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GAS PRESSURE TANKAGE PRESS

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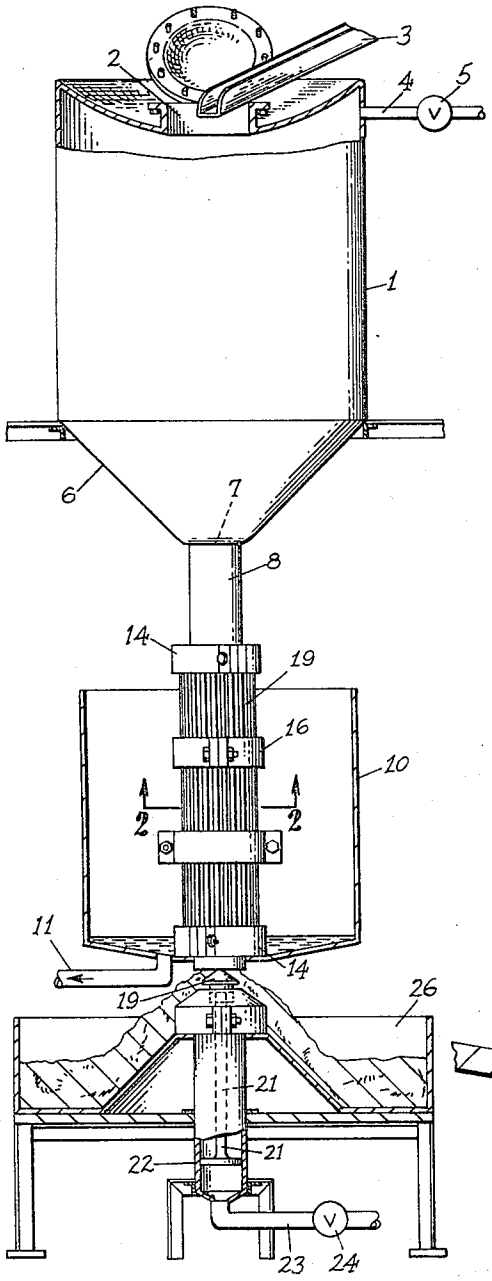


Fig. 1

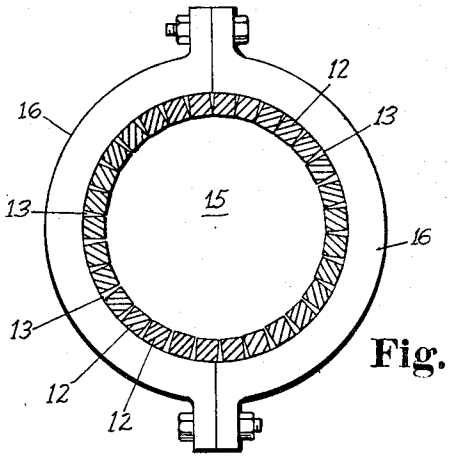


Fig. 2

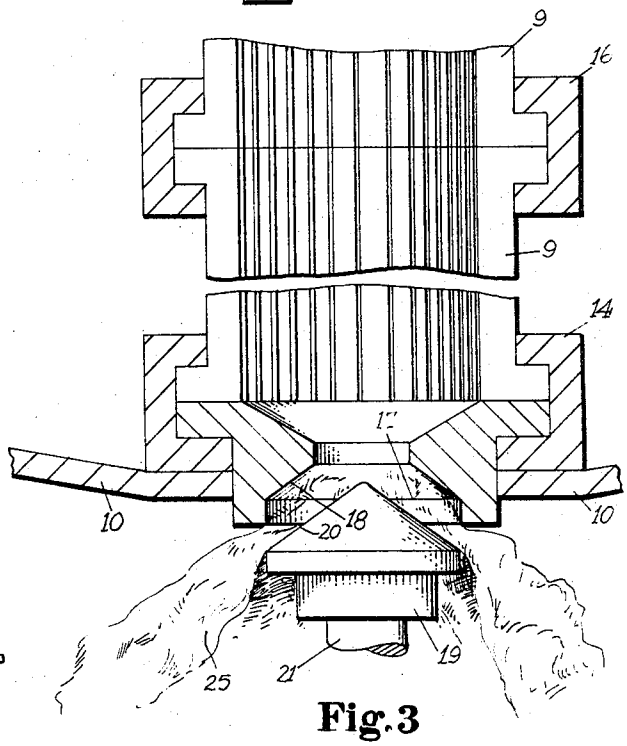


Fig. 3

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GAS PRESSURE TANKAGE PRESS

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ABSTRACT OF THE DISCLOSURE

This invention relates to apparatus and method for use in the treatment of animal and poultry by-products in the production of fat and pressed tankage or meat meal as an incident of a rendering operation. More specifically, the invention is concerned with a system using a pressure vessel, press section and a vat, whereby a gaseous medium is employed as the means for exerting pressure on the material to be treated.

In the rendering of fat from animal matter, heat is employed to break down the protein cells to yield fat, the animal matter being heated in a cooker to render out the fat, the resultant liquid fat and residual materials being tapped off or drained from the cooker followed by the separation of the residual fat from the solids or cracklings, as the solids constituent is called. The residual fats are normally removed by subjecting the cracklings to a press operation in either a screw press or a ram press, the cracklings being compacted into an essentially solid mass or cake, depending upon the type of press employed.

Where a ram-type press is employed, the operation is extremely slow in that the press, which is in the nature of a perforated cylinder of substantial mass, is charged with a batch of cracklings to be pressed and the charge compacted by the ram into a relatively small cake, the fats released from the compacting of the mass flowing outwardly through the perforated wall surfaces of the press. A metallic plate having a diameter corresponding closely to the inside diameter of the press chamber is placed over the compacted cake, whereupon another charge of cracklings is introduced and the compacting operation repeated until the press cylinder is essentially filled, whereupon the opposite end of the press removed and the cakes removed.

Where the pressing operation involves the use of a screw press, considerable difficulty has been encountered in the maintenance of such presses due to their size and the extremely high pressures which must be developed to remove the residual fats. Breakage of the screws is a relatively common occurrence and considerable time and expense is involved in making the necessary repairs.

In contrast to the foregoing, the instant invention contemplates the provision of a tankage press in which a high pressure gaseous medium is utilized to compact the cracklings and hence extract the residual fats therefrom.

A principal object of the instant invention is the provision of a tankage press wherein the cooked material, subsequent to being drained of free fat, is charged into a vessel capable of withstanding high pressures, whereupon the vessel is sealed and a gaseous medium introduced therein, the gaseous medium acting to force the charge into a press wherein the solid constituents are compacted with the release of residual fats.

A further object of the instant invention is the provision of a high pressure tankage press of the character described wherein the press section is arranged so that the compacted solids will be continuously discharged from the trailing end of the press section which is provided with a displaceable plug maintained in position by means of hydraulic pressure, the plug being yieldably mounted so as to permit the compacted solids to be ejected through a narrow annular orifice between the plug and the wall surfaces of the press.

The foregoing together with other objects of the invention which will appear hereinafter or which will be apparent to the skilled worker in the art upon reading this specification, are accomplished by that construction and arrangement of parts of which an exemplary embodiment shall now be described.

Reference is made to the accompanying drawings wherein:

FIGURE 1 is a schematic elevational view illustrating a tankage press in accordance with the instant invention.

FIGURE 2 is an enlarged sectional view taken along the line 2—2 of FIGURE 1.

FIGURE 3 is an enlarged schematic sectional view illustrating the operation of the press plug.

Referring first to FIGURE 1 of the drawings, the press illustrated comprises a pressure vessel 1 having a hatch 2 which may be opened to introduce cooked material into the pressure vessel and then closed and sealed so that the gaseous medium introduced in the vessel will be retained therein under the desired high pressure. The cooked material may be conveniently delivered to the pressure vessel by means of a delivery chute 3 which will deliver the cooked material from any desired point. The gaseous medium which will pressurize the vessel will be introduced through a supply line 4 having a pressure control valve 5, the supply line being connected to a source of gas under pressure (not shown).

At its lowermost end, the pressure vessel is preferably tapered, as at 6, terminating at its lowermost extremity in a restricted outlet orifice 7 to which a conduit 8 is connected, the conduit in turn be connected to the press section 9 wherein the solid constituents of the cooked material are compacted with the release of residual fats through the perforated walls of the press, such fats being collected in the surrounding container or vat 10 from which the fats may be subsequently drained through outlet 11.

The construction of the press section 9 does not constitute a limitation on the invention, although as illustrated in FIGURE 2, it may be of conventional construction wherein the body of the press is composed of a plurality of closely spaced apart bars 12 extending lengthwise of the press section, the bars defining extremely narrow orifices 13 therebetween. The bars will be mounted in suitable end brackets 14 so as to define a cylindrical press chamber 15 in communication with the conduit 8. The press section will be suitably reinforced along its length by means of reinforcing collars 16 which surround the bars 12 and reinforce them to withstand the pressures developed within the press chamber.

At its discharge end, the press is provided with an outlet orifice 17 having a chamfered wall surface 18 which coacts with a displaceable plug 19 having a conical nose 20 adapted to mate with the chamfered wall surface 18 and effectively close the outlet orifice 17.

The plug member 19 is preferably connected to or formed as a part of piston 21 of hydraulic or pneumatic cylinder 22 to which fluid under pressure is introduced through supply line 23 and valve 24. The orientation of the piston and cylinder is such that when pressure is introduced into the cylinder, the plug 19 will be seated against the wall surface of the outlet orifice 17 in the press section. However, as will be explained in greater detail hereinafter, the plug 19 will be displaceable upon the build-up of the pressed tankage or cake in the pressure chamber 15, whereupon the outlet orifice 17 will be at least partially opened, thereby permitting the compressed solids to be discharged, as indicated at 25 in FIGURE 3.

Referring again to FIGURE 1, the cake as it is dis-

charged from the press section is collected in a trough **26** from which it may be readily removed.

In the operation of the press, the cooked and drained material is introduced into the pressure vessel **1**; and while size does not constitute a limitation on the invention, it is desirable that the vessel be of a size sufficient to receive the complete charge of a conventional cooker with sufficient free space above the charge to permit the introduction of the gaseous medium. Upon being charged, the pressure vessel will be closed and sealed, whereupon pressure will be introduced into the vessel in the area overlying the charge. The gaseous medium may comprise compressed air or an inert gas. In any event a head of pressure will be developed and maintained which will act to cause the cooked material in the pressure vessel to be forced downwardly through the restricted outlet orifice and into the press section **9** where it will be compacted under high pressure, thereby causing the residual fats to be pressed from the tankage, the fats passing outwardly through the orifices **13** between the bars **12** for collection in the vat **10**.

The resistance of the displaceable plug **19** will be such that the plug will be displaceable to expose outlet orifice **17** only when the cake in the press has been compacted to the desired extent. While the specific pressures employed will vary depending upon the nature of the material being compressed, pressures up to and including 10,000 p.s.i. may be employed; and in this connection it will be understood that the counterpressure exerted by the piston and cylinder mounting the plug **19** will be correlated to the pressure developed on the material in the press section so that the plug will be displaced only upon the build-up within the press section of a compacting pressure sufficient to remove the residual fats from the compacted solids.

Modifications may be made in the invention without departing from its spirit and purpose. While, in the embodiment illustrated, the tankage press is vertically disposed, it will be evident that it could be horizontally disposed in its entirety, or the conduit **8** connecting the pressure vessel to the press section curved with the press section and plug assembly horizontally disposed. Other modifications will undoubtedly occur to the worker in the art upon reading this specification, and consequently it is not intended that the invention be limited in its scope other than in the manner set forth in the claims which follow.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A tankage press comprising an enclosed vertically disposed pressure vessel having a tapered funnel-like bottom part, a restricted outlet orifice at the lowermost end of said bottom part, conduit means remote from said outlet orifice connected to a source of gaseous medium under pressure for introducing said gaseous medium into said vessel, an opening at its upper end for introducing material to be pressed, means for closing and sealing said opening, a press section including a perforated press chamber having an inlet end in communication with the outlet orifice in said pressure vessel and an outlet at its opposite end, means operable under a build up of pressure to close the outlet end of said press chamber, and a vat positioned to receive and collect liquid flowing outwardly through the perforated walls of said chamber.

2. The tankage press claimed in claim **1** wherein the means closing the outlet end of said press chamber comprises a displaceable plug, and pressure applying means mounting said plug to urge it into sealing contact with the outlet end of said chamber, said plug being displaceable to open the outlet end of said chamber when the pressure exerted on the material being compacted in said chamber is sufficient to overcome the pressure exerted on said plug by said pressure applying means.

3. The tankage press claimed in claim **2** wherein the outlet end of said chamber includes an outlet orifice having a chamfered wall surface, and wherein said plug has a conical nose of a size to seat against said chamfered wall surface.

4. The tankage press claimed in claim **3** wherein said pressure applying means comprises a hydraulic cylinder.

5. The tankage press claimed in claim **1** wherein a trough is positioned to receive and collect compacted material discharged from the outlet end of said press chamber.

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