

(No Model.)

J. B. CARTER.
APPARATUS FOR PRODUCING PULP.

No. 485,090.

Patented Oct. 25, 1892.

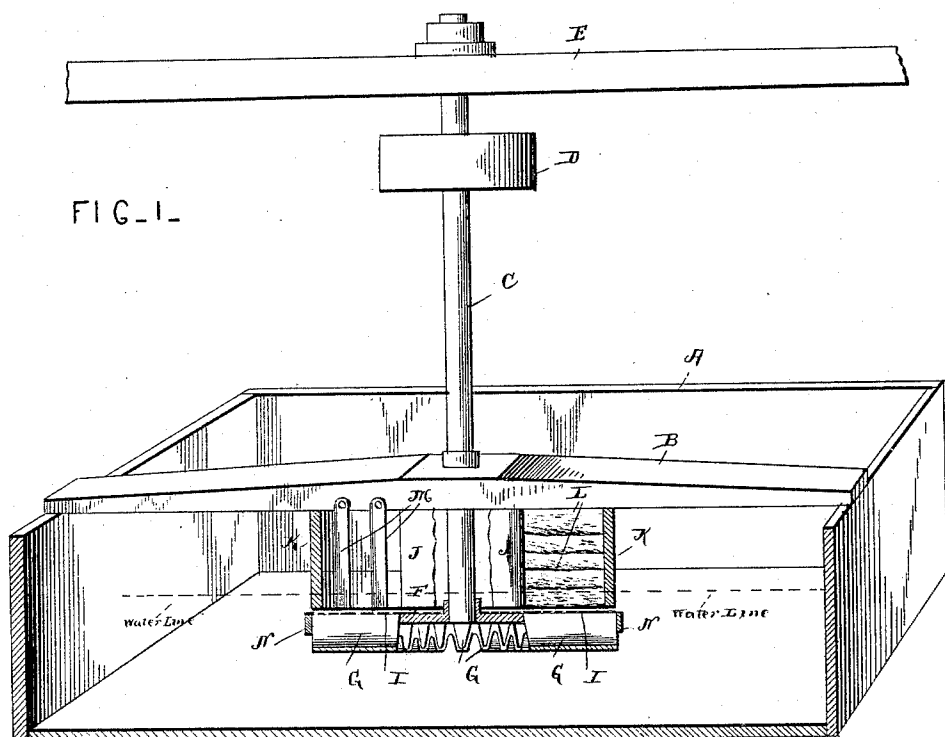
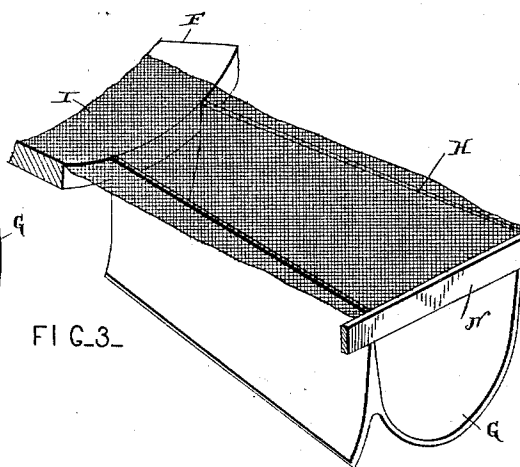
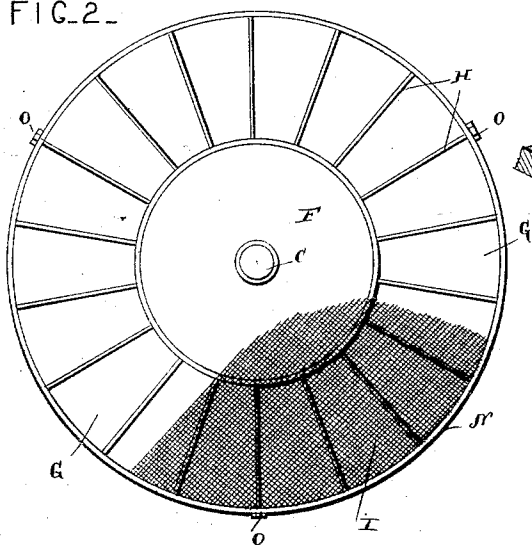


FIG. 2.



WITNESSES.

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UNITED STATES PATENT OFFICE.

JOHN B. CARTER, OF KOKOMO, INDIANA.

APPARATUS FOR PRODUCING PULP.

SPECIFICATION forming part of Letters Patent No. 485,090, dated October 25, 1892.

Application filed April 2, 1891. Serial No. 387,413. (No model.)

To all whom it may concern:

Be it known that I, JOHN B. CARTER, of Kokomo, in the county of Howard and State of Indiana, have invented certain new and useful Improvements in Apparatus for Producing Pulp; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to an improvement in an apparatus for reducing pulp, which will be fully described hereinafter, and pointed out in the claims.

The object of my invention is to produce a machine which accomplishes the reduction and felting of the stock by a single operation, as fully specified hereinafter.

In the drawings, Figure 1 is a perspective view of a machine which embodies my invention complete, one end of the tank being removed and the reducing mechanism shown in cross-section. Fig. 2 is a plan view of the rubbing-wheel, and Fig. 3 is an enlarged perspective of a portion of the rubbing-wheel.

A indicates a tank, which is of any suitable size, shape, or construction that may be preferred, across the top of which transversely extends a beam B. Journaled in this beam B, at any suitable point between its ends, is a revolving vertical shaft C, which is provided at its upper end with an operating-pulley D, and also with a second bearing or support E. The lower end of this revolving shaft C extends through the beam B any suitable distance and has rigidly secured to its lower end a circular casting F. This casting F constitutes what I term a "rubbing-wheel;" and it consists of the solid central portion, to the center of which the revolving shaft is secured, and the flutes or troughs G, which are U-shaped, as shown, and extend outward from the periphery of the central portion in the radii of the wheel. These flutes or troughs G have their upper edges H in a horizontal line with each other and with the plane of the upper face of the said central portion. The inner and outer ends of the troughs G are left open for the circulation

of water, to be fully described hereinafter, and these troughs project below the central portion any suitable distance, as shown. Placed over the entire surface of this rubbing-wheel from the shaft C to the outer edges of the flutes or troughs G is a smooth wire fabric I.

Secured to the under side of the beam B is a circular box J, which just covers the solid central portion of the rubbing-wheel and extends downward nearly to the wire fabric I, leaving a small space between the lower edge of the box or casing and the said fabric, so that as the wheel is made to revolve it will not rub against the box; also, extending downward from the beam B is a circular box or casing K, which extends around the casing J and just covers the upper faces of the flutes or troughs G. This casing K, like the casing J, extends downward to near the rubbing fabric, but leaving a space between the two for the same purpose that the space is left between the casing J and the fabric. The space between the two casings or boxes form a feeding-box in which the prepared wood, straw, or plants L to be operated upon are placed. Extending downward from the beam B and having their upper ends secured thereto are a suitable number of stops M, which extend into the space between the casings and prevent the stock which is being operated upon by the revolving rubbing-wheel from moving with the wheel.

In placing the wire rubbing-surface upon the wheel I take a piece of wire fabric sufficiently large to cover the entire surface of the central casting F and the flutes or troughs G and over the edges of the latter and secure this fabric in position by placing around the outer edges of the troughs a hoop N, and secure this hoop in place by means of a suitable number of screw-bolts O, which pass through the hoop and the wire fabric, which is bent downward around the outer edges of the troughs.

The action of this machine and its specific purpose whereby it performs the double function of a reducer and beater are as follows: The stock to be operated upon having been previously treated in any well-known or other manner to make it soft and pliant, it is placed

in the feed-box of the machine, as shown, and as the rubbing-wheel is revolved the smooth surface of the wire fabric continually rubs the stock, while at the same time the water is being agitated and rapidly carried through the troughs and through the wire fabric in contact with the fiber which is being rubbed off of the stock by centrifugal force, as will be readily understood. In this manner the fibers which are rubbed off by the rubbing-surface are continually subjected to water, which washes the fibers and carries them out to dead or still water in the tank, where they sink to the bottom. As the wheel revolves a very small portion of the fibers are rolled along on the top of the wire fabric and pass out between the fabric and the lower edge of the circular casting K, while all the rest of the fiber passes through the wire-cloth into the troughs and is carried outward by the water passing through them. This reduced fiber, which remains on top of the cloth, keeps the cloth out of contact with the unreduced stock, and further reduction of stock ceases until this fiber is rolled and washed by the water sufficiently to reduce it small enough to be forced through the wire. The pulp remaining on the wire affords an opportunity for rubbing it between the cloth and the unreduced stock, which gives to the pulp the same felting quality that the ordinary long and tedious process of beating does. As soon as the reduced fiber is beaten in this manner sufficiently to pass through the wire-cloth the rubbing-surface again comes in contact with the unreduced stock and the same operation is repeated. The fiber rubbed off is thus confined between the unreduced stock and the wire-cloth and rolled and washed until small enough to pass through the meshes of the wire-cloth, and this is what in my process I term "beating."

Heretofore wood or fibrous plants in their natural state have been subjected to a grinding or cutting process, which merely reduces their fiber to a certain degree of fineness without imparting to it any of the felting quality which it must possess before it can be converted into paper, and it has therefore before been necessary to subject this reduced stock to subsequent operation for the purpose of giving to it this quality. My invention differs from the ordinary method in first treating the wood or other plants to make them soft and pliant and then subjecting them to a rubbing (not a grinding or cutting process) and at the same time a continual washing action, whereby the pulp when it passes from the machine has this felting nature and is ready to be converted into paper. When straw or other plants are being reduced, a suitable amount of pressure will be put upon them in the feed-box to keep them in contact with the wheel. The fineness or coarseness of the pulp is regulated by the size of the meshes of the wire-cloth,

which is placed upon the upper surface of the rubbing-wheel. 65

It will be seen from the above that I am enabled to greatly reduce the cost of producing pulp ready to be converted into paper by manufacturing it in a single operation without being subsequently treated. 70

Having thus described my invention, I claim—

1. A machine for producing pulp, comprising a tank, a revolving wheel having a wire fabric on its upper surface, troughs under the said fabric having inlet and outlet openings, and a feeding chamber or box adjacent to the wheel in which the wood to be reduced is placed, substantially as shown. 80

2. A machine for producing pulp, comprising a tank, a revolving rubbing-wheel having radial troughs with open ends, a wire fabric placed over the troughs, and a feeding-box in which the material to be operated upon is placed, substantially as described. 85

3. In a machine for producing pulp, a tank, a revolving wheel within the tank having troughs which have open ends, a rubbing fabric placed over the troughs, and a feeding-box in which the material to be fed is placed, all combined substantially as set forth. 90

4. In a machine for producing pulp, a tank, a rubbing-wheel within the tank having a central portion, troughs extending outward from its periphery, a rubbing fabric placed over the troughs, and a feeding-box in which the material to be operated upon is placed, combined substantially as specified. 95

5. In a machine for producing pulp, a tank, a revolving wheel having a central portion, troughs extending outward therefrom and having their lower portions extending below the said central portion and provided with rubbing fabric placed over the troughs, and a feed-box in which the material to be operated upon is placed, combined substantially as described. 100 105

6. A machine for producing pulp, comprising a tank containing water, a horizontal revolving wheel having a rubbing-surface, and a feed-box around the wheel-shaft, the said wheel and the lower end of the feed-box being below water-line, substantially as shown and described. 110 115

7. A rubbing-wheel for the pulp-producing machine, consisting of a central horizontal portion, troughs extending from the periphery of the horizontal portion having open ends, and a rubbing fabric placed over the troughs, substantially as set forth. 120

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

JOHN B. CARTER.

Witnesses:

ISAAC WRIGHT,
JOHN E. MOORE.