T. G. WOLFE.

PRESS.

APPLICATION FILED MAR. 25, 1911.

1,015,371.

Patented Jan. 23, 1912.

4 SHEETS—SHEET 1.

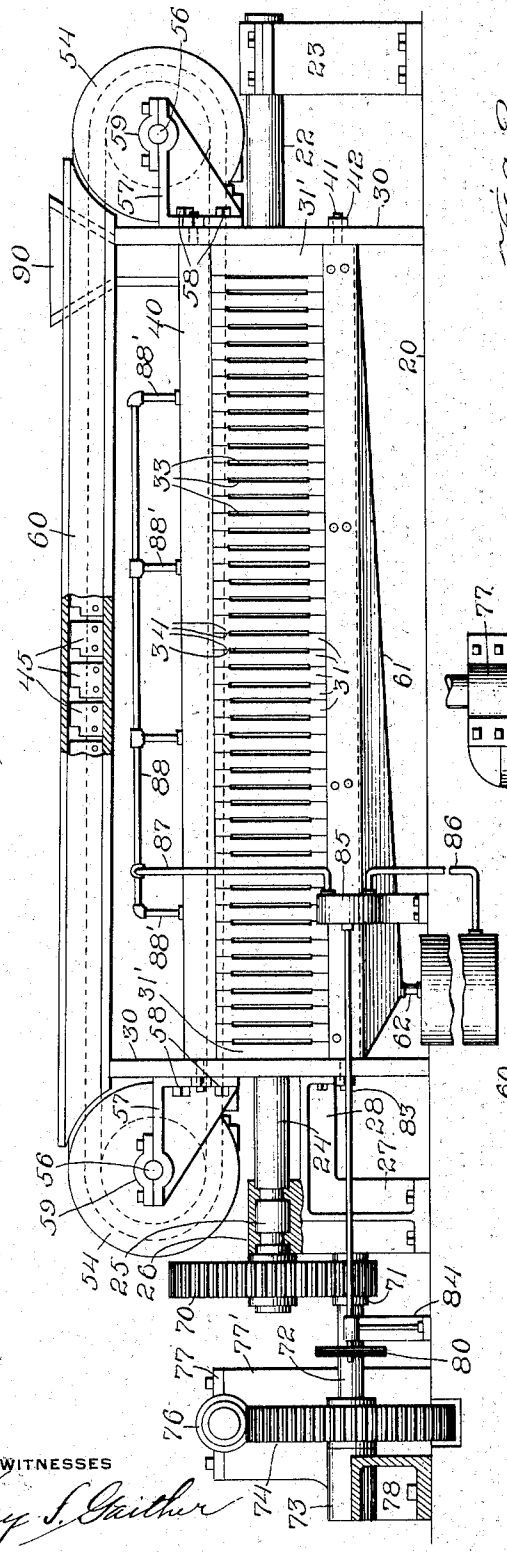

Fig. 1.

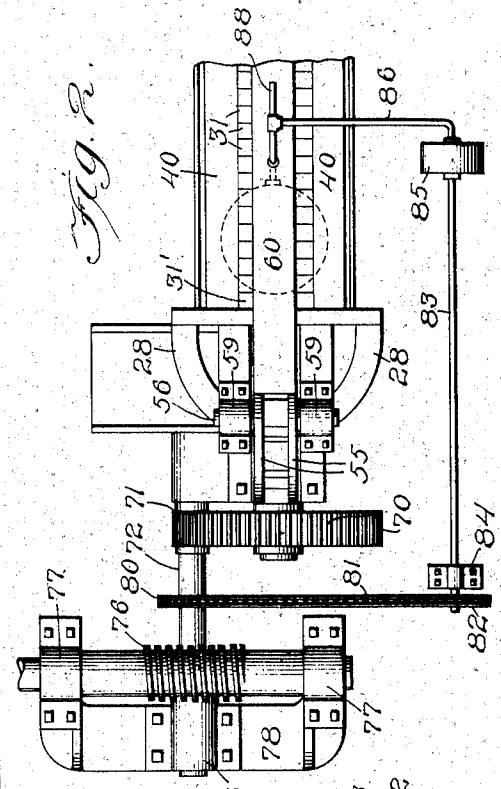

Fig. 2.

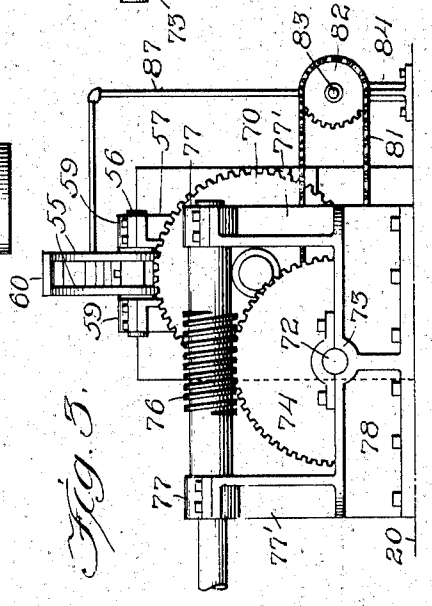

Fig. 3.

WITNESSES

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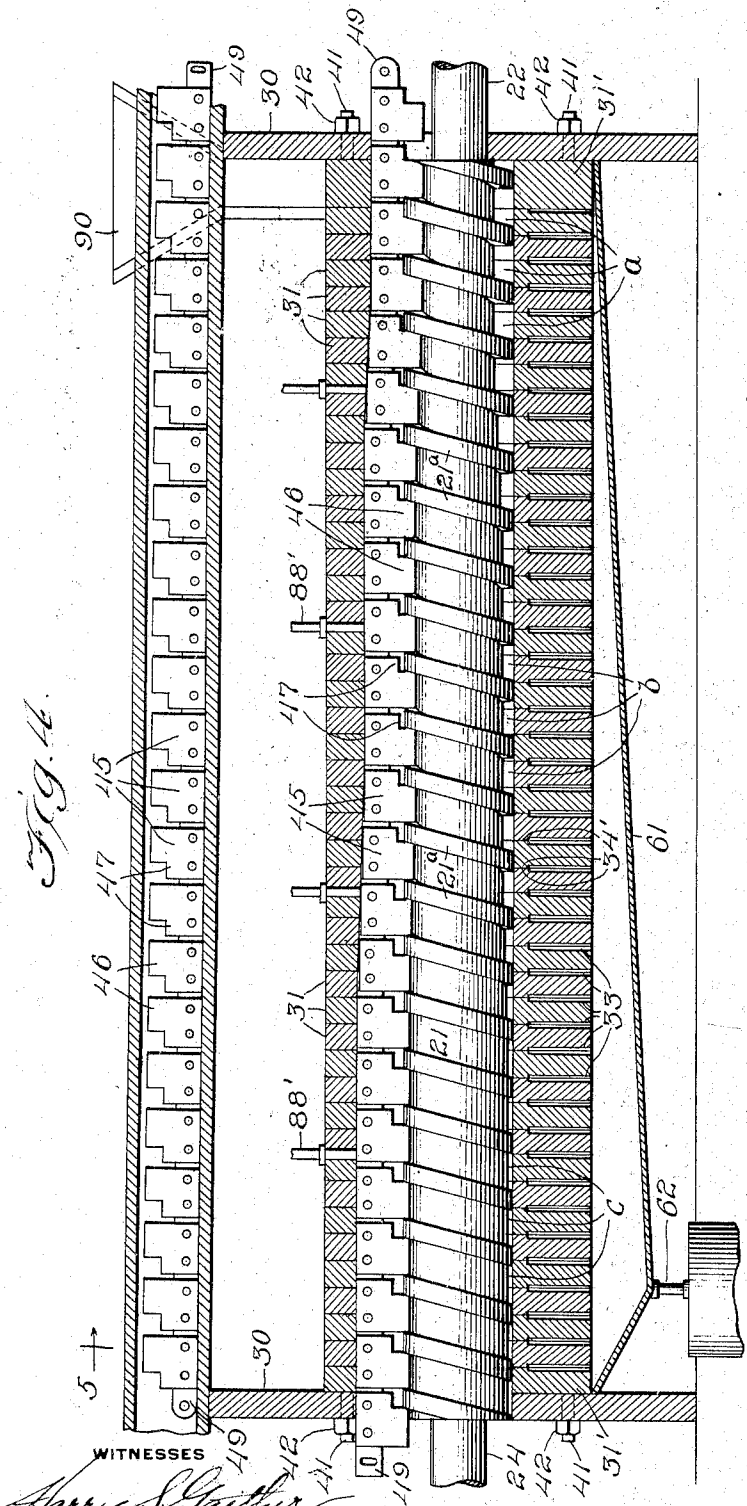

Fig. 4.

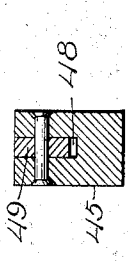

Fig. 11.

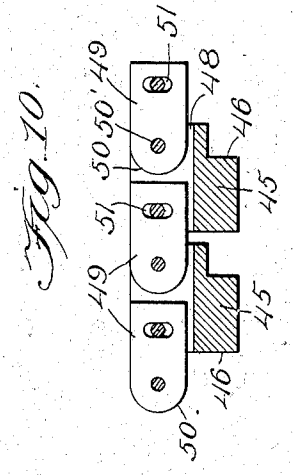

Fig. 10.

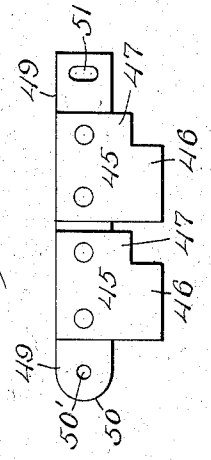

Fig. 9.

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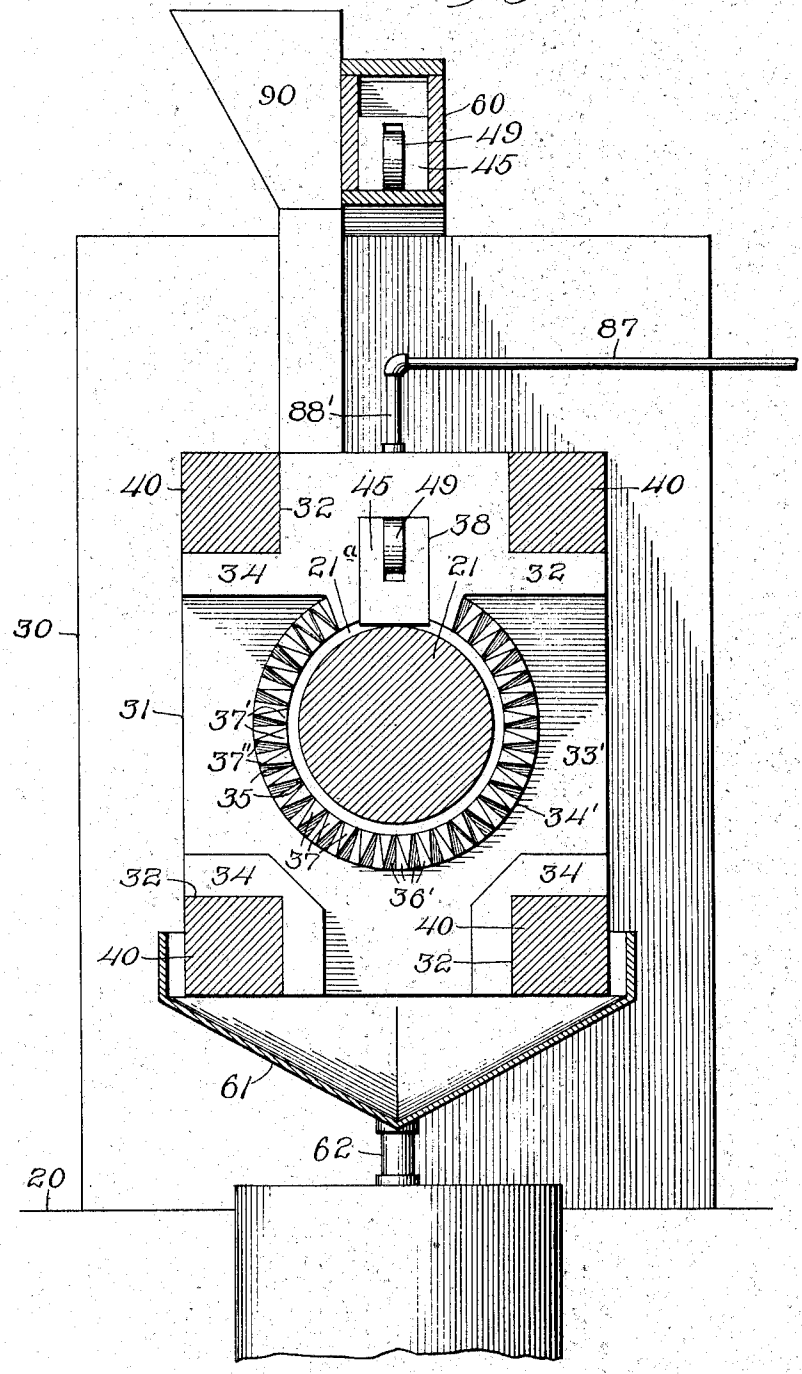
4 SHEETS—SHEET 3.

Fig. 5.



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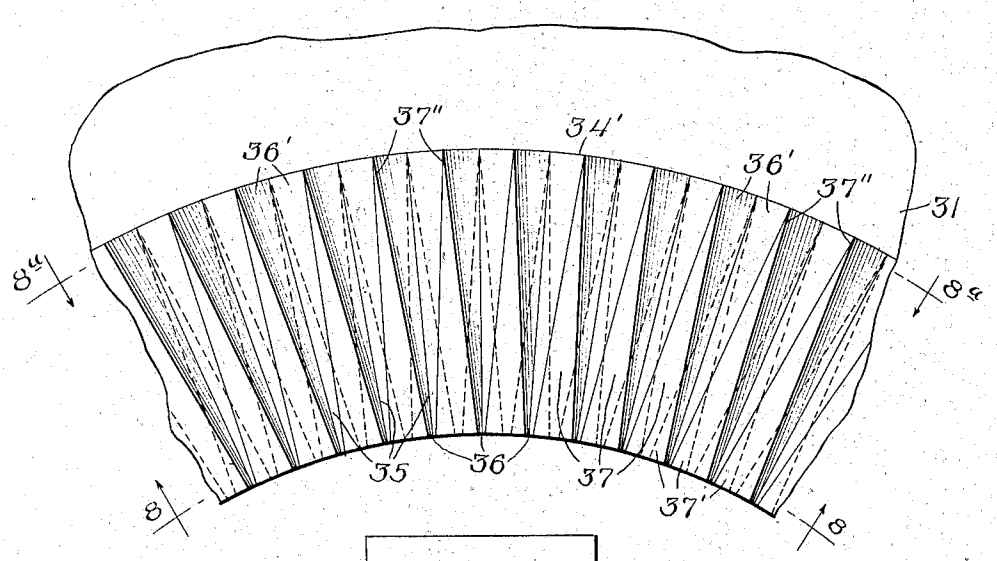
4 SHEETS—SHEET 4.

Fig. 6.



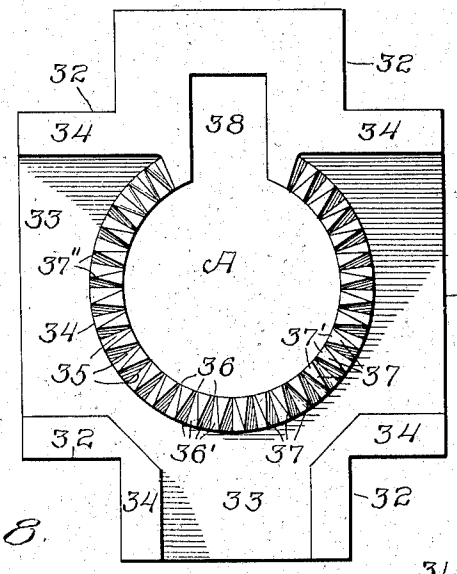


Fig. 7.

Fig. 8.

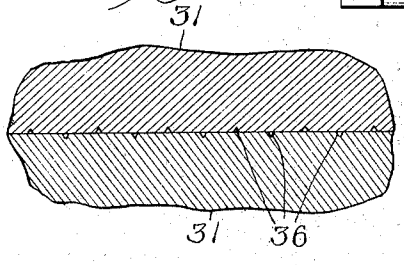
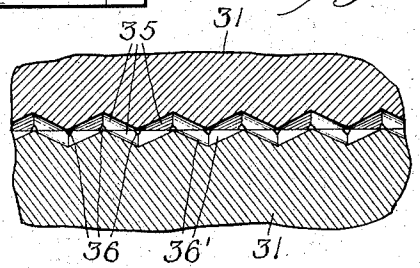


Fig. 8a.



WITNESSES

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UNITED STATES PATENT OFFICE.

THOMAS G. WOLFE, OF OKLAHOMA, OKLAHOMA.

PRESS.

1,015,371. Specification of Letters Patent. Patented Jan. 23, 1912.

Application filed March 25, 1911. Serial No. 616,893.

To all whom it may concern:

Be it known that I, THOMAS G. WOLFE, a citizen of the United States, residing at Oklahoma city, in the county of Oklahoma and State of Oklahoma, have invented certain new and useful Improvements in Presses, of which the following is a specification.

This invention relates to improvements in presses, and more particularly to that type of press known as the expressing screw.

My invention is particularly adapted for use in connection with cotton-seed oil mills and is designed to receive cotton-seed meal subsequent to its delivery from a cooker and when in suitable condition to be pressed for the purpose of extracting the cotton-seed oil.

In the drawings—Figure 1 is a side elevation of the entire device. Fig. 2 is a detail plan view showing the arrangement of the gearing etc. Fig. 3 is an end elevation of the structure shown in Fig. 2. Fig. 4 is a longitudinal sectional view of the press screw in elevation. Fig. 5 is a transverse section along the line 5 of Fig. 4. Fig. 6 is a partial detail view of one of the press plates. Fig. 7 is an end elevation of a complete press plate. Fig. 8 is a partial sectional view developed along the line 8 of Fig. 6. Fig. 8^a is a partial sectional view developed along the line 8^a of Fig. 6. Fig. 9 is a detail of several block members. Fig. 10 is a detail section of several block members, connecting links being shown in full. Fig. 11 is a transverse section of a block and link.

Like numerals refer to like parts throughout the drawings, in which the numeral 20 designates the foundation or floor to which it is intended my device shall be secured.

21 is the main shaft having the screw 21^a formed thereon. At one end of the shaft exteriorly arranged of the press is the reduced portion 22 journaled in the pedestal and bearing 23, while at the opposite end is a reduced portion 24 having one or more thrust collars 25 journaled in thrust bearings 26 carried by a pedestal or framework 27, which is securely braced to the press structure by an integral brace member 28.

My screw is peculiarly formed with depressions of a certain depth *a* at the intake end, these openings being of an equal depth preferably for a certain number of turns when the depth is gradually decreased in a certain number of turns to the depth *b*. This depth *b* is maintained for a certain predetermined number of turns when it is decreased gradually to the depth *c*, which in the drawing is maintained to the delivery end of the screw. It is obvious that any desired number of gradual steps may be provided, but in my preferable form I have provided only three. The purpose of this stepping up will be described hereinafter.

The press box proper of my invention comprises a pair of end frames 30 and a plurality of press plates 31 contained therebetween. Each of said press plates is similarly constructed and is formed with notches or apertures 32 at each corner for a purpose hereinafter to be described. Each face of these plates is similarly formed with the exception of the two end plates 31′, so that a description of one face of these plates will suffice for all. As shown in Figs. 5 and 7, the face of the plate 31 is provided with reduced levels 33 at each side and at the bottom leaving raised portions 34 across the top and at each of the lower corners and a central annular raised portion 34′ in which are cut a plurality of grooves 35 preferably of the shape and arrangement shown. At the center of each of these plates is formed a circular opening A designed to closely fit the pressing screw as will be described hereinafter. The grooves 35 are preferably very small and are arranged equi-distantly around the periphery of the central opening A. In the form shown, these grooves 35 are very small at the periphery of the circular opening A and are gradually enlarged in width and depth toward the outer periphery of the raised portion 34′ to form passages 36 having the outwardly diverging sides 36′. These passages are preferably radially arranged with respect to the center of the circular opening A and in the form shown this arrangement will leave the non-depressed portion 37 between the grooves 35 having the wide front portion 37′ and gradually being reduced to the smaller portion 37″ at the outer edge of the raised portion 34′. Each of these plates 31 is formed with a guide or keyway 38 opening into the circular opening A and arranged at the upper portion of the plate 31, as shown in Figs. 5 and 7.

In the arrangement of the completed structure these plates will be arranged face

to face as shown in Figs. 1 and 4 with their notches 32, keyways 38, and central openings A registering. Bolting members 40 of a cross section adapted to closely fit the notches or apertures 32 in the press plates are arranged longitudinally of the device and terminate in reduced threaded ends 41 projecting through and beyond the end frames 30 whereby they are engaged by suitable nuts 42 at each end so that the end frames and plates may be closely bound together to form the press-box proper. The shaft 21 and screw 21^a closely fit in the chamber formed by the succession of registering openings A in the press plates which I will refer to hereafter as the pressing chamber.

Blocks 45 constructed and adapted to coact with the expressing screw 21^a are arranged as shown in the drawings, especially in Fig. 4. Each of these blocks is similarly formed with a lower portion 46 constructed to closely fit the depression between adjacent threads 21^a of the screw, these blocks have an enlarged upper portion 47 approximately equal in length to the pitch of the screw 21^a. Formed in the upper portion of each of the blocks is a slot 48 in which is adapted to fit a connecting link 49. Each of these links is provided with a rounded end 50 and has a circular hole 50′ near the end 50. The other end of said link is formed squarely and has a vertical slot 51. In the arrangement of the blocks and links, best shown in Fig. 10, I preferably insert rivets transversely of the upper part 47 of the box through the openings 50′ in the links, these openings 50′ being slightly larger than the diameter of the rivets to permit rotation of the links 49 on said rivets. Similar rivets are arranged transversely at the forward portion of the blocks and pass loosely through the vertical slots 51. This forms a connecting means for the successive blocks and permits relative movement thereof as will appear later in the specification.

At each end of the press-box preferably secured to and spaced from the end frames 30 are guide pulleys or wheels 54 having side flanges 55 and carried by transverse shafts 56 journaled in the pedestals 57, which in turn are secured to the end frames 30 and braced thereby at 58 by suitable fastening means. The usual form of bearing caps 59 are provided where the transverse shafts 56 are journaled. Above the press-box and extending from the upper portion of one of said guide pulleys 54 to the other is a covered guide-way 60. Suitably secured below and adjacent to the press-box is the inclined trough 61 having an outlet or drain pipe 62 arranged to lead to the settling or collecting tank.

In the preferred form of driving arrangement shown in Figs. 1, 2 and 3, 70 is a driving gear secured to the end 24 of the shaft 21 exteriorly of the thrust collar and bearings 25 and 26. Meshing with this gear 70 is a smaller driving pinion 71 carried by a shaft 72 journaled at its outer end in bearings 73. Secured to the outer end of the shaft 72 adjacent the bearings 73 is a worm wheel 74 engaged and driven by a worm 76 journaled at either end in bearings 77 carried on suitable pedestals 77′. This worm may be secured to any suitable source of power so that in the arrangement shown power is transmitted from the worm 76 to the worm wheel 74, through the pinion 71 to the gear 70, rotating the screw 21, 21^a. It is to be understood that while I have shown this as my preferred form of driving means other suitable means may be employed if found preferable thereto.

78 designates a general pedestal frame carrying the bars 73 and 77 and secured to the foundation 20.

A sprocket wheel 80 is secured to the shaft 72 and drives a chain 81, which in turn drives a second sprocket 82 carried by a shaft 83 journaled adjacent the sprocket 82 in suitable bearings 84 and intended to operate an oil pump 85, which has a supply or intake pipe 86 leading to any suitable supply of oil similar to that gathered from the expressing of the machine. This pump 85 is adapted to discharge the oil through a pipe 87 to a main delivery pipe 88 having a plurality of branches 88′ connected with openings in the upper part of the press-box.

A hopper 90 of any suitable form is located at the intake end of the expressing end and is intended to receive the meal previous to its being expressed.

In the operation of my invention the meal is delivered to the hopper 90 whence it is carried on to the first turn of the screw 21^a having the depth *a*. The blocks 45 are constructed to fit exactly the depression between adjacent turns of the screw and at the intake end of the screw the shoulders formed by the increase in length of the upper portion 47 over the lower portion 46 of the blocks 45 will fit on the upper surface of the threads 21^a as shown in Fig. 4. These blocks are of a length approximately equal to the pitch of the screw having a small distance between successive blocks to allow relative movement between them and connected at the same linked position the distance from the forward face of one of said blocks to the forward face of the succeeding block is exactly equal to the pitch of the machine. As will be apparent from the description and drawings, at each turn of the screw each of these blocks 45 sliding in the keyways 38 of the press plates 31 will be carried forward a distance equal to the pitch of the screw until finally it has traversed the whole length

of the press-box and will be carried out over the guide pulleys 54 back in an inverted position in the covered guide-way 60 to a second guide pulley 54 and down into engagement with the first turn of the screw again. Thus it will appear that there will be one of these blocks in engagement with each thread of the screw and rotation of the screw will move the whole series of link blocks through the press-box and around the guide pulleys and through the guide-ways 60. The meal being fed to the first turns of the screw 21ª will fill the depressions between these turns with very little pressing effect until the depressions of the depth *a* are filled. The blocks 45 being designed to closely fill the spaces between successive turns of the screw will prevent rotation of the incoming material so that the latter will be translated but not rotated. It will, therefore, be obvious that when the depth of the depressions between successive turns of the screw is decreased to the depth *b* the material will have to be squeezed to a corresponding decrease in volume, thereby expressing much of the contained juices or fluid. Corresponding expressing effect will then take place at the next decrease in depth and so on until the thoroughly pressed meal or material is discharged at the discharge end of the screw. It is obvious that the depth of the keyways 38 of the successive presser plates will have to be increased to allow for the rise of the blocks as the depth between the turns of the screw decreases as is clearly shown in Fig. 4. The purpose of having the shoulders on the blocks closely fit the initial turns of the screw is to prevent any material from passing by the tops of the thread in any way when first fed into the machine.

It will be obvious from the description and showing that the purpose of the blocks is to prevent rotation of the material and there being a block carried between each pair of adjacent turns of the thread the movement of the meal or other material will be wholly translation toward the discharge end of the screw. Naturally a greater or less pressure will be exerted against one face of the blocks and this will tend to bind them against the side of the keyways 38, and to diminish the friction along these keyways from such pressure I provide branch pipes 88′ leading from a delivery pipe 88 to various points along the side of the keyways 38. Through these pipes any desired supply of oil of the kind expressed from the material may be delivered by the action of the pump 85.

By means of my peculiar link construction between successive blocks, as shown in Fig. 10, movement of the blocks around the guide pulleys 54 will be permitted, owing to the capability of each block to rotate slightly about each of the rivet connections 52 passing through the links 49. The slots 51 in the links will permit successive blocks to move vertically relative to each other as the blocks move from one end of the screw to the other so that as the depth between the turns of the screw decreases one block may rise relative to the succeeding block.

In the construction of the press plates 31 I arrange the grooves 35 at equi-distant intervals, as stated above, about the periphery of the circular opening A and these grooves 35 are arranged in staggered relation on adjacent plates, as shown in Figs. 6, 8 and 8ª. The purpose of the peculiar construction of these apertures and passages is as follows: By constructing very small apertures the liability of fragments of the material being squeezed being forced through the drain passages is greatly decreased and in the event that any of such fragments do become forced through by enlarging and broadening the drain passages 36 the force of the oil or expressed juices following through such apertures will tend to dislodge and carry out any small fragments that may have lodged therein. The raised portions 34 and 34′ lying approximately in the same plane when adjacent plates are in contact will allow drain outlets to be formed along the depressed portions 33 as is clearly shown in Figs. 1 and 4. In my preferable construction no depressed portion is provided at the upper part of the press plates 31 so that the expressed fluid will flow wholly out of the bottom and side openings 33 into the trough 61.

I do not wish to restrict myself to the details shown in the drawings beyond the scope of the appended claims and the spirit of my invention.

What I seek to cover by United States Patent and claim is—

1. In a device of the class described, a rotatable shaft carrying an expressing screw, a plurality of press plates carried in a frame, said plates being formed with a cylindrical opening therethrough, said expressing screw being adapted to closely fit and coact with the periphery of said cylindrical opening, substantially as described.

2. In a device of the class described, a rotatable shaft carrying an expressing screw, a plurality of press plates carried in a frame, said plates being formed with a cylindrical opening therethrough, said expressing screw being adapted to closely fit and coact with the periphery of said cylindrical opening, means to drive said shaft and screw, and means whereby material to be pressed may be fed to said expressing screw at one end thereof.

3. In a device of the class described, a rotatable shaft carrying an expressing screw, a plurality of press plates carried in a frame, said plates being formed with a cylindrical

opening therethrough, said expressing screw being adapted to closely fit and coact with the periphery of said cylindrical opening, and movable means coacting with said screw to prevent rotation of the material to be pressed.

4. In a device of the class described, a rotatable shaft carrying an expressing screw, a plurality of press plates carried in a frame, said plates being formed with a cylindrical opening therethrough, said expressing screw being adapted to closely fit and coact with the periphery of said cylindrical opening, the depressions between the turns of said screw gradually decreasing in depth from one end of the screw to the other, whereby the incoming material is pressed to expel the embodied fluid matter, the periphery of said cylindrical opening being provided with small apertures whereby the expressed fluid may be expelled.

5. In a device of the class described, a press-box formed of a series of press plates carried between end frames, said press-box having a pressing chamber comprising a longitudinal cylindrical opening formed therein, an expressing screw formed on a rotatable shaft closely fitting and adapted to coact with the surface of said cylindrical opening, said surface being provided with apertures for the discharge of the expressed fluid, the depressions between the successive threads of said screw decreasing in depth from the supply end to the discharge end, movable blocks adapted to closely fit a depression between the successive threads of said screw, said blocks being connected so as to permit movement, said blocks being guided by a keyway in the upper portion of said pressing chamber whereby said blocks will be moved longitudinally of said press-box upon rotation of said screw and rotative movement of the material to be pressed will be prevented.

6. In a device of the class described, a press-box formed of a plurality of press plates carried between end frames, said press-box containing a pressing chamber comprising a longitudinal cylindrical opening formed therein, an expressing screw formed on a rotatable shaft closely fitting and adapted to coact with the surface of said pressing chamber, the surface of said chamber being provided with apertures for the discharge of expressed fluid, the depressions between the threads of said screw decreasing in depth from the supply end of the discharge end, movable blocks adapted to closely fit the depressions between successive threads of said screw, said blocks being linked together to form an endless chain and carried around a guide pulley at each end of said press-box and through a guide between the upper portions of said pulleys, whereby said blocks will be moved longitudinally of said press-box by the rotation of said screw, and a trough located beneath said press-box and adapted to collect the expressed fluid.

7. In a device of the class described, a press-box formed of a plurality of press plates carried between end frames, said press-box containing a pressing chamber comprising a longitudinal cylindrical opening formed therein, an expressing screw formed on a rotatable shaft closely fitting and adapted to coact with the surface of said pressing chamber, the surface of said chamber being provided with apertures for the discharge of expressed fluid, the depressions between the threads of said screw decreasing in depth from the supply end to the discharge end, movable blocks adapted to closely fit the depressions between successive threads of said screw, each of said blocks being formed with a depending portion adapted to closely fit the depression between the threads of said screw and with an upper portion approximately equal in width to the pitch of said screw, said blocks being adapted to move longitudinally of said press-box being guided in such movement by a keyway in the upper portion of said pressing chamber, said blocks at the conclusion of their movement through the pressing chamber being carried around one of said pulleys through said guide-way in an inverted position around the second of said pulleys and into engagement again with the threads of said screw, said blocks being so linked together as to permit relative vertical movement when in contact with depressions between the threads of said screw which are decreasing in depth and to permit the necessary divergence of successive ones of said blocks in passing around said pulleys.

8. In a device of the class described, a press-box comprising end frame plates and a plurality of press plates carried therebetween, each of said plates being formed with a circular opening and a keyway at the top of such opening, said openings being adapted to register to form a pressing chamber and said keyways being adapted to register to form a continuous keyway when said press plates are in assembled position.

9. In a device of the class described, an expressing screw rotating in a press-box, said press-box comprising end frames and a series of press plates carried therebetween, each of said plates being formed with a circular opening and a raised portion adjacent the edge of said opening, said raised portion having small serrations at intervals along the edge of said circular opening, said circular openings registering to form a pressing chamber for and to coact with a pressing screw, said serrations providing drain holes for the expressed fluid.

10. In a device of the class described, an expressing screw rotating in a press-box,

said press-box comprising end frames and a series of press plates carried therebetween, each of said plates being formed with a circular opening and a raised portion adjacent the edge of said opening, said raised portion being provided with radially disposed drain passages decreasing in depth and width toward their inner extremities and terminating in small serrations at the edge of said circular openings, said circular openings registering to form a pressing chamber for and to coact with said expressing screw, said serrations providing drain holes for the expressed fluid.

11. In a device of the class described, an expressing screw rotating in a press-box, said press-box comprising end frames and a series of press plates carried therebetween, each of said plates being similarly formed on each side with a circular opening and a raised portion adjacent the edge of said opening, said raised portion being provided with radially disposed drain passages decreasing in depth and width toward their inner extremities and terminating in small serrations at the edge of said circular openings, said circular openings registering to form a pressing chamber for and to coact with said expressing screw, said serrations providing drain holes for the expressed fluid.

12. In a device of the class described, an expressing screw rotating in a press-box, said press-box comprising end frames and a series of press plates carried therebetween, each of said plates being similarly formed on each side with a circular opening and a raised portion adjacent the edge of said opening, said raised portion being provided with radially disposed drain passages decreasing in depth and width toward their inner extremities and terminating in small serrations at the edge of said circular openings, said circular openings registering to form a pressing chamber for and to coact with said expressing screw, said serrations providing drain holes for the expressed fluid, said serrations and passages being located at equal intervals around said raised portion and being so located that when said plates are assembled the serrations in one plate will be in staggered or alternate relation with the serrations of the contiguous face of the adjacent plate.

13. In a device of the class described, an expressing screw rotating in a press-box, said press-box comprising end frames and a series of press plates carried therebetween, each of the said plates being formed on each side with a circular opening, an annular raised portion around the edge of said opening and with raised portions at the top and the lower corners of said press plates, all of said raised portions lying in the same plane, said annular raised portion being provided with grooves terminating in small serrations at equi-distant intervals along the edge of said circular opening, said circular openings registering to form a press chamber for and to coact with said expressing screw, said serrations providing drain holes for the expressed fluid and the depressed portions of said press plates forming outlet apertures for the expressed fluid in the sides and bottom of said press plates when in assembled relation.

14. In a device of the class described, an expressing screw rotating in a press-box. said press-box comprising end frames and a series of press plates carried therebetween, each of said plates being formed with a circular opening and notches at the corners, longitudinal bolting members fitting corner notches in said plates, said bolting members being formed with reduced threaded ends adapted to project through and beyond said end frames and be engaged by nuts to bring the end frames and press plates into assembled relation and to retain them in such relation, the circular openings in said plates registering to form a press chamber to coact with said expressing screw, said press plates being provided with outlet apertures for the passage of expressed fluid.

15. In a device of the class described, an expressing screw rotating in a press-box, said press-box comprising end frames and a series of press plates carried therebetween, each of said plates being formed with a circular opening and a keyway adjacent said opening, said openings and said keyways registering to form a press chamber and a longitudinal keyway respectively in said press-box, a series of movable blocks adapted to coact with the threads of said expressing screw and guided longitudinally thereof in said keyway, and means for lubricating said movable blocks in their passage through said keyway.

In testimony whereof, I have subscribed my name.

THOMAS G. WOLFE.

Witnesses:
B. F. GILL,
VAN F. RIDGWAY.