

Dec. 25, 1928.

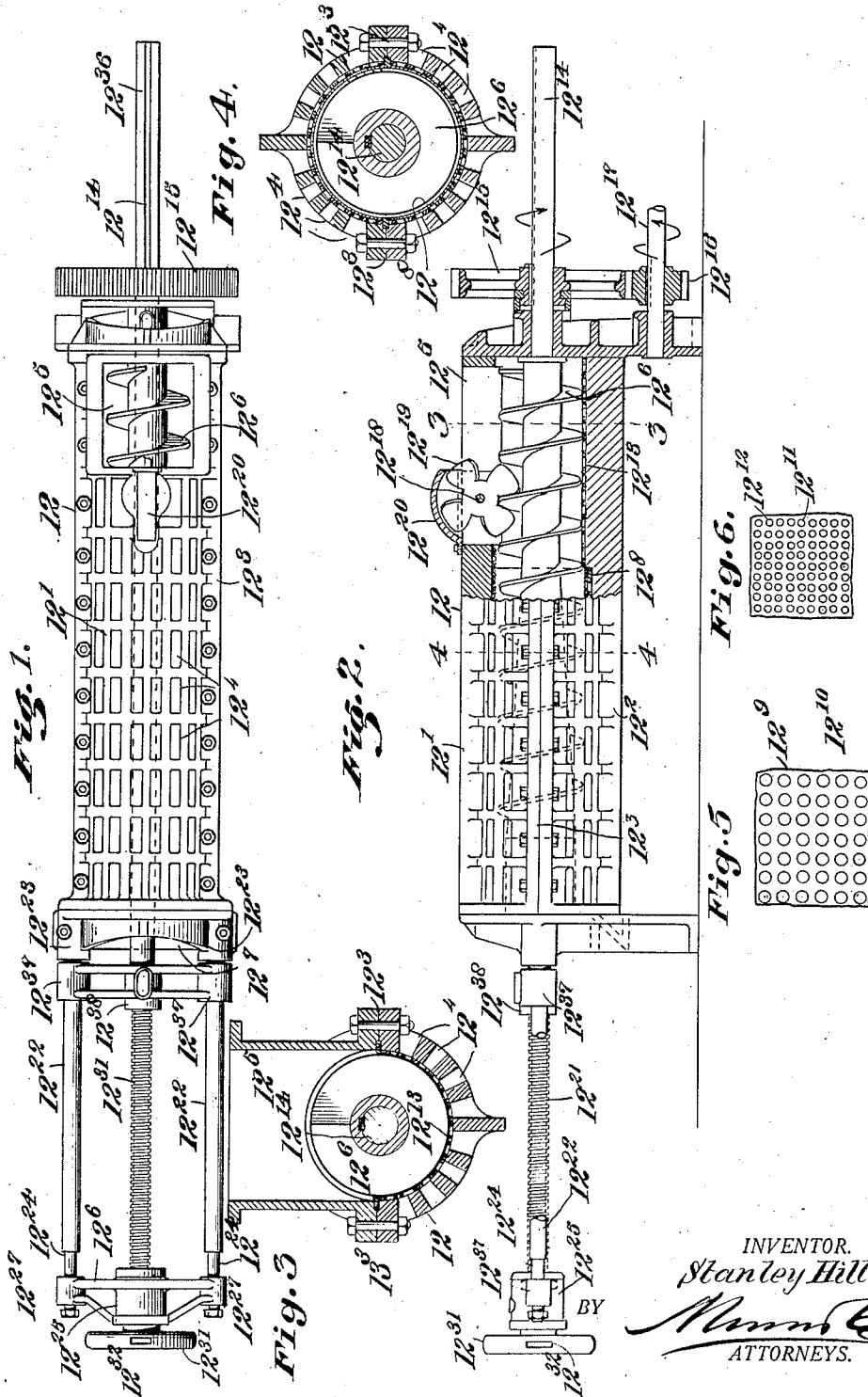
S. HILLER

1,696,401

CONTINUOUS SCREW PRESS

Filed Nov. 14, 1922

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 7.

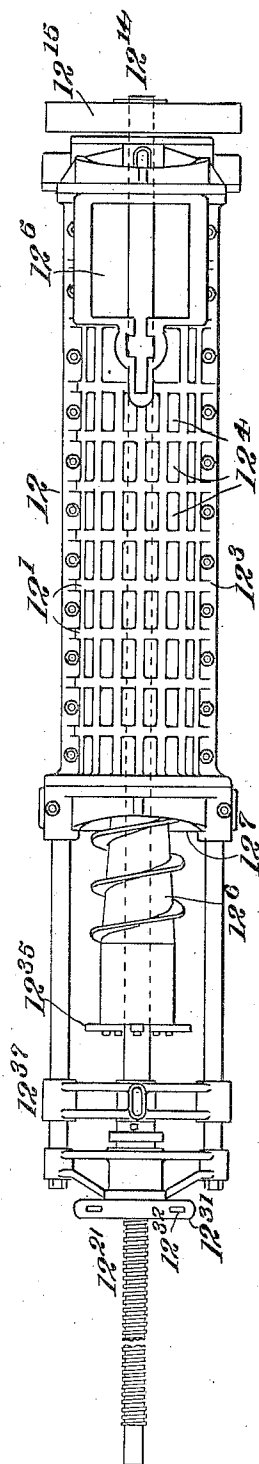


Fig. 10.

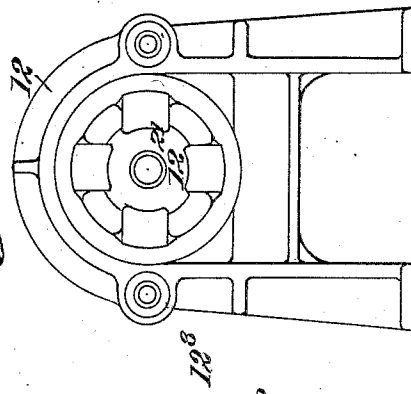


Fig. 9.

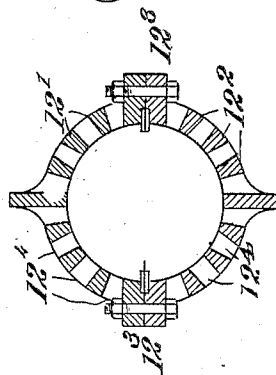
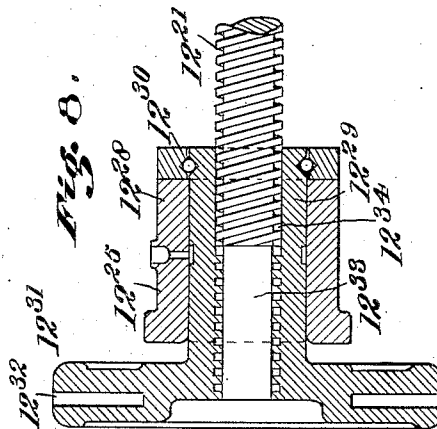


Fig. 8.



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# UNITED STATES PATENT OFFICE.

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## CONTINUOUS-SCREW PRESS.

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My invention relates to improvements in continuous screw presses.

More particularly the invention relates to improvements in relatively low pressure continuous screw presses which may be utilized for expressing moisture from wet rendered fish, packing house offal, tankage, coagulated blood and similar uses where pressures ranging under one thousand pounds per square inch on the material are ample.

The objects of the invention are to provide novel and relatively cheap screen, press body, and screw structures which permit ready replacement of the screens when worn out, permit easy cleaning of the press, and provide efficient expressing arrangements.

Other objects of the invention are such as may be attained by a utilization of the novel combinations and subcombinations herein-after particularly set forth, and as defined in the terms of the appended claims:

Referring to the drawings—

Fig. 1 is a top plan view of the press.

Fig. 2 is a view in side elevation and partly in section of the press.

Fig. 3 is a cross section on the line 3—3 of Fig. 2.

Fig. 4 is a cross section on the line 4—4 of Fig. 2.

Fig. 5 is a detail view of one of the screens on the press.

Fig. 6 is a detailed view of another one of the screens for the press.

Fig. 7 is a plan view of the press showing the conveyor screw partly withdrawn.

Fig. 8 is a detailed view in longitudinal section of the screw bearing head assembly.

Fig. 9 is a cross section through the press.

Fig. 10 is a view in elevation of the driven end of the press.

The press (12) as shown in detail in Figures 1 to 10 inclusive, comprises a shell horizontally divided in two sections (12<sup>1</sup>) and (12<sup>2</sup>) bolted or otherwise connected together by the flanges (12<sup>3</sup>), so as to make a cylindrical shell like structure. Both sections are made with a multiplicity of openings (12<sup>4</sup>). The material is introduced into one end of the press through the opening (12<sup>5</sup>) and conveyed through the press (12<sup>6</sup>). As the material is conveyed through this opening by the screw all the liquid is expressed from the same. When fish is being handled of course it is the oil that is being expressed, leaving the residue to be discharged from the discharge

end (12<sup>7</sup>). The residue, owing to the pressing effect of the screw, is practically forced through the discharge end. The internal opening in the press is lined with perforated screen like sheetings (see Figures 5 and 6). The screens while holding back the material, that is to say, the material does not go through the perforations in the screen, permits the oil to pass so that it may escape through the openings (12<sup>4</sup>) into suitable collection receptacles which are supported under the press. These receptacles may be pans with pipe communications leading into drums so that the oil may circulate from the pans through the pipes and stored in the drums. The pressing effects realized by the screw increases from the intake end of the press to the discharge end. In other words, the pressing effect gradually increases as the material is forced towards the discharge end. Consequently, special provisions must be made to prevent material from being forced through the screens where the pressing effect is severe. This is accomplished by using a double thickness of screens commencing as at (12<sup>8</sup>). The perforations of each layer of the screens vary in diameter as shown in Figures 5 and 6. For instance, the screen sheeting (12<sup>9</sup>) which will be the under layer will have perforations (12<sup>10</sup>) larger than the perforations (12<sup>11</sup>) in the sheeting (12<sup>12</sup>). Only a single thickness (12<sup>13</sup>) of the screen need be used around the intake end. As shown in cross section in Figure 4, the screen sheetings are made in horizontally divided curved sections corresponding to the divided sections of the shell and the flanges (12<sup>3</sup>) of the shell are rabbeted so as to receive and confine the flanges along the horizontal division of the screen sections. This same structure also applies to the single thickness of screen sheeting (12<sup>13</sup>) as shown in Figure 3. Of course, in this part of the press the screen does not extend along the top of the internal opening in the press, as the intake (12<sup>5</sup>) takes the place of the space of the same. The screw (12<sup>6</sup>) is mounted on a shaft (12<sup>14</sup>) and the shaft is in turn rotated by a relatively large driven gear (12<sup>15</sup>) which is mounted in driving relation to a smaller driving gear (12<sup>16</sup>) carried on the rotated shaft (12<sup>17</sup>). This driving arrangement for the screw is a special construction to account for the withdrawal of the screw from the press as will presently be disclosed. Mount-

ed with freedom of rotation on a spindle (12<sup>18</sup>) adjacent the opening (12<sup>5</sup>) into the press is a four bladed wheel (12<sup>19</sup>). The blades of the same are pitched so as to straddle the blades of the screw (12<sup>6</sup>) and the purpose of the same is to prevent the material from backing up into the opening (12<sup>5</sup>) when the pressure from packing in the discharge end is present. A cover (12<sup>20</sup>) is made for the wheel and the cover, as well as the wheel itself, may be lifted off when the screw is withdrawn from the press. It will not be necessary to lift the wheel off if the screw is rotated out of the press a sufficient distance to leave the wheel disengaged from the last spiral of the screw.

In the past considerable difficulties have been experienced with presses of this general character, that is to say those using a screw for realizing the pressing effect, due to the fact that when the plant is shut down there is always a certain amount of material left in the press, even though the bulk is run out. As this material contains a certain amount of moisture, especially after cooking, it naturally has a tacky consistency and when it dries out it practically cements the screw to the sides of the press, and otherwise binds the movable parts of the press; consequently when the plant is started up again there is every likelihood that considerable damage might be done to the press due to the fact that the movable parts may possibly be bound. One of the principal features of the present press is to provide for a thorough cleaning which should take place without undue loss of time after the plant has been shut down. To provide for cleaning it is proposed to so construct the press that the screw may be run out, thus enabling access to be had to the interior of the press so that all of the remaining material may be removed even from the perforations in the screens. These perforations, if they were not thoroughly cleaned, would be clogged with dry material. The shaft (12<sup>14</sup>) may or may not run through the screw (12<sup>6</sup>), but in any event the enlarged end or head of the screw will have a shaft (12<sup>21</sup>) extending forwardly thereof and with the same threaded for a greater part of its length. Arranged parallel of the shaft (12<sup>21</sup>) on opposite sides of the press and extending forwardly thereof are rods (12<sup>22</sup>). These rods are mounted at one end to the head of the press as at (12<sup>23</sup>) with their opposite ends (12<sup>24</sup>) reduced in diameter and carrying a bearing head (12<sup>25</sup>), the head having an outrigger bracket support (12<sup>26</sup>) with sleeves (12<sup>27</sup>) on the ends thereof through which the reduced ends (12<sup>24</sup>) of the rods pass, suitable nuts being provided preventing the sleeves from becoming disengaged from the ends. The sleeves are mounted to slide on the reduced ends. The bearing head (12<sup>25</sup>) is made with an

outer collar (12<sup>28</sup>) (see Figure 8) in which the sleeve (12<sup>29</sup>) is mounted with freedom of rotation, anti-friction bearings (12<sup>30</sup>) being arranged to reduce friction to a minimum when the sleeve rotates within the collar. The forward end of the sleeve (12<sup>29</sup>) is made with a wheel (12<sup>31</sup>) for rotating the same, and openings (12<sup>32</sup>) are provided in the wheel to receive spikes or other implements to increase the turning leverage of the wheel should occasion demand. The sleeve (12<sup>29</sup>) is made with an internal threaded opening (12<sup>33</sup>), the threads of which do not extend throughout the length of the opening, but terminate slightly over half-way of the length so as to leave an enlarged smooth opening (12<sup>34</sup>) in one end of the opening. The shaft (12<sup>21</sup>) is received in the opening (12<sup>33</sup>) of the bearing head and the threads on the shaft correspond to the threads in the opening but the smooth bore portion of the opening is of a diameter of that of the shaft, and while it is a snug fit, the shaft is free to slide in this part of the opening without an undue amount of friction. The distance that the sleeves (12<sup>27</sup>) may slide on the reduced ends (12<sup>24</sup>) of the rods (12<sup>22</sup>) is substantially the same length as that of the smooth portion of the opening (12<sup>33</sup>) so that when the shaft is presented in the opening the bearing head may slide forward until the sleeves (12<sup>27</sup>) but against the larger diameter of the rods and the end of the shaft contacts with the beginning of the threads in the opening (12<sup>33</sup>). In this position by turning the wheel (12<sup>31</sup>) the threads in the opening (12<sup>33</sup>) will engage the threads on the shaft and draw the shaft outward. Primarily, the reason for the smooth bore in the opening (12<sup>33</sup>) is to provide a bearing for the end of the shaft and at the same time leave the shaft free to rotate. The head of the screw as previously mentioned is larger in the beginning of the same and is made with a disc flange or the like (12<sup>35</sup>) which controls the affected discharge area of the discharge end of the press. In other words, it leaves the restricted opening through which the pressed material is discharged.

Considering the normal position of the bearing head (12<sup>25</sup>) as shown in Figure 8, that is to say the shaft (12<sup>21</sup>) being in the smooth bore of the opening (12<sup>33</sup>), and it is desired to withdraw the screw, the wheel (12<sup>31</sup>) is turned in a clock-wise direction so as to engage the threads in the opening with the threads on the shaft; consequently a gradual pull will be imparted to the screw withdrawing it from the press. To enable the shaft (12<sup>14</sup>) to slide relatively of the driven gear (12<sup>15</sup>) a long key slot (12<sup>36</sup>) is made on the shaft so that the gear (12<sup>15</sup>) while mounted on the shaft to rotate therewith leaves the shaft free to slide through the bearing of the gear. Of course, to per-

mit the sliding movement of the shaft, the gear must have an abutment against the casting of the press. To properly guide and support the shaft (12<sup>21</sup>) sleeves (12<sup>37</sup>) are mounted to slide on the rods (12<sup>22</sup>) with the same connected to a collar (12<sup>38</sup>), which in turn is fixed to the shaft on the smooth portion thereof in the beginning of the threads. By this construction the screw may be withdrawn, leaving the interior of the press accessible so that the screw and other parts may be thoroughly cleaned. After it has been cleaned the screw may be returned by turning the wheels (12<sup>31</sup>) in a clock wise direction.

I claim:

1. In a press having a shell into which the material to be pressed is introduced, said shell having openings substantially throughout its surface, a screen fitted within the shell, a screw conveyor within said screen, a feed opening at one end of the shell, means for withdrawing the screw out of the discharge end of the shell, comprising a shaft on the screw conveyor extending beyond the discharge end of the shell, and an out-rigger bearing head for said shaft, the combination of means for imparting a pull to the shaft for withdrawing the screw conveyor and a thrust to the shaft for returning the screw conveyor.

2. A press comprising a body portion having a feed opening and a discharge opening,

a rotatable shaft and a screw carried thereby for continuously feeding material from said feed opening to said discharge opening and for simultaneously expressing said material, and means for withdrawing said screw from said body portion to permit cleaning and prevent binding of the press.

3. The combination as set forth in claim 2 in which said last mentioned means comprises a threaded extension of said shaft, and a threaded member into which said threaded extension is adapted to fit.

4. The combination as set forth in claim 2 in which said last mentioned means comprises a threaded extension of said shaft, a threaded member into which said threaded extension is adapted to fit, together with a fixed bearing member in which said threaded member is rotatably mounted.

5. The combination as set forth in claim 2 in which said last mentioned means comprises a threaded extension of said shaft, a threaded member into which said threaded extension is adapted to fit, together with a fixed bearing member in which said threaded member is rotatably mounted, and a movable bearing member for said shaft.

6. The combination as set forth in claim 2 together with means adapted to drive said first mentioned means when wholly within said body portion and also when withdrawn from said body portion for cleaning.

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