(No Model.)

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A. LEBLANC.

SUGAR CANE MILL.

No. 304,012. Patented Aug. 26, 1884.

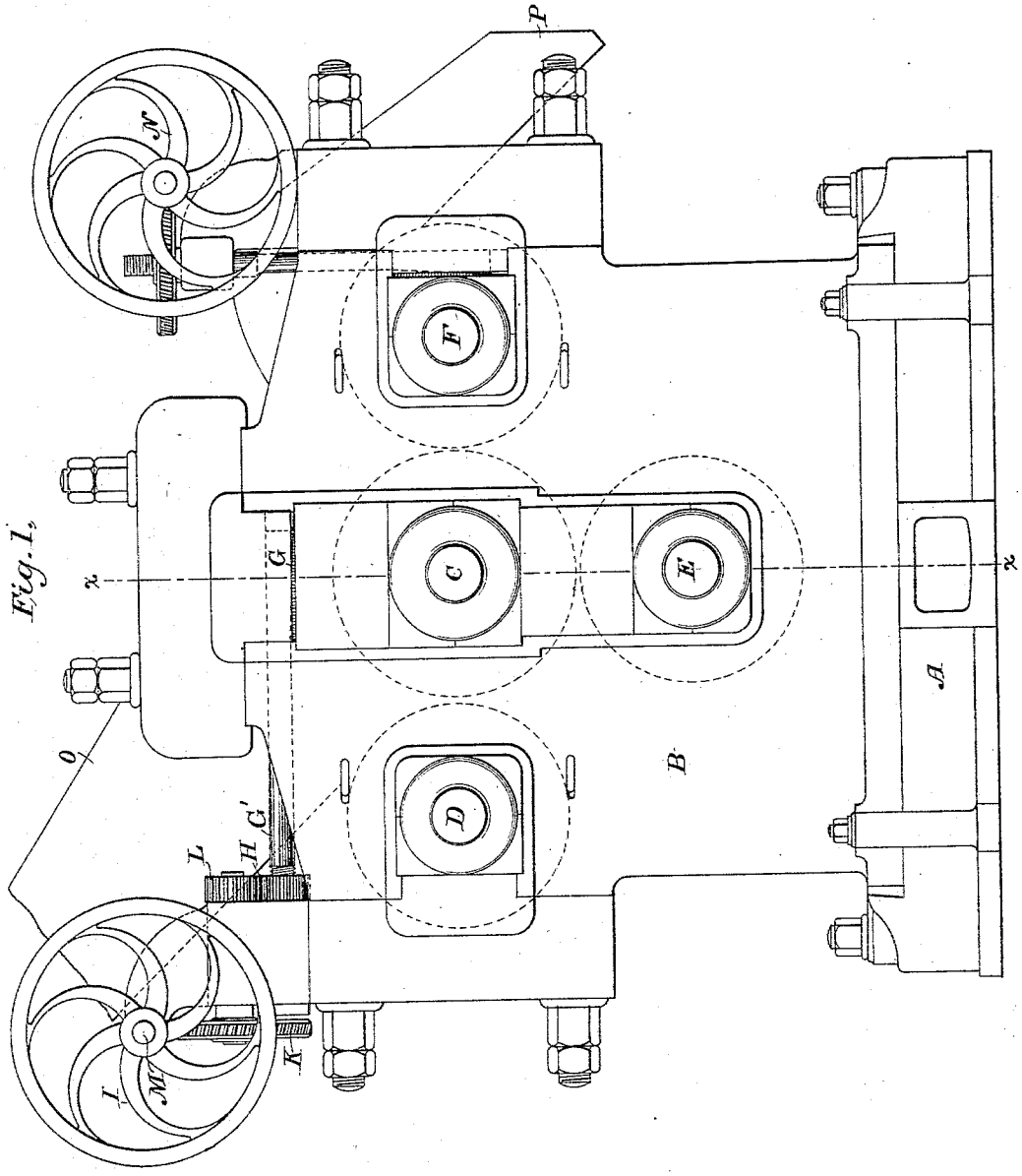


Fig. 1.

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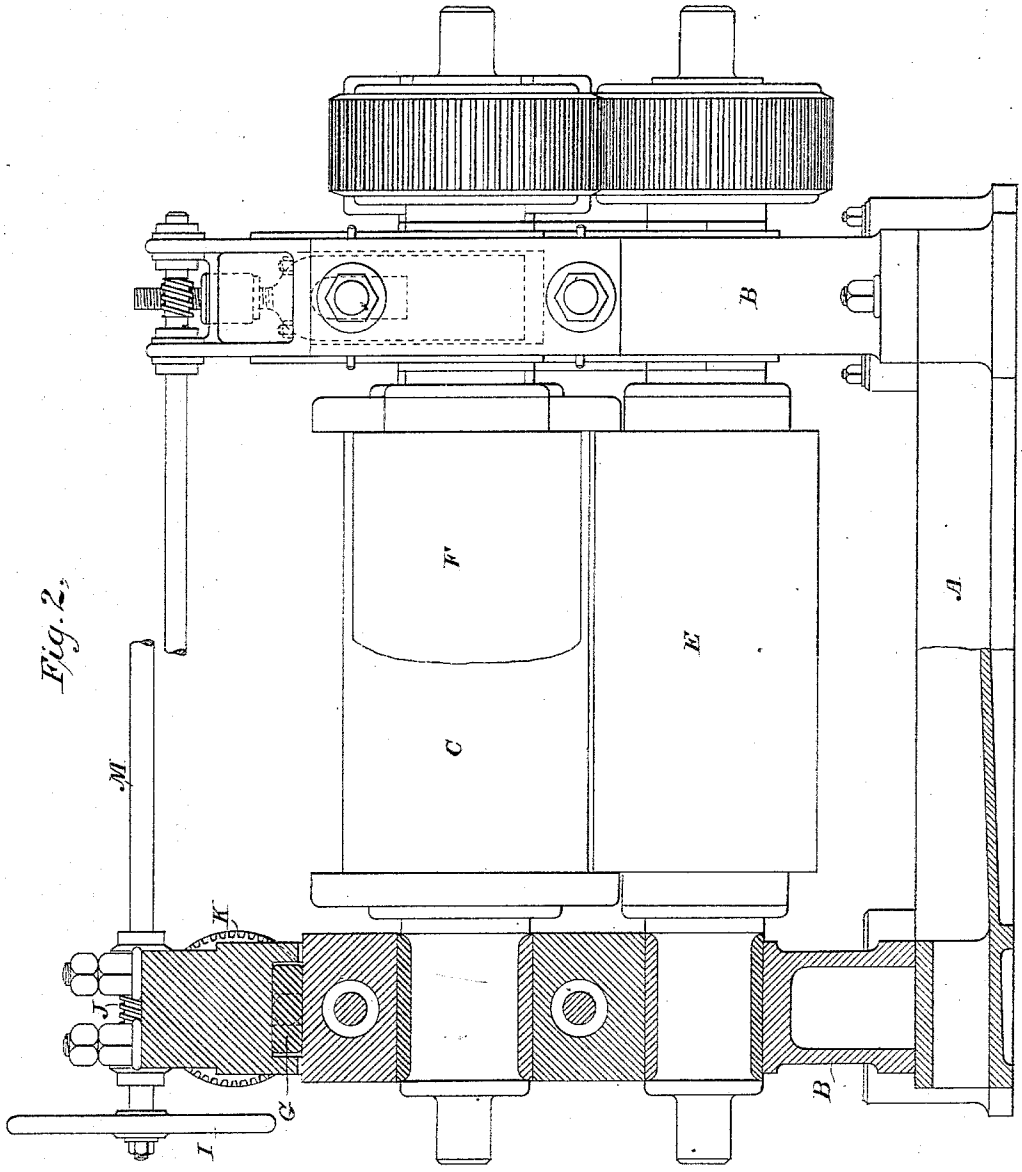
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Fig. 2.



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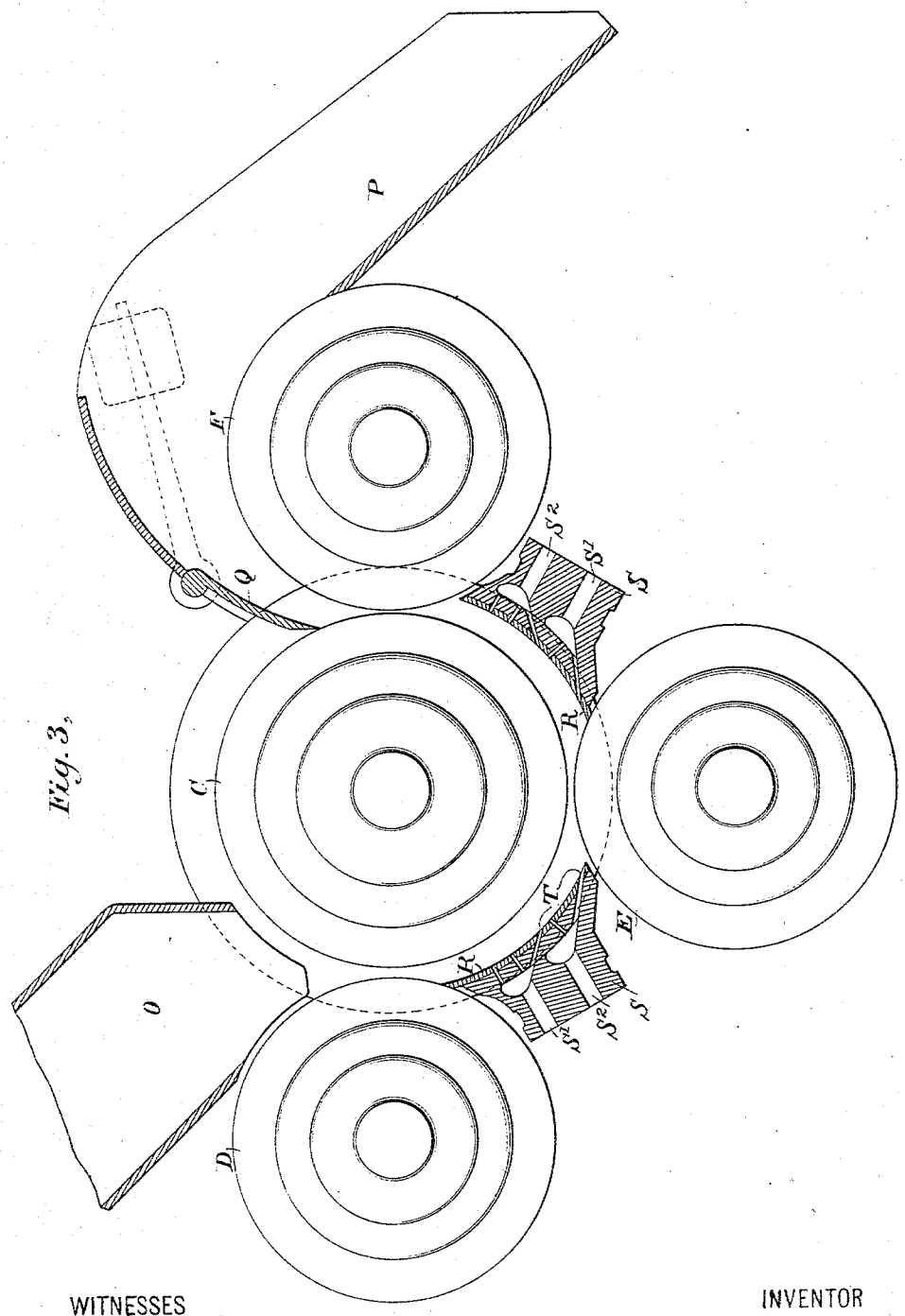


Fig. 3.

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UNITED STATES PATENT OFFICE.

ALFRED LEBLANC, OF CIENFUEGOS, SANTA CLARA, CUBA.

SUGAR-CANE MILL.

SPECIFICATION forming part of Letters Patent No. 304,012, dated August 26, 1884.

Application filed December 15, 1883. (No model.)

To all whom it may concern:

Be it known that I, ALFRED LEBLANC, a citizen of France, residing at Cienfuegos, Province of Santa Clara, Isle of Cuba, have invented certain new and useful Improvements in Sugar-Cane Mills; and I hereby declare the same in and by the following full, clear, and exact description thereof, which will enable those skilled in the art to which my invention appertains to make and use the same.

This invention relates to that class of sugar-cane mills that express the juice of the cane by the conjoint action of parallel rolls. Its object is to produce a compressing-mill that shall embody in a single structure means for pressing the cane as many times as may be required, and means for moistening it in an improved manner during the process of compressing; and it consists of suitable rolls for crushing the cane and expressing the juice, and separate conductors—one for a liquid and one for steam—so arranged that the crushed cane is first moistened and then submitted to the action of steam as it passes from one set or pair of rolls to another pair.

In the drawings accompanying this specification, Figure 1 is an end view of a machine embodying my improvements. Fig. 2 is a side view of the same in partial section on the plane *x x* of Fig. 1. Fig. 3 is a detail view of the rolls and associated parts.

Referring to these views in detail, A is the bed of the machine; B B, the standards or housings that contain the journals of the rolls. C is the large central roll, about which are grouped the smaller rolls D E F, arranged as shown, one on each side of the large roll with their axes in the same horizontal plane, and one beneath the large roll, with its axis in the same vertical plane. These rolls are provided with suitable journal-boxes and such other auxiliary supporting devices as are necessary, and are mounted in their housings in any of the well-known ways.

G is a wedge (shown in dotted lines) lying in a mortise in the standard and bearing against the upper slightly-beveled surface of the journal-box of the roll C. Its stem G′ is threaded, and enters the correspondingly internally-threaded sleeve of the gear H, which gear is operated by the hand-wheel I through worm J and worm-wheel K and its pinion L. The worm-shaft M extends to the other end of the machine, where it bears another worm designed to operate a second wedge that is constructed and arranged like wedge G, and located at this end of the large roll. When the hand-wheel I is turned, the wedges at the ends of the large roll will be simultaneously moved toward or from the threaded gears H, and the large roll C either brought nearer the under roll or released, so that it may separate therefrom. N is the hand-wheel of an adjusting device for moving the roll F, which device is similar to that employed to adjust the large roll. By the use of these adjusting devices the clogging of the machine is quickly remedied and the adjustment of the rolls readily accomplished. These devices may be applied to the other rolls, though in a machine of this particular kind the adjusting of the rolls indicated will be sufficient.

It is designed that the small rolls shall generally be three in number, and, commencing with the roll D, shall be adjusted successively nearer the large roll, so that three successive pressures may be put upon the cane, as this number is in practice found to give the best results; but it may be advantageous for some uses of such a machine to increase the number of the rolls, so as to even more economically express the juice by still further pressure.

O represents the receiving and P the discharging chute, and this latter chute is made removable, and is provided with a scraper, Q, weighted and movable as shown, which is intended to direct the bagasse from the large roll into the discharge-chute and prevent it from passing around the main roll C.

R R represent clearing knives or scrapers, which are located between and bear upon the small rolls, as shown, and are used to prevent the bagasse from winding around these rolls, and for keeping it upon the main roll and directing it through the machine. These knives constitute the faces of the perforated injecting-chests S S, which chests have two chambers, $S' S^2$, which are respectively for conveying water and steam to the bagasse as it passes from one roll to another. The perforations T in the faces of the injecting-chests are so inclined and arranged as to open below the bot-

tom of the interior of the chambers of the chests, in order that any juice that may work into the chests cannot collect and sour, but is readily drained therefrom.

One reason for injecting the bagasse with steam is to coagulate the albuminous matter in the cane, and thereby cause it to adhere to and pass off with the bagasse, thus saving the chemical operations that are necessary to separate it from the juice during evaporation, as is requisite when it has been expressed therewith. The steaming of the bagasse between successive pressures also materially aids in effectually expressing the juice, for, as the bagasse come from each pressure in a quite spongy and comparatively dry condition, the success of the following pressure depends to a considerable extent upon it being first properly remoistened. It should be understood in this connection that the crushed cane has the property of absorbing its own juices, which makes it desirable to immediately, after each pressure, thoroughly moisten it before the expressed juice can be absorbed. I have found that this moistening of the bagasse after each pressure is best effected by subjecting it first to jets of water, and then to jets of steam, which I accomplish by supplying the chambers S′ with water or any other suitable liquid and the chambers S^2 with steam. This order of injecting the liquid and steam is quite essential to the best results, for the heat of the steam, if steam be alone or first used, debilitates the capillarity and vitality of the fiber of the bagasse and prevents it from absorbing sufficient moisture to properly prepare it for the next pressure; but when the water is applied first to the bagasse it is absorbed to the full normal capacity of the mass, and the after heating of the bagasse and absorbed water by the steam produces the requisite complete saturation of the mass. By this process of treatment in a machine of the character here described the expressing operation is made continuous and more effective than heretofore, for the cane is subjected to the various steps of the process in such rapid succession as to prevent it from gaining any condition opposed to the best results. In this connection an important feature of this machine is that any number of pressures less than its full capacity may be availed of, should it be so desired, because of insufficient power to properly drive the whole machine, or to secure high speed with little power, or for any of the reasons that usually call for machines of special constructions; and this is accomplished, for example, where it is desired to utilize but two pressures, by withdrawing the last roll from its working position, removing the last steam-chest, and advancing the movable discharge-chute, so that it will receive the bagasse as it leaves the second small roll. It should be remarked that this adaptability of the machine is attained, mainly, by reason of the special arrangement of the rolls here shown—that is, the arrangement of a large or main roll having various smaller rolls acting in conjunction with such main roll to secure various successive pressures; but it will of course be understood that the improved means for moistening the bagasse between pressures are applicable to other juice-expressing mills where separate sets or pairs of rolls are used, and also that the liquid and steam conductors may be made in other forms than those here shown. The process of thus extracting cane-juice constitutes the subject of another application filed April 29, 1884, Serial No. 129,765, and is not accordingly here claimed.

What is claimed as new is—

1. The combination, in a sugar-cane mill, of rolls for crushing the cane, and separate liquid and steam conductors located between the rolls that effect successive pressures, and arranged to inject the bagasse as it passes from one pressure to another—first with a liquid, and then with steam—as and for the purpose set forth.

2. The combination, in a sugar-cane mill, of a central roll, C, two or more rolls, D and E, grouped around the central roll, and a liquid-conductor, S′, and a steam-conductor, S^2, arranged between the rolls, as and for the purpose set forth.

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Witnesses:
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