A. W. S[illegible]

PRESS.

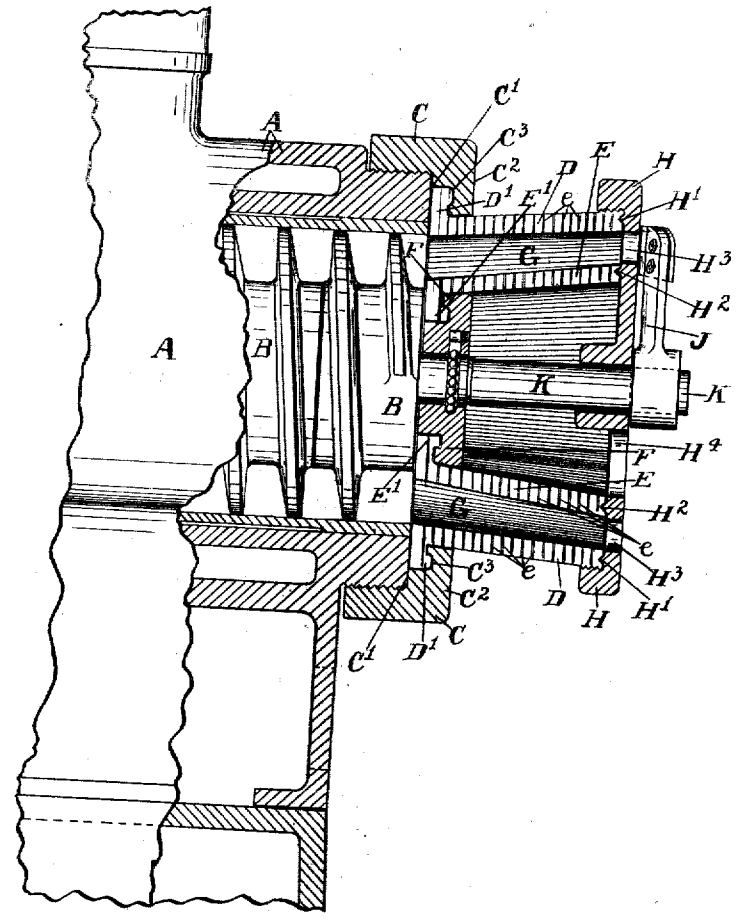
APPLICATION FILED DEC. 13 1913.

1,102,301.

Patented July 7, 1914.

3 SHEETS—SHEET 1.

FIG. 1.



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PRESS.

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3 SHEETS—SHEET 2.

FIG. 2.

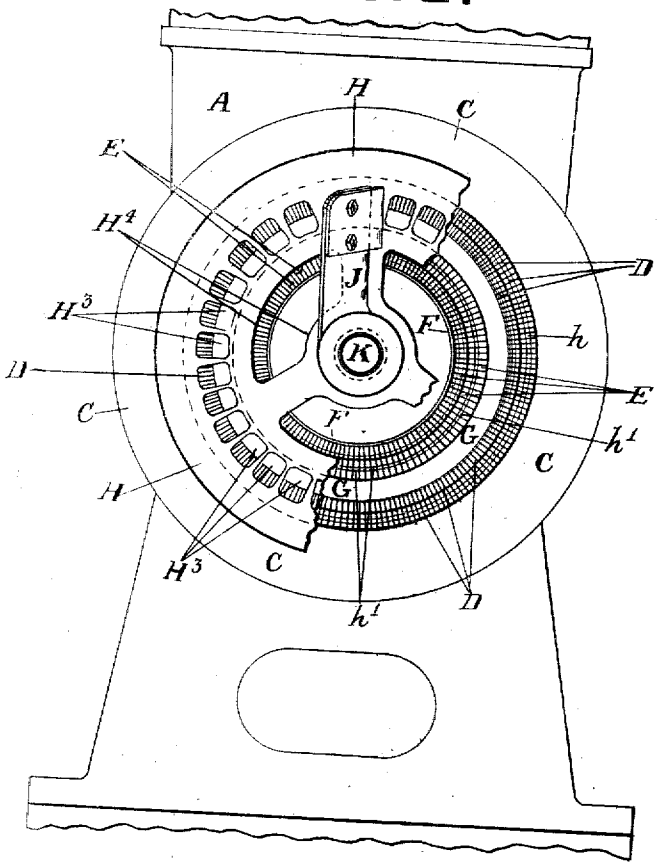


FIG. 3.

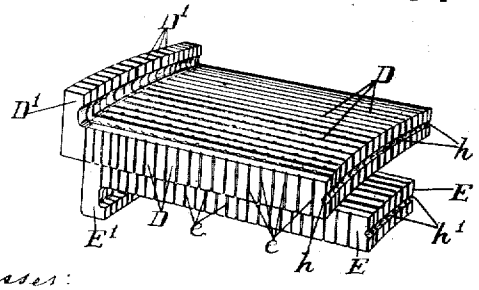
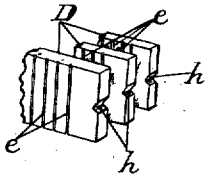


FIG. 4.



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3 SHEETS—SHEET 3.

FIG. 5.

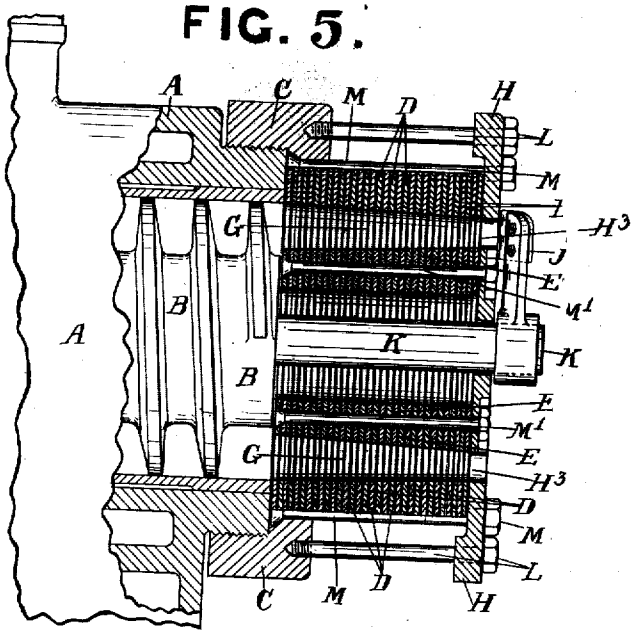


FIG. 6.

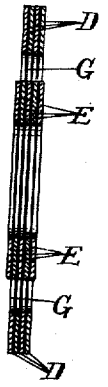
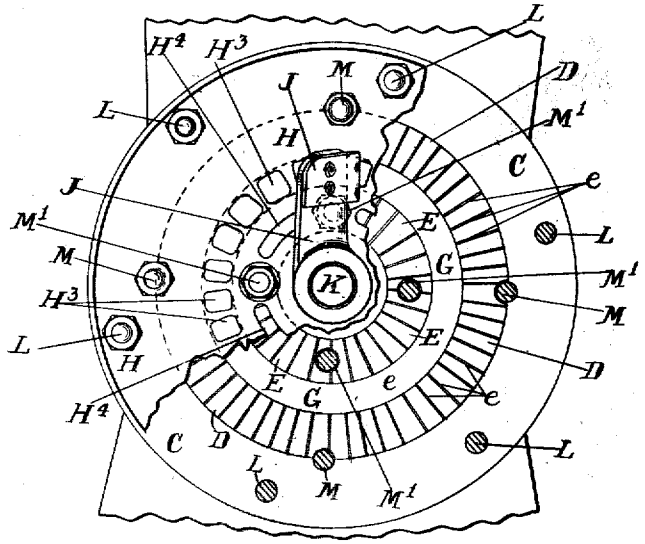


FIG. 7.



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UNITED STATES PATENT OFFI

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PRESS.

1,102,301. Specification of Letters Patent. Patented July 7, 1914.

Application filed December 13, 1913. Serial No. 806,492.

To all whom it may concern:

Be it known that I, ALBERT WILLIAM SIZER, a subject of the King of Great Britain, residing at Kingston-upon-Hull, in the county of York, England, have invented certain new and useful Improvements in Presses; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in apparatus for expressing oil from seeds, nuts and other oil-containing materials or substances, and juice or fluid from fruit, herbs, flowers, peat and the like, of that kind in which the seeds, nuts, fruit or the like from which the oil, juice or fluid is to be expressed, is compressed in a chamber having holes or passages through which the expressed oil, juice or the like escapes, the compressed material or residuum passing out through the mouth of the chamber which is usually provided with a spring controlled cover-plate or a roller, which yields to the pressure of the compressed material, which material exudes between the mouth of the chamber and the cover-plate or roller.

In apparatus of the kind referred to, the outlets for the expressed oil, juice or fluid have been produced either by drilling or boring holes in the chamber, or by constructing the chamber of longitudinal bars or slats so placed together that spaces are left between them, or some of them, or by fitting inside the shell of the chamber a number of rings so arranged as to overreach one another to provide a space between each two rings, or by placing such rings together to provide a smooth bore and providing apertures in the rings.

The passages for the escape of the expressed oil or the like produced as before described, have necessarily been of such a large size that it has been impossible to prevent some of the material being compressed from entering such passages and not only passing therethrough with the expressed oil or liquid, thereby necessitating such oil or liquid being subjected to treatment for the removal of the material mixed therewith, but of the material choking the holes or passages and thereby preventing the oil or liquid from escaping therethrough, so necessitating the frequent stoppage of the machine or apparatus for the holes or passages to be cleared of the material, which as is well known, is a slow and difficult operation.

The present invention has for its object, an improved compressing and expressing machine or apparatus by means of which the process is carried out, whereby more effective compressing of the material, and consequently an increased proportion of expressed oil or liquid, are obtained, and whereby the expressed oil or liquid escapes free from, or practically free from solid matter, and the liability of solid matter to enter the oil or like escape passages, is obviated, or at any rate is so reduced as to be of no moment, the present improvements in the compressing and expressing machine or apparatus residing in so constructing the chamber in which compression of the material and the consequent expression of the oil or the like takes place, that an annular passage is formed by means of tubes built up of staves or rings, through which passage the material to be compressed passes and is compressed therein, and in providing passages of so minute a diameter or size for the expressed oil or liquid to escape through, that it is impossible for solid matter to enter the same, and thereby prevent material being compressed from escaping through such passages and becoming mixed with the expressed oil or liquid, and in providing a die-plate or the like through which the compressed material or the like passes and exudes in the form of highly compressed and molded lengths or pieces of a pre-determined shape in cross-section, and also, if desired, in providing a device for cutting the extruded molded pieces into shorter pieces of a suitable length.

My improved process and means are particularly adapted for expressing oil from the meal of certain seeds and the like used in the manufacture of food for cattle and the like where practically the whole of the oil may be expressed, only a small proportion having to be left in the compressed meal to met the requirements of the breeders or feeders of cattle, my improved process and means effecting this and also allowing of the compressed meal being extruded in the form of shaped lengths or pieces which may be automatically cut into pieces of the desired length as it exudes at the delivery end of the machine or apparatus.

According to my invention, I employ a suitable cylinder or casing in which works

a worm-screw or the like into which cylinder or casing the material to be operated on is fed, and to the delivery end, or it may be to the top or bottom of such cylinder or casing, if the same is placed vertically or in an oblique position, I fit a plurality of concentric rings or tubes, two being a convenient number, each built up of a large number of longitudinal metal bars or staves, or of flat metal rings, each or any suitable number of which is or are provided at one or both of its flat sides with scratches or fine cuts which run from the bottom or inside to the top or outside, whereby when the bars or staves, or the rings, as the case may be, are placed together to form the concentric tubes, a large number of minute holes run from the inside to the periphery or outside of each tube.

The built up rings or tubes may each have a different taper, or one may have the same diameter throughout and the other be tapered, whereby the annular space between the said built up tube, or between each two of the same, if more than two are employed, is reduced or tapers to the outside or delivery end, thereby forming a tapered annular passage through which the seed or the like is forced, and at the outer end of the said tubes is preferably fitted a cap or die-plate provided with suitable holes through which the residuum of the seed or the like from which the oil, juice or the like has been expressed, passes in the form of lengths of compressed material. A suitably operated knife may be fitted in any suitable way at the outside of the cap or die-plate to cut the compressed residuum into short pieces as it exudes through the holes in the said cap or die-plate.

In the accompanying drawings, Figure 1 represents in side view and partly in section, part of an extrusion machine of the worm-screw type provided with my improvements to enable oil to be expressed from seeds and other oil-containing materials and substances, and juice or fluid from fruit, peat and other juice or fluid containing materials or substances, applied thereto and shown in longitudinal section, the showing of such improvements to a machine of the kind mentioned being by way of example only. Fig. 2 is a front view of Fig. 1, part of the cap or die-plate being broken away; Fig. 3 is a perspective view of some of the outer and some of the inner staves of which, according to one mode, the tubes are composed which provide the annular passage for the seed or the like being operated on, to pass through, removed from the machine; Fig. 4 is a similar view showing a part of each of three of such staves apart and drawn to an enlarged scale; Fig. 5 is a similar view to Fig. 1, but shows rings in place of staves as being employed to form the tubes to provide the annular passage through which the seed or the like is forced to be compressed and in which the oil or the like is expressed from such seed or the like, Fig. 6 is a section through some of the rings shown in Fig. 5, removed from the machine, and Fig. 7 is a front view of Fig. 5, part of the cap or die-plate being broken away to allow of part of the rings next behind being seen.

The same reference characters are used to indicate the same parts when they appear on more than one figure.

Referring first to Figs. 1 to 4 inclusive of the drawings, A is the tubular portion or cylinder of an extrusion machine of the worm-screw type, and B is the worm-screw rotatable in such tubular portion or cylinder. C is a ring internally tapped with a screw thread to screw on to the outer end of the tubular portion or cylinder A of the machine, said ring having a shoulder C^1 to abut against the outer end of the cylinder A, and a projecting portion C^2 provided with an annular groove C^3. The ring C may be secured to the end of the tubular portion or cylinder of the machine by any suitable means other than being screwed thereon. D are a number of metal staves provided with inner ends D^1 of hook-like configuration adapted to be engaged by the annularly grooved portion C^2 of the ring C, such staves being so placed together as to form a tube as shown more clearly at Fig. 1, and E are a number of similarly shaped staves which are so placed together as to form a second tube of smaller diameter than, and concentric with the tube formed by the staves D, as also shown in Fig. 1, the series of staves E being so fitted that the tube formed thereby has a greater taper than that formed by the staves D, the inner ends of the staves E being engaged by a ring F so mounted on the worm shaft that such shaft rotates without the said ring rotating, the ring being shaped as shown to engage the hook-like ends E^1 of the said staves E. A convenient way of mounting the ring F on the worm shaft, which I illustrate by way of example only, is to provide such ring with an internal annular groove or race and the worm shaft with a corresponding groove or race, and place balls or rollers between the ring and the shaft so that they run in the said two races, said balls or rollers preventing the ring from sliding on the shaft but at the same time allowing the shaft to rotate freely independently of the ring. When the two series of staves D and E are in position to form the two tubes, there is a sufficient space between the tubes so formed as to provide an annular tapered passage G through which the seed or the like fed to the worm cylinder A of the machine is forced by the worm-screw B. The staves D and E have fine cuts or scratches *e* on one or both of their sides

or faces, such scratches running from the inside to the outside of the said staves thereby to form fine passages for the escape of the oil, juice or the like expressed from the seed or the like being compressed between the tubes built up from the two series of staves, such cuts or scratches being sufficiently fine to prevent the escape therethrough of the compressed seed or other material or the like being acted on. Screwed or otherwise suitably secured on or to the outer end of the tube formed by the staves D, is a cap or die-plate H which has preferably two concentric V or other suitably shaped ribs H^1, H^2 on its inner face to fit two correspondingly shaped notches h, h^1 in the outer ends of the staves D and E respectively, said cap or plate having a number of holes H^3 in it through which the meal or residuum resulting from the compressed seed or material after the oil, juice or the like has been expressed, exudes in the form of lengths of compressed material, holes H^4 being also provided for the expressed oil, juice or the like to escape through. To cut the lengths of compressed material into smaller pieces, a knife J adapted to rotate around the face of the cap or die-plate is preferably employed and driven by any suitable means, one and a convenient means described and illustrated by way of example only, being to key or otherwise fixedly mount it on the worm shaft K at the outside of the die-plate whereby it rotates with the said worm shaft, as shown in the drawings.

Referring to the modified arrangement illustrated at Figs. 5 to 7 inclusive of the drawings, A is the tubular portion or cylinder of the extrusion machine, B is the worm-screw, C is a ring shown for example only, as being internally tapped with a screw-thread to screw on to the outer end of the portion A of the machine, and D and E are two series of flat rings, those of one series being placed together to form one tube and those of the other series, which are of s aller diameter, placed together to form a second and smaller tube concentric with the first or outer tube. The hole through each ring of the series D is so tapered and the periphery of each ring of the series E is also so tapered, or the hole through each ring of the series D, or the periphery of each ring of the series E, only, is so tapered, that when the two series of rings are placed together to form the two tubes, an annular tapered passage G is formed between the two tubes, through which passage the seed or the like fed to the worm cylinder A of the machine is forced by the worm-screw B as described with reference to the machine illustrated at Figs. 1 to 4 inclusive of the drawings. H is the cap or die-plate secured to the ring C by means of bolts L, and J is the knife secured on the worm shaft K. The rings D and E which form the two tubes are secured or bound together by means of bolts M, M^1, some of which pass through holes in the cap or die-plate and fit recesses in the rings D, and others of which pass through other holes in the said cap or die-plate and through holes in the rings E.

The method of expressing the oil, juice or the like from the seed, material or the like, and of making the residuum into compressed lengths of material is as follows: The seed, fruit, herbs or other material, substance or the like from which the oil, juice or fluid is to be expressed, is fed to the extrusion machine and into the cylinder in which the worm-screw works, and is carried or forced along the interior thereof by means of the worm-screw working in such cylinder until it comes to the end thereof when it passes into the space between the built-up tubes wherein it is compressed as it passes therethrough and out through the holes in the front cap or die-plate, which holes have preferably parallel sides, that is, they are straight, or their outer portions are straight to give the final compression and the required shape to the compressed material, the oil, juice or the like expressed as a result of the compression of the seed or the like between the tubes, percolating through the minute holes formed by the fine cuts or scratches in the sides of the staves, or the rings, as the case may be, from which the tubes are built up, and flowing away to a collecting tank or the like, the compressed material or residuum of the seed or the like passing out through the holes in the cap or die-plate in the form of lengths of compressed material which are cut into short pieces by the knife mounted on the worm shaft rotating around the face of the cap or die-plate.

I claim:—

1. In a press, the combination, with a feeding cylinder; of a removable supporting ring engaging with one end portion of the feeding cylinder, an annular and tapering press chamber having its larger end portion secured to the said ring, one of the walls of the said chamber being formed of plates arranged face to face and provided with grooves in their faces for the passage of expressed fluid, a die-plate secured to the smaller end portion of the said chamber and provided with an outlet for the passage of solid material, and means arranged in the feeding cylinder for forcing the material therefrom into the press chamber.

2. In a press, the combination, with a feeding cylinder; of a removable supporting ring engaging with one end portion of the feeding cylinder, a press chamber having its outer wall formed of plates arranged face to face and provided with grooves in their faces for the passage of expressed fluid,

one end of each plate having a projection which engages with the said ring, a perforated die-plate secured at the outlet end of the press chamber, and means arranged in the feeding cylinder for forcing the material therefrom into the press chamber.

3. In a press, the combination, with a feeding cylinder; of a disk supported on the axis of the feeding cylinder, an annular press chamber having its inner wall formed of plates arranged face to face and provided with grooves in their faces for the passage of expressed fluid, one end of each plate having a projection which engages with the said disk, means for securing the press chamber to the feeding cylinder, a perforated die-plate secured at the outlet end of the press chamber, and means arranged in the feeding cylinder for forcing the material therefrom into the press chamber.

4. In a press, the combination, with a feeding cylinder, and feeding mechanism working therein; of a ring engaging with the feeding cylinder, a press chamber secured to the feeding cylinder at one end and having an outlet for solid material at its other end, the outer wall of the said press chamber being formed of plates which are held in place by the said ring and are provided with grooves in their faces for the passage of expressed fluid.

5. In a press, the combination, with a feeding cylinder, and a feeding worm arranged therein and provided with a shaft which projects from the said cylinder; of a disk mounted on the said shaft and provided with means for preventing it from sliding longitudinally, a ring engaging with the said cylinder, a press chamber having its inner and outer walls connected to the disk and ring respectively, said walls being formed of plates having grooves in their faces of the passage of expressed fluid, and a die plate secured to the outlet end of the press chamber.

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

ALBERT WILLIAM SIZER.

Witnesses:
LOUIS EDGAR KIPPAX,
FRED. HAROLD RHODES.