

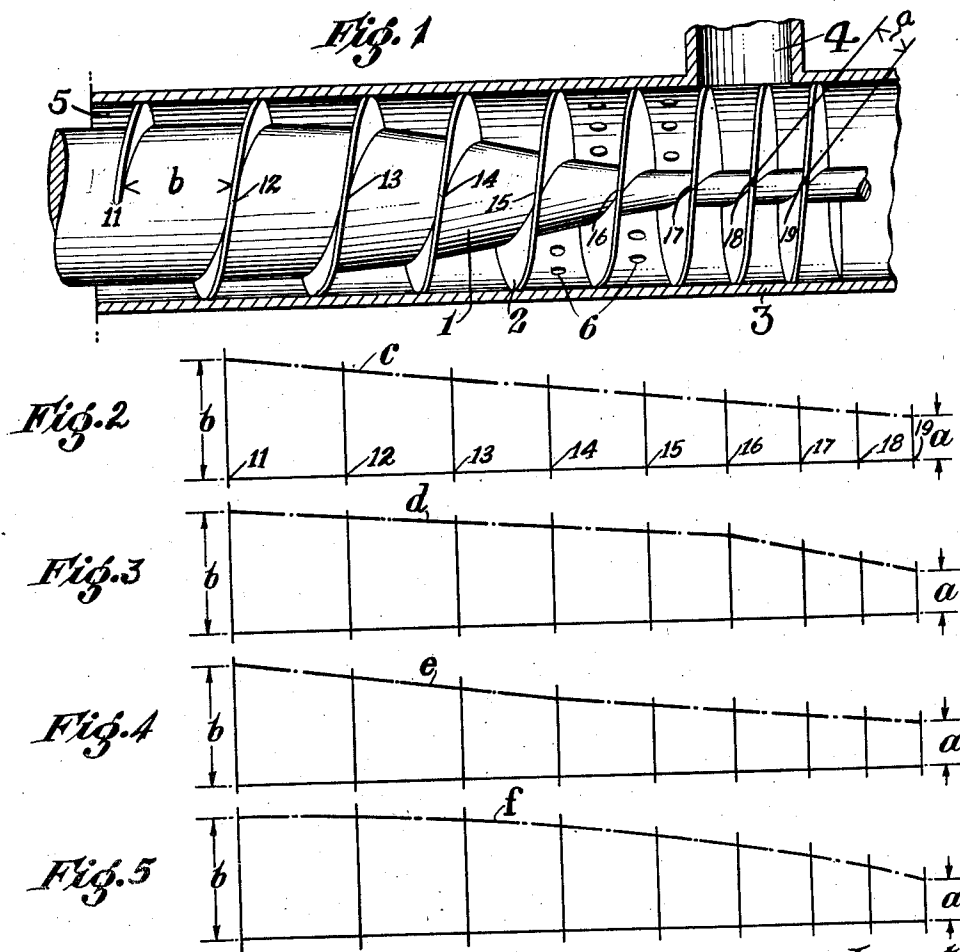
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SCREW PRESS

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SCREW PRESS

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1 Claim. (Cl. 100—48)

My invention relates to screw presses, adapted to press moisture and liquid out of animal and vegetable raw material, and the object of the invention is to insure the proper passage of the material to be pressed through the screw press without the use of auxiliary mechanical means in the press chamber to secure the said passage through the same. In screw presses for pressing animal and vegetable materials it is of great importance, in order to obtain a good result, to insure that the material to be pressed shall be prevented from stopping up or even moving backwards in the press or sticking to the press screw and rotating with this within the pressing chamber.

It has previously been proposed to arrange mechanical means in order to insure the proper passage of the material to be pressed through the pressing chamber. As examples of such means may be mentioned star or stop wheels, chains and the like; but all such arrangements will complicate the construction of the press and will introduce the danger of failure due to wear or breakage, which in turn may be due to the normal wear of the mechanism or due to accidental introduction of foreign matter, such as for instance stones, pieces of iron or the like.

During the process of pressing, the material to be pressed will have its content of moisture reduced, whereby its tendency to stick to the screw and to rotate with same instead of moving forwards in the press chamber will increase. A stoppage thus resulting will cause the fresh material which is fed into the press at the feeding end to have no chance of moving forwards, whereby a grinding of the material instead of a pressing will take place, which will in turn reduce the possibility of pressing the moisture out of the material, and if the material to be pressed is a previously autolyzed material, the pressing of the moisture out of same may even be absolutely prevented.

In order to prevent the drawbacks above mentioned, the present invention consists in a screw press comprising a housing with a substantially circular cross section, an opening to feed material into and another opening to discharge the material from the said housing, a screw arranged within the said housing and means to rotate said screw relatively to the housing, the pitch of the said screw increasing in the direction extending from the said feed opening to the said discharge opening.

According to the invention, the increase in the pitch of the said screw may be arranged evenly

from one thread to the other, or it may be in some instances arranged with a larger increase between the individual threads of the screw close to the feed opening of the said housing and a smaller increase close to the discharge opening, and finally the use of the screw according to this invention with an uneven pitch between the individual threads of the screw may be combined with the use of a screw shaft, the diameter of which increases from the feed end to the discharge end of the housing.

The proper feeding movement of the material to be pressed in relation to the press screw will be facilitated with a screw according to this invention, due to the fact that the space between the individual threads of the screw will form gutters which in the direction of the movement of the material will increase in width. The movement of the material in the opposite direction will thus be prevented due to the fact that the width of the gutter formed between each two threads will diminish toward the intake end.

While the material to be pressed moves through the press, the material will due to the change in distance between the individual threads be progressively deformed, due to the fact that from having a thick and narrow shape it will be forced to change itself to a thinner and broader shape. This deforming of the material while under pressure does to a great extent facilitate the extraction of moisture due to the pressure.

The rather considerable force which is necessary to deform the material to be pressed while between the threads of the screw does only react outwards against the housing, so as to a great extent increase the friction between the material and the same, but at the same time it reduces the friction between the material and the screw, whereby the possibility of the rotation of the material with the screw is practically avoided.

The above construction of the press screw may be used as well for presses with one as for presses with two or more screws.

In order that my invention may be readily understood, it will in the following be described with reference to the drawing which in a diagrammatical way illustrates my invention.

Fig. 1 illustrates the press screw arranged according to my invention.

Figs. 2, 3, 4 and 5 illustrate diagrammatically press screws having shafts with various forms of root surfaces and involving varying rates of changes of the screw pitch which under different

circumstances may be used in connection with my press screw.

In Fig. 1, 1 denotes the shaft of the press screw and 2 the blades or the thread of same. 3 is the housing which to a greater or smaller extent is perforated as at 6 in order to allow the moisture to escape from the material which is being pressed. 4 denotes the feed opening and 5 the discharge opening.

As will be seen from this figure, the distance between the individual threads of the screw or the pitch of this increases from the feed opening 4 to the discharge opening 5. In the construction shown, the diameter of the shaft 1 of the screw increases also from the feed end to the discharge end. The increase in the pitch but inversely of the depth of the screw may be a straight line increase, as is diagrammatically shown in Fig. 2, where "a" indicates the pitch at the feed end and "b" the pitch at the discharge end; the line "c" indicates the rate of change or increase in the pitch along the length of the screw. Numerals 11 to 19 indicate the respective points in Fig. 1 where the dimensions and pitches shown in Figs. 2 to 5 have been measured.

In the corresponding diagram of Fig. 3, the increase in the pitch is higher at the feed end than at the discharge end, while "d" represents the change in the pitch. In Fig. 4 the increase as indicated at "e" is less at the feed end and greater towards the discharge end.

The diagram in Fig. 5 indicates that the rate of change or increase in pitch indicated at "f" may at the beginning be greater from the feed end onward and thereafter reduce until finally it will take on a straight line relation and increase evenly towards the discharge end. It is to be noted that the shaft has a variable taper from the large end at the discharge opening of the press toward the feed opening, and that the shaft diameter at the latter opening is approxi-

mately uniform, the taper cooperating with the pitch to increase the effect of the variation of the latter and causing the pressure upon the material to be pressed to increase in a variable degree which has been found to render operation very efficient. As has already been mentioned the increase in the pitch of the screw may involve not only the individual spaces between each pair of adjacent turns of the screw but also the depth and the pitch may vary, including both changes in the spacing of the screw turns as well as in the taper of the shaft between said turns. The sum total in the change of the pitch may be progressive in one type of feed screw represented by a straight line as in Fig. 2, but herein it is preferred to vary the rate of change so that the line c of Fig. 2 becomes the convexed line d in Fig. 3, concaved line e in Fig. 4 and another form of convexed line f in Fig. 5, the diagram in Fig. 2 being given more on the nature of a background against which the other diagrams can be contrasted.

I claim:

A screw press comprising an interiorly cylindrical perforate housing of uniform cross section throughout and having an inlet or feed opening through which material may be fed into the housing and an outlet or discharge opening from which the material may be discharged from said housing, a solid imperforate shaft rotatable within the housing and tapering in varying manner from a large end at the discharge opening of the press to a small end at the feed opening, and a continuous integral screw upon said shaft fitting within said cylindrical housing and having a pitch which increases in variable manner in the direction extending from said feed opening toward said discharge opening, the diameter of the shaft remaining approximately uniform at least along the portion thereof which is opposite said feed opening.

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