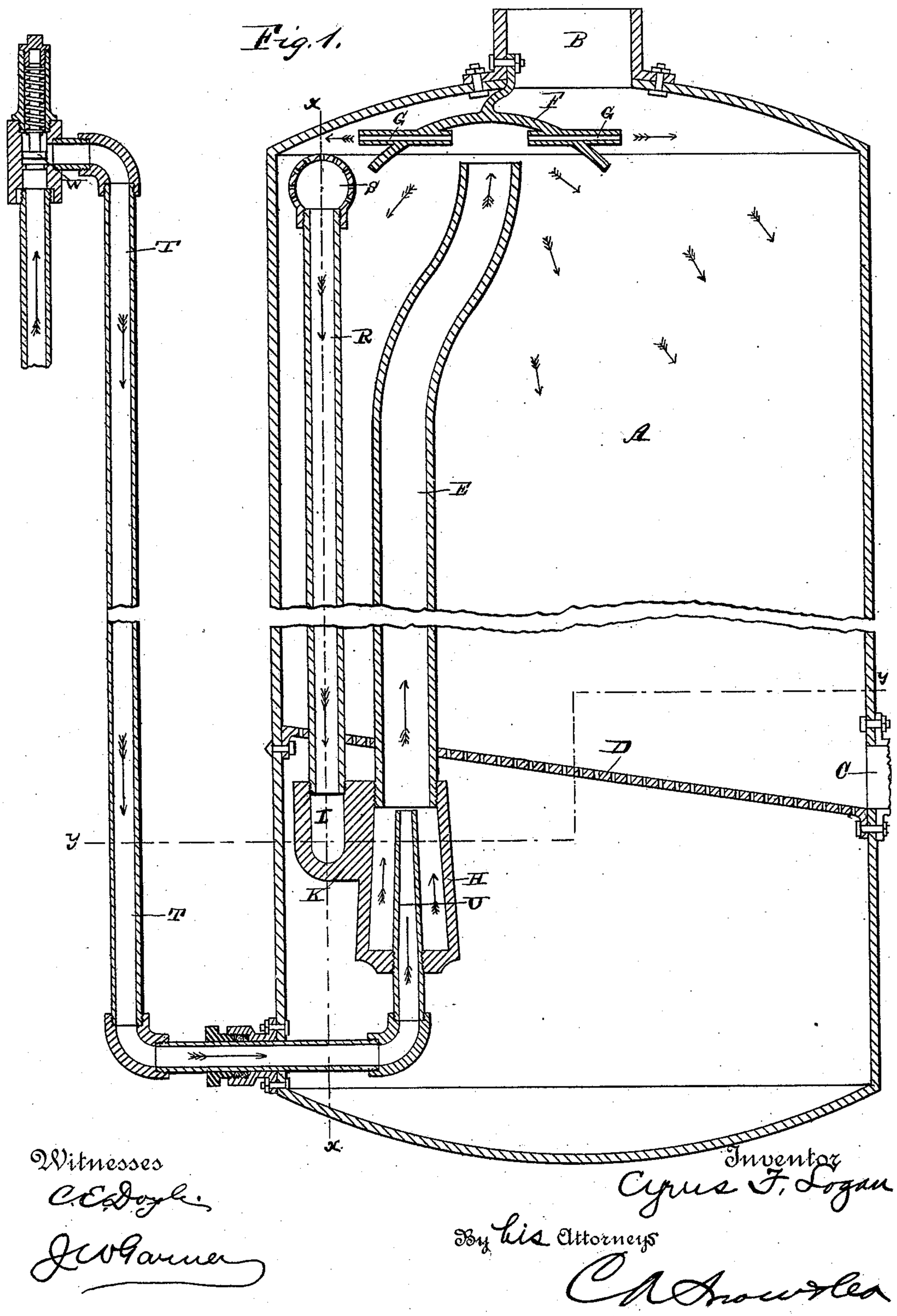
(No Model.) 2 Sheets—Sheet 1.

C. F. LOGAN.

DIGESTER FOR WOOD PULP.

No. 361,015. Patented Apr. 12, 1887.

Fig. 1.



Witnesses
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(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

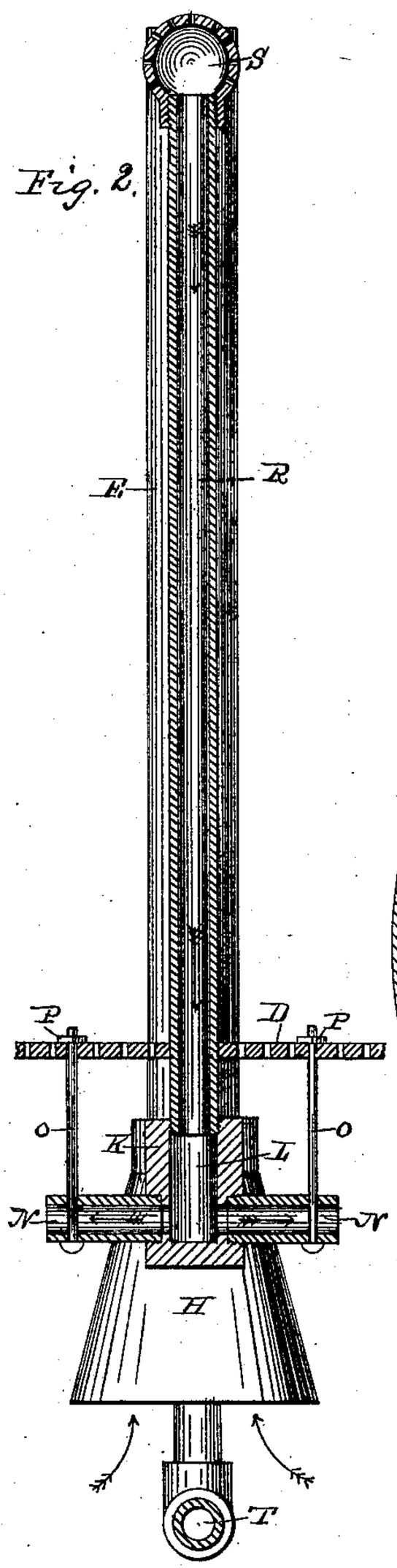
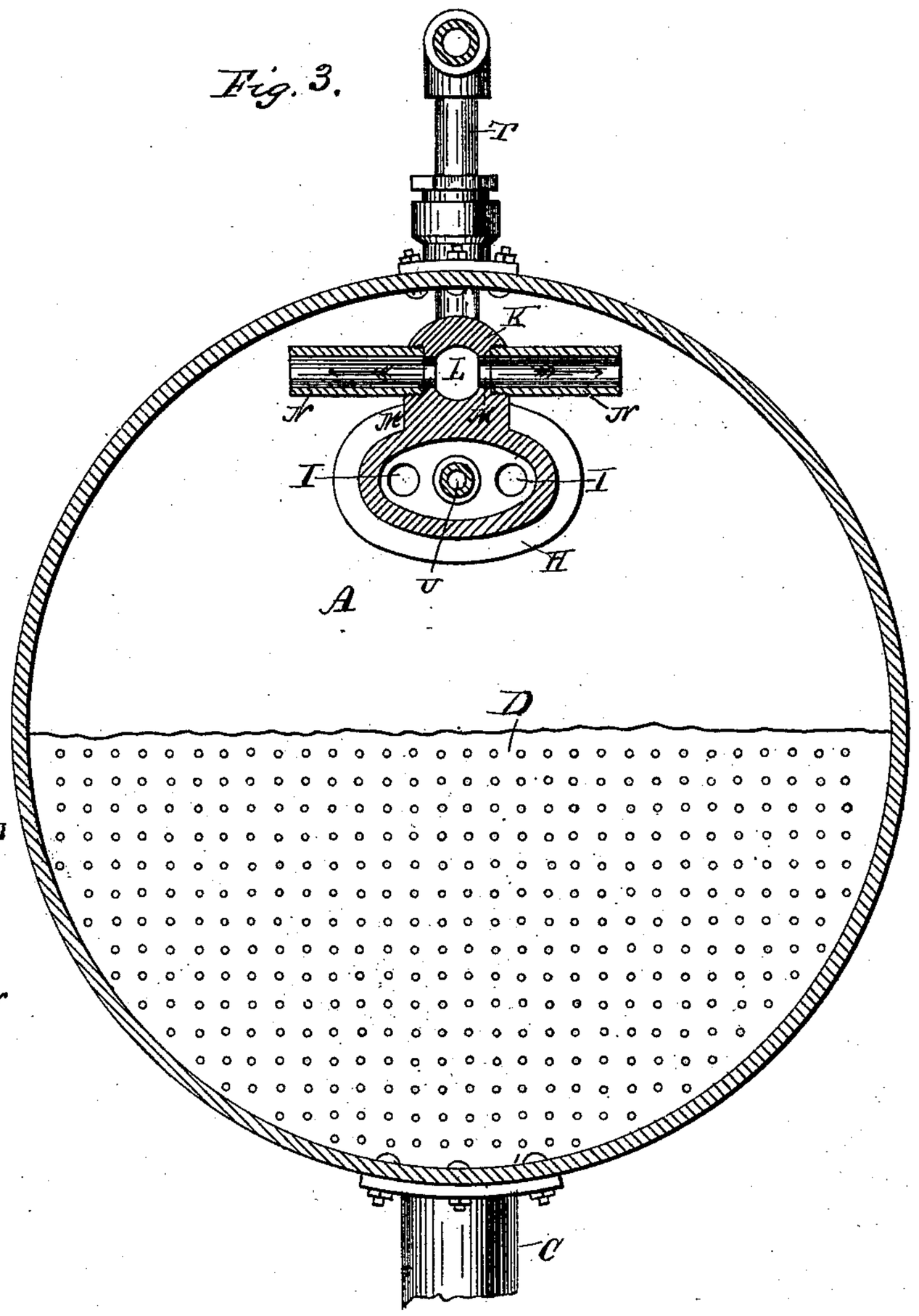


Fig. 3.



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UNITED STATES PATENT OFFICE.

CYRUS FIELD LOGAN, OF TICONDEROGA, NEW YORK.

DIGESTER FOR WOOD PULP.

SPECIFICATION forming part of Letters Patent No. 361,015, dated April 12, 1887.

Application filed October 7, 1886. Serial No. 215,597. (No model.)

To all whom it may concern:

Be it known that I, CYRUS FIELD LOGAN, a citizen of the United States, residing at Ticonderoga, in the county of Essex and State of New York, have invented a new and useful Improvement in Digesters for Wood Pulp, of which the following is a specification.

My invention relates to an improvement in digesters for wood pulp used in the manufacture of paper; and the object of my improvements is to provide a device for circulating the caustic liquid over the material from which the pulp is to be made, and also for equalizing the pressure of the steam in the digester; and to these ends my improvement consists in the peculiar combination and construction and devices that will be more fully set forth hereinafter, and particularly pointed out in the claims.

In the drawings, Figure 1 is a vertical sectional view of an apparatus embodying my improvements. Fig. 2 is a similar view taken on the line *x x* of Fig. 1. Fig. 3 is a horizontal section taken on the line *y y* of Fig. 1.

A represents a vertical cylindrical digester, which is provided at its upper end with an opening, B, through which the material is fed, and is also provided on one side with a discharge-opening, C.

D represents a perforated plate, which is located in the digester at a suitable distance from the lower end thereof, and is supported in an inclined position, as shown in Fig. 1. Through one side of the said plate passes a vertical pipe, E, which is provided with a screw-thread at its lower end and has the upper end slightly curved to one side, as shown. Above the upper end of the pipe E is supported a concave sprinkling-disk, F, which is provided with a series of radial openings, G, arranged horizontally at a slight distance above the lower edge of the sprinkling-disk. To the lower end of the pipe E, below the perforated plate D, is screwed a bell-shaped case, H, which is provided with openings I on opposite sides at its lower end. At the upper end of the case or casting H, on one side thereof, is made an offset or shoulder, K, which is provided with a vertical opening, L, and at the lower side of the said opening L, and communicating with the same, is a transverse horizontal opening, M. In the ends of the said opening M are screwed the inner ends of short pipes N.

O represents vertical rods, which depend from the perforated plate and have their lower ends secured to the pipes N. The upper ends of the said rods are screw-threaded and are provided with nuts P, which bear upon the perforated plate, and thus support the case H and the pipe E.

R represents a vertical pipe, the lower end of which passes through the perforated plate D and is screwed into the upper end of the vertical opening L. The upper end of the pipe R is provided with a hollow spherical cap, S, having a series of perforations.

T represents a steam-inlet pipe, which extends from a steam-boiler (not shown) and enters the lower side of the digester A, and the said steam-pipe is provided at its inner end with a vertical injecting-nozzle, U, which extends up through a circular opening made in the bottom of the case or casting H between the openings I, and communicates with the lower end of the pipe E. In the steam-pipe T is located a spring-actuated check-valve, W, the function of which is to prevent the steam from escaping by back-pressure from the digester through the boiler.

The operation of my invention is as follows: A suitable quantity of caustic liquid is placed in the lower portion of the tank A, below the perforated plate, and the wooden chips to be reduced to pulp are fed into the tank through the opening B, and are supported by the perforated plate. Steam from the boiler is then admitted through the pipe T, and it passes upwardly through the nozzle U into the lower end of the pipe E, and thus creates a vacuum in the case or casting H, and consequently carries the caustic liquid upwardly through the pipe E with the steam. As the liquor escapes from the upper end of the pipe E it strikes against the under side of the disk G, and is thereby delivered in the form of spray evenly over the chips in the tank, thus subjecting all of them to the action of the liquid. The steam in the upper portion of the tank which is not condensed passes through the perforations in the cap S into the pipe R, and passes downwardly through the said pipe and outwardly through the pipes N to the space below the

perforated plate, and thus a uniform steam-pressure is maintained both above and below the mass of chips upon the perforated plate. The liquid which percolates through the chips reaches the inclined plate D, and, owing to the inclination thereof, finds its way downwardly through the perforations of the plate into the lower portion of the tank. This operation is maintained until the disk has been sufficiently reduced, and the pulp is then taken from the digester through the discharge-opening C.

I am aware that it has been heretofore proposed to construct a wood-pulping apparatus comprising a closed vessel having a perforated false bottom, an open tube extending upward through the false bottom, a deflector arranged over the upper end of the said tube, and a steam-injecting pipe communicating with the lower end of the tube, and this, broadly, I disclaim.

Having thus described my invention, I claim—

1. The combination, with the tank or chamber having the perforated partition, of the pipe E, supported therein, a spraying device supported above said pipe and provided with the horizontal jet-passages, and a steam-pipe entering said pipe E to create a vacuum therein, substantially as set forth.

2. The combination, with the tank or chamber having the perforated partition, of the pipe E, supported therein, a steam-pipe communicating therewith to create a vacuum therein, and a horizontal pipe communicating with the space below the partition and covered at its upper end by means of a perforated cap, substantially as set forth.

3. In a sprinkling device for wood-pulp digesters, a concaved disk provided with radial horizontal jet-tubes, substantially as set forth.

4. The combination, with the tank or chamber and horizontal partition thereof, of a casting, H, located below said partition, a vertical pipe, E, communicating therewith and extending upwardly above said partition, a jet-sprinkling device located above said pipe, a steam-pipe communicating with said pipe E, and a condenser-pipe communicating with said casting, substantially as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

CYRUS FIELD LOGAN.

Witnesses:
EDWARD C. D. WILEY,
ROBERT DORNBURGH.