(No Model.) 3 Sheets—Sheet 1.

E. A. ELLIS.

APPARATUS FOR SEPARATING MOLASSES FROM SUGAR.

No. 487,323. Patented Dec. 6, 1892.

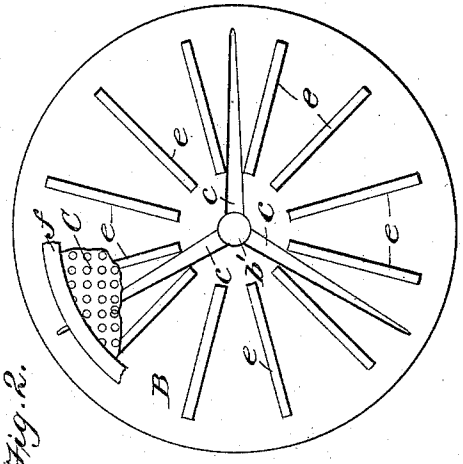

Fig. 2.

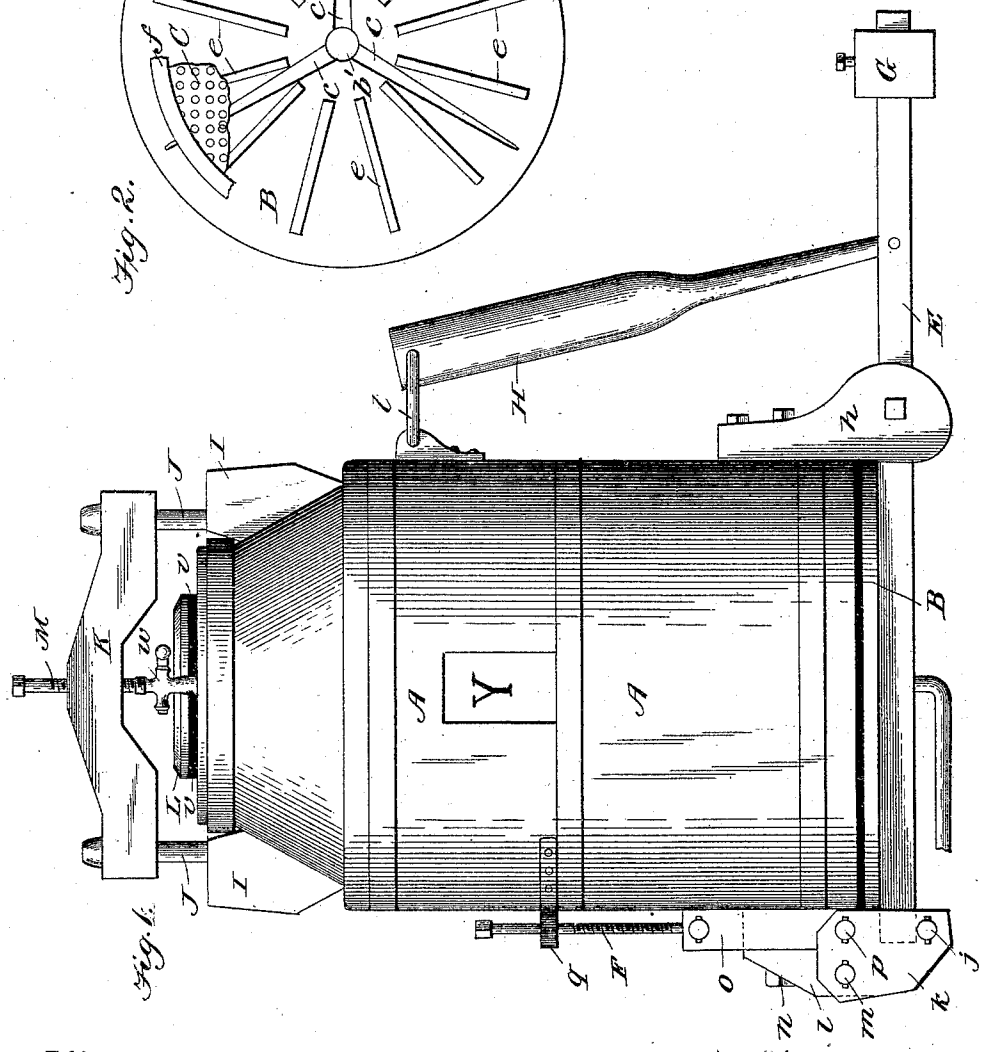

Fig. 1.

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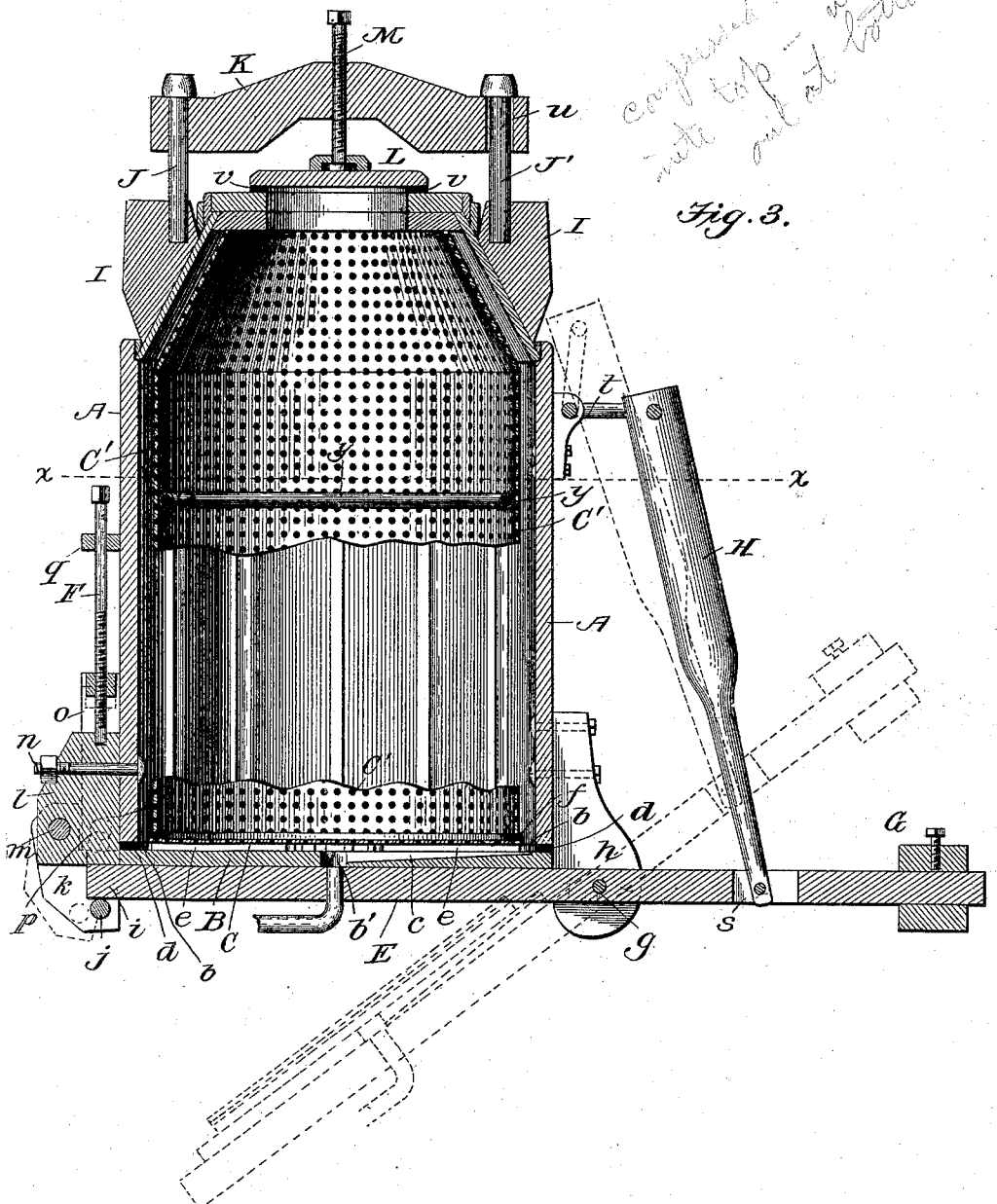

Fig. 3.

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(No Model.) 3 Sheets—Sheet 3.

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Fig. 4.

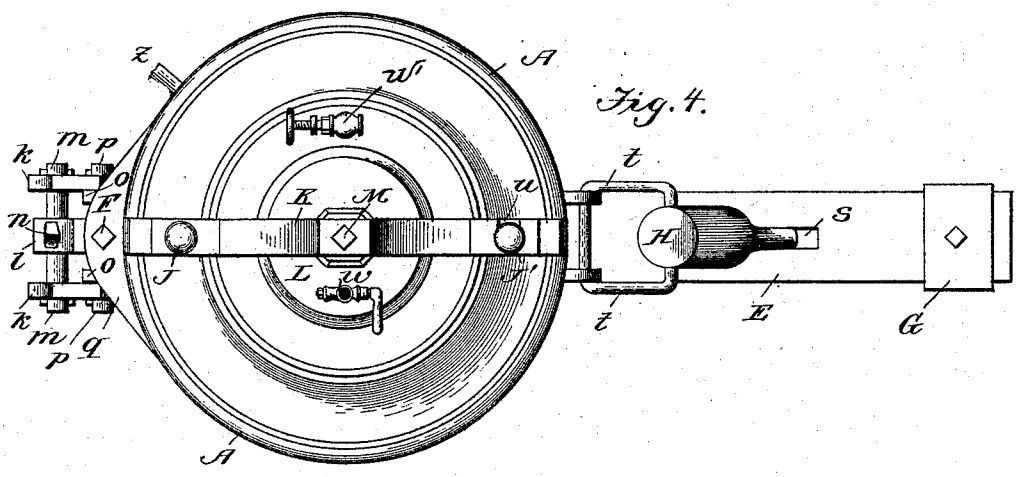
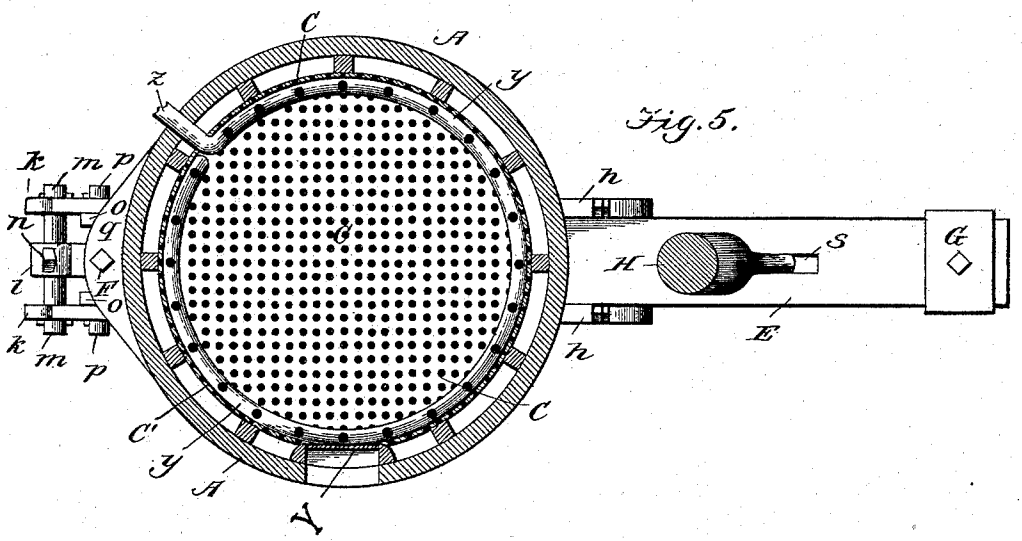


Fig. 5.



Witnesses
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UNITED STATES PATENT OFFICE.

EMMETT A. ELLIS, OF SARTARTIA, TEXAS.

APPARATUS FOR SEPARATING MOLASSES FROM SUGAR.

SPECIFICATION forming part of Letters Patent No. 487,323, dated December 6, 1892.

Application filed February 23, 1892. Serial No. 422,491. (No model.)

To all whom it may concern:

Be it known that I, EMMETT A. ELLIS, a citizen of the United States, residing at Sartartia, in the county of Fort Bend and State of Texas, have invented certain new and useful Improvements in Apparatus for Separating Molasses from Sugar; and I do hereby 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.

This invention relates to certain new and useful improvements in apparatus for separating molasses from sugar; and it consists substantially in such features thereof as will hereinafter be more particularly described, and pointed out in the claims.

It has been usual heretofore in the separation of molasses from sugar to take the "masse-cuite" (sugar laden with molasses) from the evaporating-pan after it has been passed through the usual evaporating process and subject the same to centrifugal action, so as to throw off the molasses into any suitable avenue or receptacle, while the grain or dry sugar remains behind and is collected or taken up from time to time as sufficient quantities thereof have accumulated or been separated. Varied forms of centrifugal machines are at present in use for such purpose, the economy and saving claimed by many being very great. In all of such machines, however, the vessel for containing the masse-cuite during the centrifugal operation must be rotated. Consequently the use of gearing and various forms of rotary driving mechanism is necessary, many forms of which now in use being unsteady and unreliable on account of irregular action or fluctuation in the motive power. With every fluctuation in the driving mechanism there is a corresponding variation in the centrifugal power or action, and as a consequence the separation of the molasses from the sugar is not as thorough as it ought to be and repetitions of the procedure are necessary.

The object of the present invention is to completely separate all molasses contained in a given quantity of sugar at a single operation.

A further object of the invention is to dispense with centrifugal machines for the purpose of separating molasses from sugar and consequently to dispense with the use of all driving power and connecting mechanism at the same time.

A still further object of the invention is to thoroughly separate the components of the masse-cuite by discharging the molasses as it is separated from the grain and collecting the latter in a pure and dry state, ready to be dumped or emptied into a receiver whenever required, all as will more fully hereinafter appear when taken in connection with the accompanying drawings, wherein—

Figure 1 represents a vertical side elevation of an apparatus constructed and arranged in accordance with my invention; and Fig. 2 is a plan view of the bottom thereof, showing a portion of the screen-bottom, which lies adjacent thereto, the said view being intended to more clearly indicate the grooves or conduits through which the molasses is conducted or flows to the outlet or discharge. Fig. 3 is a central vertical sectional elevation of the apparatus, showing the screen partially cut out or broken away, said view showing the construction and arrangement of the devices for locking and releasing the removable or detachable bottom of the casing, the dotted lines indicating the position to which the bottom is brought for the purpose of emptying or dumping the sugar from the vessel. Fig. 4 is a top or plan view of the apparatus, and Fig. 5 is a horizontal sectional view taken on the line *x x* of Fig. 3.

In carrying my invention into effect I employ a suitable vessel or casing of proper size or dimensions, which vessel or casing is made very strong and preferably of iron, suitable vertical ribs being constructed on the inner side for the purpose of strength. The said vessel is practically a closed vessel, although provided with a swinging or dumping bottom held in place and released by mechanism hereinafter more particularly described. The said bottom closes tightly against a rubber or similar elastic gasket, and thus the vessel is maintained air-tight at the bottom while being subjected to pressure. The vessel or casing is tapered or conical from a suitable distance from its top, with a charge-opening in the top, that is closed by a tight-fitting lid. In the said lid a valve is located or arranged for the

admission of compressed air, and the lid is likewise provided with a valve by which the pressure of air within the vessel may be broken or left off at any time. Located within the vessel or casing is a hollow perforated sieve, which in shape conforms exactly to the shape of the outer vessel or casing; but the dimensions thereof are smaller, so as to leave a space between said sieve and casing all around, into which space the molasses is forced out through the perforations of the sieve, whence it passes to conduits or grooves in the bottom of the casing and is conducted away or carried out through a suitable discharge-pipe. The screen is likewise provided with a removable bottom; but this bottom is also perforated and serves to prevent escape of the grain in the separating process.

Reference being had to the several parts of the drawings by the letters marked thereon, A represents the outer shell or casing, which, as stated, is of iron and preferably constructed with a number or series of internal ribs for the purpose of additional strength, as well, also, as serving to prevent the breaking of the interior sieve from the strain exerted to the latter by the compressed air entering the casing or vessel from the top. The base *b* of said vessel is provided with a tight-fitting removable bottom B, which latter is provided with a central discharge-opening *b'* for the molasses and a number of radial grooves *c*, extending inwardly from the edge of said bottom, as shown, and gradually deepening as they reach the opening *b'*, so as to facilitate the flow to said opening. The discharge-pipe leading from the opening *b'* may be and preferably is provided with a cock or valve which is kept closed during the separating process, so as to maintain the interior of the vessel entirely closed, it being understood, of course, that after a sufficient quantity of molasses has been expressed or separated the cock or valve in said pipe is opened to allow the molasses to run or be drawn off. An air-tight connection between the lower edge of the casing and the removable bottom B is maintained by a rubber ring or gasket *d*, fitting therein, as shown, and the said removable bottom is also formed or provided on its upper surface with a number of radial ribs or projections *e*, lying between or intermediate the grooves. The purpose of these ribs is to form or create sufficient space between the removable bottom B and the perforated bottom C of the interior screen C' to permit the passage or flow of the molasses to the grooves and central opening. A similar gasket *f* is placed between the lower edge of the perforated screen C' and its bottom C, so as to maintain a tight joint and prevent any escape of sugar beneath or out into the space between said casing and screen. It will of course be understood that when the bottom B is lowered to empty or dump the contents of the vessel the perforated bottom C is carried down or away with it.

In order to effect the dumping of the contents of the vessel, there is secured or attached a horizontal beam E, which is fulcrumed or pivoted at *g* between two ears *h h*, secured rigidly in place to the side of the casing. The locking end *i* of said beam E rests upon a strip or shelf *j*, held between the sides of two jaws *k k*, which are pivoted to the sides of a block *l* by means of a pin *m*, the said block being also secured to the side of the vessel or casing by means of the bolt *n*. Passing through the pivoted jaws *k k* and likewise through the sides of a vertical slide *o* is a pin *p*, while passing through a screw-threaded opening in the top of said slide is a vertical screw F, which is sustained in vertical position by a bracket *q* and has its lower end resting and working within a recess formed in the top of the block *l*, as shown. By turning the said screw downwardly the slide *o* is pushed down, and by virtue of the described pivotal connection of said slide with the jaws *k k* the said jaws will be caused to turn or swing outward, as shown by the dotted lines, Fig. 3, and this movement will carry the rest or shelf *j* away from beneath the end of the beam E, and thus will the bottom B be caused to fall by weight of the contents in the vessel. The opposite end of the beam B extends somewhat beyond the casing, as shown, and is preferably though not essentially provided with a weight G, which serves to counterbalance the weight of the contents of the vessel when the latter is closed, and which also serves to carry the movable bottom B back into place ready to be locked after the said bottom has been released and the contents of the vessel emptied. Working in connection with the projecting end of the said beam is a connecting rod or lever H, which is at its lower end pivoted in the sides of an opening *s* in said beam, while at its upper end is linked to the side of the casing by means of the link *t*. This rod or lever need only consist of a simple straight rod when the counterbalancing-weight on the beam is employed; but when such weight is dispensed with the rod is made weighted itself or heavier at its upper portion. In other words, by making the said connecting rod or lever H very heavy it will serve by its weight to restore the dumping bottom to its place after the contents of the vessel have been dumped or emptied, in like manner as will the weight G should the latter be employed instead. Both the weight G and lever H are herein shown for accomplishing the same purpose either separately or combined, and it will be understood, of course, that I can use either one at pleasure or both, as may be deemed necessary.

The vessel or casing A tapers or is conical for a suitable distance from the top, and this top portion is properly secured or fitted in place sufficiently tight to withstand all the uses to which the apparatus is to be put. Formed with or projecting from the casing at this point are two rests or supports I I, into which the vertical pins J J' are received

in the manner shown in Fig. 3. Swinging on the pin J is a horizontal beam K, which is provided with a groove *u*, into which the pin J′ is received whenever the said beam is brought into position across the top of the vessel or casing. The opening in the top of the vessel or casing is closed by a lid L, into the top of which the lower end of a screw-bolt M enters after passing centrally through the beam K, as shown. The joint between the lid and casing is kept air-tight by means of a rubber or other suitable gasket *v*, while the screw-bolt M is for the purpose of pressing the lid down tight into its place. It is obvious that by loosening the bolt the lid can be readily removed by simply swinging the beam to one side free of the pin J′. One reason for making the vessel or casing conical or tapering at the top is that the parts for operating and holding the lid are thereby furnished a ready support, while another reason is that the back pressure of the air which is admitted to the interior of the casing is better resisted or overcome. In the lid L an inlet-valve *w* is provided, through which air under pressure may be admitted from any suitable source or compressor, while also arranged in said lid is an exhaust or break-pressure valve *w′*, by which the pressure of air within the casing may be relieved at any time.

Placed in the side of the casing at any suitable height is a panel Y, of glass, so as to furnish a sight into the molasses-space for ascertaining the height of the molasses, and located within the inner perforated screen is a perforated pipe *y*, which may consist of one, two, or more coils, as circumstances may require. At the proper time water is passed into said perforated pipe *y* for the purpose of cleansing. After the water has been passed through, the compressed air may be permitted to blow out or through the molasses-exit, so as to be sure that all of it is carried off. The water is admitted to the pipe *y* at *z*. (See Fig. 5.)

The operation is as follows: The vessel being in suitable position to permit the free downward working of its removable bottom is first charged with the masse-cuite up to the proper or desired height and the lid is then swung around and secured in place air-tight. Compressed air is then let in through the valve for that purpose, care being had not to have the pressure too great. The pressure of the air will squeeze or express the molasses out through the perforations in the screen in a thorough manner, while the grain of the mass will remain inside of the screen, from which it is dumped at the proper time in the manner hereinbefore described. The sugar thus obtained will be found to be thoroughly dry and pure, and the molasses of course passes off through the opening *b′*. During the separating process the bottom B will be secured in place air-tight, as will be apparent.

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

1. In an apparatus for separating molasses from sugar, the combination, with the containing-vessel provided with the removable bottom B, of the beam, the swinging jaws supporting the end of said beam, the vertical slide and the screw therefor, the rod or lever connecting the projecting end of the beam with the casing, and the counterbalancing-weight, all substantially as described.

2. In an apparatus for separating molasses from sugar, the combination of the outer closed vessel or casing provided with a removable or dumping bottom, the inner perforated screen or vessel having, also, a removable perforated bottom, the beam, the swinging jaws supporting the end of said beam, the vertical slide and the screw therefor, the rod connecting the projecting end of the beam with the casing, and the counterbalancing-weight, substantially as described.

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

EMMETT A. ELLIS.

Witnesses:
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GEO. W. LITTLEFIELD.