(No Model.) 3 Sheets—Sheet 1.

J. R. ABBE.

Paper Pulp Engine.

No. 235,844. Patented Dec. 28, 1880.

Fig. 1.

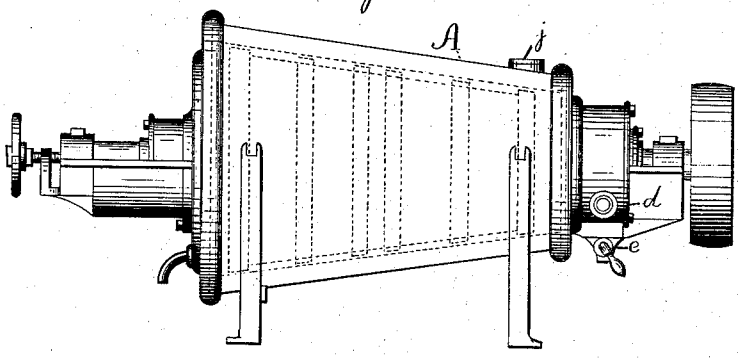


Fig. 2.

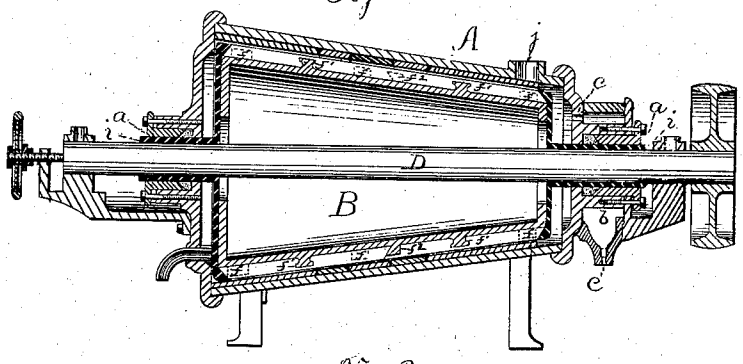
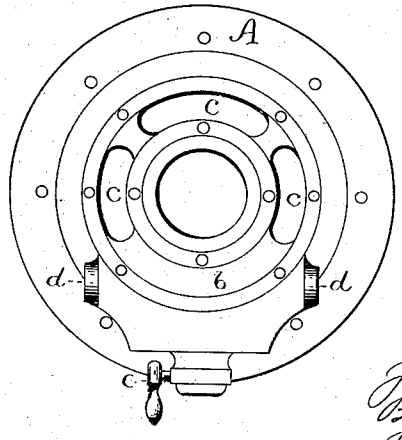


Fig. 3.



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Fig. 4.

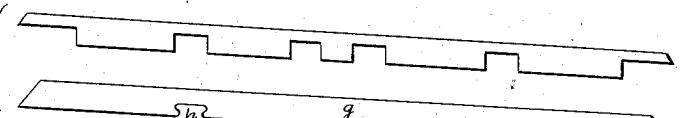


Fig. 5.

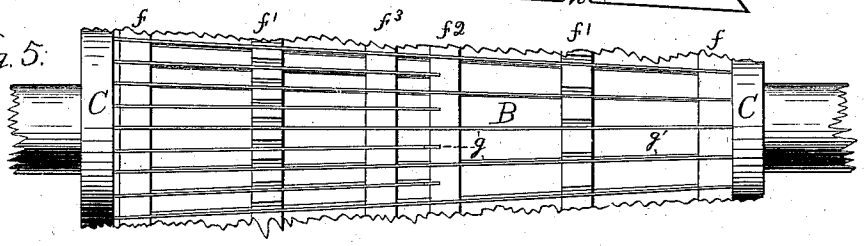


Fig. 6.

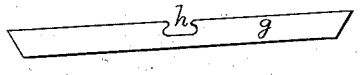


Fig. 8.

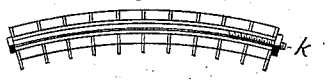


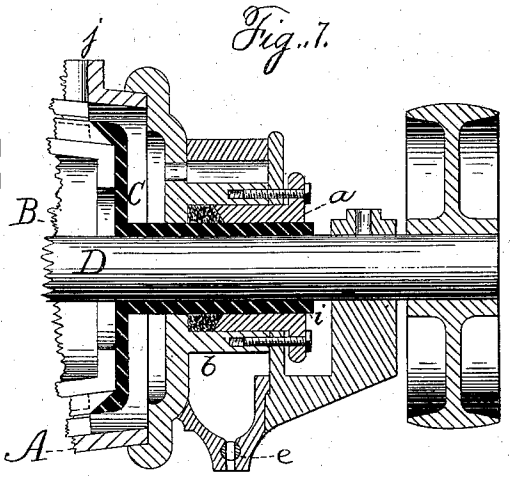
Fig. 9



Fig. 10



Fig. 7.



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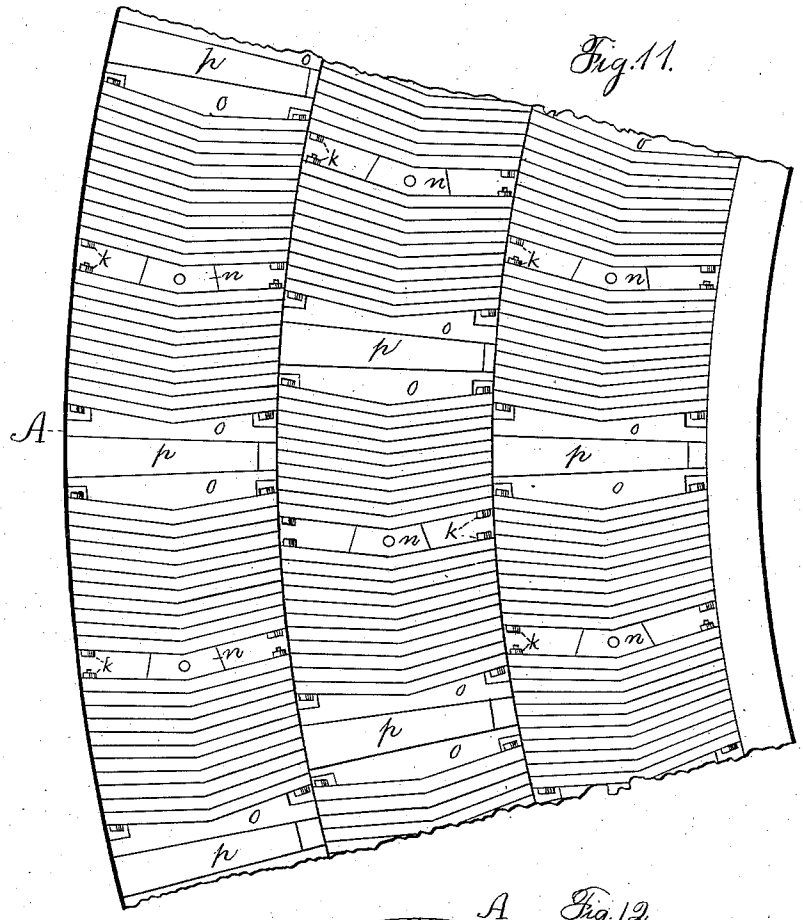
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J. R. ABBE.

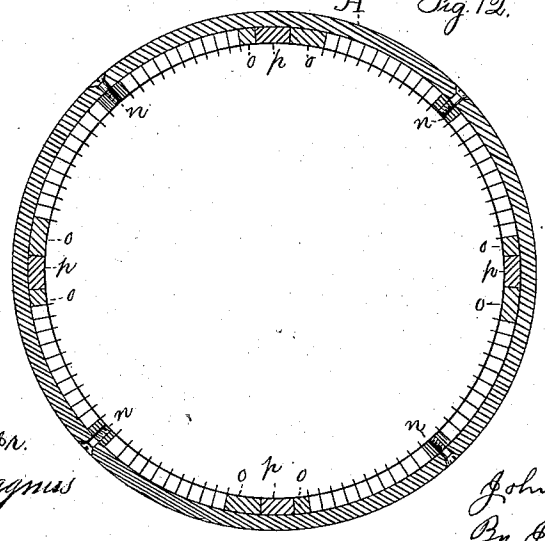
Paper Pulp Engine.

No. 235,844. Patented Dec. 28, 1880.

Fig. 11.



A Fig. 12.



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UNITED STATES PATENT OFFICE.

JOHN R. ABBE, OF SOUTH WINDHAM, CONNECTICUT.

PAPER-PULP ENGINE.

SPECIFICATION forming part of Letters Patent No. 235,844, dated December 28, 1880.

Application filed June 30, 1880. (No model.)

To all whom it may concern:

Be it known that I, JOHN R. ABBE, of South Windham, in the county of Windham and State of Connecticut, have invented certain new and useful Improvements in Paper-Pulp Engines, of which the following is a specification.

My improvement relates to paper-pulp engines, the construction of which is hereinafter fully described; and the objects of my improvement are, first, to so simplify the construction of the machine that the knives and woods in both the male and female members of the engine may be readily inserted by an unskilled person, and thereby save the necessity of returning the machine or parts of it to the factory where it is made for the purpose of repairing the knives; second, to provide a receiving-chamber through which to admit the stock, and which will retain sand, bits of steel, or other substance, and thereby prevent them from dulling the knives; and, third, to so construct the parts, especially in relation to the bearings, that they may be easily refitted and also made durable. I attain these objects by means of the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation. Fig. 2 is a longitudinal and vertical section. Fig. 3 is a side elevation of the outer shell or case with the end caps removed. Fig. 4 is a side elevation of one of the woods and long knives. Fig. 5 is a side elevation of a portion of the cone carrying the knives. Fig. 6 is a side elevation of one of the short knives. Fig. 7 is a vertical section of a portion of the machine, but on a larger scale than a like view, Fig. 2. Fig. 8 is an end view of a gang of knives for filling the outer shell. Fig. 9 is a side view of one of said knives. Fig. 10 is a side elevation of a knife-frame. Fig. 11 is a developed view of the interior of the outer shell, showing its knives; and Fig. 12 is a vertical transverse section of the shell.

Many of the parts of my machine are substantially the same as those in common use, and such parts I consider unnecessary to specifically describe.

A designates the principal shell or case, which, aside from the manner of inserting the knives, is substantially the same as those in common use. This case is provided at each end with a suitable stuffing-box or gland, *a*, which is of ordinary construction, except that it is fitted to the hubs of the cone B instead of to the shaft which carries said cone.

At the small end of the shell, and surrounding the stuffing-box, I form an annular chamber, *b*, the same being divided from the chamber of the main case or shell A by a partition, but having openings *c* in said partition extending from one chamber to the other. By reference to Fig. 3 it will be seen that these openings do not extend to the bottom of said annular chamber *b*.

In using this machine stock is admitted through the inlets *d* into the chamber *b* near the bottom of said chamber, from whence it passes upward through the opening *c* into the chamber of the main case A, when the knives act upon it in the usual manner. In case sand, iron, or other foreign substance is in the stock, it will settle to the bottom of this chamber and not pass upward into the chamber containing the knives, and thereby said sand, steel, or other foreign substance will not dull said knives, as would be the case if the stock were admitted directly into the chamber containing said knives.

The stop-cock *e* at the bottom of the chamber *b* permits the removal of sand and other foreign matter from the receiving-chamber.

The next part of my invention relates to the peculiar construction of the cone. First, I provide a cone having ribs projecting from its general surface a little less than the width of the knives to be employed. Three of these ribs, *f f f*, may be of any desired form, but preferably with plain sides. Two of them, *f'* and *f'*, are made dovetail or T shape in cross-section, as shown in Fig. 2, and the rib f^2 is beveled under upon one side, as shown at the lower side of Fig. 2. These ribs are slotted with a slot of a thickness which will just admit the knives to be employed, the slots upon the ribs *f* and f^2 being in one and the same line, while the slots in the ribs *f'* are thrown a little to one side of the line which passes through the other slots by a distance about equal to the thickness of the knives. The

depth of the slots extends to the general surface of the cone, or, in other words, the full depth of the ribs.

The knives *g*, Figs. 4 and 6, are preferably beveled at their ends, and they are provided with notches *h*, of a shape corresponding to a transverse section of the ribs *f'*. These knives may be made from ordinary flat strips of sheet-steel.

The slots in the ribs of the cone can be very readily cut on an ordinary planer, with the slots in the ribs *f'* out of line with the slots in the other ribs, by setting the cone upon centers and rocking it a little on said centers when the chisel is passing through the ribs *f'*, and after it leaves one of said ribs, and before it reaches one of the other ribs, it can be rocked back again, so that the chisel will pass through on a line with the first slot cut by it. Suitable machinery can be readily devised to stop the cone in its proper position during the planing process. After the knives and cone have been prepared, in order to insert them it is only necessary to spring them a little out of a straight line, so as to enter into all the slots in the ribs, and then crowd them down to the bottom of the ribs, when the opening *h* in the knives will receive the ribs *f* and *f'* and allow the knife to straighten itself by springing into position, as shown most clearly in Fig. 5, in which position the solid part of the hooked rib is in the notch or recess of the knife, and prevents the same from being detached from the cone, except by springing the knife far enough to one side to bring it into the offset slot of the rib *f'*. The short knives, Fig. 6, are secured in place in the same manner, only they take upon but one of the ribs *f'*. In addition to this fastening of the short knives, one end is passed under the beveled side of the rib f^2. As in other engines of this class, veneered or other woods are placed between each of the knives to fill the space between them nearly solid. A flange or plate, C, the inside of which is beveled under to correspond with the bevels on the ends of the knives *g*, is then firmly bolted to the ends of the cone, as shown. This plate C is also provided with a collar or hub, *i*, which hub constitutes the journal upon which the cone revolves.

The cone may be secured to the main shaft D independently of the plate C and its hub *i*, or the cone may be secured to the shaft through the plate C and its hub *i*. By making the hub *i* of the plate C at the end of the cone constitute the journal upon which the cone revolves, said journal may be readily redressed when worn, and thereby the shaft D may be made to last for a long time.

Although I have specified that the inlet for the stock was at *d*, I have also provided an inlet, *j*, in the upper part of the case A, by means of which sand may be admitted for the purpose of grinding the knives in the ordinary manner, and which inlet also may, if desired, be used to admit sizing.

The third part of my invention relates to the manner of securing the knives within the outer shell, and the main feature of this part of the invention resides in arranging the knives with the woods between them in gangs and on the proper curvature to fit the shell, so that they may be readily inserted by an unskilled workman. An end view of one of said gangs of knives and the woods between the knives is represented in Fig. 8.

As in ordinary knives, there is a bend or angle at the middle portion, and I prefer to make these knives with the ends notched, as shown by the side view, Fig. 9. A gang of them with the woods between are held in place by curved bolts, like the bolt *k* in Fig. 8, there being one of these bolts at each end of the knives. Instead, however, of using bolts, a frame may be employed like that shown in Fig. 10, which consists of a wire bent into the desired form and with nuts upon the ends, and in which the arms *l l* are curved and take the place of the bolt *k* in Fig. 8, while the cross portion *m* serves as the head of the bolts. Rivets might also be employed in place of the bolt *k*, if desired. These knives are arranged, preferably, in three sections in the length of the shell, and the gangs which are fitted for each section will be upon a different curvature, according to the difference in the diameter of the shell. I secure lugs or blocks *n* to the inner walls of the case or shell at the proper distance apart, which lugs may be secured by means of a screw or bolt passing through the shell A. In securing the knives within the shell I place two gangs between each pair of lugs *n*, and then place two gibs, *o o*, properly formed to fit the knives, and between said gibs I force a wedge or key, *p*, which firmly secures the knives in place. The spaces between the other lugs are filled in like manner until the knives, lugs, gibs, and keys or wedges complete the entire circle of the shell. The other circles of knives are inserted in like manner, care being taken to have the number of knives in each gang, or the size of the gangs, of such relative proportions to each other that the space in one circle which is occupied by the lugs *n* and the gibs and keys *o p o* shall always be opposite knives in the adjoining circle; or, in other words, the knives in the respective circles are arranged so as to break joints.

Many of the details in my improvements may be varied without changing the character of the invention, the essential features of which have been heretofore pointed out. These machines are sometimes used to revolve in one direction and sometimes in another, which should be taken into consideration in building the machine. For instance, the offset slots in the ribs *f'* should be so located as to be on the front side of the knife as it revolves, so that in case the knife should by any reason be permitted to move a little it would not be forced toward the slot and thereby detached from the rib.

I claim as my invention—

1. In a paper-pulp engine having a chamber which carries the knives, the receiving-chamber *b*, separated from the chamber containing the knives by a partition, but connected therewith by one or more openings, substantially as described, and for the purpose specified.

2. In a paper-pulp engine, the main case A, containing a chamber with knives, and the receiving-chamber *b*, both of which chambers are provided with an inlet and outlet, substantially as described, and for the purpose specified.

3. The cone provided with a series of ribs, part of which are cut under upon their sides, and with the cut-under ribs slotted longitudinally with the cone, but out of line with the slots in the other ribs, substantially as described, and for the purpose specified.

4. The combination of the cone provided with a series of slotted ribs, part of which are cut under and slotted out of line with the rest, in combination with the knives notched or recessed upon their inner edge, so as to take upon the sides of the cut-under ribs, substantially as described, and for the purpose specified.

5. The cone carrying a series of knives beveled at their ends, in combination with the plates C, beveled under, as described, and secured to the ends of the cone, so as to embrace the ends of the knife, substantially as described, and for the purpose specified.

6. The cone having a series of long and short knives provided with a rib or flange, f^2, cut under upon one side, in combination with the flange or plate C, secured upon the end of the cone, said rib and plate embracing the end of the short knives, substantially as described, and for the purpose specified.

7. In a paper-pulp engine, the cone provided with the tubular hub *i*, which embraces the main shaft D, and the periphery of which hub constitutes the journal upon which the cone revolves, substantially as described, and for the purpose specified.

8. In a paper-pulp engine, a series of knives and woods secured together in a gang, and arranged upon the arc of a circle to conform to the inner walls of the shell, substantially as described, and for the purpose specified.

9. In a paper-pulp engine, a detached gang of knives and woods secured together by means of the curved bolts *k*, or their equivalent, substantially as described, and for the purpose specified.

10. The combination of the case or shell A, lugs *n*, the gangs of knives and woods secured together independent of the case, and the gibs and wedges or keys *o p o*, substantially as described, and for the purpose specified.

JOHN R. ABBE.

Witnesses:
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SAM BINGHAM.