A. T. STURDEVANT.

Machine for Manufacturing Paper Stock.

No. 219,034. Patented Aug. 26, 1879.

Fig. 1.

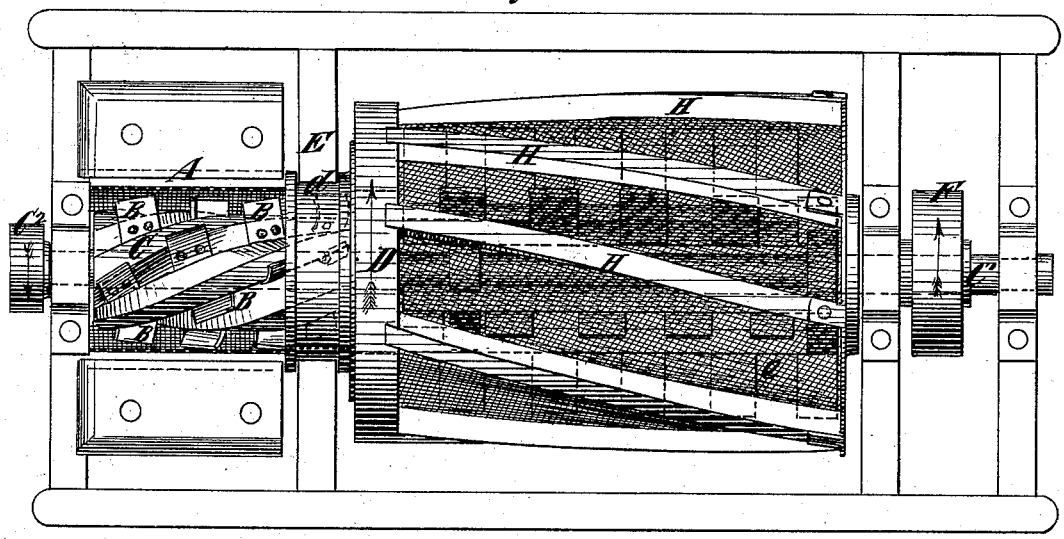


Fig. 2.

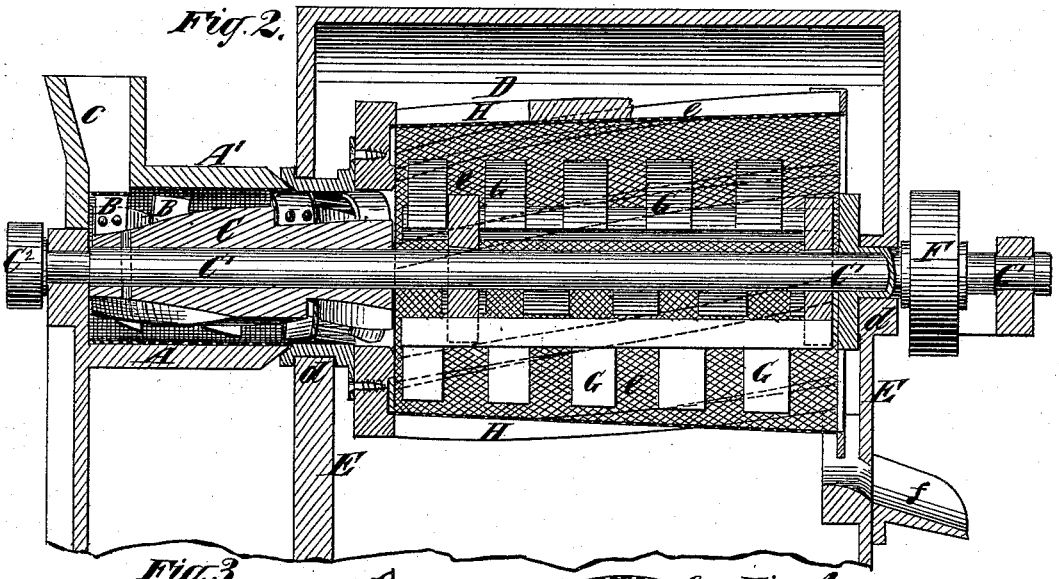


Fig. 3.

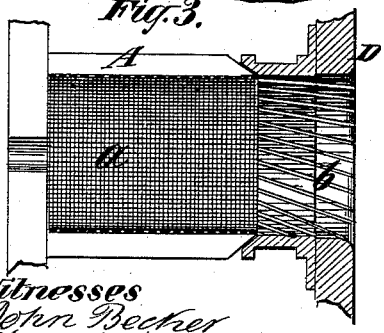
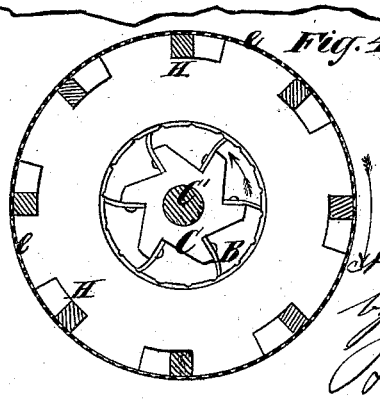


Fig. 4.



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UNITED STATES PATENT OFFICE.

ALFRED T. STURDEVANT, OF DANBURY, CONNECTICUT.

IMPROVEMENT IN MACHINES FOR MANUFACTURING PAPER-STOCK.

Specification forming part of Letters Patent No. **219,034**, dated August 26, 1879; application filed July 8, 1879.

To all whom it may concern:

Be it known that I, ALFRED T. STURDEVANT, of Danbury, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Machines for Manufacturing Paper-Stock, of which the following is a specification.

In the manufacture of paper-stock from wood the wood is first reduced to finely-divided shreds or fiber by any suitable machines—such, for instance, as that forming the subject of the application of Ira C. Forbes for Letters Patent for improvements in machines for reducing wood to fiber, filed June 14, 1879. The wood fiber thus produced is then reduced to a pulpy mass, suitable for working up into paper.

My invention relates to means for reducing such fiber to a pulpy mass, as aforesaid; and the object is to provide a machine for reducing wood fiber, by which a fine quality of material for paper-stock is produced.

My invention consists in a novel process wherein the wood is first reduced by rubbing fiber over an imperforate roughened surface or bed by means of rubbers, and subsequently rubbing it over and forcing it through a wire-gauze bolt or screen, or perforated or reticulated material, by means of rubbers.

It also consists in the combination, with a circular or partly circular bolt or screen and a shaft, of a series of rubbers carried by said shaft, and adapted to rotate within said screen, but at no point touching the surface thereof.

It also consists in the combination, with a rotary bolt or screen and series of rubbers arranged to rotate therein, of ribs arranged spirally upon the periphery of said bolt or screen, whereby material may be fed longitudinally through the same.

It also consists in a rotary bolt or screen having a reticulated covering, arranged so that the wires or threads thereof extend spirally or diagonally upon the said bolt or screen.

It also consists in various combinations of parts and details of construction hereinafter explained.

In the accompanying drawings, Figure 1 represents a plan of my improved machine, a portion thereof being removed. Fig. 2 is a vertical longitudinal section thereof. Fig. 3 is a plan view of the imperforate roughened surface or bed by which the fiber introduced into the machine is first acted on; and Fig. 4 is a detail view, showing a modified form of a portion of the machine.

Similar letters of reference designate corresponding parts in all the figures.

A designates an imperforate rubbing surface or bed, shown as cylindric in form, and roughened in any suitable manner, as by lining it with wire-gauze *a*, or by forming grooves *b* therein, or both. The upper portion, A′, is made detachable, and represented as removed in Fig. 1, in order to better illustrate my invention.

B designates a series of rubbers, preferably of elastic material, made, for instance, of india-rubber, and arranged upon a drum, C, secured to a shaft, C^1, so as to rotate therewith. The rubbers B are preferably arranged in spiral lines upon the drum C, so that the fiber introduced through a hopper, *c*, will be fed gradually forward by the said rubbers while it is subjected to their rubbing action.

Motion may be imparted to the shaft C^1 by means of a pulley, C^2, mounted thereon.

D designates a bolt or screen, into which the material is fed from the cylinder A, and which is preferably arranged concentric therewith. The said bolt or screen is represented as supported in bearings *d* in the frame-work E of the machine, and is adapted to be rotated by means of a pulley, F, in the reverse direction to that of the shaft C^1.

Secured upon the shaft C^1, and rotating therewith, are represented a series of rubbers, G, which, like the rubbers B, are preferably made of elastic material. These rubbers, although arranged within the bolt or screen D, do not touch the same at any point; but, acting on the mass of material within the screen, they serve to rub the material over the same, and, when reduced to sufficient fineness, to force it out through the perforated or reticulated covering *e* therefor. Such covering is preferably formed of reticulated material, such as wire-gauze; and to effect the gradual feed of material through the bolt or screen, I may arrange the said covering so that the wires or threads of which it is formed extend spirally or diagonally along the periphery of the said bolt or screen. In order to aid in effecting the proper feed of material through the bolt or screen, I have shown the ribs H, to which

the covering is secured, arranged spirally, as clearly represented in Fig 1.

The bolt or screen may also be made slightly flaring toward its delivery end, as here represented, to facilitate the feed.

Although the ribs H are shown in Figs. 1 and 2 as secured to the outside of the screen, they may, if desirable, be secured upon the inside thereof, as represented in Fig. 4.

In the operation of the machine material introduced through the hopper *c* is first acted upon and reduced to a finer state by the rubbers B, thence passes to the bolt or screen D, through which the material which is of sufficient fineness is forced by the rubbers G, and the rejected material, which is too coarse to pass through the screen, passes out of the screen through the end thereof, and is delivered by a spout or chute, *f*, into any suitable receptacle, after which it may be passed again through the machine and reduced still finer.

It will be seen that by my invention the material is first continuously rubbed and reduced in fineness, and is subsequently further rubbed and reduced in fineness and passed through the meshes of the screen, and thereby separated from the coarse material and refuse, thereby producing a very fine quality of paper-stock.

Although particularly intended for the manufacture of paper, the product of my machine may be utilized for various other useful purposes, such as for the manufacture of floor-cloth.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The novel process of reducing wood fiber, consisting in first rubbing it over an imperforate roughened surface or bed, and subsequently rubbing it over and forcing it through a wire-gauze bolt or screen, or perforated or reticulated material.

2. The combination, with a circular, or partly circular, bolt or screen, of a series of rubbers mounted on a shaft and adapted to rotate within said bolt or screen without at any point touching the surface thereof, substantially as specified.

3. The combination, with a rotary bolt or screen, of a series of rubbers mounted on a shaft and adapted to rotate within said bolt or screen, but in a reverse direction to that of said bolt or screen, without at any point touching the surface thereof, substantially as specified.

4. The combination, with a rotary bolt or screen and a series of rubbers arranged within the same, of ribs arranged spirally at the periphery of said bolt or screen, whereby material may be fed longitudinally through the same, substantially as specified.

5. The combination, with a rotary bolt or screen and a series of rubbers adapted to rotate therein, of ribs arranged spirally at the periphery of said bolt or screen, whereby material may be feed longitudinally through the same, substantially as specified.

6. A rotary bolt or screen having a covering of reticulated material arranged so that the wires or threads thereof extend in spiral lines upon the said bolt or screen, substantially as specified.

7. The combination, with a rotary bolt or screen having a wire-gauze covering arranged so that the wires thereof extend in spiral lines upon the said bolt or screen, of a series of rubbers adapted to rotate within the said screen and ribs arranged spirally at the periphery of said bolt or screen, substantially as specified.

8. The combination, with a stationary imperforate cylinder having a roughened inner surface and a rotary bolt or screen arranged concentrically and communicating with said cylinders, of a series of rubbers mounted on a shaft and adapted to rotate in said rotary bolt or screen and a series of rubbers also mounted upon said shaft and spirally arranged therein within the said stationary cylinder, whereby the material to be treated is fed through the said stationary cylinder to the said rotary bolt, substantially as specified.

9. The combination of the cylinder A, rubbers B and G, arranged on the shaft C^1, and the bolt or screen D, provided with its spirally-arranged ribs H and wire-gauze covering *e*, substantially as specified.

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