B. C. BARTON.

PRESS.

APPLICATION FILED MAY 9, 1917.

1,238,981.

Patented Sept. 4, 1917.

3 SHEETS—SHEET 1.

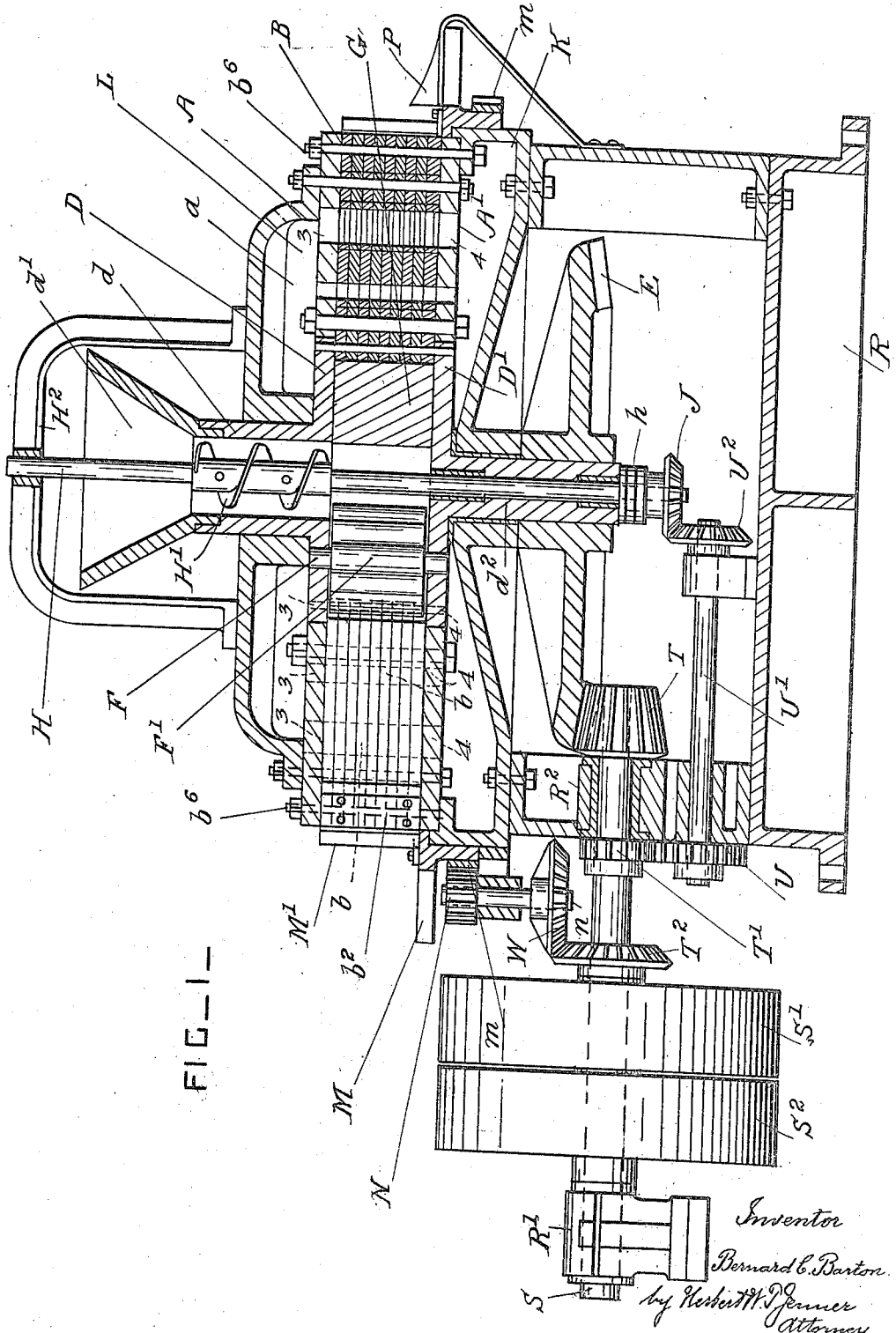


FIG. 1.

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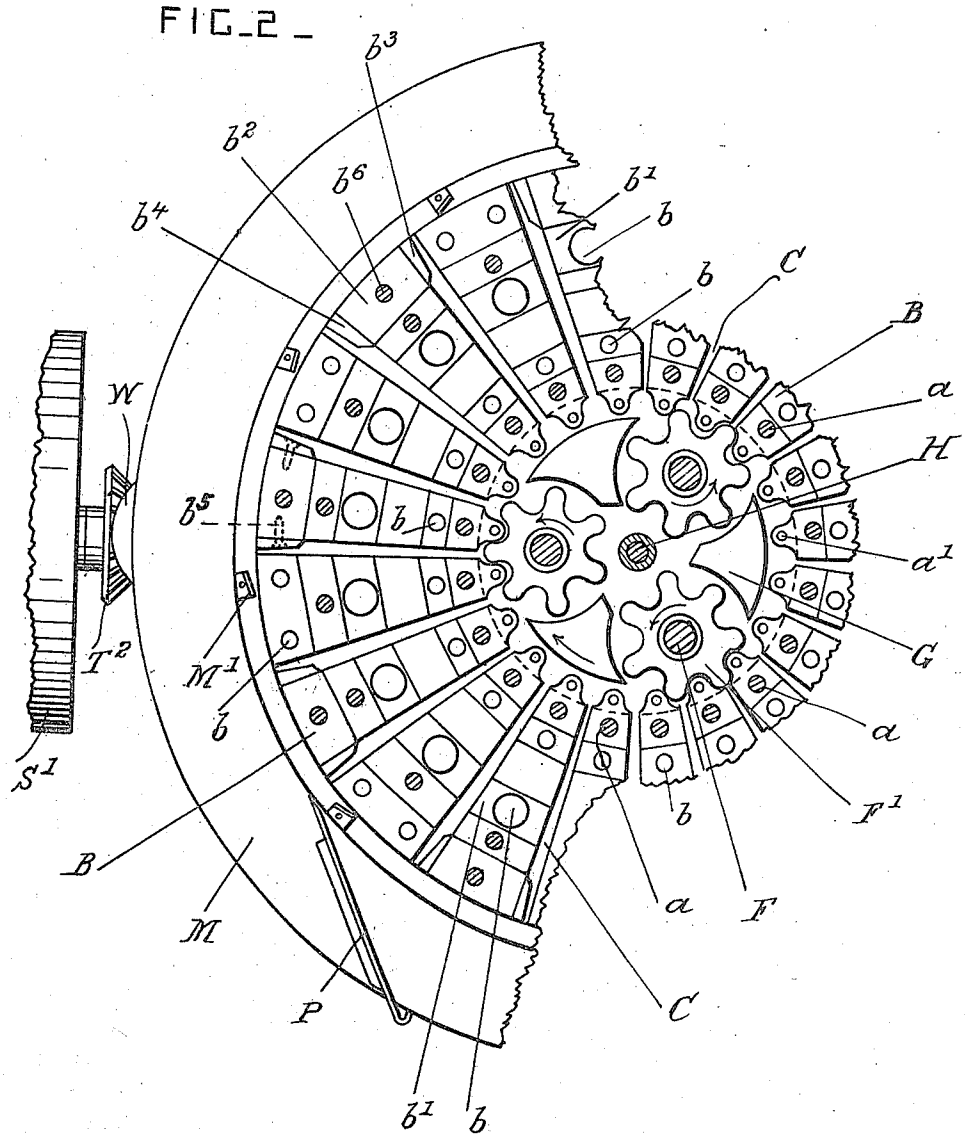
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3 SHEETS—SHEET 2.

FIG. 2.



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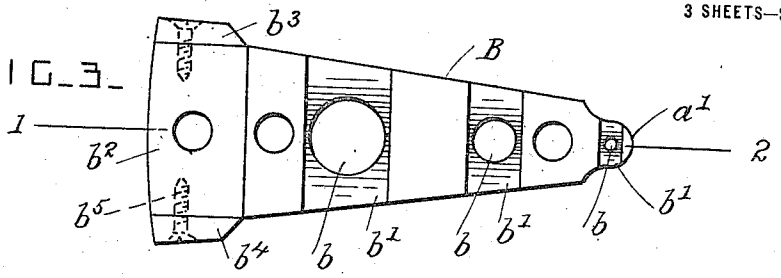
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3 SHEETS—SHEET 3.

FIG_3_



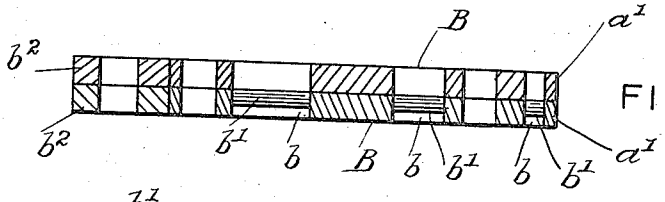
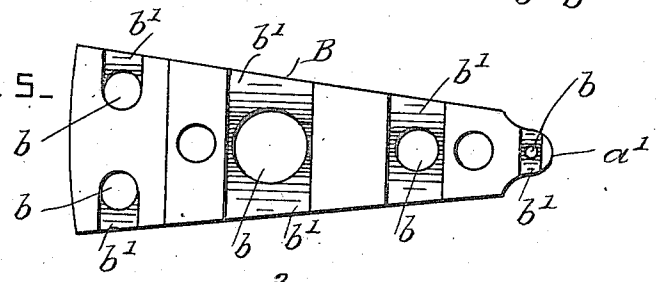


FIG_4_

FIG_5_



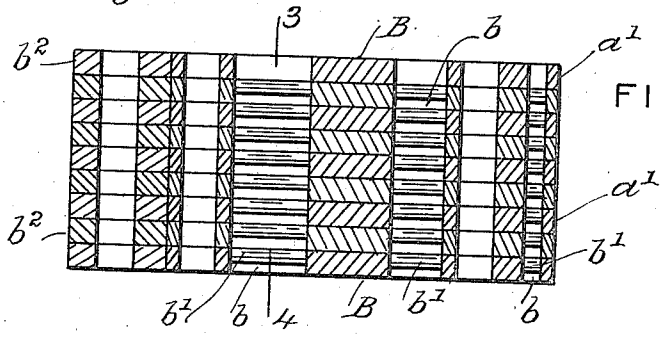
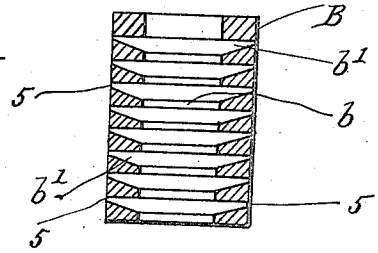


FIG_6_

FIG_7_



Inventor

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UNITED STATES PATENT OFFICE.

BERNARD CYRIL BARTON, OF NORTH FERRIBY, ENGLAND.

PRESS.

1,238,981. Specification of Letters Patent. Patented Sept. 4, 1917.

Application filed May 9, 1917. Serial No. 167,497.

To all whom it may concern:

Be it known that I, BERNARD CYRIL BARTON, a subject of the King of Great Britain, residing at North Ferriby, in the East Riding of the county of York, England, have invented certain new and useful Improvements in Presses, of which the following is a specification.

This invention has reference to compressing machines or apparatus of the extrusion type.

My invention has for its object an improved construction of machine or apparatus which, while designed more especially for expressing oil from oil-containing seeds, nuts, beans and the like and extruding the residuum in the form of lengths or pieces of compressed material for use for food for cattle and other animals, is also suitable for expressing liquid from other liquid-containing materials and substances, for compressing meal of the kind used for the manufacture of food, and from which the oil or the like has been previously extracted by the solvent or other process, for compressing plastic materials, powders and the like, and extruding the same in the form of lengths or pieces of compressed material for use for the particular purpose or purposes for which the compressed material is suitable, as an example of which may be mentioned the compressing of soap in a plastic state to produce lengths or bars of the required cross-sectional shape.

In the accompanying sheets of drawings which illustrate one exemplification of my invention, Figure 1 represents a vertical section of the apparatus, Fig. 2 is a plan view of a portion of the same taken on the top of the piles of plates, and of the compressing wheels, Fig. 3 is a plan view of one of the radial plates, provided with a loose outer end having loose side pieces, and Fig. 4 is a longitudinal section of two of such plates taken on a line corresponding with the line 1—2 of Fig. 3, Fig. 5 is a similar view to Fig. 3 but shows a plate without a removable end and side portions, Fig. 6 is a longitudinal section through a complete pile of plates of the kind illustrated in plan view at Fig. 3, and Fig. 7 is a section on the line 3—4 of Fig. 6.

Figs. 3 to 7 inclusive are drawn to a larger scale than Figs. 1 and 2, and in Fig. 7 the ports 5 are shown of greatly exaggerated widths.

In constructing a machine or apparatus in accordance with my invention, I employ a fixed drum built up of two strong metal plates A and A^1, preferably circular in shape, the one situated above the other, between which plates are arranged radially at intervals, a number of piles of suitably shaped metal plates B, the whole being secured together by any suitable means, as for example, by bolts a passed through the top or cover plate A, through the radially arranged piles of plates B, and through the bottom plate A^1.

The several piles of radially arranged plates are so situated the one in relation to another that a space C which preferably widens outwardly, that is, toward the periphery of the drum, intervenes between each two piles, these spaces forming passages through which the seed, meal, powder or other material or substance fed to the machine or apparatus is forced and extruded and in which it is compressed as it passes therethrough, each plate having a hole or holes b through it vertically, from which holes inclined grooves or channels b^1 run to the edges of the plate, the holes in the several plates of a pile, registering, and also registering with corresponding holes in the top or cover plate and in the bottom plate.

The holes 3 in the top plate and the holes 4 in the bottom plate are shown in line with the holes b, in Fig. 1. The inclined grooves b^1, are shown in Fig. 7, and they extend from the holes b to the edges of the plates where they form ports 5 of sufficient width to permit liquid to pass from the spaces C down the grooves, through the holes b and 4 and into a chamber K below the bottom plate. The ports 5 are very narrow so that solid matter is prevented from entering the inclined grooves, and these ports are shown of exaggerated width in Fig. 7. The shape and inclination of the grooves b^1 is not material, and may be varied in any way, so as to permit of the escape of the expressed liquid from the solid matter.

The inner end of each plate of each pile is so cut or formed as to provide or form a tooth a^1 whereby the interior of the drum or chamber is toothed after the manner of an internally toothed wheel, the root of each tooth communicating with or forming the entrance to a space or passage C between two piles of plates.

The passages C between the piles of radially arranged plates B, may be constricted or reduced in width at or near their outer ends by any suitable means, one and a convenient means for the purpose consisting in employing in certain piles of plates, say for example, alternate piles, plates of less length than those in the other piles, and in fitting a block or completing piece b^2 at the outer end of such short plates, the said blocks or completing pieces being either of a greater width than the outer end of the plates to which they are fitted, or having loose side pieces b^3, b^4 of the required width and shape secured by screws b^5, or equivalent means to their edges, the latter being the arrangement shown. The blocks or completing pieces b^2 are secured in position by any suitable means, one and a convenient means consisting in passing a strong pin or bolt b^6 through the top plate A of the fixed drum or chamber, through the particular pile of blocks or completing pieces, and through the bottom plate A^1 of the fixed drum or casing.

The blocks or completing pieces, or the pieces fitted to their edges, as the case might be, may have their edges corrugated or of any suitable shape to produce the required shape of passage for the compressed seed or the like to be forced through to impart to it when fully compressed, the required cross-sectional shape.

A further advantage of providing the piles of radially arranged plates, or certain of such piles, with blocks or completing pieces at their outer ends, are that the piles of plates, or any of the same, can be readily fitted and removed by withdrawing the pins or bolts which secure the blocks or completing pieces and withdrawing such blocks or completing pieces, or those which are necessary, so allowing of access being had to the piles of plates, or to any particular pile, and that should there be any choking of the passages, this would generally be remedied by the removal of the blocks or completing pieces and so increasing the size of the outlets of the passages, and by allowing the machine to run until such passages were cleared.

Inside the drum or chamber built up as before described, and rotatable therein, is an open sided hollow box or casing of cylindrical shape, said box or casing consisting of an upper circular plate D and a lower similar plate D^1, the upper plate D fitting loosely in a circular hole in the top or cover plate A of the fixed drum or chamber and the lower plate D^1 fitting loosely in a similar hole in the bottom plate A^1 of the said drum or chamber.

The upper plate D of the rotatable box or casing is provided with an upwardly projecting tubular portion d which carries a removable hopper d^1, the lower plate D^1 having a tubular depending portion d^2 on which, according to one mode, is keyed or otherwise fixedly mounted a large bevel or other suitable wheel E.

In the said rotatable box or casing are mounted a plurality of spindles F on each of which is mounted a toothed compressing wheel F^1, which wheels rotate with the rotatable box or casing and mesh with the teeth on the inner ends of the radially arranged plates in the fixed drum or chamber, the said toothed compressing wheels being also adapted to rotate on or with the spindles on which they are mounted.

Between each two toothed compressing wheels, is a shaped block G which acts as a distance piece between the top and bottom plates D and D^1 of the rotatable box or casing and also as a guide for the material or substance passing from the center of the box or casing to the point at which pressure is applied by the teeth of the compressing wheels.

Passing through the center of the rotatable box or casing is a rotatable shaft H on which is keyed or otherwise suitably fixedly mounted a strong worm-screw H^1 which rotates with such shaft in the tubular portion d on the upper plate D of the said box or casing, on which the hopper d^1 is mounted, the bottom end of which shaft H projects through the large bevel or like wheel E mounted on the downwardly projecting tubular portion d^2 on the bottom plate D^1 of the said rotatable box or casing, a suitable gear wheel J being mounted, according to one mode, on the bottom end of the said shaft H, the top end of such shaft being rotatable in a bearing in a bridge piece H^2 on the top of the fixed drum or chamber. A thrust bearing h of any suitable type may be employed between the gear wheel J on the bottom of the rotatable shaft H and the bevel or like wheel E on the downwardly projecting tubular portion of the rotatable box or casing, if gear wheels are mounted on the portions mentioned.

Fitted below the bottom plate A^1 of the fixed drum or chamber built up of piles of radially arranged plates B and their top and bottom plates A and A^1, and supporting the same, is an annular trough or casing K into which the oil or other liquid expressed from the seed or the like being compressed, flows through the said holes 4, such trough or casing having a suitable outlet or outlets. Mounted above but preferably on the top of the said drum or casing is another hollow casing or chamber L into which steam can be admitted for heating the seed or the like being compressed. Steam can also be driven from the chamber L through the holes 3 into the holes through the radially arranged plates B for the purpose of cleansing them of sediment or any accumulation of oil or

the like which may settle on the walls of the holes therethrough.

Surrounding the bottom of the fixed drum or chamber is a horizontal ring or table M adapted to rotate around such drum or chamber, said ring or table being provided with a vertical knife M^1 or the equivalent, or with more than one, for cutting off or breaking into pieces of a predetermined length the extruded compressed material as it exudes from the passages between the piles of radially arranged plates B in the said fixed drum or chamber, said ring or table being rotated by any convenient means, one means suitable for the purpose consisting in providing its periphery, or a suitable flange or ring formed or fitted thereon, with teeth *m* with which teeth a pinion or like wheel N, driven from any suitable source of power, gears.

For the purpose of removing the pieces of cut or broken compressed material from the rotatable ring or table on to which they fall, I employ a fixed arm or device such as P which is fitted to a fixed portion of the machine, which device projects over the ring or table M preferably at an angle and intercepts the severed pieces of material as the table rotates and guides them to the edge thereof from which they fall on to the floor or into sacks or the like provided to receive them.

The apparatus is mounted on a suitable base R, or the equivalent, which is provided, according to one mode, with bearings R^1, R^2 for the driving mechanism which consists conveniently of a shaft S on which is a fast pulley S^1 and a loose pulley S^2, the shaft being driven through the fast pulley from any suitable source of power such as a line of shafting, motor or the equivalent, which pulley shaft transmits motion to the rotatable parts of the machine through suitable gear wheels, one of which wheels T, which is keyed on such shaft, gears with the large bevel E on the bottom of the rotatable box or casing situated in the fixed drum or chamber and drives such box or casing, a second wheel T^1 on such shaft S gearing with a wheel U on a counter shaft U^1 provided on its inner end with a bevel wheel U^2 which gears with a bevel wheel J on the bottom of the vertical shaft H which passes up through the rotatable box or casing, and on which the worm-screw H^1 is mounted, and drives such shaft and worm-screw, a third wheel T^2 on said pulley shaft S gearing with a gear wheel W mounted on the spindle *n* of the toothed wheel N which gears with the teeth on the horizontal ring or table M which surrounds the bottom of the fixed drum or chamber, and drives such wheel N and so causes the rotation of the said horizontal ring or table and the knife or knives or the like carried thereby.

In operation, the seed or other material is fed into the hopper carried by the upwardly projecting tubular portion of the box or casing, which is rotatable in the fixed drum or chamber, and falls into such tubular portion, being forced down therein by the worm-screw on the vertical shaft, and outwardly into the spaces or passages between the teeth on the inside of the fixed drum or chamber, formed on the inner ends of the piles of radially arranged plates, into which it is compressed and forced under pressure through the said passages between the piles of radially arranged plates by the teeth of the pinion or like compressing wheels, in which passages the seed or the like is further compressed as it passes therethrough and is extruded in the form of sheets or lengths of compressed material of the desired cross-sectional shape.

If the material being treated is in the form of oil or liquid containing seeds or the like, the oil or liquid is expressed from the seed or material as the seed or material is squeezed through the passages between the piles of radially arranged plates, the expressed oil or liquid flowing through the ports 5 or between the adjacent surfaces of the plates along the grooves or channels in the plates and down through the holes with which the plates are provided and thence to the trough or receiver provided below the fixed drum or chamber for its reception. When the sheets or the like of compressed material exude from the passages in which compression takes place, they are cut off or broken into pieces of the required length by the knife or knives or the equivalent mounted on the rotatable ring or table as a result of the rotation of such ring or table, on to which they fall and from which they are caused to pass or fall off at a given point by the arm or like device which projects over such ring or table.

In place of driving the rotatable box or casing, the vertical shaft which carries the worm screw, and the rotatable ring or table, from below, as before described, the driving mechanism may be arranged to drive the said parts from above.

I claim:—

1. In a press, a stationary drum formed of top and bottom plates and spaced piles of plates arranged between them and provided with outlets for expressed liquid, outlet passages for solid matter being formed between the piles of plates, and the inner ends of the said plates having wheel teeth, a revoluble casing journaled centrally in the said drum, and a toothed compressing wheel journaled eccentrically in the casing and arranged in gear with the said wheel teeth.

2. In a press, a stationary drum formed of top and bottom plates and spaced piles of plates arranged between them and provided

with outlets for expressed liquid, outlet passages for solid matter being formed between the piles of plates, and the inner ends of the said plates having wheel teeth, a revoluble casing journaled centrally in the said drum, spaced blocks secured in the said casing, and a series of toothed compressing wheels journaled eccentrically in the said casing between the said blocks and arranged in gear with the said wheel teeth.

3. In a press, a stationary drum formed of top and bottom plates and spaced piles of plates arranged between them and provided with outlets for expressed liquid, outlet passages for solid matter being formed between the piles of plates, and the inner ends of the said plates having wheel teeth, a revoluble casing journaled centrally in the said drum, spaced blocks secured in the said casing, a tubular feeding chamber secured centrally to the said casing, means for forcing the material through the feeding chamber into the central part of the said casing, and a series of toothed compressing wheels journaled eccentrically in the said casing between the said blocks and arranged in gear with the said wheel teeth.

4. In a press, a stationary drum formed of top and bottom plates and spaced piles of plates arranged between them and provided with outlets for expressed liquid, outlet passages for solid matter being formed between the piles of plates, means for forcing the material under pressure from the central part of the drum through the said passages, a knife for cutting the strips of solid material into predetermined lengths as they protrude from the said passages, and means for moving the said knife circumferentially around the said drum.

5. In a press, a stationary drum formed of top and bottom plates and spaced piles of plates arranged between them and provided with outlets for expressed liquid, outlet passages for solid matter being formed between the piles of plates, means for forcing the material under pressure from the central part of the drum through the said passages, an annular table journaled concentric with the drum and arranged around the lower part of it, means for revolving the said table, and a series of cutting-off knives projecting upwardly from the said table.

6. In a press, a stationary drum formed of top and bottom plates and spaced piles of plates arranged between them, outlet passages for solid matter being formed between the piles of plates, the plates of each said pile having vertical holes for the escape of expressed liquid and having also lateral grooves in their adjacent surfaces which form ports at the edges of the plates and which communicate with their said holes, and means for forcing the material under pressure from the central part of the said drum through the said passages.

7. In a press, a stationary drum formed of top and bottom plates and spaced piles of plates arranged between them and provided with outlets for expressed liquid, outlet passages for solid matter being formed between the piles of plates, side pieces secured to certain of the said piles of plates in the outer end portions of the said passages and operating to reduce the area of their delivery ends, and means for forcing the material under pressure from the central part of the said drum through the said passages.

8. In a press, a stationary drum formed of top and bottom plates and spaced piles of plates arranged between them and provided with outlets for expressed liquid, outlet passages for solid matter being formed between the piles of plates, certain of the said piles of plates having removable and correspondingly laminated outer end portions provided with pieces which project into the outer end portions of the said passages and which reduce the area of their delivery ends, and means for forcing the material under pressure from the central part of the said drum through the said passages.

9. In a press, a stationary drum formed of top and bottom plates and spaced piles of plates arranged between them, outlet passages for solid matter being formed between the piles of plates, the said top and bottom plates and the plates of each said pile having vertical communicating holes for the inlet of steam and for the escape of expressed liquid, and the said piles of plates having also lateral grooves in their adjacent surfaces which form ports at the edges of the plates and which communicate with their said holes, and means for forcing the material under pressure from the central part of the said drum through the said passages.

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

BERNARD CYRIL BARTON.

Witnesses:
LOUIS EDGAR KIPPAX,
HERBERT WHEAT.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."