

(No Model.)

2 Sheets—Sheet 1.

C. RUSSELL & P. H. CRAGIN.

PAPER PULP SCREEN.

No. 347,893.

Patented Aug. 24, 1886.

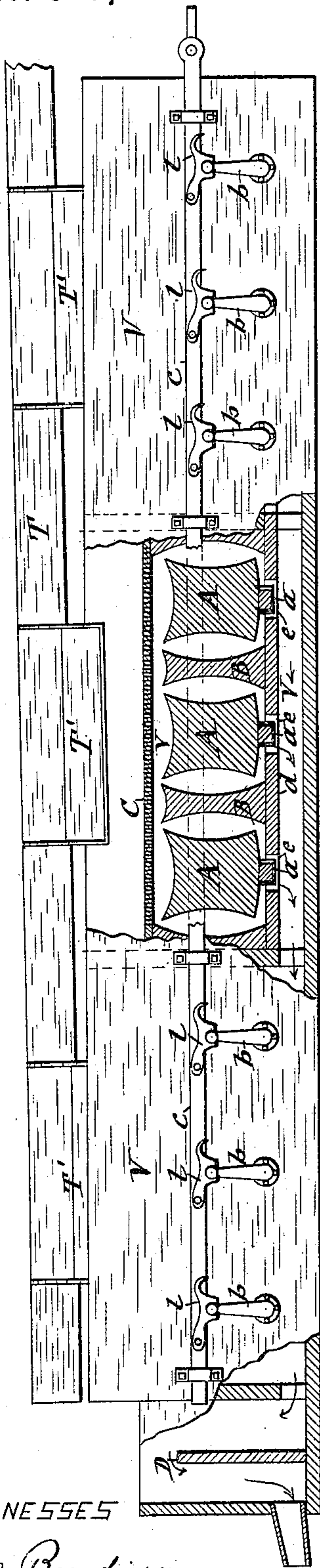


Fig. 1

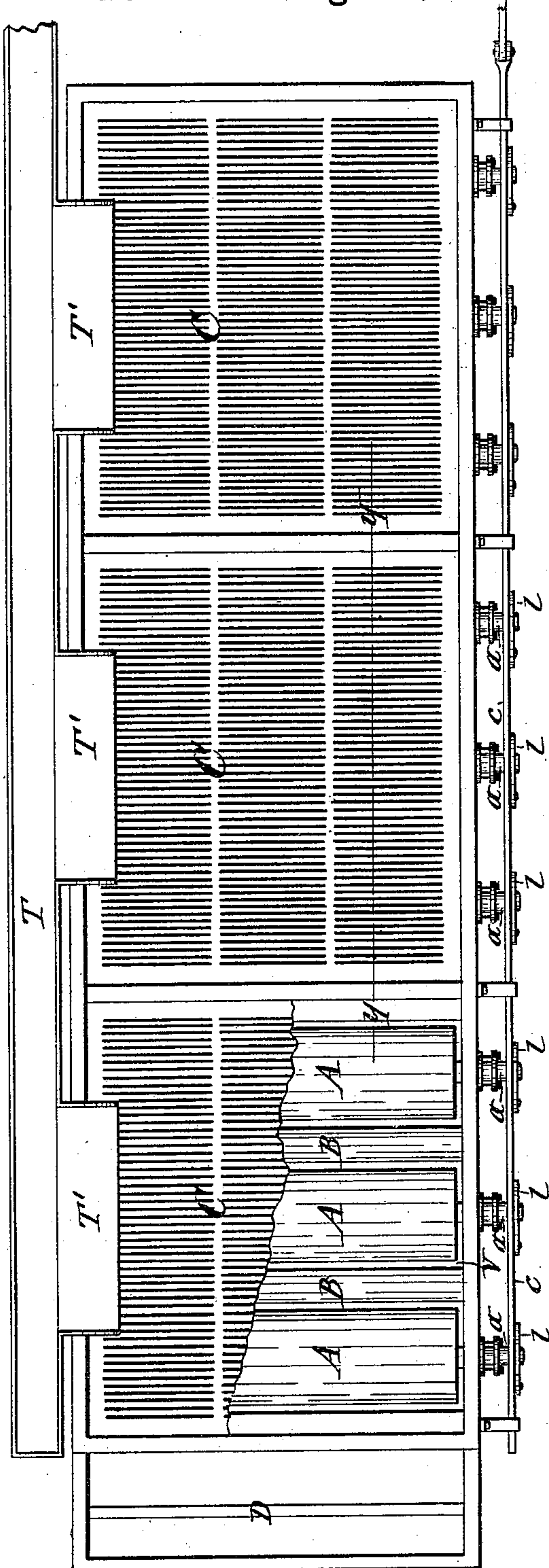


Fig. 2

WITNESSES

C. Bendixen

M. F. Walz

C. Russell
INVENTORS of Patrick H. Cragin
per Smith, Lusk & King, Attys.

(No Model.)

2 Sheets—Sheet 2.

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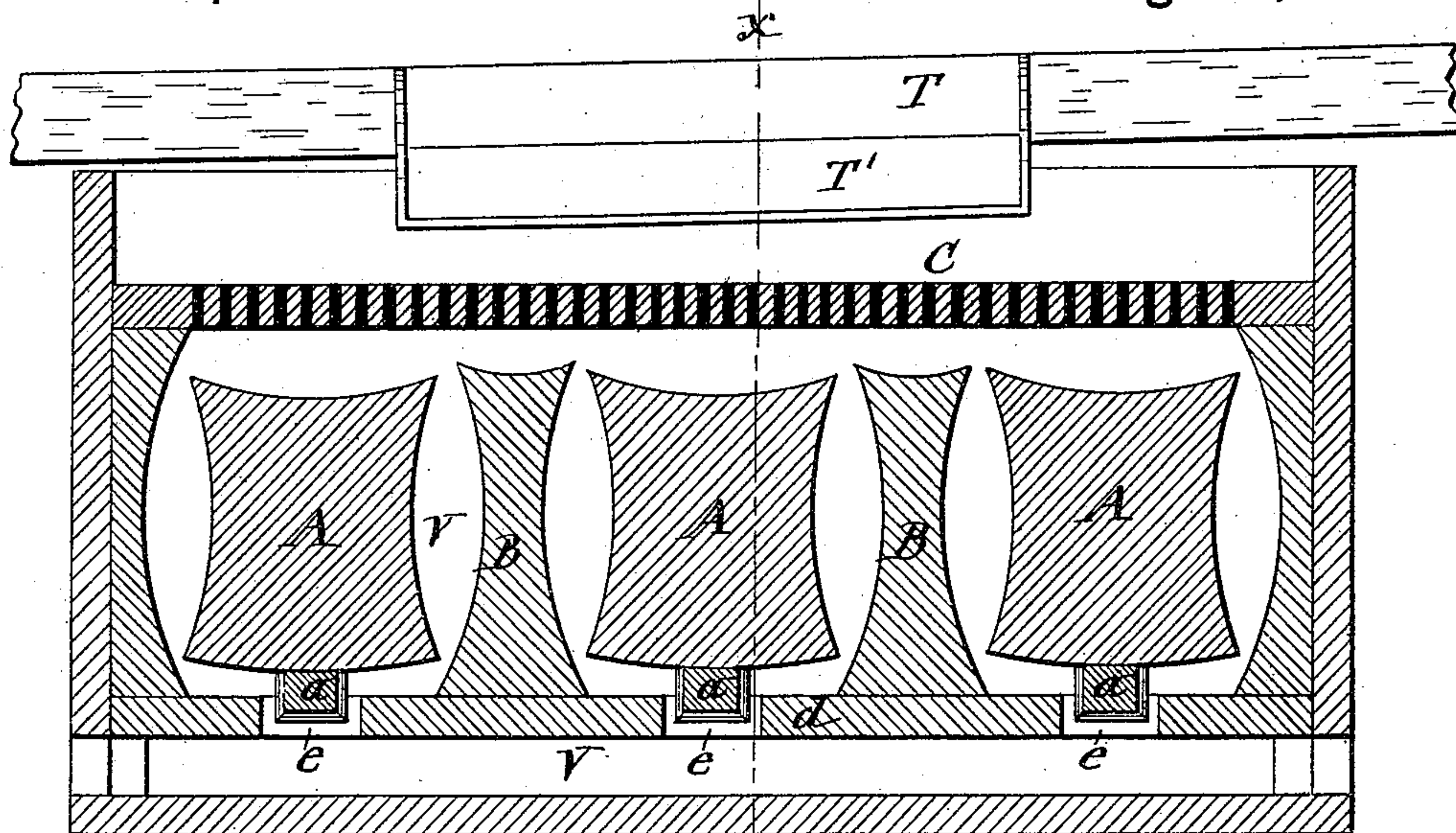


Fig. 3

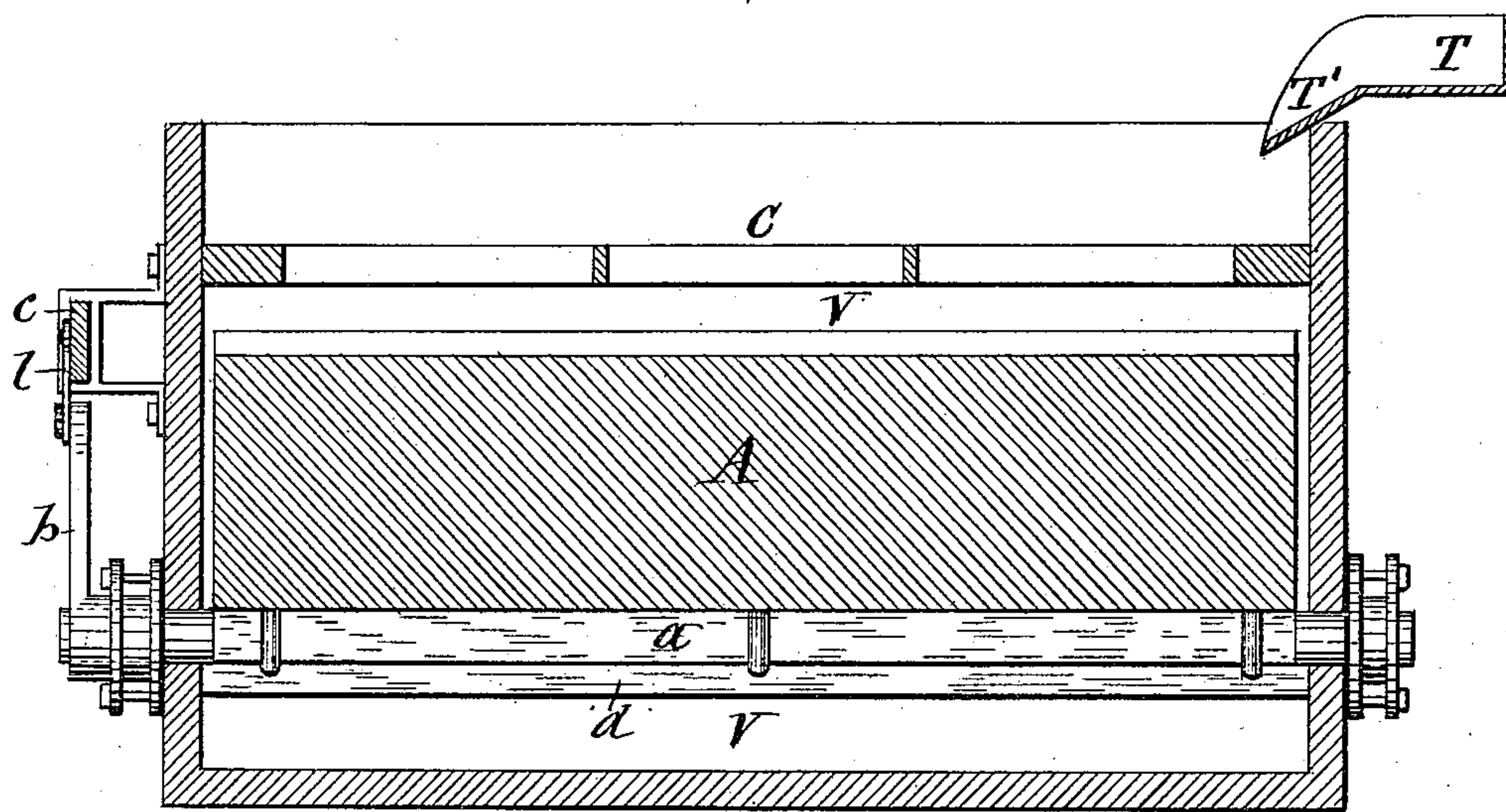


Fig. 4

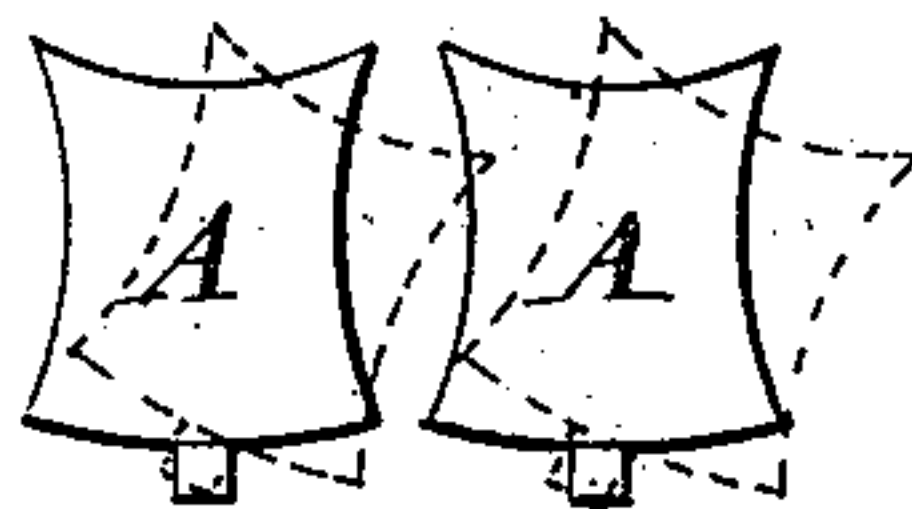


Fig. 5

WITNESSES

C. Bendixon

A. F. Walz

INVENTORS

Calvin Russell

Patrick H. Cragin

per Russell, Lucas & Hay

UNITED STATES PATENT OFFICE.

CALVIN RUSSELL AND PATRICK H. CRAGIN, OF PENN YAN, ASSIGNOR OF
ONE-THIRD TO HENRY RUSSELL, OF ALBANY, NEW YORK.

PAPER-PULP SCREEN.

SPECIFICATION forming part of Letters Patent No. 347,893, dated August 24, 1886.

Application filed March 26, 1886. Serial No. 196,624. (No model.)

To all whom it may concern:

Be it known that we, CALVIN RUSSELL and PATRICK H. CRAGIN, of Penn Yan, in the county of Yates, in the State of New York, have invented new and useful Improvements in Paper-Pulp Screens, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to the class of paper-pulp screens which are arranged over a liquid-containing vat with an air-space between the liquid and the screen, and by intermittent displacement of the air in said space a pumping action is produced, which serves to keep the openings of the screen clear and facilitates the passage of the pulp through the screen.

Our invention has special reference to the devices employed for producing the aforesaid pumping action; and it consists in a novel organization of a pumping apparatus which is simple and inexpensive in construction, efficient, and comparatively noiseless in its operation, and the power required for operating it is reduced to a minimum.

In the annexed drawings, Figure 1 is a side elevation of a paper-pulp screening apparatus embodying our invention, with a portion of the front broken away to show the internal arrangement. Fig. 2 is a top plan view of the same with portions of the screen broken away to illustrate the subjacent pumping apparatus. Fig. 3 is an enlarged vertical longitudinal section of a section of the aforesaid screening apparatus, taken on line *y y*, Fig. 2. Fig. 4 is a vertical transverse section on line *x x*, Fig. 3; and Fig. 5 is a transverse section of a modification of our improved pumping apparatus.

Similar letters of reference indicate corresponding parts.

V represents the pulp-vat, and C the paper-pulp screen, which is arranged horizontally across the upper part of the vat and fitted air-tight to the sides thereof.

T denotes a trough, which, by spouts *T'*, delivers the diluted pulp upon the screen C. By means of a dam, D, at the discharge end of

the vat V, the liquid in said vat is maintained at a uniform level a short distance below the screen, and thus an air-space is formed immediately underneath the screen, which air-space is water-sealed, to prevent ingress of air, except through the slots of the screen.

Immediately under the surface of the liquid in the vat we submerge the chief element of our improved pumping apparatus, consisting of the pumping-bar A A, arranged horizontally side by side and submerged in the liquid of the vat, as aforesaid. These pumping-bars we arrange movable laterally toward and from each other in any suitable manner. The object of said arrangement is to alternately open and close the spaces between the bars. In opening said spaces a vacuum is formed between each pair of bars, and thereby a downward suction through the screen is produced. This suction facilitates the escape of the diluted pulp through the screen. In closing the spaces between the pumping-bars the liquid or diluted pulp which has entered said spaces is expelled downward and the air is forced upward. The upward pressure of the air through the screen serves to clear the interstices of the screen, and thus facilitates the screening of the diluted pulp.

In practice we find that we render the pumping-bars A A more efficient in their operation by forming them concave on top and on their sides, as shown in the annexed drawings, and placing between the movable bars A A a stationary bar, B, likewise concaved on top and on the sides adjacent to the bars A A, and the vat V we also provide with concaved sides.

The bars A A are mounted on rock-shafts *a a*, which are extended horizontally across the vat, and each has one of its ends extending through the side of the vat and through a stuffing-box, and has a crank or rock arm, *b*, attached to it at the exterior of the vat. A reciprocating bar, *c*, connected with the successive rock-arms *b b b b*, operates the rock-arms in common or synchronously, and thereby the pumping-bars A A are oscillated on their longitudinal axis. And in the oscillation of the bars the pumping action is produced by the alternate opening and closing at the top

and bottom edges of the bars, of the pockets formed by the concaved sides of the bars. It will be observed that by placing of the axis of the bars below the center thereof, as shown in Fig. 3 of the drawings, a much greater movement is obtained at the upper portions of the bars than at the lower portions of the same, and this increases the efficiency of the pumping-bars A A.

10 If desired, the stationary bar B may be dispensed with, as represented in Fig. 5 of the drawings.

Below the described pumping-bars is a false bottom, *d*, which is provided with discharge-openings *e e*, central under the bars A A, and this false bottom constitutes the bottom of the pump-case.

In order to permit of disconnecting one set of pumping-bars from the actuating mechanism without interfering with the operation of the remainder of the pumping-bars we detachably connect the rock-arms *b b* with the reciprocating rod *c* by means of suitable clutches or latches, *l l*, pivoted on the rod *c* and provided with notches engaging the wrist-pins of the rock-arms. By raising said latches the rock-arms become disconnected from the reciprocating rod *c*.

It will be observed that by pivoting the pumping-bars A A in the manner described we reduce the strain to a minimum and render the apparatus comparatively noiseless, and the superior efficiency of the apparatus has been proved by practical tests.

35 Having described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The combination, with a paper-pulp screen and subjacent pulp-vat, of pumping-bars arranged horizontally side by side and movable laterally immediately beneath the surface of the liquid in the said pulp-vat, substantially as and for the purpose specified.

2. The combination, with a paper-pulp screen and subjacent pulp-vat, of pumping-bars arranged horizontally side by side and oscillatory on their longitudinal axes, and immersed immediately beneath the surface of the liquid in the pulp-vat, substantially as set forth.

3. The combination, with a paper-pulp screen and subjacent pulp-vat, of pumping-bars arranged horizontally side by side and movable toward and from each other immediately beneath the surface of the liquid in said vat, and concaved on their adjacent sides, substantially as described and shown.

4. The combination, with a paper-pulp screen and subjacent pulp-vat, of pumping-bars arranged horizontally side by side and movable toward and from each other immediately beneath the surface of the liquid in the vat, and concaved on their upper sides, substantially as described and shown.

65 5. The combination, with a paper-pulp screen and subjacent pulp-vat, of pumping-

bars arranged horizontally side by side and movable toward and from each other immediately beneath the surface of the liquid in the vat, and concaved on their adjacent sides and on their upper sides, substantially as described and shown. 70

6. The combination, with a paper-pulp screen and subjacent pulp-vat, of pumping-bars arranged horizontally side by side and movable toward and from each other immediately beneath the surface of the liquid in the vat, and a horizontal bar arranged stationary between the movable bars, substantially as set forth. 80

7. The combination, with a paper-pulp screen and subjacent pulp-vat, of pumping-bars arranged horizontally side by side and movable toward and from each other immediately beneath the surface of the liquid in the vat, and concaved on their sides, and a horizontal bar arranged stationary between the movable bars and concaved on the sides adjacent to said bars, substantially as described and shown. 90

8. In combination with the paper-pulp screen, the subjacent pulp-vat provided with concave sides, pumping-bars arranged horizontally between said sides and in one and the same plane, and movable laterally immediately beneath the liquid in the vat and concaved on their sides, substantially as set forth and shown. 95

9. The combination, with the paper-pulp screen and subjacent pulp-vat, of pumping-bars arranged horizontally side by side and movable laterally immediately beneath the surface of the liquid in the tank, and a false bottom under the pumping-bars, provided with discharge-openings central under said bars, substantially as described and shown. 100

10. In combination with the paper-pulp screen and subjacent pulp-vat, a pumping apparatus submerged in the liquid in the vat, and comprising a series of bars arranged horizontally side by side and oscillating on their longitudinal axes and concaved on their sides, stationary horizontal bars between the oscillating bars and concaved on their sides, and a false bottom under said bars provided with discharge-openings central under the oscillatory bars, substantially as described and shown. 110

11. In combination with the paper-pulp screen and subjacent pulp-vat, a series of pumping-bars arranged horizontally side by side immediately beneath the surface of the liquid in the vat, rock-shafts attached to the bottom of the respective pump-bars, rock-arms attached to the rock-shafts, and a reciprocating bar connected with and operating in common the aforesaid rock-arms, substantially as described and shown. 125

12. In combination with two or more screens and vats, each provided with a set of pumping-bars, as described, and rock-shafts and rock-arms for operating said pumping-bars, a reciprocating bar extended across the suc- 130

cessive rock-arms, and clutches or latches detachably connecting the rock-arms with the reciprocating bar, substantially as and for the purpose set forth.

5 In testimony whereof we have hereunto signed our names and affixed our seals, in the presence of two attesting witnesses, at Penn

Yan, in the county of Yates, in the State of New York, this 17th day of March, 1886.

CALVIN RUSSELL. [L. S.]

PATRICK H. CRAGIN. [L. S.]

Witnesses:

CALVIN J. HUSON.

EDWARD KENDALL.