands, the backs of the knives bearing against the surface of the core between the belts and bands, substantially as described.

4. In a paper-stock-refining engine, a conical core formed at intervals in its length with outwardly-projecting annular belts which are formed at intervals with cross-grooves running lengthwise of the core, annular bands fitted on said belts, knives fitting at their backs and ends into said grooves and notched in the ends to engage with said bands, and spacing-pieces fitted between the knives and supporting them laterally between said bands, substantially as described.

5. In a paper-stock-refining engine, the combination of a conical core formed at the smaller end with a plain cylindrical belt and at intervals between the ends and adjacent to the cylindrical belt with tapering belts, which are formed with radial cross-grooves running lengthwise of the core, the intermediate belts each having a longitudinal channel in its outer face and cross-grooves on opposite sides of the channel out of line with each other, annular bands fitted on said belts, the band at the smaller end of the core being fitted on the cylindrical belt and the adjacent tapering belt which it overlaps, and knives fitting at their backs and ends into corresponding grooves in adjacent belts and being notched in the ends to engage with corresponding bands, substantially as described.

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

HERMAN G. SAECKER.

Witnesses:

H. E. POMEROY,  
P. M. CONKEY.