

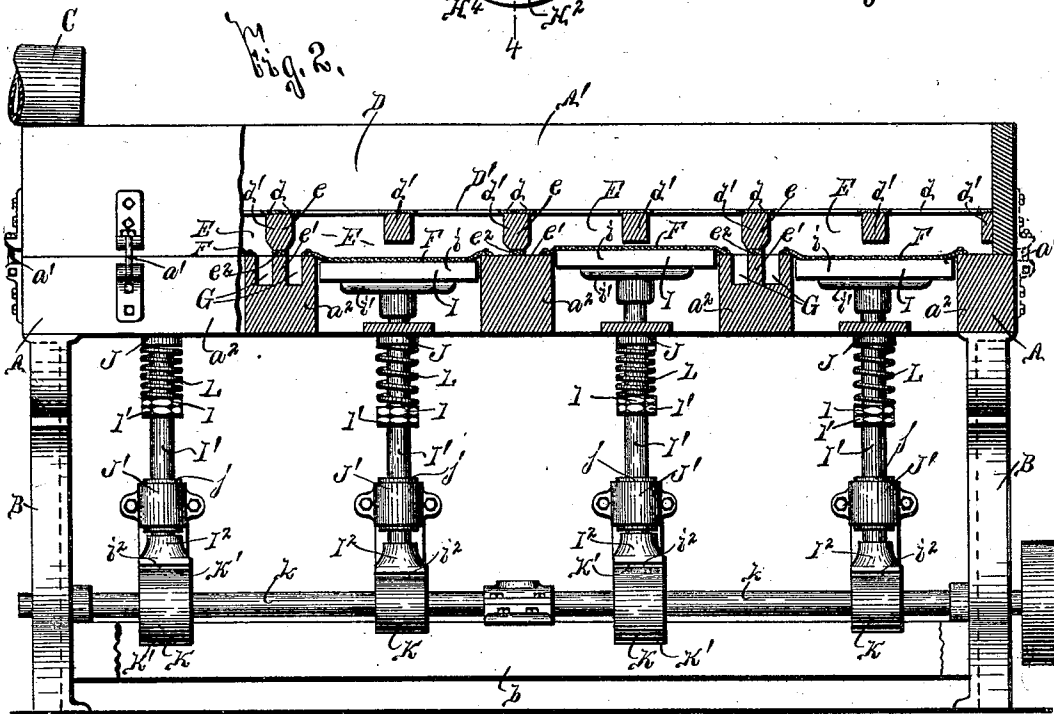
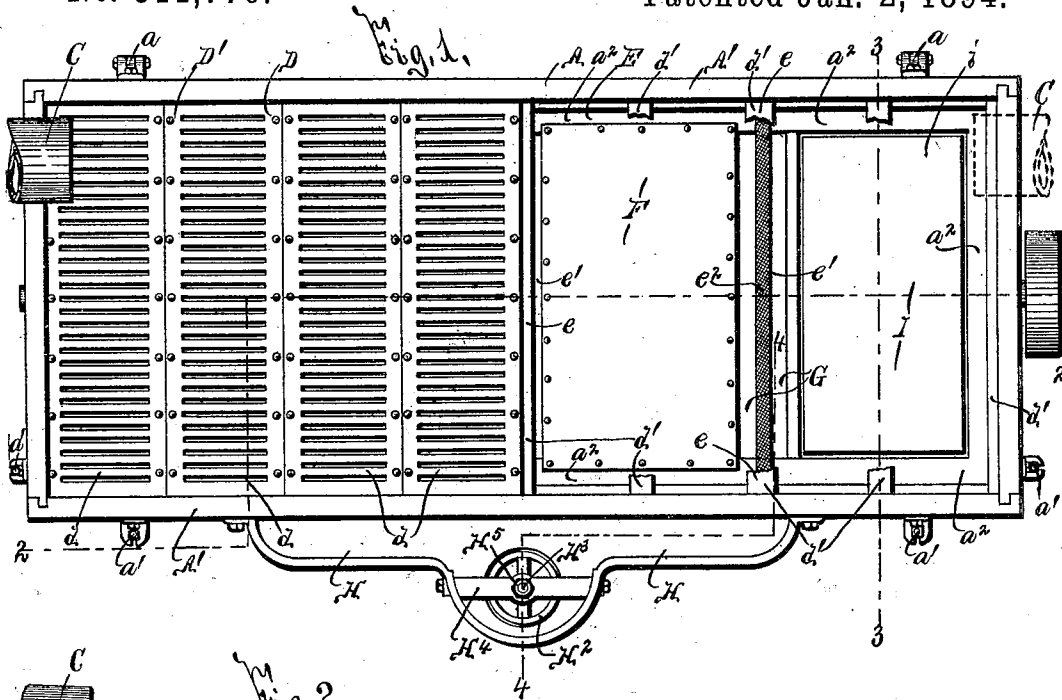
(No Model.)

2 Sheets—Sheet 1.

D. B. GOTHAM.
STRAINER.

No. 511,770.

Patented Jan. 2, 1894.



WITNESSES:

H. C. Chase,
W. H. Randall.

INVENTOR

Darwin B. Gotham

BY

Wm. Wilkinson & Son
ATTORNEYS.

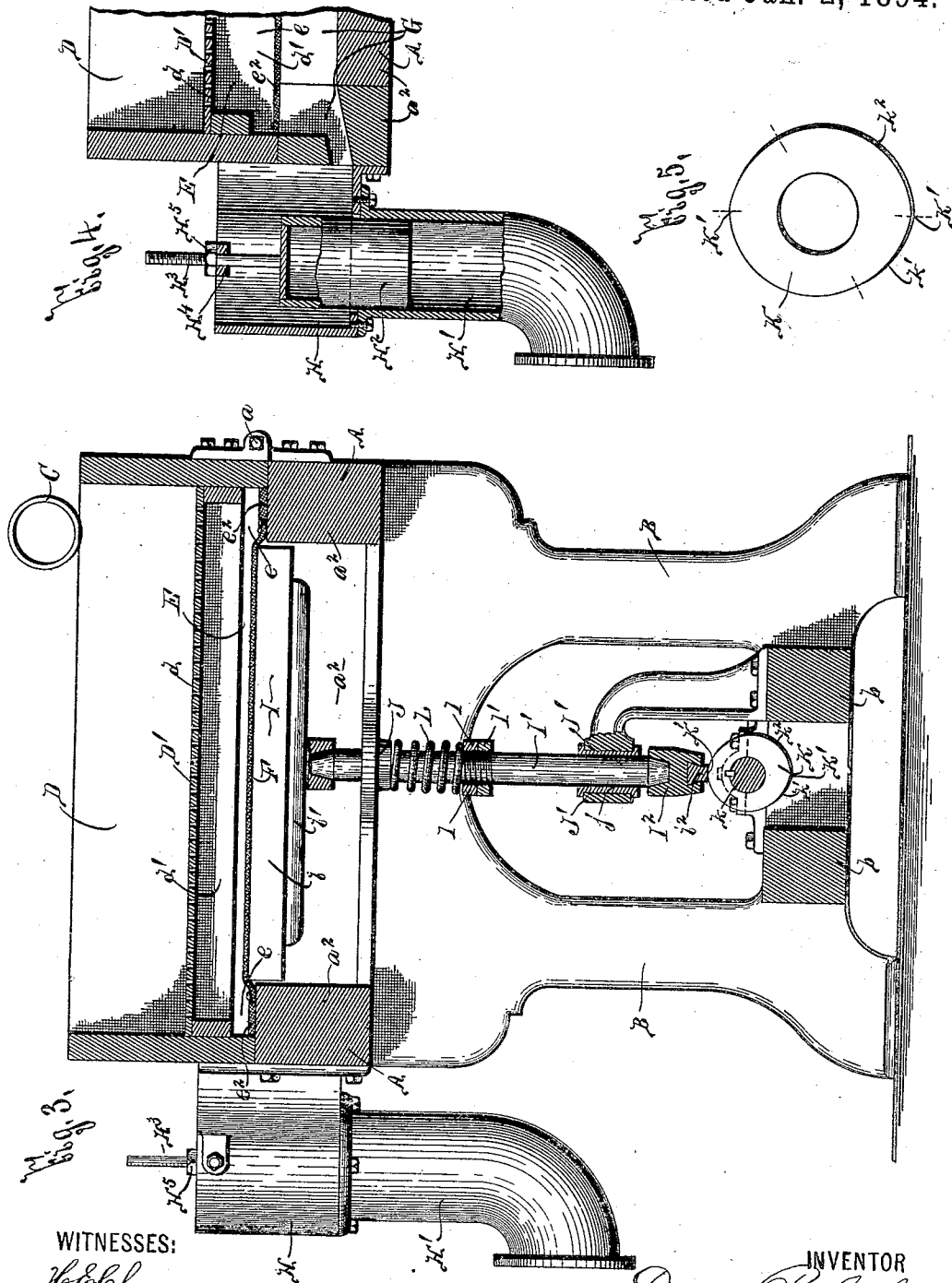
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UNITED STATES PATENT OFFICE.

DARWIN B. GOTHAM, OF WATERTOWN, NEW YORK.

STRAINER.

SPECIFICATION forming part of Letters Patent No. 511,770, dated January 2, 1894.

Application filed November 19, 1891. Serial No. 412,388. (No model.)

To all whom it may concern:

Be it known that I, DARWIN B. GOTHAM, of Watertown, in the county of Jefferson, in the State of New York, have invented new and useful Improvements in Strainers, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

My invention relates to improvements in strainers particularly adapted for use in the manufacture of pulp and like materials used in making paper and similar materials, and it has for its object the production of a device which is extremely practical, durable and effective.

To this end the invention consists, essentially, in a chamber for receiving the pulp mixed with a desirable amount of liquid and provided with a perforated plate through which pulp of the desired fineness readily passes, separate receiving chambers beneath the former chamber for the reception of the strained pulp and liquid passed through the perforated plate of the upper receiving chamber and provided with movable diaphragms at their base and with suitably depressed outlet passages at their adjacent edges, plungers movable beneath the diaphragms for drawing the pulp through the perforated base of the upper receiving chamber, and forcing from the perforations the pulp which is sufficiently coarse to clog the perforations of the plate, and actuators for operating said plungers with a variable movement.

The invention furthermore consists in the detail construction and arrangement of the parts, all as hereinafter more particularly described and pointed out in the claims.

In describing this invention, reference is had to the accompanying drawings, forming a part of this specification, in which like letters indicate corresponding parts in all the views.

Figure 1 is a top plan view of my invention, a portion of the perforated plates of the upper chamber being removed and a portion of the wall of said chamber being sectioned for the purpose of further illustrating the detail construction of the strainer. Fig. 2 is a longitudinal vertical sectional view, taken on line 2—2, Fig. 1. Fig. 3 is a cross sectional view, taken on line 3—3, Fig. 1. Fig. 4 is a detail sectional

view, taken on line 4—4, Fig. 1; and Fig. 5 is an enlarged elevation of the cam for operating the reciprocating plunger.

In straining pulp and similar materials, suitable perforated or strainer plates are employed for effecting the separation of the fine from the coarse pulp unsuitable for use and in order to effect this separation and prevent clogging of the perforated strainer plates, it is customary to use a vibratory diaphragm and a reciprocating plunger for producing a forcible current through the perforations of the plate.

By practical operation and use of strainers as at present devised, I have observed that the greatest possible efficiency is not derived therefrom for the reason that the plunger moves up and down with the same velocity and does not eject the coarser materials from the perforations of the strainer plates of the chamber with any greater force than it draws the finer grains of the pulp through said perforations to the outlet passage of the machine. In my invention, the reciprocating plunger is given a variable movement by a suitable actuator so that its downward movement is much slower than its upward movement, thus augmenting the capacity of the machine by increasing the length of time during which the fine pulp and liquid pass through the perforated plates to the outlet conduit of the machine and adding to the efficiency of the machine by more forcibly ejecting the coarse particles of pulp from the strainer plate.

The frame —A— and its standards —B— are of desirable form, size and construction, the standards being preferably tied together by bars —b—b—. The upper portion —A'— of the frame is hinged at —a— at its rear extremity and is secured in position by hinged bolts —a'— for permitting said upper chamber to be swung backward when the machine is cleaned, repaired, &c. The pulp mixed with a desirable amount of liquid is discharged by suitable conduits —C— into the receiving chamber —D— provided at its base with the perforated plate —D'— which consists, preferably, of a series of sections —d— having their adjacent extremities supported on cross bars —d'—. Beneath the chamber —D— are the receiving chambers —E— into which pass the finer particles of pulp and the

liquid discharged into the chamber —D—. These chambers —E— are separated by suitable partitions —e— alternating with the cross bars —d'— and adapted to bear against a corresponding partition —e'—, it being understood that a suitable packing —e²— is preferably placed between the partitions for preventing the passage from one chamber to the other.

- 10 —F— represents the yielding diaphragm at the base of the chambers —E— having its edges adapted to be secured to the bars —a²—a²— of the frame —A— and consisting, preferably, of a piece of rubber belting or
15 similar material capable of continued use and great flexibility.

At the adjacent edges of the chambers —E— and between the adjacent edges of the diaphragms —F— are the depressed outlet passages —G— through which the separated pulp passes to a main outlet conduit —H—, best seen at Figs. 1 and 4.

- Beneath the diaphragms —F— are plungers —I— consisting of a wooden plate —i— adapted to force the diaphragm upwardly and permit the same to move downwardly by the force of the spring —L— presently described the gravity of the superimposed pulp and water and pressure of the air thereupon, and the
30 metallic plate —i'— for supporting the wooden plate —i—. Projecting from the plunger —I— is its rod —I'— which is guided through suitable bearings —J— and —J'—, the lower one, and if desired, the upper one being provided with a removable bushing —j—.

At the lower extremity of the plunger rod beneath the bearing —J—, is the lower head —I²— having a removable wearing plate —i²— of bronze or other suitable material adapted to rest upon the periphery of an actuator or cam —K—. This cam is rigidly secured to a shaft —k— journaled in the standards —B— and is so shaped that the length of the face k' of its extension K' is less than that of the
45 other or return face k²; and, as its length is less circumferentially, its pitch must be steeper and hence its throw greater and quicker. Therefore, this cam will cause the plunger to rise quickly but to descend slowly.

- 50 As preferably constructed, the cam is provided with oppositely arranged extensions —K'— whereby one revolution thereof reciprocates the plunger twice. As previously stated, this construction of actuator or cam is an important feature of my invention, since it greatly adds to the desirability of the machine by augmenting its capacity in lengthening the time during which the pulp passes through the strainer plate, and increasing its
60 efficiency in increasing the force with which the plunger ejects the coarser pulp from the perforations of the strainer plate. The spring —L— previously mentioned as aiding in the depression of the plunger by forcing the head —I²— upon the plunger rod, firmly against the cam —K—, encircles the upper end of the plunger rod and is interposed between the

upper bearing —J— and a movable shoulder or nut —l— on the plunger rod. The tension of this spring —L— is readily varied by depressing or raising the nut —l— which may be more firmly held in position by means of a check-nut —l'—.

Upon reference to the drawings it will be noted that the outlet conduit —H— is provided with a suitable discharge pipe —H'— opening from the central portion of its base through which the strained pulp is conducted to any desired locality.

Movable in the upper extremity of the pipe —H'— is a sleeve —H²— for regulating the height of the material within the outlet conduit and in order to adjust this sleeve, the same is provided with the upwardly extending rod —H³— passed through a suitable support —H⁴— and provided with an adjusting nut —H⁵—.

The operation of my invention will be readily perceived from the foregoing description and upon reference to the drawings, and it will be particularly noted that the same is extremely durable, effective and practical. It is evident, however, that the detail construction and arrangement of its parts may be somewhat varied from those shown and described. Hence I do not limit my strainer to the precise form and construction of its parts.

In my pending application, filed December 8, 1893, (Serial No. 493,103,) I show and describe a pulp strainer of similar construction to the one herein illustrated and described; and in said application are included claims on the reciprocating plungers, plunger rods having their lower ends provided with removable wearing pieces bearing on actuating cams, and coiled springs surrounding the rods and bearing against movable shoulders thereon— which subject matter is not claimed herein.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a strainer, the combination with a chamber containing a horizontal perforated plate, vertically movable plungers beneath said plate, and outlet passages in said receiving chamber leading to a common delivery; of an outlet conduit having a discharge pipe at its lower end, a sleeve vertically movable within the upper end of said pipe, a threaded rod rising from said sleeve, a support on the conduit through which said rod passes, and an adjusting nut on the rod above the support, as and for the purpose set forth.

2. In a strainer, the combination with a chamber containing a horizontal perforated plate, vertically movable plungers beneath said plate, a pair of receiving chambers beneath the plate, a partition between such chambers, and outlet passages in said receiving chambers at their adjacent edges leading to a common delivery; of an outlet conduit having a discharge pipe at its lower end, and a sleeve vertically movable within the upper

end of said pipe, as and for the purpose set forth.

3. In a strainer, the combination with a chamber containing a horizontal perforated plate, vertically movable plungers beneath said plate, a pair of receiving chambers beneath the plate, a partition between such chambers, and outlet passages in said receiving chambers at their adjacent edges leading to a common delivery; of an outlet conduit having a discharge pipe at its lower end, a sleeve vertically movable within the upper end of said pipe, a threaded rod rising from

said sleeve, a support on the conduit through which said rod passes, and an adjusting nut 15 on the rod above the support, as and for the purpose set forth.

In testimony whereof I have hereunto signed my name, in the presence of two attesting witnesses, at Syracuse, in the county 20 of Onondaga, in the State of New York, this 7th day of October, 1891.

DARWIN B. GOTHAM.

Witnesses:

CLARK H. NORTON,

L. M. BAXTER.