

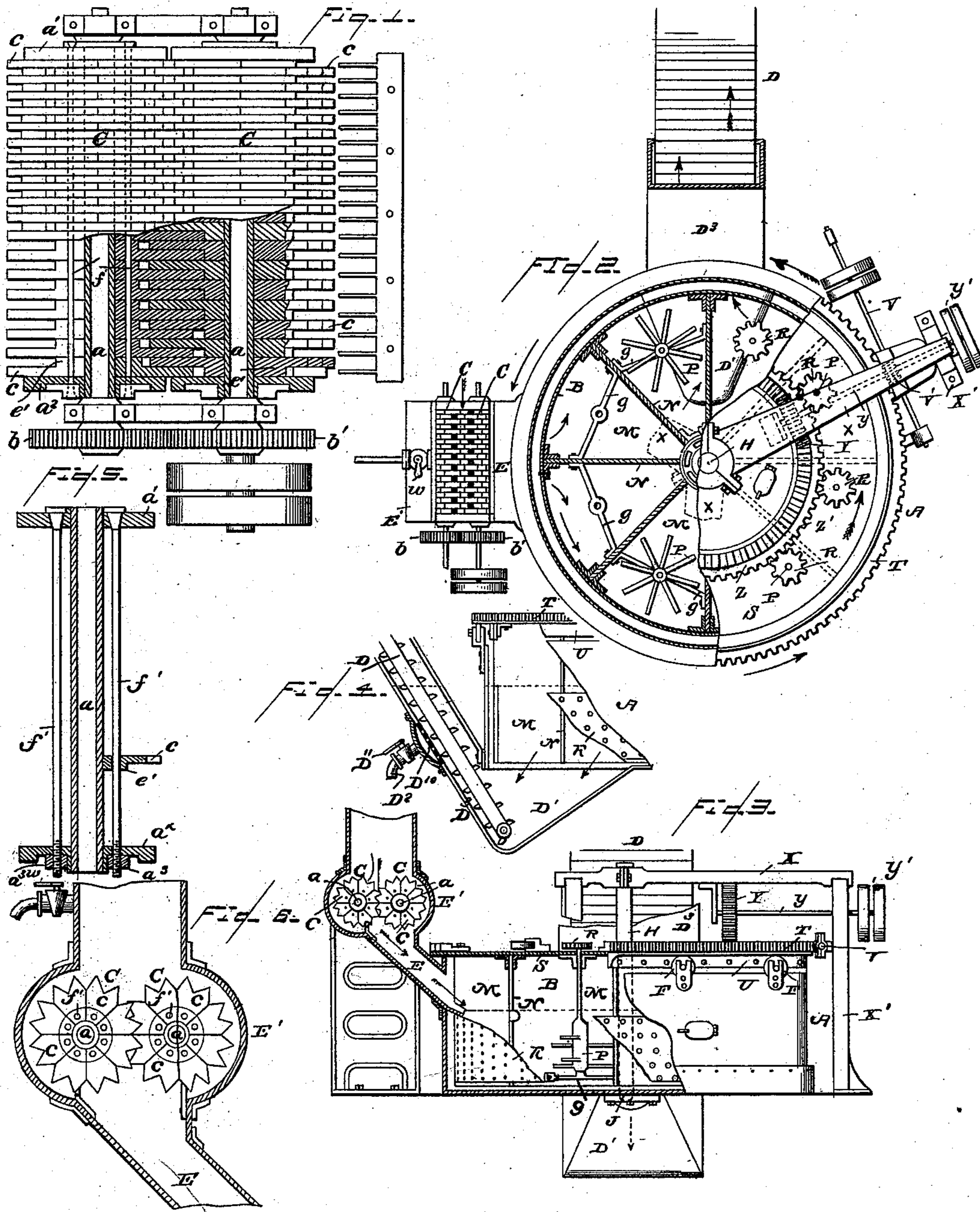
(No Model.)

3 Sheets—Sheet 1.

F. BIANCHI.
DIFFUSION APPARATUS.

No. 402,056.

Patented Apr. 23, 1889.



WITNESSES,

W. H. Schieffelin
J. Edmunds Turpin

Francis Bianchi
INVENTOR

By, H. R. Stringfellow

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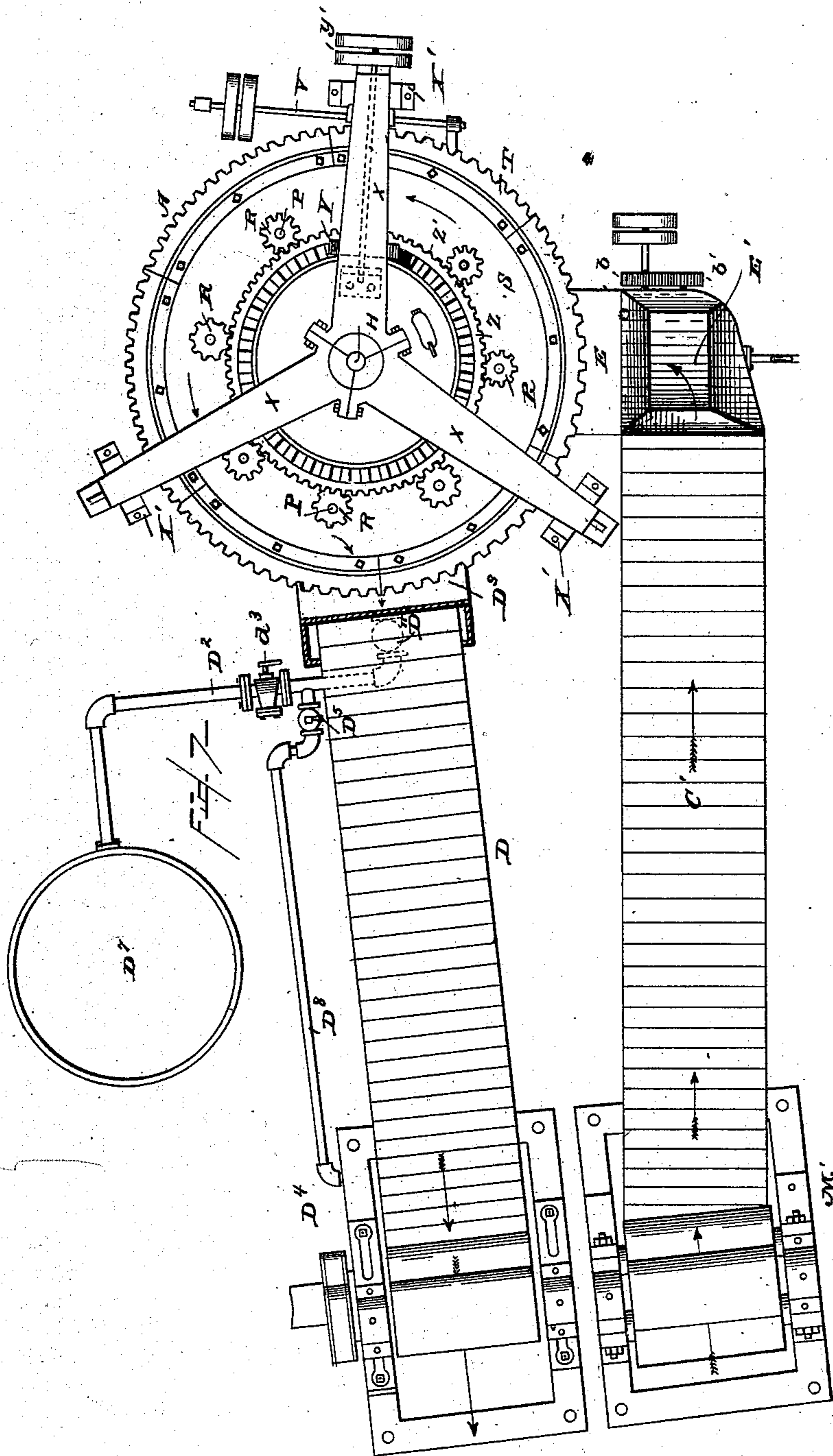
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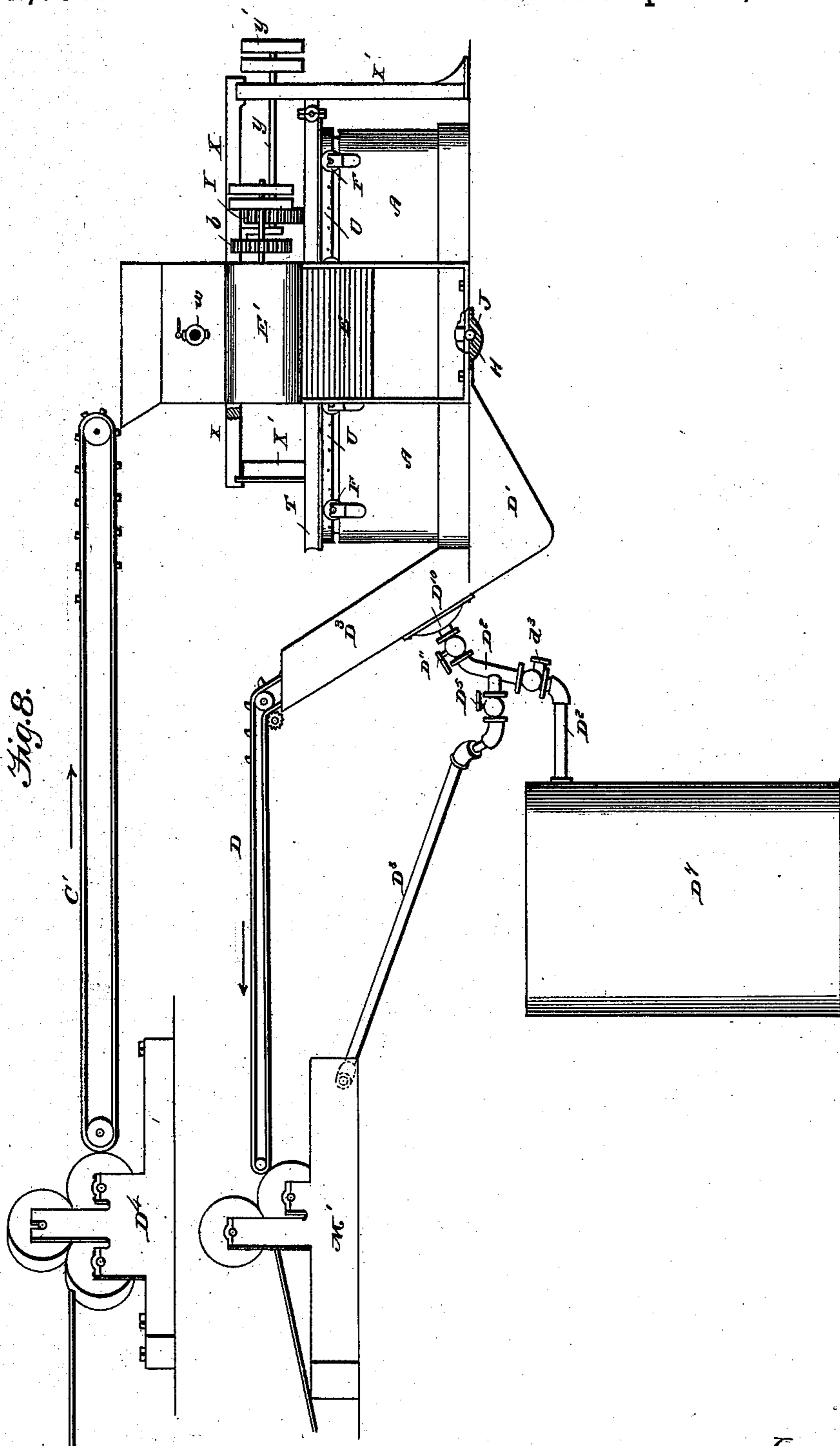
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No. 402,056.

Patented Apr. 23, 1889.



Witnesses:

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UNITED STATES PATENT OFFICE.

FRANCIS BIANCHI, OF NEW ORLEANS, LOUISIANA, ASSIGNOR OF ONE-HALF
TO LEON BOYER, OF SAME PLACE.

DIFFUSION APPARATUS.

SPECIFICATION forming part of Letters Patent No. 402,056, dated April 23, 1889.

Application filed June 25, 1887. Serial No. 242,561. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS BIANCHI, a citizen of the Republic of France, residing at New Orleans, in the parish of Orleans and State of Louisiana, have invented certain new and useful Improvements in Diffusion and Bagasse-Saturators for Cane-Mills; and I do 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 appertains to make and use the same.

My invention relates to certain new and useful improvements in the treatment of sugar-cane after the same has passed through a roller-mill, which improvement will be fully understood from the following description and claims, taken in connection with the annexed drawings, in which—

Figure 1 is a top view, partly in section, of the rotary shears used for finely reducing the cane as it comes from the crusher. Fig. 2 is a top view, partly in section, of the saturating-tank, its agitators, rotary cutters, and part of the carrier which conveys the saturated cane from the said tank to a two-roller compressing-mill. Fig. 3 is a vertical side elevation, partly in section, of Fig. 2. Fig. 4 is a vertical sectional detail showing the lower part of the saturated-cane elevator applied to part of the saturating and agitating apparatus for conveying the saturated cane therefrom and delivering it to the two-roller compressing-mill. Fig. 5 is a longitudinal section through the central clamp for holding one set of cane-cutters. Fig. 6 is a vertical cross-section through the cutter and the conveyer-case thereof, showing an end view of the two rotary shearing-cutters. Fig. 7 is a plan view of the entire apparatus. Fig. 8 is a partially diagrammatic elevation of the same.

Referring to the annexed drawings by letter, A designates a stationary cylindrical tank of any suitable capacity, and adapted to contain finely-cut cane mixed with warm water of a suitable degree of temperature. Inside of this tank is a rotary drum, B, provided with a straining-band, K. (Shown partly broken away in Fig. 3 and partly in horizontal section in Fig. 2.) This drum B is subdivided into compartments M by means

of radial partitions N, into which compartments the finely-cut cane is fed, as will be hereinafter explained. The said partitions are secured at their outer ends to the drum B, and their inner ends are secured to a central vertical shaft, H, supported by a step, J. The upper end of this shaft H is journaled in the center of a stationary frame composed of three radial arms, X, secured to posts X'. Near the lower ends of the partitions N, and secured to them, are bearings g, which afford journal-supports for the vertical shafts of radially-armed agitators P, the upper ends of which shafts pass freely through and are journaled in a cover, S, above the tank A, and have pinion spur-wheels R keyed on them, which wheels engage with the vertical teeth Z' of a wheel, Z, as shown in Figs. 2 and 7. This toothed wheel Z is secured to the shaft H. The cover S is supported by an angular ring, U, upon anti-friction rollers F, journaled in brackets secured to and projecting above the top of the tank A. With the horizontal radial teeth of the wheel Z engages a spur-wheel, Y, on a shaft, y, which is journaled in a hanger on one of the radial arms X of the supporting-frame, and also in the upright post X' of said arm and on the outer end of said shaft y belt-pulleys y' are applied. By these means the agitators receive rotary motion during the operation of stirring the cane in the several compartments M.

To the top of the revolving drum B is secured in a suitable manner a toothed ring, T, with which engages a worm, V', on a shaft, V, which rotates in suitable journal-boxes and bears on one end belt-pulleys, as clearly shown in Figs. 2 and 7. By these means the drum receives rotary motion in the direction of the arrows marked on Fig. 2.

E designates an inclined chute for conducting the finely-cut cane from a case, E', into the several compartments M of the rotary drum B. In the case E', I arrange two gangs, C C, of rotary shearing-knives c, rotating in opposite directions, the knives of one gang working in contact with the similar knives of the other gang, and adapted to cut up finely the crushed cane-stalks. The knives of each gang are preferably composed of segments

having V-shaped cutters, as shown in Figs. 3 and 6, and these segments are provided with spacing-shoulders e' , Fig. 1, and strung upon rods f' , as shown in Figs. 1 and 5. The central tubular shaft, a , of each gang of cutters is provided with clamping-heads $a' a^2$, through which the headed rods f' are passed, so that by tightly screwing up the nuts a^3 on these rods the cutters are firmly clamped between the heads and rigidly secured to the shaft a . On the ends of the cutter-bearing shafts are spur-wheels $b b'$, engaging with each other, so as to give reverse rotary motion to the cutters, and on one of the shafts a fast and loose belt-pulleys are applied.

The upturned throat of the cutter-case E' is provided with an inlet-pipe having a regulating-cock, w , by means of which water at a suitable temperature is supplied to said case, and from thence conducted through the chute E into the tank A , where it is maintained at a proper level. It is designed to thoroughly saturate the cane during the agitating and stirring processes.

M' designates a roller crushing-mill of any suitable construction, that shown being of the familiar three-roller type. This mill is for the purpose of crushing the cane before it passes to the cutting apparatus. As the cane is crushed, it passes to an endless carrier, C' , which conveys it to the cutter-case E' and deposits it therein. The cane is divided into small pieces by the cutters, and then passes down the chute E into the compartment M of the drum B , where it is agitated by the stirrers P in the water within the case A until thoroughly saturated. The rotation of the drum B brings each compartment in succession over a depression, B' , in the bottom of the case A , and the saturated cane falls to the bottom of the said depression. The depression D' has an upwardly-opening extension, D^3 , through which, to the bottom of the depression D' , extends an endless carrier, D , which lifts the saturated cane from the said depression and conveys it to a compressing-mill, D^4 , of any approved construction, that shown being of the double-roller type.

The mill D^4 expresses the saccharine matter from the cane, the said matter or juice falling to the usual receptacle. The expressed juice passes from the mill D^4 through a pipe, D^8 , to a pipe, D^2 , leading to a tank, D^7 , for receiving the said juice. The pipe D^8 is provided with a valve, D^5 , by means of which the flow of juice to the pipe D^2 may be controlled. The pipe D^2 has a valve, d^3 , between its connection with the pipe D^8 and the tank D^7 . The pipe D^2 is continued beyond the pipe D^8 to the extension D^3 , and opens into the latter about on a level with the bottom of the tank A . Between the extension D^3 and the pipe D^8 the pipe D^2 has a valve, D^{11} , and the opening into the said extension is protected

against the introduction of pieces of cane into the pipe D^2 by a suitable strainer, D^{10} . By an evident manipulation of the valves d^3 , D^5 , and D^{11} the juice from the mill D^4 may be conveyed directly to the tank D^7 or to the tank A ; or the water in the said tank A , with the juice expressed by the cutters and absorbed from the cut cane, or conveyed thereto from the mill D^4 , may be carried directly to the tank D^7 . When the water in the tank A is sufficiently charged with the juice from the cane, it may be drawn from the said tank and conducted to evaporating-pans. The tank D^7 may be an evaporating-pan, or the pans may be connected with it.

My invention prevents the gumming of material, and thus avoids the stoppage of the machinery.

As will be seen, the water in the tank A may at any time be saturated with the cane-juice by conveying it from the press D^4 , and when conducted to the evaporating-pans may be treated therein without waste of fuel.

Having described my invention, what I claim is—

1. The combination, with a cane-crushing mill, of rotary cutters inclosed in a suitable case for finely dividing the crushed cane, an endless conveyer for moving the cane from said mill to said cutter-case, a chute leading from the latter into a stationary tank, and a revolving drum subdivided into compartments and provided with rotary agitators, all constructed and adapted to operate substantially as and for the purposes described.

2. The combination of the cane-crushing mill with the endless carrier C' , the cutter-case and its rotary cutters, the feed-water-supply pipe w , the stationary tank provided with a subdivided revolving drum having agitators therein and a surrounding strainer-band, a discharge-trunk for the saturated cane, an endless conveyer leading to an expressing-mill, a receiving-tank for the juice, and pipes provided with cocks and communicating with the said stationary tank, the receiving-tank, and the expressing-mill, all substantially as and for the purposes described.

3. The combination, with the stationary tank, a rotary drum therein subdivided into compartments, and an agitator in each of said compartments for stirring the same, of a mill adapted to express the juice from the saturated cane, and an endless carrier for conveying the saturated cane from the bottom of the tank to said mill, substantially as specified.

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

FRANCIS BIANCHI.

Witnesses:

PERCY D. PARKS,
HENRY J. RHODES.