W. A. DOANE.

Wood-Pulping Machine.

No. 224,405. Patented Feb. 10, 1880.

Fig. 1.

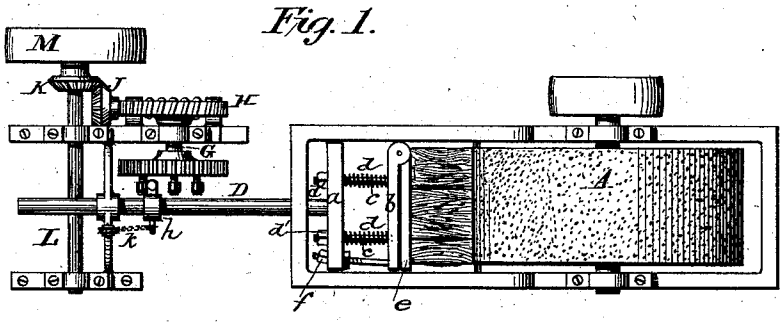


Fig. 2.

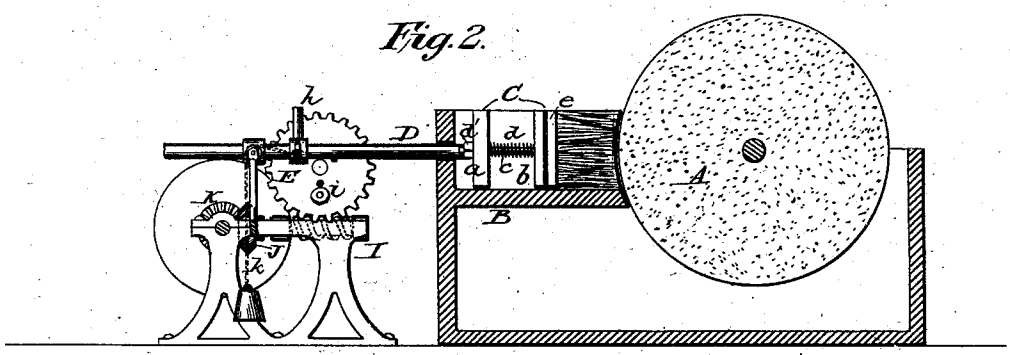
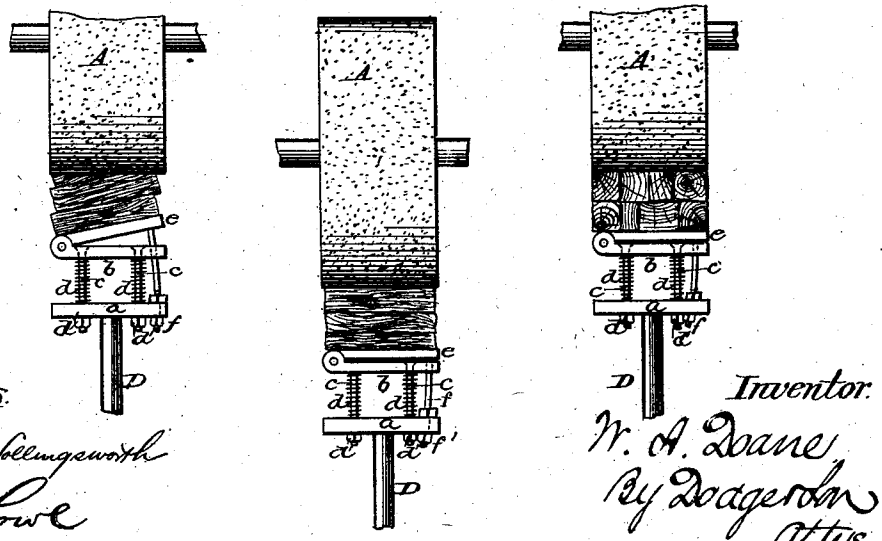


Fig. 3. *Fig. 4.* *Fig. 5.*



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WILLARD A. DOANE, OF KAUKAUNA, WISCONSIN.

WOOD-PULPING MACHINE.

SPECIFICATION forming part of Letters Patent No. 224,405, dated February 10, 1880.

Application filed January 16, 1880.

To all whom it may concern:

Be it known that I, WILLARD A. DOANE, of Kaukauna, in the county of Outagamie and State of Wisconsin, have invented certain Improvements in Wood-Pulping Machines, of which the following is a specification.

My invention relates to that class of wood-pulping machines wherein the wood is carried by feeding mechanism against a revolving grinding-stone; and the object of the invention is to provide a single machine which may be adjusted to feed the wood to the stone at different speeds and to present its grain in different directions thereto as the quality and condition of the wood and the character of the pulp required may demand.

The reduction of wood to pulp by the use of a grinding-stone is well known in the art. It is also known that to secure given qualities of fiber or pulp the wood must be fed to the stone at different speeds, dependent upon the character and condition of the wood. It is also known that by presenting the grain of the wood in different positions or directions to the grinding-surface the length and character of the fiber may be greatly changed.

My machine is constructed with the above-named facts in view, so that it may be quickly adjusted to feed the wood in such manner as circumstances may in each case render necessary.

The grinding-stone is arranged as usual, and the wood is forced against the same by means of a reciprocating head, the face of which may be adjusted at any desired inclination to the face of the wheel in order to present the wood with its grain at a greater or less angle to the grinding-face.

The presser-head is advanced by mechanism adjustable in such manner as to change the length of its movement according to the length of the wood employed, and also adjustable in such manner as to increase or diminish the speed at which the presser-head advances according to the hardness of the wood being operated upon.

Figure 1 represents a top-plan view of my machine; Fig. 2, a longitudinal vertical central section of the same; Figs. 3, 4, and 5, plan views illustrating the different positions in which the wood may be presented to the stone.

A represents the grinding-stone, mounted on and driven by a horizontal shaft seated in suitable bearings.

B represents a shelf or support arranged opposite the face or breast of the stone, and provided with raised sides in order to support the wood during its presentation to the stone.

C represents a horizontally-reciprocating presser-head mounted on the shelf or support B, and designed to force the wood before it to the stone. This presser-head consists of a vertical rear plate, *a*, secured rigidly to a carrier-rod, D, and a front plate, *b*, connected to plate *a* by means of two rods or stems, *c*. The rods *c* are secured rigidly to the plate *b* and extended loosely through plate *a*, and are provided between the plates with spiral springs *d* to force the plates apart, and on the rear ends with nuts *d'* to limit the separation of the plates. The springs are made of such strength that they give only in the event of the entrance of a solid foreign substance between the head and stone, or of a hard knot being encountered in the wood.

During the ordinary operation of the machine the head carries the wood forward with a positive and steady movement; but in the event of an excessive and dangerous resistance to the head the entire feeding mechanism is relieved by the yielding of the springs.

To the front of the plate *b*, at one end, I hinge a second plate, *e*, against which the wood bears when the machine is in action.

To the free end of the plate *e*, I attach an arm, *f*, which is extended backward through the plates *a b* and provided with a nut or nuts, *f'*, by means of which the plate *e* may be swung forward and fixed at any angle or inclination to the line in which the head reciprocates, as shown in Fig. 3, so that the head will be caused to present the usual rectangular blocks of wood with their grain at an inclination to the stone, as represented in the last-mentioned figure.

The advance of the presser-head is secured by providing its carrier-rod D with a vertical arm, *h*, and providing a vertical wheel or disk, E, with studs or crank-pins *i*, which act against the arm *h*, pushing the arm and presser-head forward, and then riding off from the lower end of the arm and permitting the head and other parts to recede. The retraction of the

head is secured by passing a weighted chain, *k*, from the rod D over a supporting-pulley, as clearly represented in Fig. 2.

The wheel E may have any desired number of the crank-pins to act successively, and thus advance the presser-head several times during each rotation of the disk.

The crank-pins should be made adjustable to and from the center of the disk E, and the arm *h* made adjustable lengthwise on the rod D.

The adjustment of the arm backward upon the rod, in connection with the adjustment of the crank-pins outward, will give the presser-head an increased length of movement and adapt the machine for feeding long blocks or bolts of wood. This is mainly advantageous when the wood is to be ground squarely across the end of the grain, which I find to be in some cases a very desirable method.

The speed at which the wood is advanced may be increased by moving the crank-pins outward and giving the arm *f* a proper adjustment in relation thereto. This may be done without increasing the length of movement of the head by limiting the backward movement of the same.

The crank-pins may be provided with rollers in order to reduce the friction, and may be adjusted by seating them in slots in the disk and securing them by nuts, or by screwing them into holes located at different points in the wheel, as shown in the drawings.

The disk or wheel E is mounted on one end of a horizontal shaft, G, which may be mounted in any suitable bearing, and which has on the outer end a worm-wheel, H, driven by a worm or screw, I. The worm is provided at one end with a bevel-gear, J, driven by a corresponding gear, K, which latter is, in turn, mounted on a shaft, L, provided with a driving-pulley, M. By this combination motion is communicated to the disk and crank-pins, and thence to the presser-head, which is advanced slowly and retracted quickly.

The worm-teeth may be formed on the edge of the disk which carries the crank-pins, and one shaft may carry crank-wheels for a number of machines.

I claim—

1. The combination of the grinding-wheel, the reciprocating presser-head having the hinged face-plate, and means for adjusting the same, substantially as shown and described.

2. The combination of the plates *a b*, hinged plate *e*, springs *d*, rods *c*, and adjustable arm *f*.

3. The combination of a grinding-surface, a reciprocating carrier advanced by positively-acting mechanism, and a yielding face or front upon said carrier.

4. The combination of the presser-head, a transverse arm, *h*, connected therewith, and a crank-pin arranged to act against said arm, and adjustable as to the extent of its throw or sweep.

5. The combination of the presser-head, the transverse arm *h*, connected with said head, and adjustable to and from the same, and a crank-pin arranged to act against and disengage from said arm.

6. The combination of a reciprocating member provided with a transverse arm, *h*, a crank-pin arranged to act against said arm, and, after forcing the same in one direction, pass from its end, and means, substantially such as shown, for returning the arm to its original position preparatory to another action of the crank-pin.

7. The combination of the presser-rod D, arm *f*, crank-pin, and worm-gear, as described.

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