L. W. CURSEY.

OIL PRESS.

APPLICATION FILED NOV. 24, 1909.

967,732.

Patented Aug. 16, 1910.

2 SHEETS—SHEET 1.

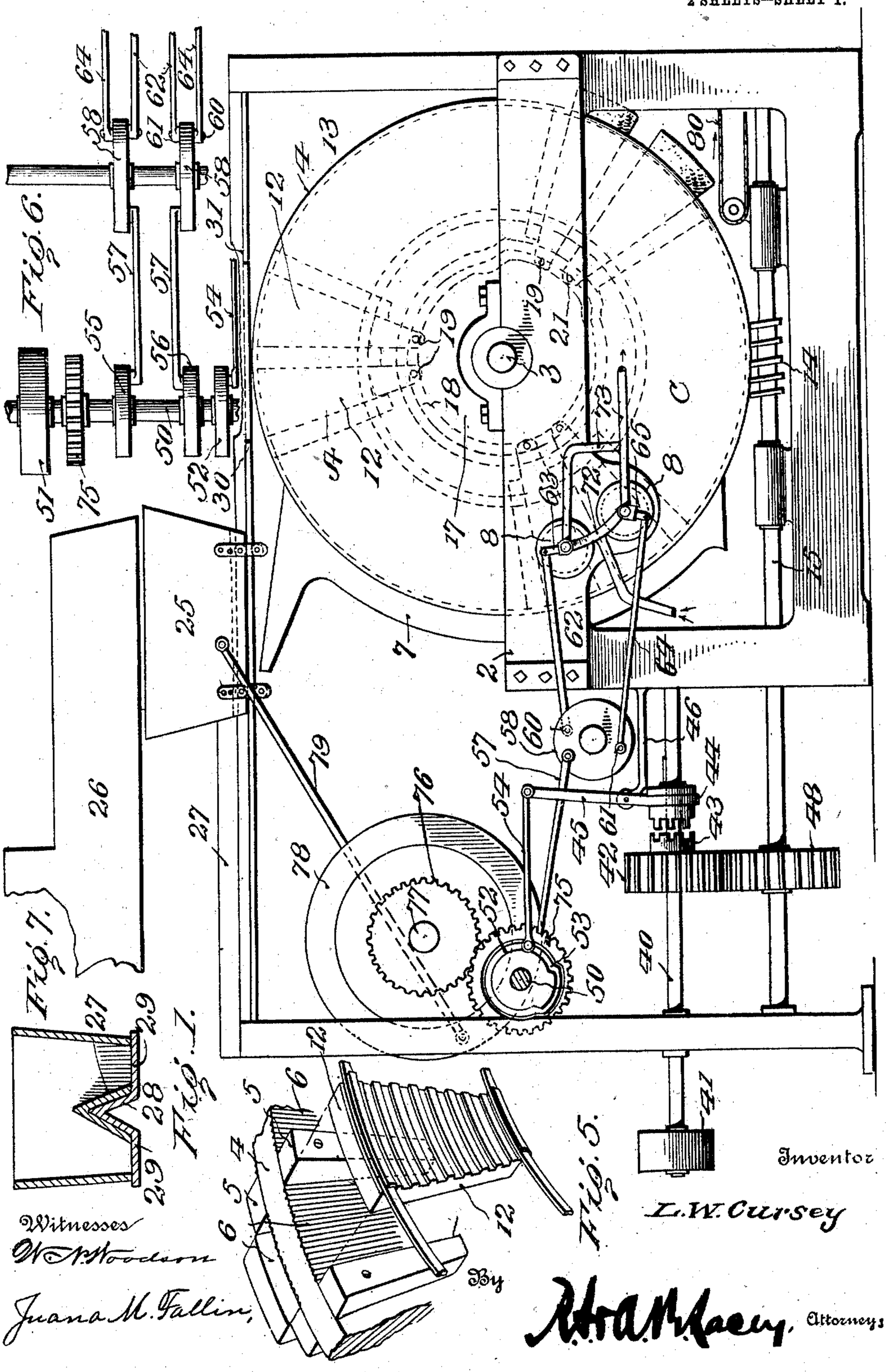

Fig. 6.

Fig. 1.

Fig. 7.

Fig. 2.

Fig. 5.

Witnesses

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2 SHEETS—SHEET 2.

Fig. 4.

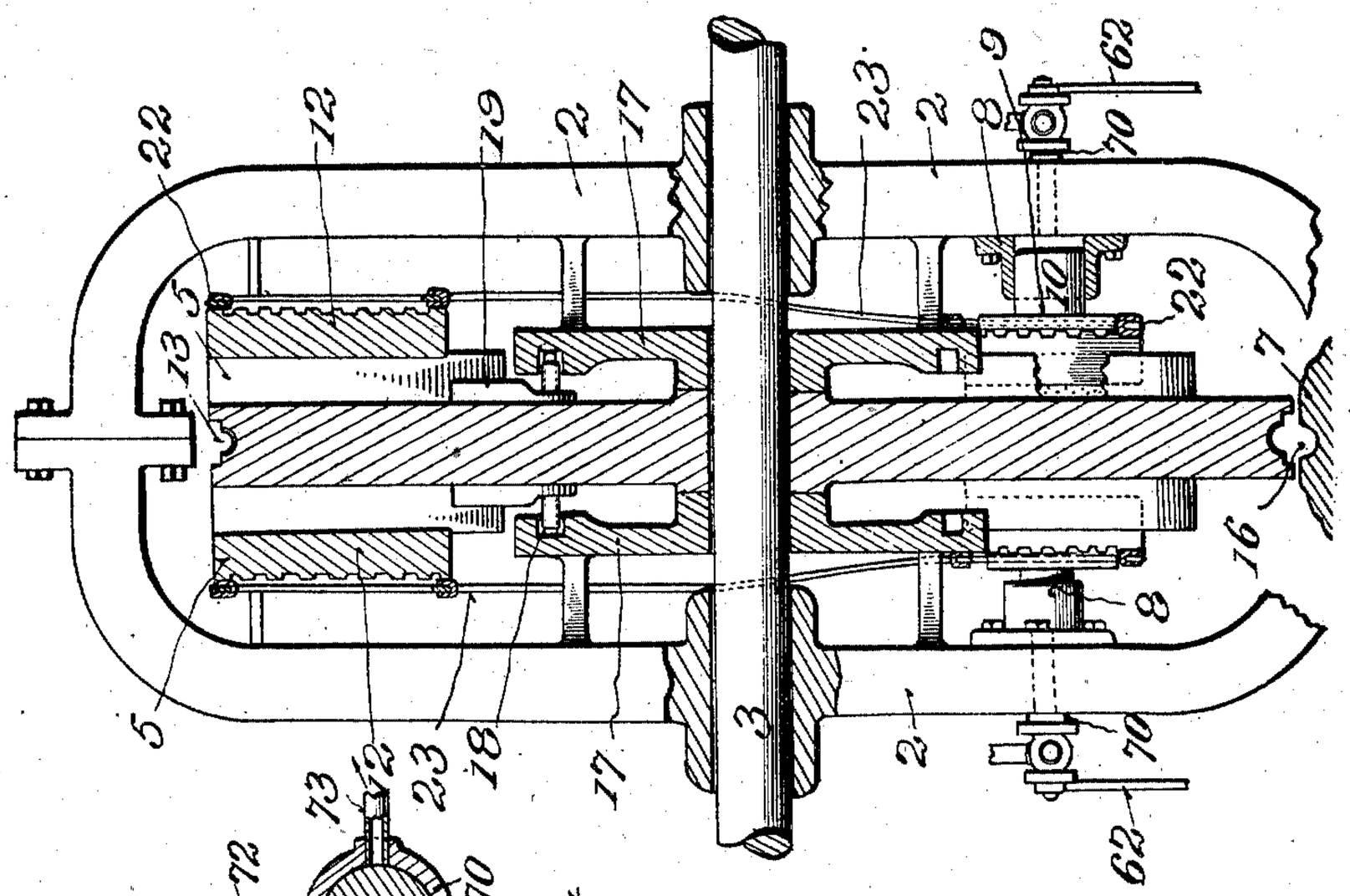


Fig. 3.

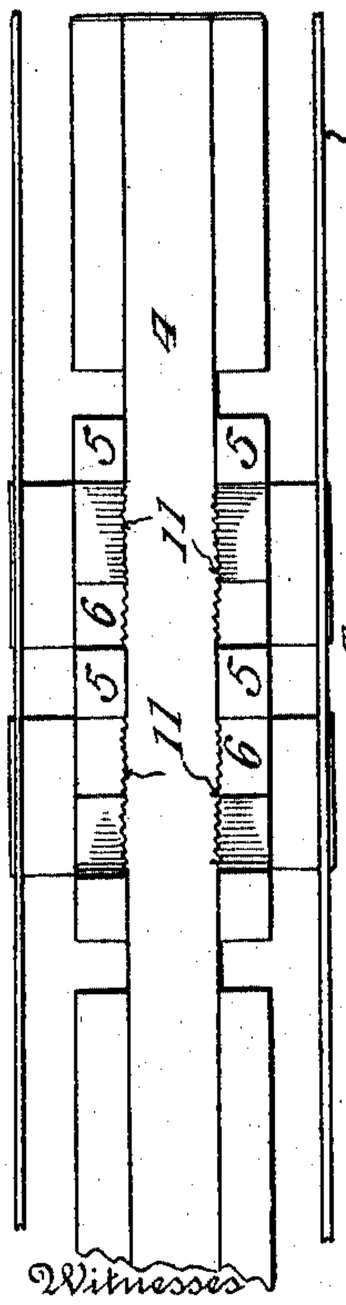
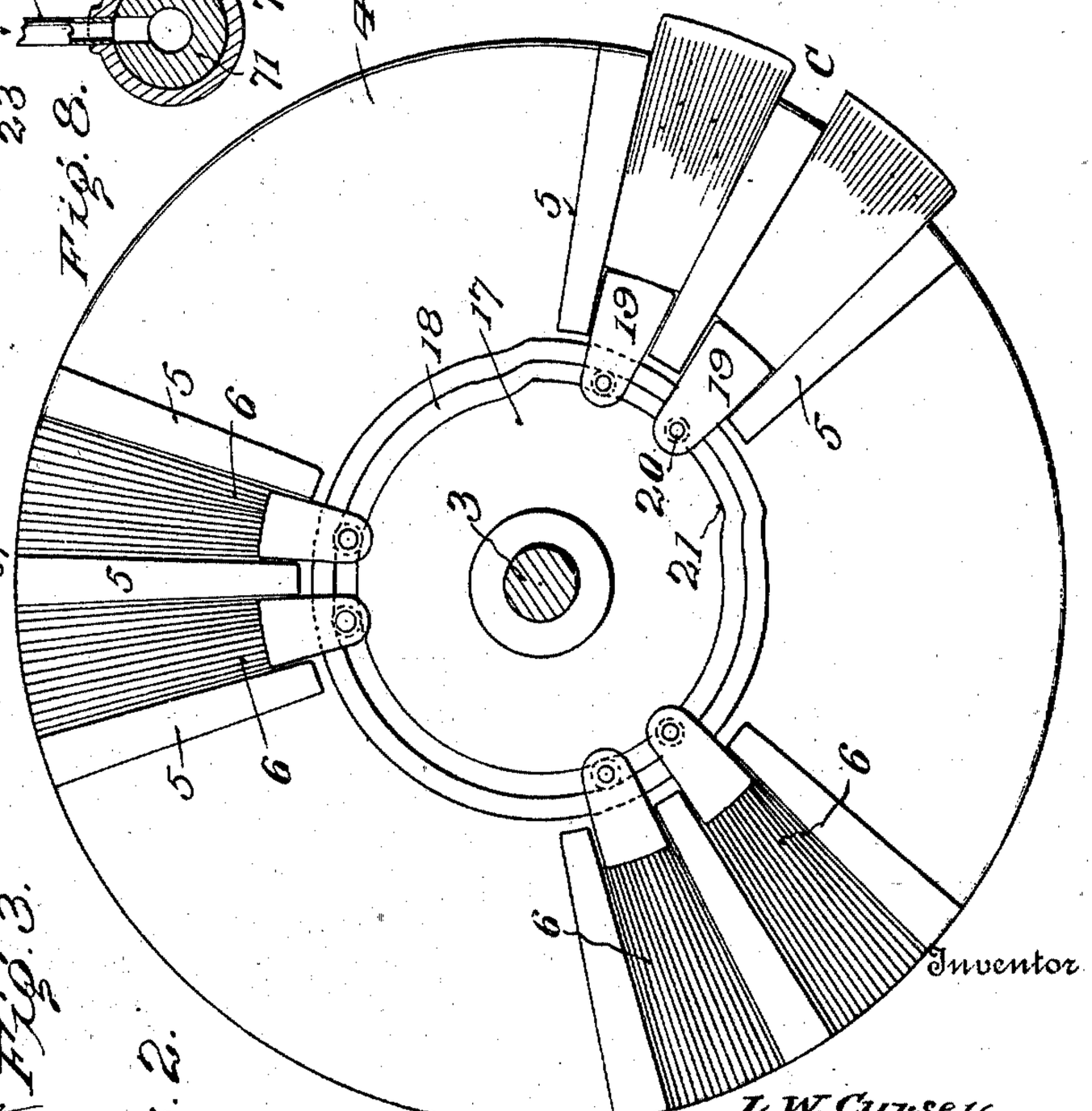


Fig. 2.



Witnesses

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UNITED STATES PATENT OFFICE.

LOUIS W. CURSEY, OF MEMPHIS, TENNESSEE.

OIL-PRESS.

967,732.

Specification of Letters Patent. Patented Aug. 16, 1910.

Application filed November 24, 1909. Serial No. 529,773.

To all whom it may concern:

Be it known that I, LOUIS W. CURSEY, a citizen of the United States, residing at Memphis, in the county of Shelby and State of Tennessee, have invented certain new and useful Improvements in Oil-Presses, of which the following is a specification.

My invention relates to presses such as are used for pressing out oil or other like materials, and particularly to a rotary press, the object of my invention being to provide an automatic revolving press having self-opening and self-closing press boxes with automatic feed for feeding the oil meal to the press, and an automatic ejector for ejecting the pressed oil cake from the press.

A further object is to provide, in a press of this character, a press box which is closed on all sides while pressure is being applied to the material within, but is automatically opened for the ejection of the oil cake, after pressure is relieved.

In general terms, my invention includes a rotatable carrier mounted in a suitable casing and having on its sides a series of press boxes provided with press plates. This carrier revolves so as to bring a plurality of opened press boxes beneath the feeding hopper, then carries said press boxes in a closed position to hydraulic presses, whereby the oil is expressed, and then carries the press boxes to a point where they are opened, and an ejector operates for the purpose of ejecting the oil cake. The press boxes are arranged in sets around the rotatable press box carrier, and each set is brought successively into position beneath the feeding hopper, into engagement with the hydraulic press platens, and to the discharge point.

For a full understanding of the invention and the merits thereof, and to acquire a knowledge of the details of construction, reference is to be had to the following description and accompanying drawings, in which:

Figure 1 is a side elevation of my improved oil press; Fig. 2 is an outside face view of the rotatable carrier, the press plates being removed; Fig. 3 is a view looking toward the edge or periphery of the carrier; Fig. 4 is a horizontal section of Fig. 1, through the axis of the rotatable carrier; Fig. 5 is a detail fragmentary perspective of the margin of the rotatable carrier, one of the press plates being removed; Fig. 6 is a fragmentary plan view showing the driving shaft and means for actuating the wrist plates; Fig. 7 is a section of the track and shiftable hopper; Fig. 8 is a detail section through the valve for operating one of the hydraulic presses.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

Referring to these figures, 2 designates a frame of any desired character and supported in any desired manner, this frame being made preferably as shown in the plan view, Fig. 4, in two parts, bolted together so as to resist lateral pressure. Rotatably supported upon the frame is the shaft 3, which shaft carries upon it the disk or wheel 4, as shown in Fig. 4. The outer margin of the wheel is provided with sets of radial headtrees 5, these headtrees being arranged on opposite sides of the wheel. These trees are arranged in sets of three, the sets being equidistant around the wheel, and the set of three trees each forming two press boxes 6, the face of the wheel, between the trees, being radially ribbed or corrugated, as at 11. The press boxes thus formed are sector-shaped, being larger at their outer extremities than at their inner. This tapering form of the press boxes has an important effect in charging and discharging the press boxes, the press boxes being charged when their larger ends are upward, and discharged when the larger ends are downward, thus facilitating the feeding of the press box and the dropping out of the pressed cake.

Extending from the upper portion of the wheel, in the arc of a circle, and nearly to the lowermost portion of the wheel, is the arcuate abutment or casing 7 which fits the circumference of the wheel closely and closes one end of the space between the headtrees 5 which form the press boxes 6 as the wheel rotates. It will be seen that before the press box 6 reaches the arcuate abutment 7, it is opened at its upper end, as in the position A, for the purpose of receiving a charge of the material to be pressed. During the passage of the press boxes over the inside face of the arcuate abutment 7, the end of the press box is closed, as before remarked, and when the press boxes have moved past the lower edge of the arcuate abutment, to the position C, they are opened at their lower end to permit the pressed cake to be ejected.

Located intermediate of the ends of the

arcuate abutment 7, and in a position opposite to that portion of the disk or rotatable member 4 in which are the press boxes 6, are opposed pairs of hydraulic presses. The outer cylinders of these presses are designated by the numeral 8, the platens by the numeral 9, and the pistons of the platens by the numeral 10. The connections of these hydraulic presses or rams will be later described. As before remarked, these presses are arranged in pairs on each side of the rotatable carrier 4, and are so arranged that all four of the presses operate at one time, two on each side of the rotatable carrier. The pressure used with the hydraulic presses will be accumulated pressure, insuring instantaneous action of the rams.

Supported between the headtrees and on the faces of the press boxes, are the press plates 12. These are preferably ribbed upon their exterior surface, for the purpose of making them lighter, but are smooth upon their interior faces. They are adapted to be forced inward by the pressure of the platens 9 when the press box carrier has rotated to a proper position. These press plates are permanently carried within the press boxes, but are shiftable out and in, they being automatically drawn out of the press boxes when the rotatable carrier is in its loading position and after the rotatable carrier has passed beyond the lower edge of the semi-circular or arcuate plate 7, so that the cake may be ejected. Means for doing this will be later described. The circumference of the rotatable carrier is channeled, as at 13, and this channel is formed with worm teeth which engage with a worm gear 14 mounted on a driving shaft 15. The inside face of the arcuate abutment 7 is also channeled at 16, the channel alining with the channel 13, the two channels forming means whereby the oil pressed from the cake between the hydraulic rams or presses will be carried downward and discharged at the lower end of the arcuate abutment 7.

Mounted upon the inside of the supporting frame 2, and surrounding the shaft 3, are the opposed eccentrics 17, each of which is formed with an eccentric groove 18 in its face. Mounted in each of the press boxes, and extending through the inner end thereof, are the ejectors 19 which have the form of plungers, these plungers being so shaped as to fit the inner end of the sector-shaped press box recess. The inner ends of the ejectors are provided with laterally projecting studs carrying rollers 20 which fit the cam track of the eccentric 17 so that as the carrier 4 rotates, the plungers will be moved inwardly or outwardly, or held stationary by the cam track. The cam track has such a form that when any of the press boxes arrive beneath the filling opening or in the position A, the ejectors will be at their innermost position. They will retain this position during the pressing operation, and until they reach the portion of the cam track designated 21. At this portion of the track, they will be moved outward and act to eject the cake from a press box, as shown in Fig. 2. It will be obvious that only a comparatively small movement is necessary to eject the cake, because of the fact that the press box is tapered. Thus, as soon as the cake is dislodged, even to a small extent, the cake will drop out of the box. After the cake has been ejected from the box, the plunger or ejector 19 will be retracted to its original position by the cam track.

It is necessary that when the press box has reached the ejecting position, the press plate thereof be lifted from the cake so as to permit the easy dropping out or ejection of the cake, and it is also necessary that the press plate be retained in this position while the press box is being filled with fresh material, and that after it is filled, and the press box has moved past the upper edge of the curved abutment 7, the press plate shall be moved inward. For this purpose, each press plate has a groove or slot 22 in its edge. This slot is engaged by an inclined rib or cam 23 that begins at the lower end of the curved abutment 7 and extends around the frame of the machine to the position at which the press plate enters between the first ram or hydraulic press 10. As the carrier 4 rotates past the filling opening, the press plates are held apart, thus giving the press box its maximum capacity. Then, as the press boxes approach the rams, the press plates are moved inward, entirely closing the sides of the press box. When the press plates reach the rams, the platens thereof will force the press plates inward, thus pressing the material contained in the press box and forcing the oil or juice out therefrom. The press plates are kept in their innermost position until after the press box passes the lower edge of the abutment 7, whereupon the cam acts to withdraw the press plates outward, enlarging the press box, after which the ejectors act, and the cake drops out as before described.

While I do not wish to limit myself to a carrier provided with any especial number of press boxes, I have shown in the drawings a rotatable carrier having on each side thereof six press boxes arranged in three pairs, these pairs being equidistantly arranged around the carrier. Thus, the carrier intermittently revolves through a one-third revolution, directing two of the boxes on each side directly under the hydraulic rams, two boxes on each side under the filling opening, and the other two boxes on each side to a position where the cake is being ejected. Thus one set of boxes is always being filled, another pressed, and in another the cake is being ejected. It

is obvious, however, that I need not arrange these press boxes in pairs, and that I can increase or decrease the number of press boxes upon the carrier.

For the purpose of giving a rotation to the rotatable carrier, I have shown the worm shaft 15 above referred to, but I do not wish to be limited to this means of rotating the carrier, as it is obvious that many different means may be provided for rotating the press box carrier, or giving it a step-by-step movement through a predetermined part of a revolution.

While I may use any form of feeding device found applicable for the purpose, I preferably use a movable hopper or cart-like receptacle 25 which operates between a meal heater and the feeding opening, whereby the press boxes are filled. This hopper is preferably formed of a casing having no bottom but supporting longitudinally to the middle portion of the hopper and at the lower end thereof the triangular supporting member 27. This supporting member rests upon a triangular rail 28 having the laterally projecting flanges 29. When the hopper is upon this rail and over the laterally projecting flanges 29, the flanges form the bottom of the hopper so that the bottom is closed. The flanges 29 are cut away at the points 30 and 31 so that when the hopper comes to a position over the carrier, the sides of the hopper will be open at the bottom, and material will be guided down by the triangular median member 27 to the opposed press chambers 6. Means for operating the movable hopper will be later described.

As a means for driving the various parts heretofore described, I provide a main drive shaft 40 which is continuously operated from the driving pulley 41. This shaft is mounted in any suitable manner and carries upon it the loose gear wheel 42 having thereon the clutch member 43. Slidably mounted on the shaft 46 by means of a spline or feather is the shiftable clutch member 44 which is complementary to the clutch member 43 and which rotates with the shaft 40. This member 44 is shifted by means of a lever 45 mounted on a bracket 46. Fast upon a shaft 15 is the gear wheel 48 which meshes with the gear wheel 42 so that when the wheel 42 is rotated with the shaft 40, the wheel 48 will be rotated with the shaft 15. This shaft carries upon it the worm 14 which engages with the rotatable carrier, as heretofore described. It will thus be seen that when the gear 42 is connected to the shaft 40, the carrier will be rotated, and when disconnected, the carrier will be held from rotation.

50 designates a shaft which is rotated at the same speed as the shaft 40 and by any desired mechanism, as by the pulley 51. This shaft carries upon it the cam disk 52 formed with a cam track 53 which engages a link 54, this link being connected to the lever 45 so that as the cam revolves, the lever will be held stationary until the offset portion of the cam is reached, when the lever will be reciprocated to force the movable clutch member 44 into engagement with the member 43. The cam 52 is so timed that it will rotate three times to each complete rotation of the carrier 4 and its shaft 3. By this means, the carrier 4 is given intermittent rotary movement so that each set of press boxes is brought in front of the hydraulic presses and held there while these presses operate, and after the operation, the carrier is again rotated.

It will be seen that the sets of press boxes are so arranged relatively to each other that when one set of press boxes is in front of the hydraulic presses or rams, the other presses will be in position to receive material from the hopper 25. Mounted upon the shaft 50 and rotating therewith, are the cam disks 55 and 56, each of which is connected by a link 57 to a wrist plate 58. Each wrist plate has upon it the oppositely located projecting studs 60 and 61. A link 62 extends from the stud 60 to the valve-operating arm 63 of one hydraulic press cylinder, while the stud 61 is pivotally connected to the link 64 which extends to the arm 65 of the other hydraulic cylinder on the same side. It will be seen that there are two cams 55 and 56 and two wrist plates 58, and that each wrist plate is connected by two links 62 and 64 to the valves of the hydraulic cylinders on that side of the carrier. The cylinder of each press has projecting from it the pipe 70, and rotatably mounted in said pipe is the valve 71 (see Fig. 8). Leading from said pipes are the inlet pipe 72 and the outlet pipe 73. When the valve is turned in one direction, the pipe 70 is connected to the inlet pipe 72, while when turned in the opposite direction it is connected to the outlet pipe 73. The cams 55 and 56 are precisely the same as the cam 52, but these cams 55 and 56 are set a little in advance of the cam 52 so that the outlet valves will open just before the rotation is given to the carrier and so that the inlet valves will be opened just after the carrier has been brought to a position of rest. Also mounted upon the shaft 50 is the toothed gear 75 which meshes with a gear wheel 76 on a shaft 77, which shaft carries upon it the crank disk or crank 78 to which is connected the link 79 which is pivotally attached at its other end to the hopper 25. Thus, as the disk 78 rotates, the hopper will be carried from the meal heater to a point immediately above the carrier. This reciprocation of the hopper will occur three times for each complete rotation of the car-

rier 4, and is so timed that the hopper will arrive over the discharge opening 30 to the carrier just after the chambers 6 have arrived thereunder.

The operation of my invention will be obvious from what has gone before, and it will be seen that my press is entirely automatic in its action; that the press boxes are automatically filled, automatically closed and automatically opened to permit the ejection of the cake; that the oil or other liquid expressed from the meal or other material will be forced out and will run down the ribbed inner faces of the press boxes to the inside face of the curved abutment 7, and will be carried down the channel of this abutment 7 and delivered at the bottom of the abutment, and that the oil will continue to drop or run off from the lower end of the press box as soon as the press box passes the lower end of the abutment 7.

The advantages of my invention are, first, that it does not require a press cloth to be used; second, that it saves the labor of removing the press cloth from the oil cake, as well as saving the use of the press cloth. The press boxes are so formed that they are automatically filled from the top, and the ejector operates so as to eject the cakes from the bottom, where they are assisted by gravity and their own weight to easily drop from the press box. The ejector forms the bottom of the press box as well as the plunger whereby the pressed cake is forced out, while when the press boxes are moving to the hydraulic rams and being engaged thereby, they are closed at the outer end by the curved abutment 7 which also acts as the means for conducting the oil to the point of delivery. After the pressed cake is forced out, it is preferably deposited upon a conveyer of any suitable kind, designated by the numeral 80, which will carry the compressed cake away from the machine.

Having thus described the invention, what I claim is:—

1. A press of the character described including a rotatable member carrying a series of pressing chambers disposed on each side of the rotatable member, and opposed pressing platens with which said chambers are adapted to be brought into alinement as the member rotates.

2. An oil press including a rotatable member formed with a plurality of radially extending headtrees forming the end walls of a series of pressing chambers, pressing plates closing the sides of the pressing chambers and freely movable into and out of said chambers, and a pressing platen with which said chambers are successively brought into registry.

3. An oil press including a rotatable member having on opposite sides thereof a series of radially extending headtrees forming the end walls of pressing chambers, the said rotatable member forming one side wall of all of said pressing chambers, press plates carried between the headtrees, forming the other side wall of each chamber and movable into and out of the chamber, and opposed press platens mounted on either side of the rotatable member with which said chambers are successively brought into registry as the member rotates.

4. An oil press including a rotatable member carrying a series of pressing chambers, a pressing plate forming the end wall of each of said pressing chambers, and a hydraulic ram with which the pressing chambers are adapted to be brought into registry, the platen of said ram engaging with the said pressing plate.

5. In a press of the character described, the combination with a rotatable member carrying a series of open ended pressing chambers disposed on each side of the said rotatable member, of opposed pressing plates with which said chambers are brought into alinement as the member rotates, an ejector forming the end wall of each of the pressing chambers, and means for forcing each ejector outward to eject the contents of the chamber and withdrawing the ejector to permit the chamber to be filled.

6. In a press of the character described, the combination with a rotatable member carrying a series of open ended pressing chambers disposed on each side of said rotatable member, of oppositely disposed pressing platens located one an each side of the rotatable member with which said chambers are brought into register as the member rotates, an ejector forming the inner end wall of each of the pressing chambers, means for forcing each ejector outward to eject the contents of the chamber, and withdrawing the ejector to permit the chamber to be filled, and means for automatically closing and opening the end of the chamber opposed to the ejector.

7. In a press of the character described, the combination with a rotatable member carrying a series of press boxes upon its circumference, of a press plate for each of said chambers, movable inwardly into the chamber, means for forcing said press plate inward at a predetermined point in the rotation of the rotatable member, means for withdrawing said press plate from the chamber at a predetermined point, an ejector closing the inner end of the chamber, means for forcing the ejector inward into the chamber at a predetermined point and withdrawing the ejector to permit the chamber to be filled, and means for automatically opening and closing the opposed end of the chamber to permit the chamber to be filled or the contents ejected.

8. A press of the character described, in-

cluding a rotatable member carrying upon its periphery a series of open-ended pressing chambers, a press plate for each of said chambers, closing the side thereof, said press plate being freely movable inward and outward, an ejector closing the inner end of the pressing chamber, a plate extending around a portion of the path of movement of the rotatable element, in contact with the circumference thereof, and thereby closing the outer ends of those pressing chambers with which the plate contacts, an inwardly operating pressing platen mounted adjacent to said plate, with which the pressing chambers are successively brought into registry, means for rotating the rotatable member, means for operating the ejector of any chamber after the chamber has passed by said plate, and means for withdrawing the press plate from any chamber after said chamber has passed the curved plate, and for forcing the press plate inward after the material within the pressing chamber has been ejected and said chamber has been refilled with material to be pressed.

9. In a press of the character described, a rotatable member carrying a series of pressing chambers, said chambers being located on opposite sides of the rotatable member and in direct alinement with each other, pressing plates forming the outside wall of each of the pressing chambers and movable inward and outward therein, opposed hydraulic rams with which the opposed pressing chambers are brought into registry, and means for operating the rams when the opposed pressing chambers are brought into registry therewith.

10. An oil press of the character described, including a solid rotatable wheel having opposed radially extending headtrees forming the side walls, of a plurality of pressing chambers, one side wall of which is formed by the wheel itself, movable pressing plates, one for each of said chambers and forming the other side thereof, means for closing the inner end of said pressing chambers, a curved plate fitting around a portion of the circumference of said wheel and against the ends of the pressing chambers, thereby forming an outer wall therefor during the period in which said chambers are passing the plate, means located at one end of said plate for filling the chambers with material to be pressed, means for forcing the press plate of each chamber inward during the period that the pressing chamber is passing over the curved plate, and means for ejecting the contents of any chamber after it has passed the said plate.

11. An oil press including a frame, a wheel-like member rotatably mounted on said frame, opposed open-ended radially extending pressing chambers carried by said wheel, a fixed curved plate extending partially around the circumference of the wheel and closing the outer ends of the said pressing chambers during the period that the pressing chambers are passing said plate and in contact therewith, ejectors mounted in the other ends of the pressing chambers, opposed pressing platens mounted on said frame adjacent to the lower end of the curved plate with which said chambers are adapted to register at a predetermined point in the revolution of the wheel, means for rotating the wheel-like member, means for forcing the pressing platens inward to express the contents of the chambers, means for operating the ejectors in the chambers after said chambers have passed the end of the curved plate, means for withdrawing the ejectors, and means located at the other end of the curved plate for filling the chambers when the chambers are brought in alinement therewith.

12. In a press of the character described, the combination with a press box having its ends automatically opened and closed, of a loose press plate forming one side of said press box.

13. In a press of the character described, the combination with a revolving carrier, of a radially extending pressing chamber, the opposed lateral walls of the pressing chamber converging toward each other in the direction of the center of rotation, an ejector mounted in the smaller end of the pressing chamber, and a curved plate conforming to the circumference of the rotatable carrier and adapted to contact with and close the end of each pressing chamber as the carrier is rotated past the plate, means for applying pressure to the material within the pressing chamber during the passage of the chamber past said plate, and means for operating the ejector after the chamber has passed the plate.

14. In a press of the character described, a rotatable carrier, a series of pressing chambers formed on the circumferential margins of the carrier, on opposite sides thereof, movable pressing plates forming the outside walls of each chamber, a series of ejectors, one for each of the pressing chambers and mounted at the inner ends of the pressing chambers, a curved plate against which the circumference of the carrier rotates and past which the open ends of the pressing chambers move, said plate extending partially around the circumference of the carrier, means for forcing the movable pressing plates inward at one point in the travel of the carrier, and a fixed cam engaging with the ejectors to withdraw them from the pressing chamber at the time the pressing chambers are being filled, and to force them inward into the pressing chambers at a predetermined point for ejecting the contents of the chambers.

15. An oil press of the character described, having a rotatable carrier, a series of pressing chambers mounted upon the circumference of the carrier, a movable pressing plate closing one side of the chambers, means for closing the opposite ends of the chambers, means for exerting pressure upon said pressing plates at one point in the rotation of the carrier, and a cam engaging the pressing plates to withdraw the same from the chamber at the point where it is desired to eject the material.

16. A press of the character described, having a rotatable carrier, a series of pressing chambers mounted upon said carrier and rotatable therewith, the outer ends of said pressing chambers being open, ejectors closing the inner ends of the pressing chambers, a covering plate extending partly around the circumference of the rotatable carrier and closing the ends of the pressing chambers when the pressing chambers are moved in contact therewith by the carrier, and movable press plates forming one side of each of the pressing chambers, means for forcing said pressing plates inward to press the material in the chamber at a predetermined point in the rotation of the carrier, a cam engaging with the ejectors to move each ejector into the corresponding chamber, as each chamber has passed the end of the covering plate, and moving the ejector out of the chamber as the chamber passes beneath the other end of the covering plate, and a cam engaging with the side plates to open them as the ejector moves outward, and holding each plate in its open position until the chamber in which said plates move has passed the end of the covering plate.

17. In a press of the character described, the combination with a revolving carrier, of a radially extending open ended pressing chamber, the opposed, lateral walls of the pressing chamber gradually converging toward each other from the outer end of the chamber to the inner end thereof in the direction of the center of rotation, an ejecting plunger mounted in the smaller end of the pressing chamber, a curved abutment conforming to the circumference of the rotatable carrier and adapted to contact with and close the end of the pressing chamber as the carrier is rotated past the abutment, and means for moving the ejector into the pressing chamber and withdrawing it toward the small end thereof.

18. A press of the character described, having a rotatable carrier, a series of pressing chambers mounted upon the carrier, movable press plates forming one side of each of the pressing chambers, opposed hydraulic presses mounted upon the frame of the machine, with which the pressing chambers are adapted to be brought into alinement as the carrier rotates, a gear for rotating said carrier, having a shaft, a driving shaft, a loose gear thereon engaging with the first named shaft, clutch mechanism for engaging the loose gear with the driving shaft, a cam for operating the clutch mechanism, valve mechanism on the hydraulic presses, opposed wrist plates to the valve mechanism, cams for operating the wrist plates and rotating with the clutch-operating cam, a shiftable hopper, and means for reciprocating said hopper from the driving mechanism.

19. In a press of the character described, the combination with a press box having its ends automatically opened and closed, said press box being open on one side, the other side of the box being formed with corrugations extending to the open end of the box, of a loose press plate forming one side of said press box.

20. In a press of the character described, the combination with a revolving carrier having a series of pressing chambers oppositely disposed to each other and arranged on each side of the revolving carrier, the said chambers being open at their outer ends, and one side of the chambers being open, the inner side of the chamber formed by the body of the revolving carrier having its face provided with radially extending corrugations, a loose press plate forming one side of each chamber, a curved abutment fitting against the circumference of the carrier and extending partly around the same and terminating near the lower portion thereof and forming a closure for the open ends of the pressing chambers while the pressing chambers are moving past the abutment, the face of the abutment being formed with a downwardly extending conducting channel, and means for forcing the pressing plates inward to compress the material in the chambers when the open ends of the chambers are closed by said abutment.

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

LOUIS W. CURSEY. [L. S.]

Witnesses:
CHARLES P. MARSHALL,
PETER BISHOP.