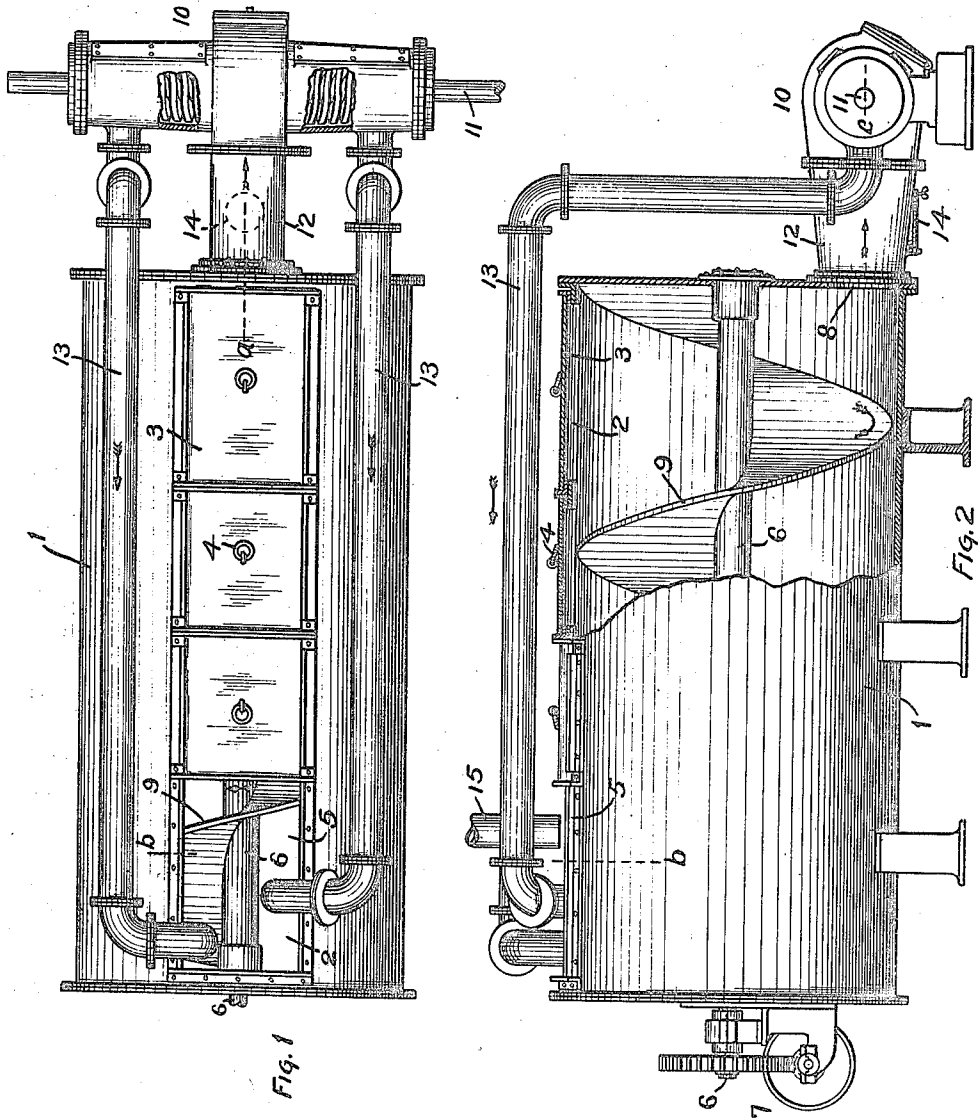


H. L. KUTTER.
PULPING APPARATUS.
APPLICATION FILED FEB. 1, 1917.

1,222,218.

Patented Apr. 10, 1917.
2 SHEETS—SHEET 1.



Herman L. Kutter

Witness:

Geo. Johnson

Inventor

by *James W. Ser*

Attorney

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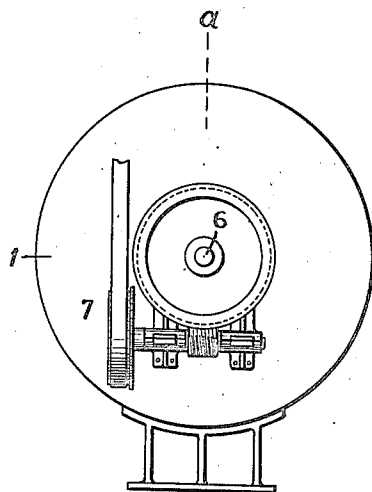


Fig. 3

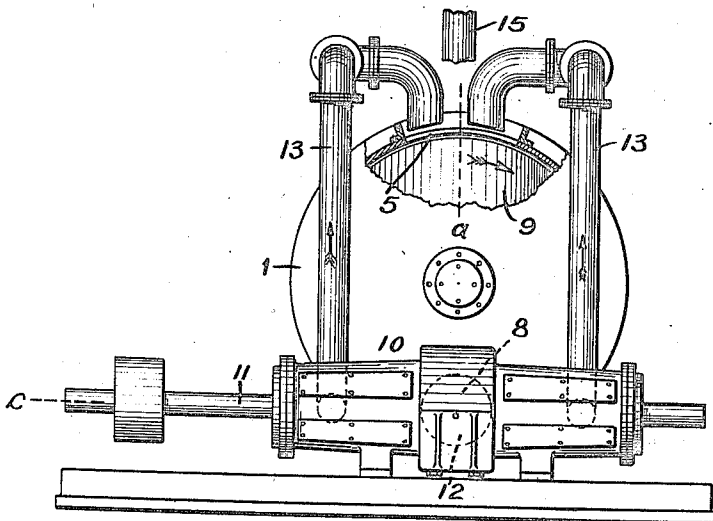


Fig. 4

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UNITED STATES PATENT OFFICE.

HERMAN L. KUTTER, OF HAMILTON, OHIO.

PULPING APPARATUS.

1,222,218.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, HERMAN L. KUTTER, a citizen of the United States, residing at Hamilton, Butler county, Ohio, have invented certain new and useful Improvements in Pulping Apparatus, of which the following is a specification.

This invention relates to a pulping apparatus designed to deal with paper stock and reduce it to a pulp expeditiously and economically.

The invention will be readily understood from the following description taken in connection with the accompanying drawings in which:—

Figure 1 is a plan of a pulping apparatus exemplifying my invention, part appearing in section in the plane of line *c* of Figs. 2 and 4, the shell being illustrated as horizontal;

Fig. 2 a side elevation of the same, part appearing in the plane of line *a* of Figs. 1, 3 and 4;

Fig. 3 an elevation of the driving end of the apparatus; and

Fig. 4 an elevation of the macerating end of the apparatus, part appearing in vertical section in the plane of line *b* of Figs. 1 and 2.

In the drawings:—

1, indicates a fixed horizontal cylindrical shell;

2, a longitudinal opening in the top of the shell and extending from end to end thereof;

3, movable doors or covers closing this opening except at the initial end of the shell;

4, lifting-rings to facilitate the opening of the doors;

5, the uncovered portion of the opening at the initial end of the shell;

6, a shaft journaled axially in the shell;

7, transmitting mechanism by means of which continuous rotation may be imparted to the shaft;

8, an outlet opening at the base of the lower end of the shell;

9, a coarse spiral conveyer carried by the shaft 6, the periphery of this conveyer coming fairly close to the interior of the shell and the terminal end of the conveyer coming fairly close to the end wall of the shell containing outlet 8, the conveyer to be turned in such direction as to urge material toward the terminal end of the shell from the end at which is provided the unclosed opening 5;

10, a mechanical macerator adapted to receive water and stock and, by successive action upon the mass, reduce it to a pulp;

11, the rotary shaft of the macerator;

12, a conduit connecting outlet 8 of the shell with the central portion of the casing of the macerator;

13, conduits connected with the outlets of the macerator and adapted to deliver freely into the opening 5 of the shell;

14, a normally closed outlet-opening from the conduit 12 between the conveyer shell and the macerator; and

15, a water-supply-pipe adapted to deliver water into the conveyer-shell.

The macerator 10 is of a known type, as seen, for instance, in Kutter's United States Patent No. 1,162,292, dated November 30th, 1915. It consists of a fixed casing in which rotates a screw whose exterior fits the interior of the casing, the screw being right-handed at one portion and left-handed at another portion so as to neutralize end thrusts in forcing the material from the inlet to the outlet. While this particular type of macerator is illustrated my invention is independent of the type and comprehends any form of macerating apparatus which will bring about the desired disintegration of fibers by successive actions of the macerator upon the stuff. The presence of a plurality of the conduits 13 is merely incidental to the fact that the particular macerator set forth is of the right and left hand screw character.

Considering the macerator alone, whether of the type illustrated or other macerators of the propeller class, it is found by experience that such macerators will fail to satisfactorily circulate stuff having a greater density than four per cent., thus seriously limiting the macerating capacity.

In the illustrated pulping apparatus the inherent circulating capacity of the macerator is not entirely relied on. The conveyer shell being, say, half full of water, the paper stock to be dealt with is charged into the opening 5. The stock becomes soaked and carried to the discharge end of the shell and goes from the shell to the inlet of the macerator which operates on the stuff and discharges it back into the shell whence it goes again to the macerator, and so on and on and on, stock being added to the shell until the entire charge has been reduced to the desired condition of pulp. In the absence of the conveyer the circulation

of the stuff would, at any practical rate of accomplishment, cease when the density of about four per cent. had been reached. But in my apparatus the conveyer forces the stuff forward into the macerator at substantially the rate at which the macerator delivers the stuff back into the conveyer shell and the circulation may be continued until the density of the pulp is about ten per cent., thus more than doubling the capacity of the macerator. The final forcing of the stuff into the macerator occurs as the terminal end of the conveyer passes the outlet 8 of the shell. When the pulping operation has been carried to its practical limit then discharge 14 may be opened, the pulp flowing out and leaving the apparatus ready for a new charge.

The rate of flow of stuff through the macerator is seen to be controlled, not entirely by the capacity of the macerator to draw in stock which it is to propel forward as it macerates it, but by that capacity on the part of the macerator plus the capacity of the conveyer for forcing the stuff into the macerator, the stuff coming to the shell as fast as it comes out of the macerator.

It is to be understood that the apparatus particularly set forth is exemplifying only and subject to many modifications. It has been my intention to set forth the principle of my invention and the best mode in which I at present contemplate applying that principle.

I claim:—

1. Pulping apparatus comprising, a macerator provided with an inlet and an outlet and with macerating mechanism adapted for propelling stuff from the inlet to the outlet, a shell provided with an outlet-opening and provided also with an inlet-opening, a conduit placing the outlet-opening of the shell in communication with the inlet of the macerator, a conduit leading from the outlet of the macerator to the inlet-opening of the shell, means for discharging the contents of the shell and macerator, and a spiral conveyer disposed within the shell and adapted to force the contents of the shell to the outlet leading to the macerator, combined substantially as set forth.

2. Pulping apparatus comprising, a macerator provided with an inlet and an outlet and with macerating mechanism adapted for propelling stuff from the inlet to the outlet, a shell of circular cross-section provided with an outlet-opening and provided also with an inlet-opening, a conduit placing the outlet-opening of the shell in communication with the inlet of the macerator, a conduit leading from the outlet of the macerator to the inlet-opening of the shell, means for discharging the contents of the

shell and macerator, and a spiral conveyer disposed within the shell and having a diameter substantially equal to the interior of the shell, combined substantially as set forth.

3. Pulping apparatus comprising, a macerator provided with an inlet and an outlet and with macerating mechanism adapted for propelling stuff from the inlet to the outlet, a shell of circular cross-section provided with an outlet-opening and provided also with an inlet-opening, a conduit placing the outlet-opening of the shell in communication with the inlet of the macerator, a conduit leading from the outlet of the macerator to the inlet-opening of the shell, means for discharging the contents of the shell and macerator, and a spiral conveyer disposed within the shell and having a diameter substantially equal to the interior of the shell, the terminal end of the conveyer being adapted to sweep near the terminal end of the interior of the shell and pass the outlet-opening therein, combined substantially as set forth.

4. Pulping apparatus comprising, a macerator provided with an inlet and an outlet and with macerating mechanism adapted for propelling stuff from the inlet to the outlet, a shell provided with an outlet-opening and provided with an opening extending longitudinally in its top, a removable covering closing the major portion of the top-opening of the shell but leaving an open inlet at the initial end of the shell, a conduit placing the outlet-opening of the shell in communication with the inlet of the macerator, a conduit leading from the outlet of the macerator to the open-inlet of the shell, means for discharging the contents of the shell and macerator, and a spiral conveyer disposed within the shell and adapted to force the contents of the shell to the outlet leading to the macerator, combined substantially as set forth.

5. Pulping apparatus comprising, a macerator provided with an inlet and an outlet, a shell having an outlet communicating with the inlet of the macerator and provided also with an inlet-opening, a conduit placing the outlet-opening of the shell in communication with the inlet of the macerator, a conduit leading from the outlet of the macerator to the inlet-opening of the shell, means for discharging the contents of the shell and macerator, and mechanism for forcing stuff from the shell into the macerator at substantially the rate at which the macerator delivers stuff to the shell, combined substantially as set forth.

HERMAN L. KUTTER.

Witnesses:

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