Oct. 24, 1961 A. W. FRENCH 3,005,401

EXPRESSING PRESS

Filed Feb. 9, 1955 4 Sheets-Sheet 1

FIG-1

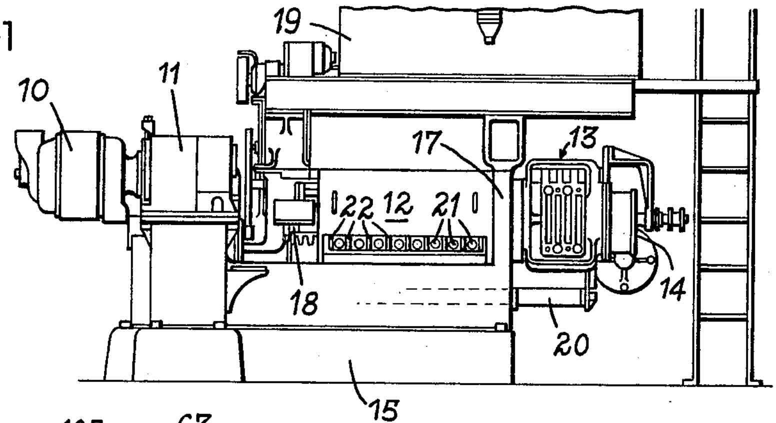

FIG-6

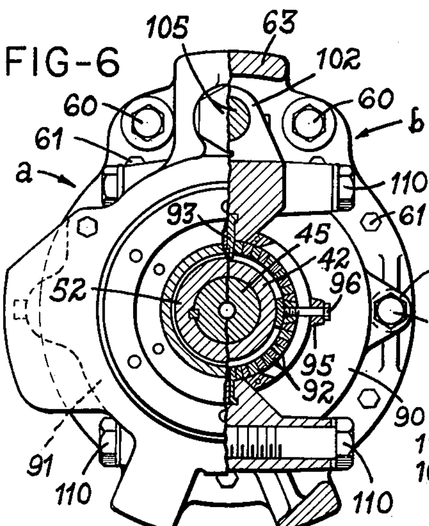

FIG-10

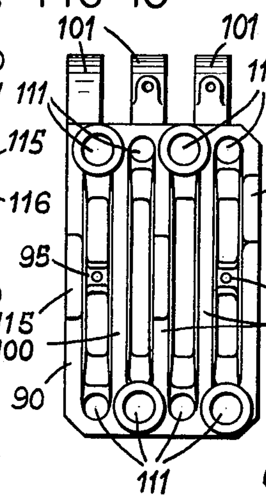

FIG-11

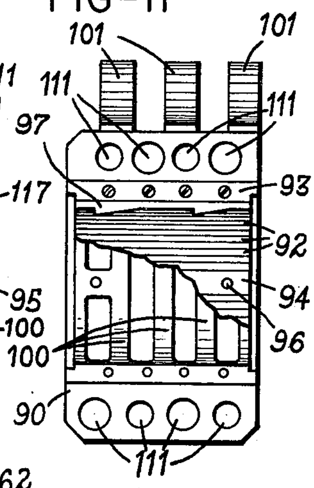

FIG-7

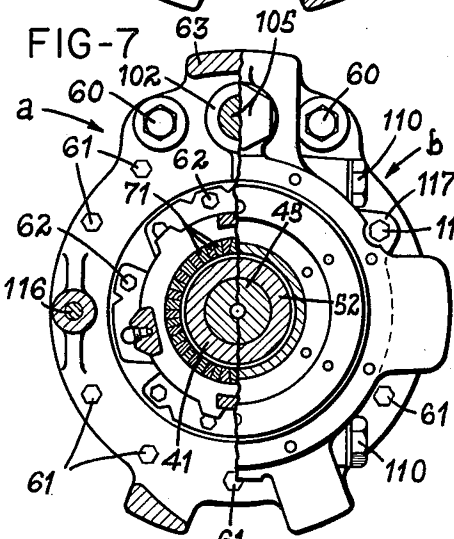

FIG-9

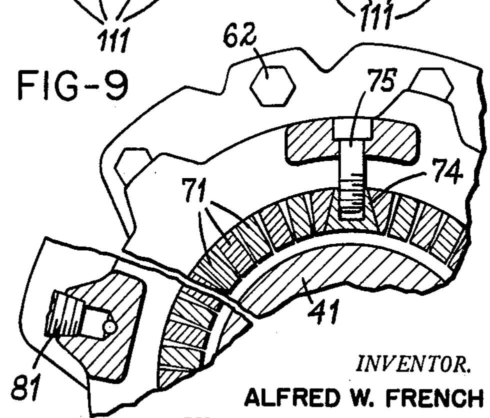

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FIG-5

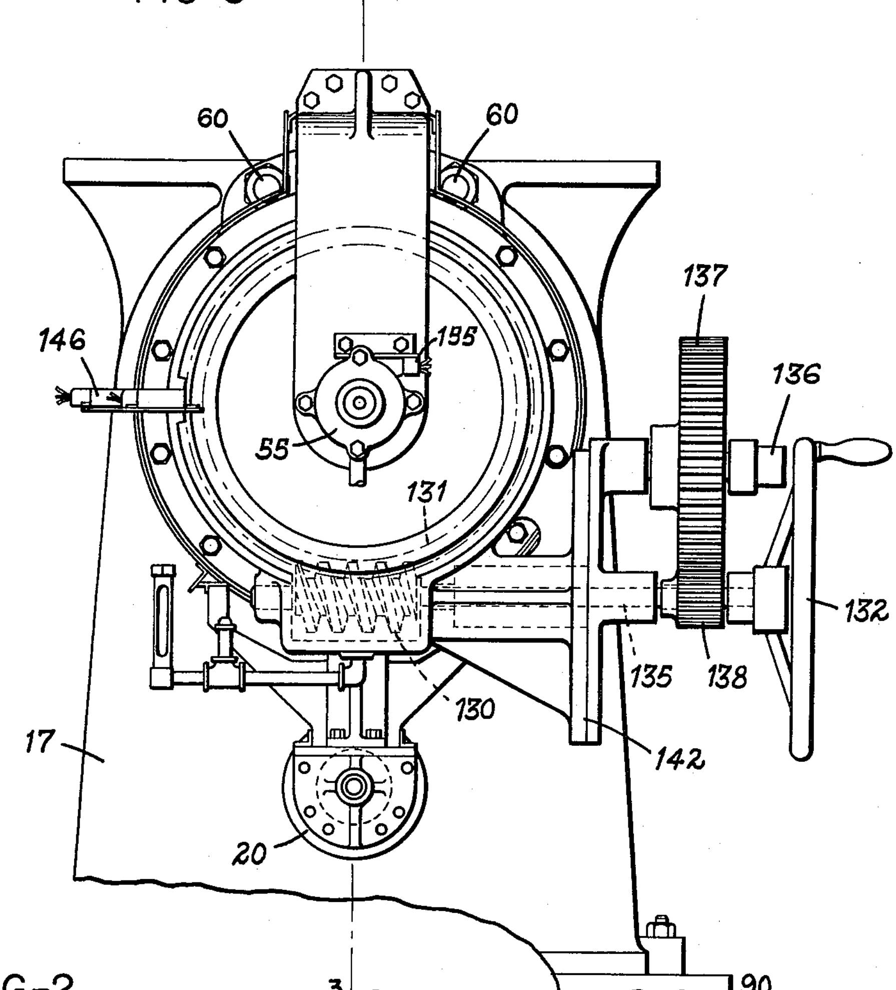
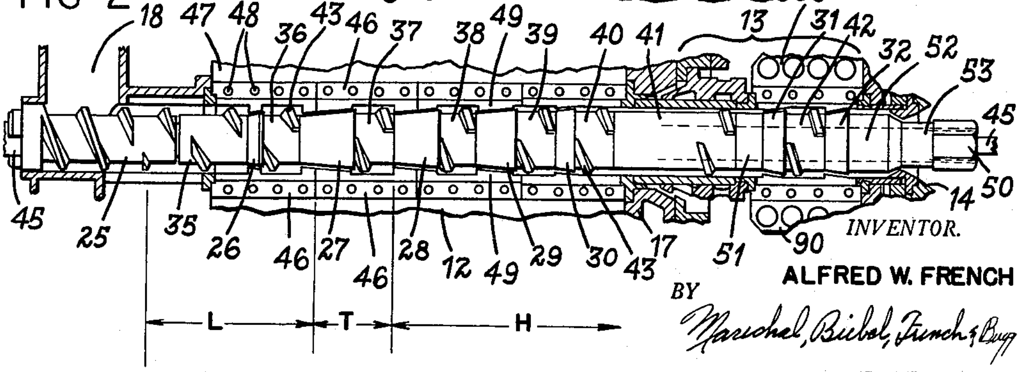


FIG-2



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Oct. 24, 1961 A. W. FRENCH 3,005,401

EXPRESSING PRESS

Filed Feb. 9, 1955 4 Sheets-Sheet 3

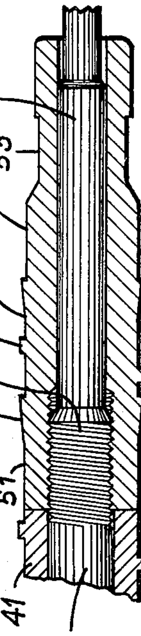

FIG-13

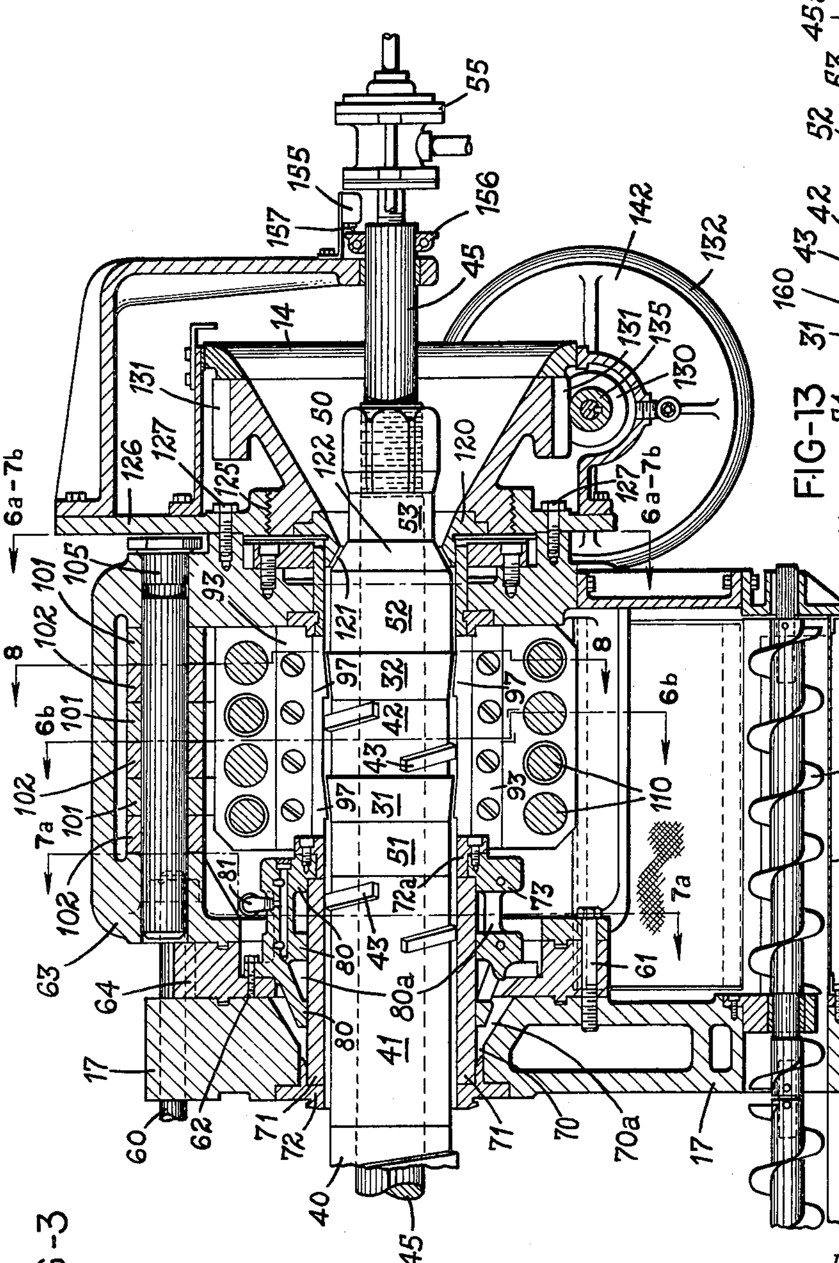

FIG-3

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Oct. 24, 1961 A. W. FRENCH 3,005,401

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Filed Feb. 9, 1955 4 Sheets-Sheet 4

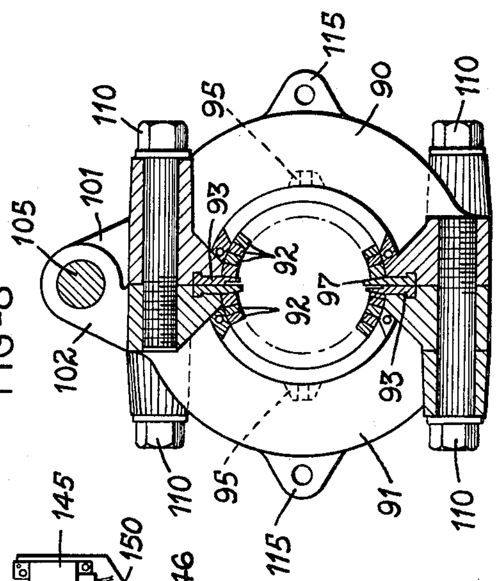

FIG-8

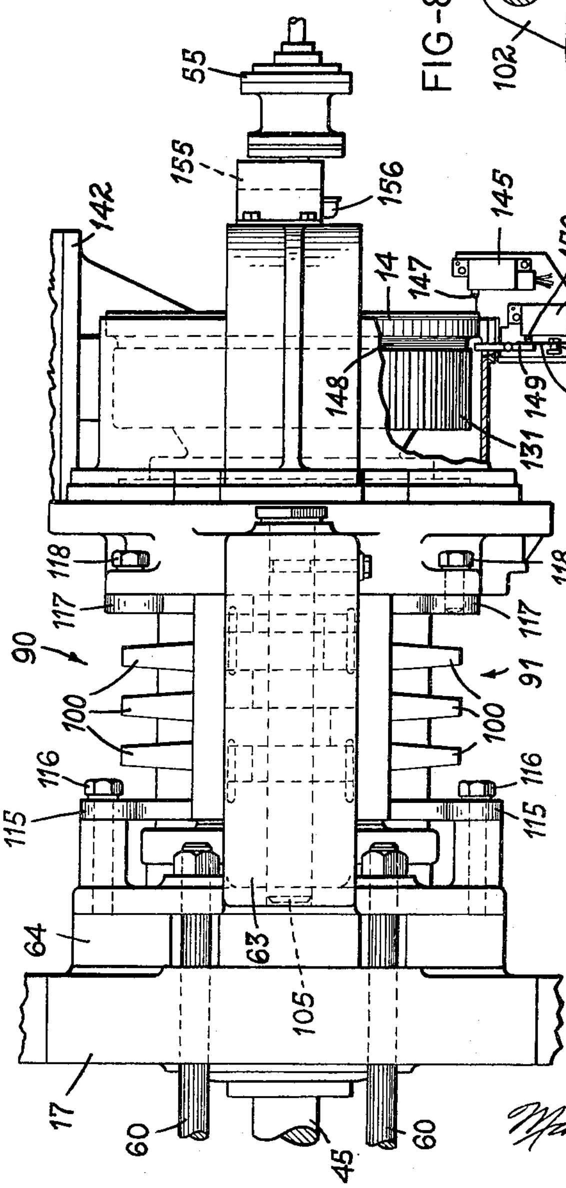

FIG-4

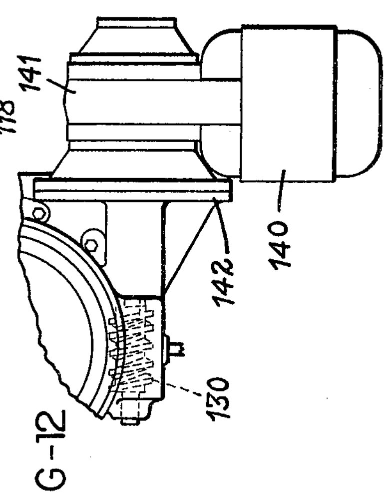

FIG-12

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United States Patent Office

3,005,401

Patented Oct. 24, 1961

3,005,401
EXPRESSING PRESS

Alfred W. French, Piqua, Ohio, assignor to The French Oil Mill Machinery Company, Piqua, Ohio, a corporation of Ohio

Filed Feb. 9, 1955, Ser. No. 487,138
4 Claims. (Cl. 100—93)

This invention relates to an expressing press and, more particularly, to a mechanical or screw press of the type adapted for expressing liquids from liquid-containing materials by forcing the material through a cage under pressure by which liquid is squeezed from the material and escapes through drainage openings in the walls of the cage.

In such liquid expressing presses there is a cage having a strong outer frame within which is an annular lining constructed of a plurality of bars arranged lengthwise of the cage and separated by narrow spaces which form the drainage apertures or escape openings for the expressed liquid. The liquid containing material is forced axially through the cage by a rotating screw or worm impeller arrangement which feeds material into the cage as a relatively loose mass and forces it through the cage toward a restricted discharge opening at the other end thereof. The pressure and feed worm or screw have a plurality of stages of increasing diameter to subject the material to progressively increased expressing and compacting pressures as it advances through the cage toward the discharge end thereof.

In general, it is desirable to obtain the maximum yield of expressed liquid of proper quality from the liquid-containing material without, however, detrimentally affecting the quality of product as by subjecting it to too high temperature.

According to the present invention, the number of pressure stages or sections in an expressing press is increased and the ratios of the axial extent of low pressure sections and increasing high pressure sections are correlated to provide for additional liquid extraction yield without objectionable temperature rise. Furthermore the apparatus according to the invention provides for subjecting the material to high pressure for a longer time and greater extent of its travel through the press in high pressure sections as a part of the press or as extensions beyond the end of existing presses, and provides for cooling or other temperature control of the additional or extension sections to obtain additional liquid extraction under prolonged high pressure without detriment to the high quality of product desired. For example, considering cottonseed oil, a conventional mechanical screw type expressing press having four 11" sections of expressing length and an initial auxiliary section permits recovery of a satisfactory product down to about 4% residual oil in the discharged solid cake, whereas extending such a press with the construction according to the invention will reduce the residual oil content to about 3½% with five such expressing sections and 3% or lower with six such sections.

It is accordingly, an object of this invention to provide, in a liquid expressing press of the character described, additional expressing pressure means for subjecting liquid-containing material to progressively higher liquid expressing pressures through an increased plurality of pressure stages for enhanced liquid recovery.

Another object of this invention is to provide an extension cage construction adapted to be fitted to existing liquid expressing presses of the character described without substantial alteration of the press to provide correlated additional increased progressive pressure steps for the material to be treated.

A further object of this invention is to provide, in an expressing press of the character described a plurality of low and high pressure stages or sections the axial extent and varying expressing pressures of which are correlated to provide improved yield of expressed liquid of satisfactory characteristics.

Another object of this invention is to provide a method for enhanced yield of liquid recovery in which the material being processed is subjected to low and high pressures under controlled temperatures with the low pressure zone expressing the bulk of the liquid to be recovered and with the high pressure zone being of substantially greater extent than the low pressure zone.

A still further object of this invention is to provide, for a liquid expressing press of the character described, an extension cage and pressure means adapted for mounting upon the end of existing presses and including means for readily opening the cage, means for controlling the temperature of material processed through the cage, and means for providing a substantially continuous and uninterrupted advancement of material to be processed through succeeding increasing pressure stages.

Other objects and advantages of the invention will be apparent from the following description, the accompanying drawings and the appended claims.

In the drawing—

FIG. 1 is a side elevation of a mechanical liquid expressing press embodying the invention;

FIG. 2 is a fragmentary longitudinal section showing the various stages or sections along the feed worm and drainage cages of a press embodying the invention;

FIG. 3 is a vertical longitudinal section along the line 3—3 of FIG. 5 through an extension cage construction embodying the invention as applied at the discharge end of a liquid expressing press;

FIG. 4 is a top plan view of the construction of FIG. 3 with some parts omitted for clarity of illustration;

FIG. 5 is an elevational view of the discharge end of a press embodying the invention;

FIG. 6 is a composite transverse sectional view of a construction embodying the invention, the left half of which is taken along the line *6a—6a* of FIG. 3 and the right half of which is taken along the line *6b—6b* of FIG. 3;

FIG. 7 is a composite transverse sectional view of a construction embodying the invention the left half of which is taken along the line *7a—7a* of FIG. 3 and the right half of which is taken along the line *7b—7b* of FIG. 3;

FIG. 8 is a transverse sectional view of a split extension cage construction section embodying the invention taken along the line 8—8 of FIG. 3;

FIG. 9 is a fragmentary transverse section on an enlarged scale of a portion of a one-piece extension cage construction embodying the invention;

FIGS. 10 and 11 are elevational views of opposite sides of one-half of a split extension cage construction embodying the invention;

FIG. 12 is an elevational view of an optional motor drive for adjustment of a discharge cone of a press embodying the invention; and

FIG. 13 is a fragmentary longitudinal section of a modification of the extension cage feed and pressure worm arrangement adapted for converting existing presses to embodying the invention.

Referring to the drawing in which like reference characters designate like parts throughout the several views thereof, a liquid expressing press embodying the invention is illustrated generally in FIG. 1 as a press particularly adapted for expressing cottonseed oil from cooked cottonseed meats. As illustrated, the press has a main drive motor 10, transmission gear box 11, a main drainage cage section 12, an extension drainage cage section 13, and a discharge cone 14, all mounted on a base or main frame 15 having a main end frame 17. Liquid-containing material to be processed enters the inlet end 18 of the press as from a cooker or other source 19, is forced through the main drainage cage section 12 and the extension cage section 13 to be discharged as a compressed cake from discharge cone 14, with the liquid expressed therefrom being collected and fed to suitable apparatus by the liquid collecting trough 20 extending under the various drainage cage sections 12 and 13.

The main cage section 12 comprises a plurality of axially disposed drainage bars arranged in a cylindrical configuration with minute spaces therebetween to form drainage apertures for liquid expressed from the material being froced through the cage by a rotating feed and pressure worm construction. The cage is satisfactorily formed of two semicylindrical halves meeting each other in face-to-face relation along a diametric longitudinal vertical plane and affixed together at top and bottom as by bolts 21, and also has a plurality of longitudinally spaced radial ribs 22 containing passages through which coolant or other temperature controlling medium may be circulated—all substantially as taught by Patents No. 2,320,765, issued June 1, 1943, to Charles B. Upton, and No. 2,421,763, issued June 10, 1947, to Forrest C. Simon. The material to be processed is fed axially through main cage section 12 from the inlet end 18 to the outlet end 14 by a multistage screw or worm feeding and pressure impeller arrangement substantially as taught in Patent No. 2,335,819, issued November 30, 1943, to Charles B. Upton.

A satisfactory screw or worm impeller particularly adapted to the expressing of cottonseed oil from cooked cotton seed meats is illustrated in FIG. 2. Considering the impeller construction itself, it will be noted that it is made up of a feeding section 25 and a plurality of pressure collars 26—32 separated by screw collars 35—42 each carrying worm flights 43.

These various members are constructed as separate collars keyed to a main shaft 45, except for the feed section 25 which rotates freely on shaft 45 and is separately driven at a different speed than shaft 45 by motor 10 and transmission 11 which also drives shaft 45. It will be noted that the diameters of pressure sections 26—32 increase to provide increasing pressures to which the material is subjected as it is forced from left to right in the drawing by screw sections 25 and 35—42, and that the various pressure sections 26—32 are followed by sections 36—42 of lesser diameter to form a shoulder (e.g., between 26 and 36, 27 and 37, etc.) for resisting reverse passage of the material and some relaxation of radial pressure after each pressure collar and before subjecting the material to the action of the next pressure collar.

In the construction indicated in FIG. 2, the main cage 12 is illustrated as being made up of four lengths of drainage bars arranged in end-to-end relation to form a cylindrical drainage cage of substantially uniform internal diameter as taught in the above noted patents, and, thus, the main cage 12 may be generally referred to as a "four-section drainage cage." The longitudinal extents of each of the four sets of drainage bars are indicated in FIG. 2 by the plates 46 which hold the drainage bars in place in the semicylindrical casting 47, as by means of screws 48. The plates 46 have radially inwardly extending breaker bar portions 49 to inhibit the tendency of the material being processed to rotate with the worm instead of being fed axially through the cage 12 by the worm in accordance with the above mentioned patents. Separate collars 26—32 and 35—42, etc., as well as being keyed to shaft 45, are held axially in place thereon by a retaining nut 50 threaded onto shaft 45 and having a neck portion 53.

Referring more particularly to FIG. 3, the construction of the extension cage portion 13 of a press embodying this invention is shown in more detail. Main shaft 45, as indicated in FIG. 3, extends beyond main cage section 12 through end frame 17 and carries worm flight collars 41 and 42, tapered collars 31 and 32 as well as collar 51 and discharge collar 52. A rotating fluid-tight joint 55 is provided at the end of shaft 45 for the circulation of coolant or other temperature controlling medium through axial passages through main shaft 45.

As indicated in FIG. 3, the extension cage portions are all mounted on main end frame 17, and consist of two drainage cage sections of cage bars: A continuous or nonsplit section surrounding collar 41, and a split openable cage section surrounding collars 31, 42, and 32. These extension sections are mounted on main end frame 17, which is tied to the main portion of the press as by tie rods 60, by means of bolts 61 and 62, split cage bracket 63, and spacer 64.

Considering first the continuous or nonsplit cage sections surrounding collar 41, it will be noted that the main end frame 17 has a bore 70 through which drainage screen bars 71 extend. Bars 71 are affixed at one end by spacer bushing 72 and, at the other end, by bushing 72*a* on bracket 73 mounted on spacer 64 by bolts 62. Drainage passages 70*a* are formed in the main end frame 17. As indicated in more detail in FIG. 9, the bars 71 are substantially rectangular in cross section and are disposed in a cylindrical configuration providing drainage therebetween for fluid expressed from material being forced between collar 41 and screen bars 71. The bars may be additionally held in place by keystone type bars 74 affixed as by bolts 75 to the cage bracket.

Because of the size of bore 70 and the bracket construction 72, 73, etc., the screen bars 71 have substantially the same dimensions as the corresponding screen bars in main cage 12, and provide a channel of uniform diameter as a continuation of main cage 12 for continued feeding of material therethrough substantially without relaxation of pressure thereon. Since the bars 71 extend through main frame 17 and are spaced from the main cage screen bars by bushing 72 which also has a through passage, they provide for continuous drainage of liquid as the liquid-containing material is continuously passed under pressure from main cage 12 to extension cage 13. Bracket 73 includes a plurality of axially spaced ribs 80 having internal coolant circulation channels to which coolant is introduced through the nipple and T 81. Spaces 80*a* between the ribs 80 provide drainage channels for liquid expressed from between bars 71 to flow into liquid collecting trough 20 and be carried by feed screw 82 therein to a suitable press liquid outlet.

The split extension cage section surrounding collars 31, 42, and 32 is constructed from two interfitting substantially semicylindrical cage members 90 and 91, the outside and inside elevations of one of which are shown in FIGS. 10 and 11 respectively, it being understood that the other cooperating member cage 91 is substantially the mirror image of the cage member 90 illustrated. Each of the members 90 and 91 comprises a plurality of drainage cage screen bars 92 mounted around the inside of the cage member and held in place by bolted face plates 93 and keystone members 94 mounted on bosses 95 by means of bolts 96. Two of the face plates 93 carry radially inward extensions or breaker bars 97 interfitting between the paths of travel of the worm flights 43 for preventing the material in the press from merely rotating with the impeller instead of being axially forced through the press, as with the corresponding plate and breaker bar members 46 and 49 in main cage 12. Around the outside of members 90 and 91 are axially spaced ribs 100, similar to ribs 22 in main section 12, provided with coolant circulation channels. Spaces between the ribs 100 provide drainage channels for liquid expressed outwardly from between screen bars **92** to run into the liquid collecting trough **20**.

Each of the cage members **90** and **91** carries at the top thereof a plurality of spaced lugs **101** and **102** adapted to interfit and cooperate with each other in the manner of a hinge, the lugs **101** and **102** being axially bored to receive a pin **105** therethrough. As indicated particularly in FIG. 3, pin **105** is also received in split cage bracket **63** for suspending the two members **90** and **91** pivotally from bracket **63** in face-to-face relation meeting along a longitudinal vertical diametric plane. According to this construction, the two halves **90** and **91** of the split cage section may be opened by pivoting about pin **105** for cleaning or other necessary access to the screw collars in the extension sections **13** and/or the screen bars **71** or **92** without disassembling the entire press construction.

In operative position, however, the two halves **90** and **91** of the split cage section are held together in face-to-face relation against expressing pressure by a plurality of bolts **110** received in passages **111** adjacent the upper and lower portion of the cage members **90** and **91**, similarly to the bolts **21** in main cage **12**. Additionally, the inlet end of the cage members **90** and **91** carries an ear **115** for attachment to split cage bracket **63** by bolts **116**, while the discharge end of cage members **90** and **91** carries a similar ear **117** for attachment to the other end of split cage bracket **63** by bolts **118**.

The discharge cone assembly comprises an adjustable discharge cone **14** having a cone tip **120** for varying and restricting the size of discharge orifice **121** around the beveled portion **122** of collar **52** upon axial movement of cone **14** and cone tip **120**. Cone **14** is threadably engaged at **125** with cone bracket **126** mounted on the discharge end of split cage bracket **63** by bolts **127**. Thus, upon rotation, cone **14** and cone tip **120** will be axially moved with respect to shaft **45** by means of the threaded engagement at **125** with the stationary bracket **126**. Such rotation of cone **14** is accomplished by means of worm gear **130**, engaging the gearing **131** around the outside of cone **14**, worm gear **130** being controlled by suitable means such as handwheel **132** operating through shaft **135**. Handwheel **132** may be changed from shaft **135** to shaft **136** where it operates shaft **135** through gears **137** and **138** to obtain a different mechanical advantage for coarse and rapid adjustment of cone **14**, the fine adjustment of the cone being obtained by handwheel **132** mounted directly on shaft **135**.

The further cone **14** is advanced to the left in FIG. 3, the more constricted will be the discharge orifice **120**, and the greater the pressure exerted on material being processed, it being understood that the compressed deliquefied or solid material or cake is discharged through the discharge orifice **120** and out of the press from discharge cone **14**.

As an alternative to the manual adjustment of cone **14** by handwheel **132** and its gearing as shown in FIG. 5, an automatic motor driven gear adjustment may be provided. As indicated in FIG. 12, such an arrangement includes motor **140** with suitable gear drive **141** mounted on bracket **142**, instead of handwheel **132** and gears **137** and **138**, to drive worm gear **130** providing for rotation of cone **14**. In such automatic control, limit switches **145** and **146** are preferably provided. Switch **145** is operative to stop motor **140** when the cone **14** is run outwardly sufficiently for the edge thereof to bear against operating contact **147** of switch **145**. Similarly, switch **146** is operative to shut off motor **140** when cone **14** is run in sufficiently for the groove **148** therein to operate pivot arm **149** sufficiently to press the operating contact **150** of switch **146**. Both these limit switches are primarily safety switches to preclude the inadvertent adjustment too far out to disengage its threaded engagement at **125** or so far in that it bears frictionally against the beveled surface **122** of collar **52** to damage the machinery or jam the press.

These limit switches **145** and **146** also make it unnecessary for an operator who may be attending a plurality of expressing presses to wait at each press for the cone **14** thereof to be run all the way in or all the way out after motor **140** has been started, since the limit switches **145** and **146** will arrest the motion of the cone before the operating limits of the cone are reached. Furthermore, limit switch **146** may be provided with a shim **151** of predetermined thickness which is hinged at **152** and may be inserted between pivot arm **145** and switch contact **150** to operate switch **146** to stop motor **140** when a predetermined positioning of cone **14** is attempted. A further safety arrangement is provided by limit switch **155** which is operated to stop the main drive motor **10** and the entire press mechanism should its operating contact **157** be contacted by collar **156** on main shaft **45** as by breaking or excessive heat expansion of shaft **45**.

It will thus be seen that a construction is provided by the present invention in which extension cage sections of substantial axial extent may be readily added to existing presses. Furthermore, the first extension section, comprising screen bars **71** and collar **41**, etc., is a continuous or non-split unit having the bars **71** of substantially full radial height, as compared to the screen bars in the main cage **12**, and substantially the same dimensions as the standard bars in main cage **12**, yet extending substantially through main frame portion **17** for continuous feeding of the material being processed from main cage **12** and for continuous drainage of the expressed liquid from the material as expressing pressure is continuously applied and maintained. Also a split extension cage section is provided with screen bars **92** surrounding collars **31**, **32**, and **42** and adapted to be opened for free access to the interior of the cage, as with main cage **12**, for cleaning out the press should it be stopped under load.

Whereas the main shaft **45** of the construction heretofore described is somewhat different from the main shaft of a press having, for example, only the four sections or main cage **12** without the extension cages **13**, it may be desired to convert an existing four-section press to one embodying the extension cage construction described. The main shaft of such existing presses, however, may indeed be almost as long as the main shaft **45** heretofore described, although the threaded portion thereof for affixing the retaining nut **50** may be at a different axial position on the shaft because of the construction of the existing press not including an extension cage. A modified construction particularly adapted for the conversion of such existing presses is indicated in FIG. 13 in which the main shaft **45a** is shown in the manner of the main shafts of existing presses without extension cages and having a threaded retaining nut receiving portion **160** located axially in a position approximately corresponding to the collar **51** in FIG. 3. A satisfactory adapter unit construction for converting such a press is, as indicated in FIG. 13, to provide a one-piece sleeve the outer surface of which is configured to correspond to the combination of collars **51**, **31**, **42**, **32**, and **52** as well as nut **50** with its neck portion **53** as an integral unit instead of having the various collars separate. By providing threads on the integral bore of such a unit as indicated at FIG. 13, the entire unit can be threaded onto the existing shaft **45a** at its existing threaded connection **160** rather than supplying an entirely new shaft **45** to receive the various collars separately and with new or additional threads to receive retaining nut **50**.

Both the nonsplit and the split extension cage sections are provided with means for circulating coolant therethrough for temperature control of the material being processed to prevent damage to the quality of the products from excessive heating resulting from high pressures and friction. Satisfactory results have been obtained by using, as such coolant circulating means, generally the same arrangement as for the main cage section and/or as indicated in the aforementioned patent to Upton, 2,320,765. It has also been noted that a given material in a given size press is subjected to greater expressing pressures if the temperature of the material is maintained at a relatively low level, apparently because as the temperature of the material increases, the material more readily (i.e., with less friction) passes through the press with less oil being expressed. Since friction appears to be a greater temperature increasing factor than pressure alone, the temperature of the material can be quite accurately controlled and maintained below a maximum temperature at which the particular material being processed would become detrimentally affected.

It should also be noted that the diameter of the various pressure collars **26—32**, etc., are correlated with the substantially uniform and constant inside diameter of the main cage **12** and extension cage section **13** to provide an initial low pressure expressing stage where material being processed is subjected in large volume to a relatively low pressure for expressing quickly the usual initial gush of easily expressed fluid. As the material loses the bulk of its liquid and becomes more firmly compacted and of lesser volume, it is passed continuously from the low pressure stage to a high pressure stage where it is subjected to greater pressures to recover the remaining recoverable oil.

Generally the low pressure stage of the press may be considered as extending axially through the zone in which the fluid content of the material being processed is reduced to approximately 8% to 12%. Being relatively free, the bulk of recoverable liquid is expressed in a zone of the press in which the cross sectional area available for the material to pass between the impeller and the drainage cage is approximately twice or more the cross sectional area available for the material to pass through the high pressure stage of the rest of the axial extent of the press. In FIG. 2, for example, the axial extent of the low pressure stage has been indicated at L, a short transition stage from low to high pressure at T, with the remainder of the press being the high pressure stage H. It will also be noted that the cross sectional area at the end of the transition zone is no more than approximately ½ the cross sectional area of the low pressure stage.

In a four-section press for cottonseed oil, for example (i.e., a press having the main cage **12** and only the feed and pressure collars appearing to the left of end frame **17** in FIG. 2), the ratio between the axial extents of the high and low pressure stages has heretofore been approximately 1:1 to maintain a satisfactory throughput of material of satisfactory quality. In the construction shown in FIG. 2, by contrast, the axial extent of the high pressure stage is more than double that of the low pressure stage. Thus, according to the invention, satisfactory results are obtained by coordinating, depending upon the particular material to be processed, the ratio between low and high pressure stages such that the axial extent of the high pressure stage is substantially more than 1¼ times that of the low pressure stage, and preferably from 1½ to 2½ times or more. Furthermore, all of the drainage cage sections are provided with means for cooling or otherwise controlling the temperature of the material being processed through the press to maintain the temperature of the expressed liquid at no more than a predetermined value below which a satisfactory product is obtained notwithstanding the substantially greater extent and time in which the material is subjected to high pressure action.

As noted, the specific ratios, as well as the correlation of feed and pressure worm diameter with drainage cage diameter will depend in large measure on the particular material being processed to provide a low pressure stage for reducing the retained liquid content of the material being processed to approximately 8% to 12% by weight through a cross sectional area at least twice that of a following high pressure stage, and these various ratios and dimensions obtain whether a new press is constructed having all the expressing sections within the main frame or whether an existing press is converted by the addition of one or more extension cage sections.

The construction shown is particularly adapted to such materials as cottonseed meats or flaxseed, the oil content of which materials is roughly 35%. With such materials, for example, approximately 70% to 85% of the recoverable oil is expressed in the low pressure stage. With materials higher in oil content, such as copra, for example, a longer low pressure stage is indicated to reduce the oil content of the material entering the high pressure stage to 8% to 12%. Nevertheless, in applying the invention to a press particularly adapted to such higher oil-bearing materials, the axial extent of the high pressure stage is substantially increased. For example, whereas such material has been heretofore processed through presses in which the low pressure stage may be as much as 1½ times the length of the high pressure stage, this ratio is altered according to the invention to make the axial extent of the high pressure stage for such materials at least as great or greater than the low pressure stage.

While the forms of apparatus herein described constitute preferred embodiments of the invention, it is to be understood that the invention is not limited to these precise forms of apparatus, and that changes may be made therein without departing from the scope of the invention which is defined in the appended claims.

What is claimed is:

1. In a liquid expressing press of the character described having a main section including main drainage cage screen bars and a main end frame, the combination which comprises an extension expressing cage, means for mounting said extension cage coaxially with said main cage and beyond said end frame, a plurality of drainage screen bars in said extension cage of substantially the same radial height as said main drainage cage screen bars, and means on said main end frame for mounting said extension cage screen with said bars extending through said main end frame providing a continuous expressing pressure and drainage passage through said main section and said extension cage.

2. An extension cage construction for an expressing press of the character described having a main expressing section and a main end frame of substantial thickness, which comprises in combination a first extension cage section, a plurality of screen bars in said first extension section, means for mounting said first section screen bars in operative expressing position in axial continuation of said main expressing section, means for maintaining an expressing pressure on material passing from said main expressing section into said first extension cage section, a second extension cage section circumferentially divided into a plurality of parts, a plurality of screen bars in said second section, means for mounting a portion of said second section screen bars in each said cage part, means interconnecting said cage parts for movement from a closed position to an open position providing access to the interior thereof, locking means for maintaining said cage parts in said closed position against the action of the expressing pressure, and means for mounting said second extension section on said press in cooperative coaxial position with said first extension section providing a continuous drainage cage extension.

3. In an expressing press of the character described having a main expressing section and a main end frame of substantal thickness, the combination which comprises a first extension cage section, a plurality of screen bars in said first extension section, means for mounting said first section screen bars in coaxial continuation of said main section and extending through said main end frame for maintaining an expressing pressure on material passing from said main expressing section into said first extension cage section, a second extension cage section, a

plurality of screen bars in said second section, a pair of substantially semicylindrical bracket members for said second section screen bars, means for mounting part of said second section screen bars in each said semicylindrical bracket member, hinge means interconnecting said pair of bracket members for pivotal movement from a closed position in face-to-face interfitting arrangement to an open position, locking means for maintaining said bracket members in said closed face-to-face position against the action of the expressing pressure, means for mounting said second extension section on said main end frame in cooperative coaxial continuation of said first extension section providing a continuous drainage cage extension, and means for cooling said extension sections.

4. An adapter unit for extending the length of the impeller of a fluid expressing press of the character described having a main shaft shorter than said extended impeller length and carrying a plurality of impeller collars extending along a portion of the length thereof and affixed by locking means spaced from the free end of said shaft, said unit comprising a sleeve for interfitting engagement over said free end of said shaft, the outer surface of said sleeve being configured to conform to the outer surfaces of a series of impeller collars, and means on said sleeve for locking engagement with said locking means on said main shaft for affixing said sleeve and said impeller collars on said shaft against axial displacement, said sleeve extending a substantial distance along said shaft toward said free end thereof and beyond said locking means.

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