(No Model.) 3 Sheets—Sheet 1.

F. STITZEL.

EXPRESSING PRESS.

No. 586,673. Patented July 20, 1897.

Fig. 1

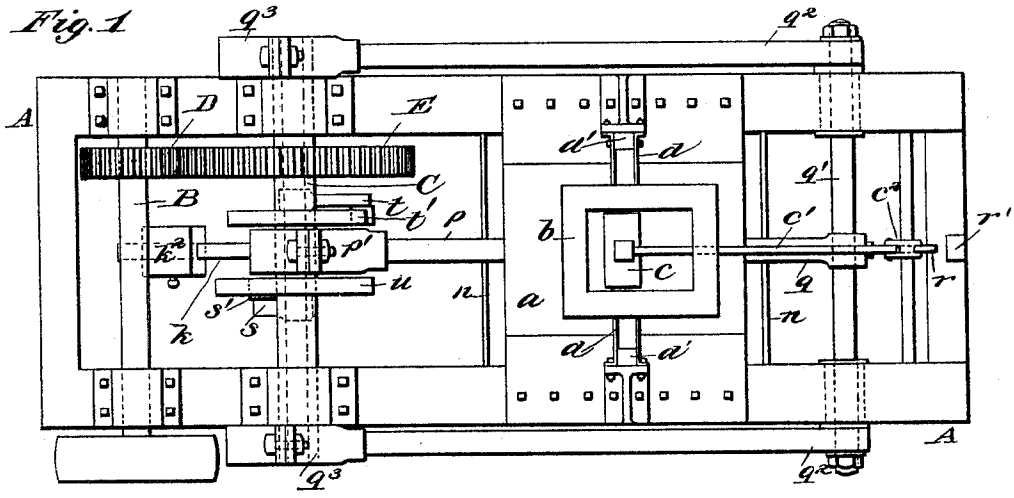


Fig. 2

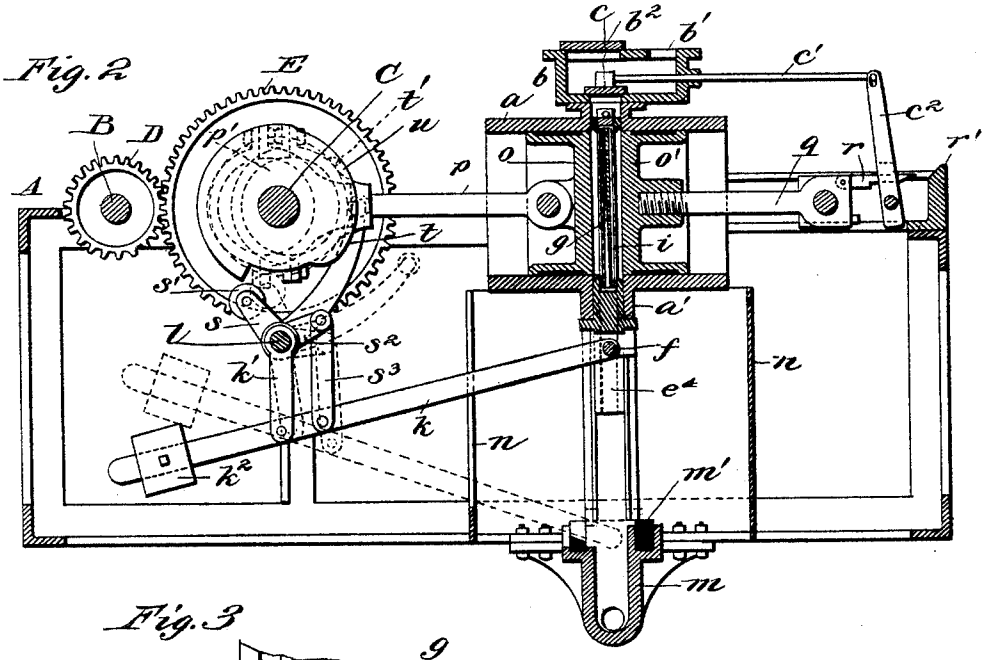
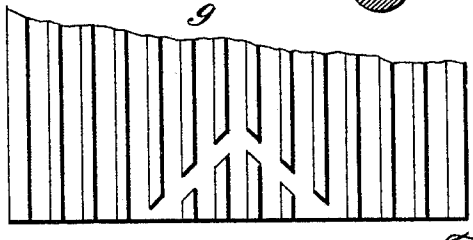


Fig. 3



Witnesses.

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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EXPRESSING PRESS.

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Fig. 4

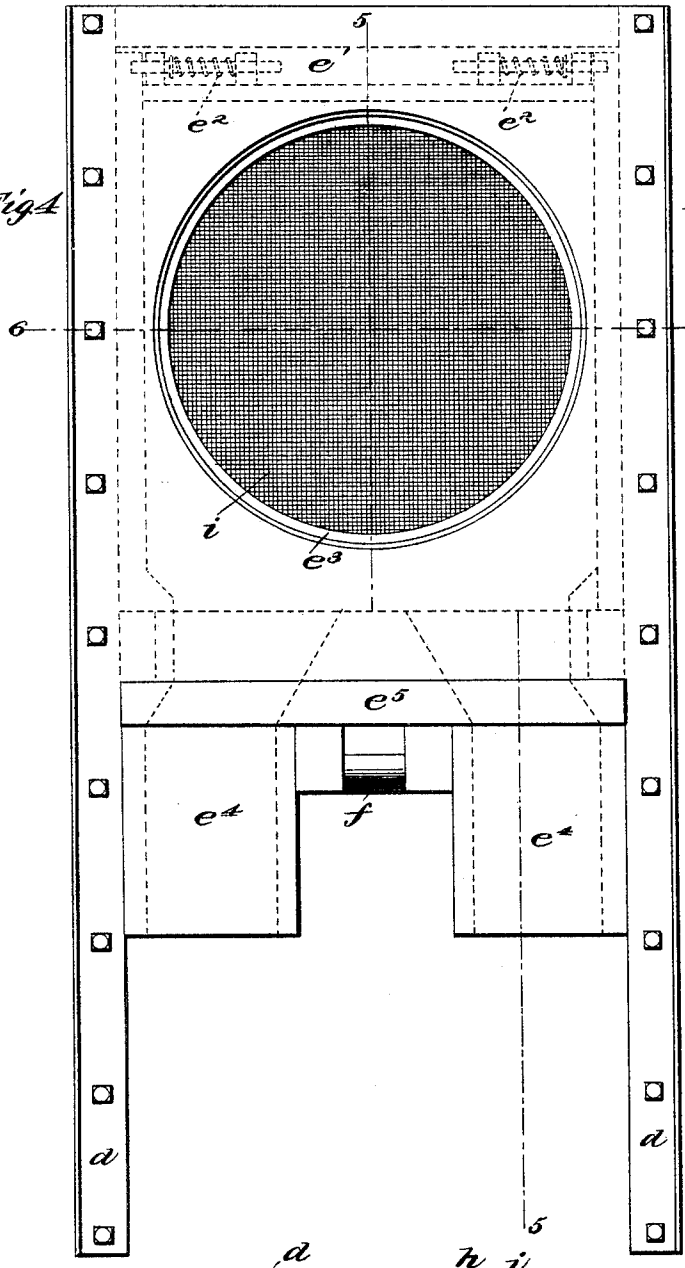


Fig. 5

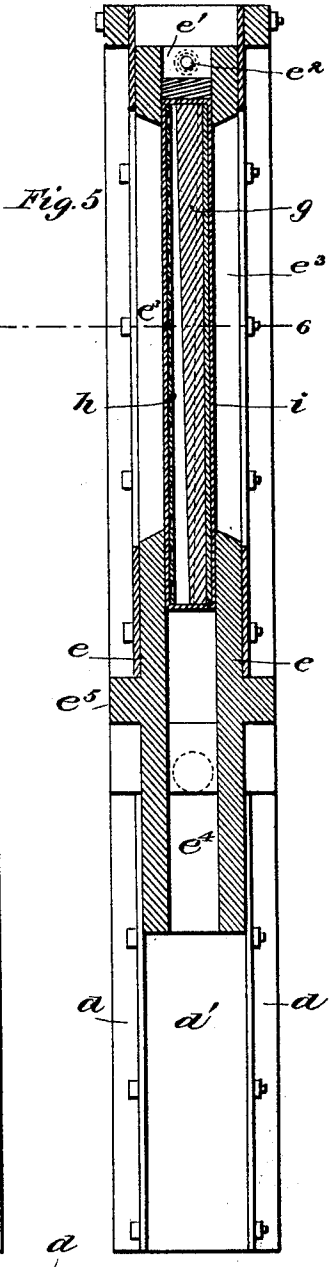
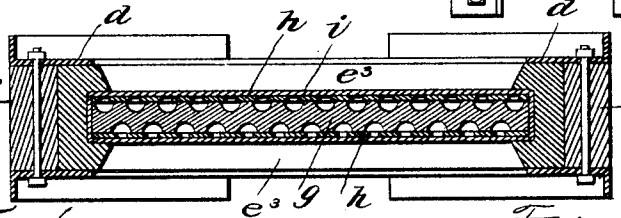


Fig. 6



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(No Model.)

3 Sheets—Sheet 3.

F. STITZEL.

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Fig. 7

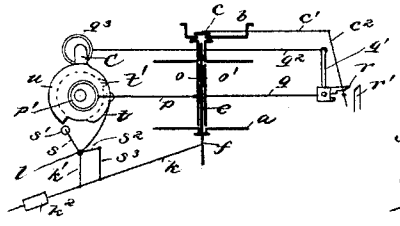


Fig. 8

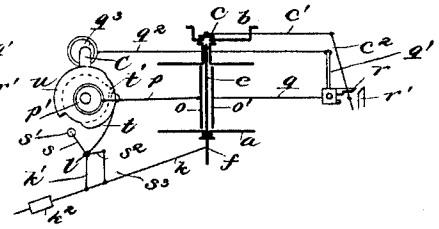


Fig. 9

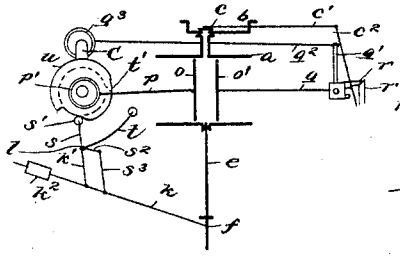


Fig. 10

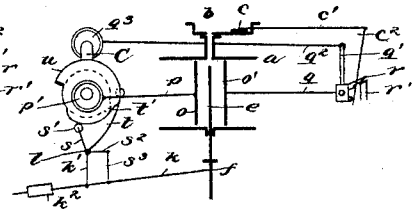


Fig. 11

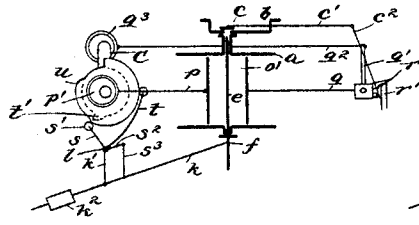
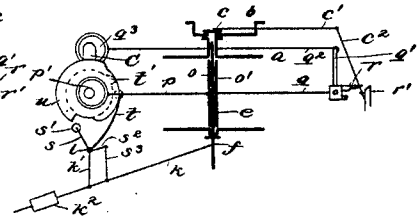


Fig. 12



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UNITED STATES PATENT OFFICE.

FREDERICK STITZEL, OF LOUISVILLE, KENTUCKY.

EXPRESSING-PRESS.

SPECIFICATION forming part of Letters Patent No. 586,673, dated July 20, 1897.

Application filed March 11, 1897. Serial No. 627,000. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK STITZEL, a citizen of the United States, residing at Louisville, in the county of Jefferson and State of Kentucky, have invented a certain new and useful Improvement in Expressing-Presses, of which the following is a full, clear, and exact description.

The slop from distilleries is utilized for cattle-food, either in a wet or a dry state. A common way of preparing slop for the dry state is to take the hot stuff as it comes from the stills, screen it, then press it, then pulverize it, and finally dry it. The press used is a suitable hydraulic press and manual labor is used in preparing the slop for it, the slop being taken from a tank in which it has been stored until sufficiently cool for handling, then formed into the well-known "cheese," and then pressed.

The object of my invention is to provide a link or member in a plant for the automatic treatment of the slop by machinery from the still to a cooling room or car.

With this object in view my invention consists of an expressing-press into which the slop is fed and subjected to pressure, so as to form cakes, which cakes are discharged from the machine and automatically carried thence to a pulverizing and drying apparatus to fit it for shipment, the expressed fluid being at the same time carried away to any suitable waste-receptacle.

In practicing my invention I use a pressure-cylinder containing oppositely-acting plungers which coöperate with a press-box, which press-box contains a strainer. The slop to be treated is fed into the cylinder so as to enter the press-box, and the plungers being caused to approach opposite sides of the said press-box the slop is forced into the said press-box and against the strainer and the fluid extracted and the solid matter condensed into cakes on opposite sides of the press-box, the fluid escaping from the press-box to a waste-receptacle and the cakes being carried down out of the cylinder and discharged from the press-box to be conveyed thence for further treatment, all as I will proceed now more particularly to set forth and finally claim.

As will appear presently, my invention includes a single-plunger press as well as a double-plunger mechanism.

In the accompanying drawings, illustrating my invention, in the several figures of which like parts are similarly designated, Figure 1 is a top plan view. Fig. 2 is a vertical section. Fig. 3 is a face view of the lower portion of the strainer-plate. Fig. 4 is a face view of the press-box. Fig. 5 is a vertical section of the press-box, taken in the plane of line 5 5, Fig. 4. Fig. 6 is a cross-section of the press-box, taken in the plane of line 6 6, Figs. 4 and 5. Figs. 7, 8, 9, 10, 11, and 12 are diagrams illustrating the various movements of the press.

The frame A may be of any suitable construction to support the mechanism now to be described. B is a power-shaft, and C is a driven shaft, these two shafts being connected by the gear-wheels D E or by any other suitable means.

a is a cylinder, made preferably in two parts and with open ends and provided with flanges *a'*, by means of which it is mounted upon a housing (presently described) for the press-box, which housing is interposed between the adjacent flanged ends of the cylinder.

b is a valve-box arranged above the cylinder and in alinement with the housing and in such manner as to open into the cylinder. This valve-box is provided with an inlet *b'* for the slop and a cover b^2 for access to the press-box. A valve *c* is arranged over an opening in the valve-box which registers with the press-box, and this valve is in the nature of a slide-valve and is operated by a rod *c'* and link c^2, as hereinafter described.

The housing is composed of vertical angle-pieces *d* and filling-pieces *d'*, all bolted together, as shown more particularly in Figs. 4, 5, and 6. This housing, as already stated, is erected between the adjacent ends of the cylinder, and it contains and forms fluid-tight slideways for the press-box *e*. This press-box is made hollow and is provided with a cover *e'*, held in place thereon by spring-bolts e^2 or other devices, whereby said cover may be easily removed for access to the interior of the box. The opposite sides of the press-box are provided with openings e^3 of substantially the internal diameter of the cylinder *a*,

and its lower end is provided with outlet-passages e^4.

f is a pin arranged in the lower portion of the press-box and adapted to be connected with the operating mechanism, as will be presently described.

The press-box is made with a lateral projection or shoulder e^5, for a purpose presently appearing.

Within the press-box is arranged a press-plate or screen. This press-plate or screen comprises a plate g, having its opposite faces provided with longitudinal tapering grooves, as shown in Figs. 3, 5, and 6, and there may be added the perforated screen-plates h. The whole is inclosed in a fibrous or textile sack i. This press-plate is arranged within the press-box e so as to intercept the openings e^3, and it is covered and held in said press-box by means of the cover e', which cover, as already indicated, may be removed for obtaining access to the press-plate for its removal for cleansing or repair purposes, the cover being withdrawn through the openings covered by the valve c and the cover b^2.

I do not limit my invention to any particular form of press-plate, but have described that which I believe to be the most practicable and useful for straining out the fluid from the slop and retaining the solid matter.

The press-box is supported upon a lever k, which is suspended by a double or forked vibrating hanger-strap k' from a rock-rod l, and the said lever k is provided with a counterweight k^2.

Beneath the housing is arranged a trough m, which is designed to carry away the waste fluid. This trough is provided with a cushion m' to coöperate with the lateral projections e^5 when the press-box drops. The trough is confined between vertical walls n.

Plungers o o' are arranged in the opposite ends of the cylinder a in a fluid-tight manner. The plunger o is connected by a rod p with an eccentric p' on the shaft C, whereby a reciprocating motion is imparted to said plunger when the said shaft is rotated. The plunger o' has its stem q connected to a cross-head q', which in turn is connected by rods q^2 with eccentrics q^3 on opposite ends of the shaft C. By setting the eccentrics p' and q^3 q^3 in opposite directions it is obvious that the plungers o and o' will be moved in opposite directions by the rotation of the said shaft. The cross-head q' carries a latch r, which coöperates with the lever c^2 and a portion r' of the frame A to operate the valve c in any ordinary manner.

On the rock-rod l is mounted an arm s, containing a roller s', and also having the arm s^2, from which depends a double or forked hanger-strap s^3, which is connected with the lever k in advance of the strap k'. Another arm t is also mounted on rod l and moves or rocks with the arm s. A cam u is mounted upon the shaft C and coöperates with the roller-arm s to move up the lever k and thereby raise the press-box in its housing, and on the shaft C is fixed an arm or cam t', which coöperates with the roller-arm t to move down the lever k, so as to drop the press-box, all as and for a purpose now to be described.

Referring to Fig. 7, it will be seen that the parts are all in a position where pressure is being applied to the slop, and this position of Fig. 7 is the same as that shown in Fig. 2. The next movement is that shown in Fig. 8, wherein the plungers are receding from one another, the cam u leaving the roller-arm s and the cam t' coming into contact with the roller-arm t, thereby dropping the press-box with its contained cakes upon the cushion m' with a jarring motion, as in Fig. 9, which serves to loosen and jar out the cakes of slop that have been formed in the openings e^3 in the press-box by the pressure of the plungers, such jolting action serving to detach the solid matter from the textile covering of the press-plate and such cakes dropping into the space confined by the walls n and being carried thence for further treatment. The severity of the shock is regulated by the counterweight k^2, which is a counterbalance to the press-box, the latter having a downward tendency. The continued rotation of the shaft C in the same direction and after the fall of the press-box brings an elevated portion of the cam u into contact with the roller s', Figs. 9 and 10, and depresses arm s, Fig. 10, thereby causing the strap s^3 to elevate the said arm and consequently the press-box, and when said press-box has been lifted to substantially the position shown in Fig. 10 then the valve c is opened and a fresh supply of slop is admitted into the cylinder. Upon further movement of the parts in the same direction the valve is closed and the press-box is elevated to its full height, as shown in Fig. 11, and then the plungers are brought together upon the press-box to repeat the operation first described, such repeated operation being shown in Fig. 12, and Figs. 12, 7, and 2 indicating the same position.

By my invention the slop may be automatically conveyed from the stills in the hottest possible condition, its fluid extracted, the solid matter compressed, the fluid conveyed away, the pressed cakes automatically handled, and the whole operation carried on without the intervention of manual handling, thus not only expediting the operation, but saving manual labor. The cakes are pulverized and dried in a loose state.

I do not limit my invention to the exact details herein set forth and described, either of construction or operation, as the same may be variously modified. I esteem my invention to be a broad and generic one.

Instead of using the double-ended cylinder I may omit the right-hand end together with its plunger and its operating parts and close up that end and that side of the press-box and housing and use simply the left-hand end—that is to say, it is within my invention to use

a single-acting instead of a double-acting press, the operation and operating mechanism being the same otherwise.

What I claim is—

1. An expressing-press, comprising a cylinder into which the material to be treated is fed, a plunger therein, a press-box interposed between said plunger and cylinder and containing the substance to be acted upon by it, means to reciprocate said press-box to bring it into position for action of the plunger and means for suddenly dropping said press-box to discharge the pressed material, substantially as described.

2. An expressing-press, comprising a cylinder into which the material to be treated is fed, oppositely-acting plungers, a press-box interposed between said plungers and containing the substance to be acted upon by them, means to reciprocate said press-box to bring it into position for action of the plungers and means for suddenly dropping said press-box to discharge the pressed material, substantially as described.

3. An expressing-press, comprising a cylinder, plungers arranged in said cylinder and moving toward and from one another, a press-box dividing said cylinder, means to reciprocate it and means for suddenly dropping the press-box from between the plungers to discharge its contents, substantially as described.

4. An expressing-press, comprising a cylinder and means to feed material thereto, plungers arranged in said cylinder and acting in opposite directions, a press-box adapted to be reciprocated vertically in said cylinder and between said plungers, a suspended lever having a changing fulcrum and connected with said press-box to raise and lower it, and means to actuate said suspending devices to give a sudden drop to the press-box to discharge its contents, substantially as described.

5. An expressing-press, comprising a cylinder, plungers arranged therein, means to reciprocate said plungers toward and from one another, a press-box arranged in said cylinder crosswise of and between the plungers, a suspended lever connected to said press-box, and cams adapted to vibrate said suspended lever, substantially as described.

6. An expressing-press, comprising a cylinder, a fluid-tight plunger arranged therein, a press-box arranged in the cylinder and to be acted upon by the plunger, a valvular feeding device adapted to supply to the said cylinder the material to be pressed, means to actuate the said plunger to press the material into the press-box, and means to cause a sudden dropping of the press-box to discharge the fluid and the solid matter from the press-box, substantially as described.

7. In an expressing-press, a sliding press-box, and means to cause it to fall suddenly and with a jarring action in combination with a compressing-plunger and a cylinder, substantially as described.

In testimony whereof I have hereunto set my hand this 1st day of March, A. D. 1897.

FREDERICK STITZEL.

Witnesses:
JAS. J. BARRY,
W. J. O'HEARN.