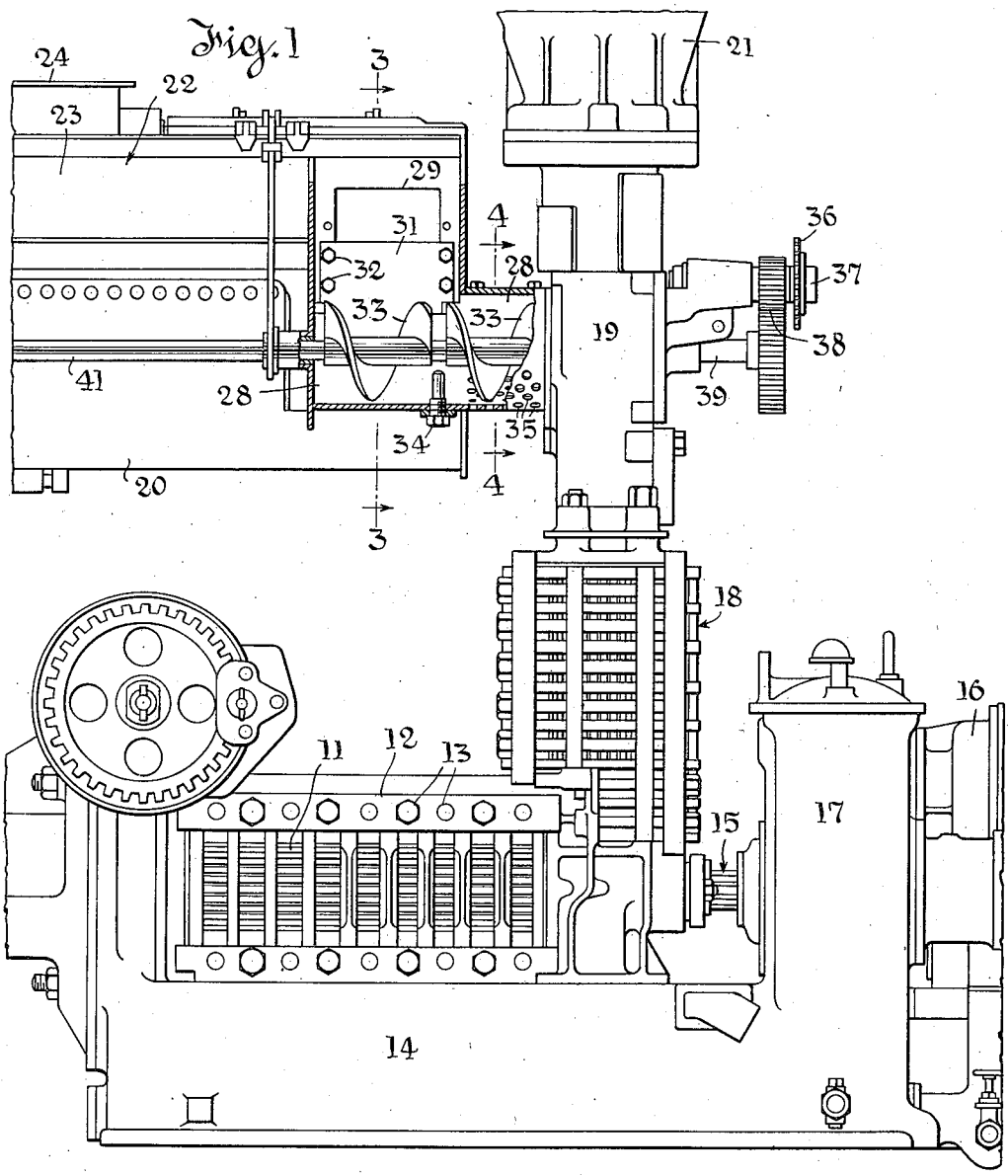
March 3, 1942. R. T. ANDERSON 2,275,337

EXPRESSING OF OLEAGINOUS MATERIAL

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Fig. 1

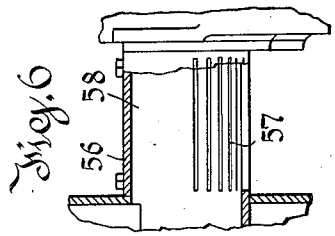


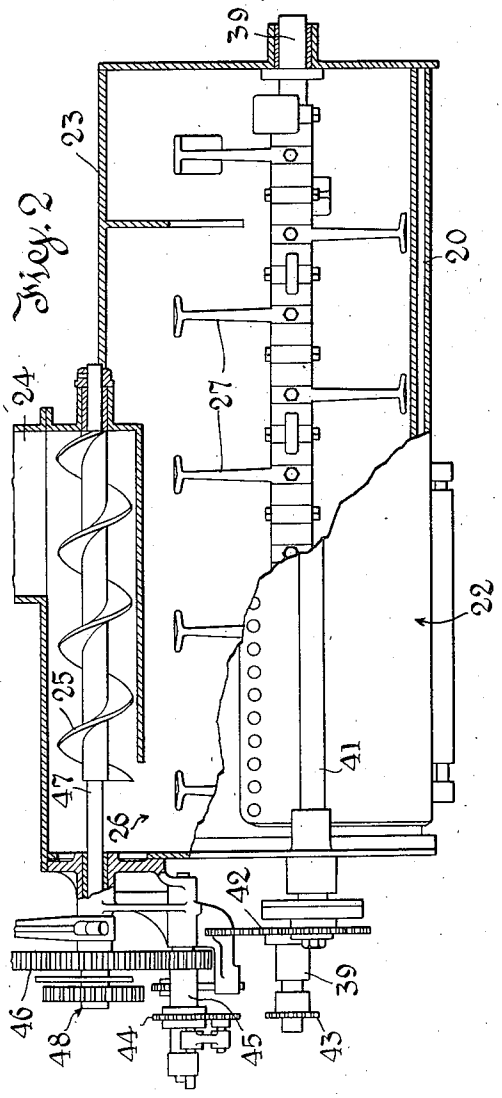
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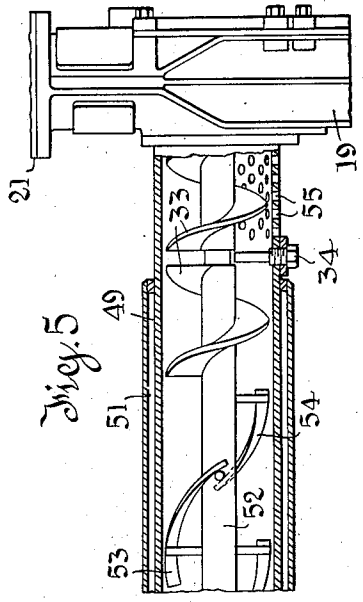
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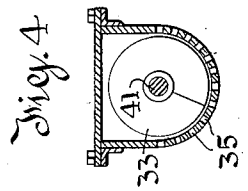
EXPRESSING OF OLEAGINOUS MATERIAL

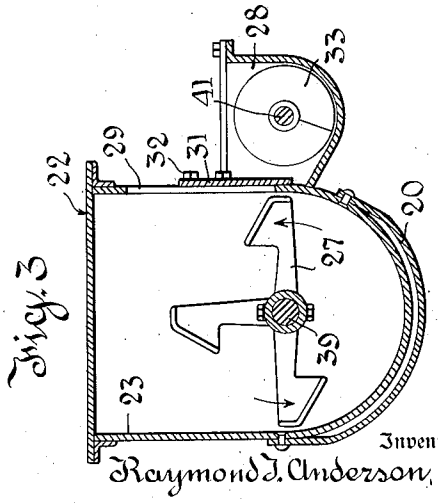
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UNITED STATES PATENT OFFICE

2,275,337

EXPRESSING OF OLEAGINOUS MATERIAL

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Application August 14, 1939, Serial No. 290,000

2 Claims. (Cl. 100—48)

This invention relates to the expressing of oleaginous material. More particularly, it relates to a novel conditioning apparatus and press combination whereby the capacity of the press may be increased substantially over that of prior art structures.

As indicated in Anderson Patent No. 1,971,632, the capacity of a press of the continuous screw type having interrupted screw flights and cooperating with a drainage barrel structure, can be increased enormously by modifying the feed chute of the press so that its structure corresponds more or less closely to that of the main press barrel. In presses of this general type, it is essential for efficient expressing of liquid from oil-bearing materials that the material under treatment be of a particular moisture content for most efficient expressing. In the treatment of material such as cotton seed, for example, it has been found that the production of oil is greatest when the moisture content of the feed entering the press is approximately 1% to 4% by weight, depending on the material being treated. This means that material being fed to the press must have its moisture content modified in accordance with atmospheric or seasonal conditions, necessitating at times the addition of moisture and at other times the reduction of moisture before the material enters the press.

The usual practice has been to feed the material, be it of animal or vegetable origin, through a conditioner in which its moisture content is adjusted, usually by a drying and agitating action which tends to bring about uniform condition of the material throughout, so that its character is substantially unvarying as it enters the feed chute of the press. In operating devices of this character, and particularly with presses of the type shown in the patent referred to above, the efficiency of the expressing is improved if the material is relatively compact when it enters the feed chute. If this compacting action is carried out by a press structure, and especially a continuous screw press with drainage, it results in the expressing of a minor portion of the oil from the oil-bearing material, and this not only increases the efficiency of the expressing performed in the vertical and horizontal barrels which follow, but compacts the material in such a way that the over-all capacity of the press combination may be increased to a remarkable degree.

One object of the present invention is, therefore, to provide mechanism associated with the conditioner for compacting material as it enters the feed chute of the press and to express a portion of the liquid contained in it before it enters the press.

Another object of the invention is to increase the capacity of known types of press by a modification of the existing structures associated with the press proper, but without requiring any change in the actual press arrangement.

Other objects and advantages will appear from the following description when read in connection with the accompanying drawings, in which—

Figure 1 is a side view, partially in section, of one structural combination of a conditioner and press embodying the present invention with a portion only of the conditioner shown;

Fig. 2 is a partial vertical section of a portion of the conditioner showing the method of feeding material in and through it and forwardly to the compacting mechanism associated with the feed chute of the press, the compacting mechanism being disposed laterally of the conditioner;

Fig. 3 is a sectional view on line 3—3 of Fig. 1;

Fig. 4 is a sectional view on line 4—4 of Fig. 1;

Fig. 5 is a fragmentary view of a modification in which the conditioner and the compacting apparatus leading to the feed chute of the press are in axial alignment; and

Fig. 6 is a fragmentary view of a modified structure of a portion of the compacting apparatus.

Referring to the drawings, the press corresponds in principle to that shown in Patent No. 1,971,632 referred to above, and preferably comprises a horizontal barrel structure 11 made up of spaced barrel bars held together by longitudinal clamping bars 12 and cross bolts 13 in the usual manner, this barrel containing a continuous screw made up of interrupted flights and cooperating knife bars for expressing oleaginous materials, whereby the liquid flows out through the openings between the barrel bars into a reservoir contained in the base 14 of the machine, while the expressed cake is discharged from the left hand end of the barrel through the usual choke mechanism (not illustrated). The shaft carrying the worms is designated 15 in the drawings, and is driven from a motor 16 through change speed gearing housed in a gear box 17, details of which are unimportant for purposes of the present invention. A vertical barrel structure designated generally by reference character 18 includes a plurality of separated worm flights of a character similar to those in the horizontal barrel, and cooperating with vertical barrel bars to perform expressing of material fed downwardly through the feed chute 19 by the usual feed-

ing spiral worm located therein as shown, for example, in the patent above mentioned. It will be understood that in practice the feeding spiral or worm in the vertical chute 19, as well as the expressing screw, may be actuated from a separate motor contained in or attached to the gear housing 21, or through a suitable drive connection to the common motor 16. Preferably feed regulating means is interposed to cause the mechanism in the feed chute to feed material at a variable rate depending upon its condition, so that both the vertical barrel 18 and the horizontal barrel 11 are caused to operate at approximately maximum capacity and efficiency at all times.

Associated with the feed chute is a conditioner 22 comprising (see Fig. 2) an outer casing 23 preferably having a heating jacket 20 to which heating or cooling medium may be supplied to obtain desired moisture and temperature conditions in the material which is delivered to the feed chute 19. As shown in Fig. 2, the material to be treated enters a hopper 24 where it is fed by a worm conveyor 25 from right to left until it drops into the conditioner chamber through the inlet 26. It is pushed forwardly from left to right through the conditioner and continuously agitated and stirred by agitating blades 27 which may take various forms, only one of which is shown in Fig. 2.

The use in this conditioner of any agitating and conveying means equivalent to that shown is contemplated so long as it functions to agitate and mix the material thoroughly while heating it, so that it is of substantially uniform moisture content throughout when it is delivered to the feed chute of the press. The conditioner casing 23 carries an offset lateral chamber 28, as best shown in Fig. 3, and this chamber 28 is attached to, and in communication with, the interior of feed chute 19 as indicated in Fig. 1. The casing 28 preferably has a removable cover, as shown, to permit access to the interior of the casing. The wall of casing 23 on the side adjacent the offset chamber 28 contains an opening 29, the size of which may be varied by varying the position of baffle plate 31 which is secured to the casing by bolts 32. It will be seen that by raising this plate the size of the discharge opening 29 may be reduced, and similarly by lowering the plate the opening may be enlarged.

As material is fed forwardly from left to right in the conditioner, it is stirred up by the stirrers or blades 27 and finally reaches the blades in the portion of the chamber opposite the offset casing 28 and opening 29. At this point, the blades 27, which are rotating in a counter-clockwise direction as indicated in Fig. 3, lift the material upwardly and discharge it through opening 29 over baffle plate 31 into the casing 28, where it engages a feed screw and is fed forwardly and compressed and a portion of the oil expressed before delivery into the feed chute 19. For this purpose, the feed screw is made up of a plurality of separate worm flights 33 with a cooperating stop screw 34 which prevents rotation of the material and assists in its compacting in the usual manner of continuous screw presses. The casing 28 is perforated as at 35 (see Figs. 1 and 4), and the liquid material expressed by the worm flights 33 is discharged at this point through the perforations, and may flow over the vertical and horizontal barrels until it mingles with the oil expressed from those barrels into the liquid reservoir in the bottom of the press. Although but two worm flights 33 have been illustrated, it is to be understood that any greater number may be employed if desired. Hence this description should be understood to be illustrative and not limiting.

The expressing action performed in the casing 23 at the outlet of the conditioner insures that the material delivered to the feed chute is always well compacted and free of voids and soft spots which might cause temporary interruption of the flow of material to the vertical barrel through the feed chute 19. This results not only in an efficient operation of the two press barrels, but the capacity of the machine is increased due to the fact that the initial expressing, which is always easier to perform, is carried out in the conditioner, thus making it possible for the press to operate at all times on thoroughly compacted material from which the readily expressible oil has already been removed.

As indicated above, the motor 16 drives the expressing mechanism in the horizontal barrel of the press and may, if desired, drive the expressing mechanism of the vertical barrel also. In any event, it is usually found preferable to provide means for actuating drive sprocket 36 on shaft 37 from the motor 16. Shaft 37 is geared at 38 to the shaft 39 which, as shown in Figs. 1 and 2, extends throughout the conditioner and carries the agitator arms 27. Shaft 39 at the left hand end of the conditioner (see Fig. 2) carries a sprocket 42 which drives shaft 41 by suitable means such as a chain and sprocket connection. Shaft 41 extends throughout the length of the conditioner, and carries worm flights 33 at its right hand end adjacent to the feed chute 19, as indicated in Fig. 1.

Shaft 39 carries a driving sprocket 43 connected as by a suitable drive chain (not shown) to a similar sprocket 44 on a jack shaft 45 which actuates the shaft 47 of feed worm 25 through gearing 46. Conventional variable feed mechanism indicated generally by reference character 48, may be interposed in the drive between jack shaft 45 and the shaft 47 to vary the rate of feeding by the worm 25. Since the details are not important, further description of the driving mechanism is believed to be unnecessary, except to state that as the shaft 39 rotates to work the agitator arms 27 and stir the material fed to the conditioner by the feed screw 25, the shaft 41 also rotates and compacts and expresses the material fed to the casing 28 by the agitator arms or blades associated with opening 29.

In the form of the invention so far described, the casing 28 containing the screw flights for performing preliminary extraction of the material under treatment is separate from and disposed laterally of, the conditioner casing, but this structure is not essential and under certain conditions the arrangement may be that indicated in Fig. 5.

Referring now to Fig. 5, reference character 49 designates a cylindrical casing forming a treatment chamber or conditioner and having a heating or cooling jacket 51. Rotatably mounted within the chamber formed by casing 49 is a shaft 52 of an agitator conveyor which, in the form here shown, comprises agitator conveyor blades of two types, the blades 53 for conveying material from left to right being of one length and the blades 54 for conveying material from right to left being shorter, so as to give the material back and forth movement with a resultant movement from left to right caused by the

greater length of the blades **53**. The right end of the shaft **52** adjacent the feed chute **19** carries spaced screw flights **33**, as well as the blades **53** and **54**. Stop screw **34** cooperates with the flights in the usual manner to prevent rotation of the material so that the compressing action results in partial expressing of the liquid from material passing through the casing. The right hand end of the casing associated with the screw flights **33** is extended beyond the jacket **51** and is perforated at the bottom as at **55** to discharge expressed liquid from the casing, and then deliver the compacted, partially expressed material to the feed chute **19**. The general operation of the mechanism illustrated in Fig. 5 corresponds to that already described and differs only in that a different type of agitator performing its own conveying function is utilized, and the main casing of the conditioner is extended to form the barrel of the expressing portion of the conditioner, so that both the agitator and the screw flights are on the same shaft and in axial alignment.

In Figs. 1, 4 and 5, it has been indicated that the openings in the expressing portion of the conditioner may be circular in cross section, but it is to be understood that this is not essential. For example, as shown in Fig. 6, the casing **58** with its cover **56** may contain elongated slots **57** for the discharge of expressed liquid. The slotted sheet metal casing **58** and the perforated sheet metal casing **28** function similarly, and both perform functions substantially similar to those of the more elaborate structure of the press barrels shown at **11** and **18**.

As indicated above, the present improvement insures a complete compacting of the material fed to the press proper with a complete absence of voids or soft spots which might interfere with efficient expressing subsequently performed. By the arrangement described, the horizontal and vertical barrels always operate on well compacted material and the easily expressible liquids are removed before the material enters the feed chute of the press. In this way, the efficiency and over-all capacity of the press are increased enormously, and the uniformity of the material in the press so improved that where the material under treatment is of uniform character it may even be possible to operate the expressing means of both the horizontal and vertical barrels directly from the main motor **16** without requiring frequent choke adjustment at the outlet of the horizontal barrel, or without the use of any variable feed mechanism associated with the feed chute of the press.

Although only a few forms of the invention have been described, it will be obvious that changes and modifications may be made in the structural details within the scope of the appended claims without departing from the spirit and scope of the invention.

What is claimed is:

1. The combination with a press of the continuous screw type for expressing liquid from oleaginous materials, of a conditioner for preparing material for treatment in said press, the outlet of the conditioner being connected to the inlet of the press, said conditioner including a main casing containing rotary agitating means arranged to discharge conditioned material laterally from the discharge end of the conditioner adjacent said press inlet; a lateral casing having drainage openings and disposed adjacent the outlet end of said conditioner to receive material discharged from said main casing by said rotary agitator; and a continuous expressing means comprising discontinuous worm flights with interposed stationary stop means in said lateral casing for compacting material delivered thereto and removing a portion of its liquid content before discharging it into said press.

2. The combination with a press of the continuous screw type for expressing liquid from oleaginous materials, of a conditioner for preparing material for treatment in said press, the outlet of the conditioner being connected to the inlet of the press, said conditioner including a main casing containing rotary agitating means arranged to discharge conditioned material laterally from the discharge end of the conditioner adjacent said press inlet; a lateral casing having drainage openings and disposed adjacent the outlet end of said conditioner to receive material discharged from said main casing by said rotary agitator; adjustable door means between said main casing and said lateral casing for controlling the rate of flow of material therebetween; and expressing means including a plurality of separated worm flights and cooperating stop means in said lateral casing for removing a portion of the liquid from the material delivered to it from the main casing before the material is discharged into the press.

RAYMOND T. ANDERSON.