

HYDRAULIC PRESS FOR LABORATORY PREPARATION OF FISH PRESS CAKE

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INTRODUCTION

In the preparation of fish meal, fish waste material is often cooked and pressed to expel oil and water. The product formed is fish press cake. Fish meal results when this material is dried and ground.

In the production of experimental lots of fish meal at the Seattle Technological Laboratory, about 16 pounds of fish material are cooked and pressed to prepare one batch for the experimental fish meal dryer. Formerly, a small laboratory press with a capacity of about 4 pounds of material was used to prepare the press cake. As the use of this device required four pressings for one charge of the dryer, the pressing operation required considerable time. Also, some of the material cooled below the desired pressing temperature before the operator could complete all four pressings.

To save time and to facilitate pressing the material while it still is hot, which helps to remove the oil and water, we designed and built a press with enough capacity to handle 16 pounds of cooked material at each pressing.

The purpose of this report is to describe the design, construction, and operation of this press.

DESIGN

The press (fig. 1) consists essentially of (1) a head, (2) a hydraulic jack, (3) a pressure gauge, (4) a movable platen, (5) a stationary platen, and (6) a stand on which the press is mounted.

In the design of the press, features such as light weight, portability, and simple construction were incorporated. The construction used eliminated the need for patterns, heavy casting, and machining.

CONSTRUCTION

Extruded aluminum channel 2" x 2" x $\frac{1}{4}$ " was used for the head, the movable platen, and the stationary platen. The channels, cut to length, were bolted together side by side with spacers between the flanges to resist collapsing when the through bolts were tightened. Two of the units, containing eight channels each, were used--one on top of the other, with the channels at right angles--for the head of the press. The stationary platen is similar except that 10 channels were used instead of 8 and a $\frac{1}{4}$ -inch aluminum plate was attached to the upper side to serve as a liquid-tight surface. The movable platen consists of a single set of eight channels with a $\frac{1}{4}$ -inch aluminum plate attached to the lower side to serve as the pressing surface.

The hydraulic jack was mounted in an inverted position with the base of the jack bolted to the head of the press. This arrangement protects the jack from coming in contact with the expressed liquids from the fish.

The hydraulic gage was mounted on a high pressure pipe tee next to the jack.

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The pressure pump for the hydraulic jack was mounted in an accessible position on the side of the press stand. High pressure hydraulic tubing was used for the connection between the pump and the jack.

The movable platen, which is guided by four corner posts that connect the base and the head (see fig. 1), is held against the ram of the jack by four suspended coil springs. During operation, as the pressure is released, the springs return both the ram and the platen to the starting point.

In order that the expressed liquids can be caught, the edges of the stationary platen was fitted with an angle iron dam. A $\frac{1}{2}$ -inch drain outlet was located in one corner of the platen.

The entire press was mounted on an angle-iron stand fitted with casters to provide mobility.

Cost of the materials used to construct the press was less than \$350.

OPERATION

In addition to the press itself, the following equipment is needed to produce press cake: (1) 24-inch squares of press canvas, (2) a 10" x 10" x $1\frac{1}{4}$ " mold, (3) a spatula or a tamper, (4) four pieces of channel iron, and (5) $\frac{1}{8}$ -inch-mesh steel screens 12" x 12".

The press is operated as follows:

1. Lay a 24" square of press canvas on a flat surface and place the mold in the center of the canvas.
2. Fill the mold with the hot cooked fish material, using a spatula or a tamper to press the material into the mold.
3. Remove the mold and fold the cloth over the fish to make a pad approximately $1\frac{1}{4}$ " thick.
4. Prepare six similar pads to charge the press.
5. Lay four pieces of channel iron side by side on the press base

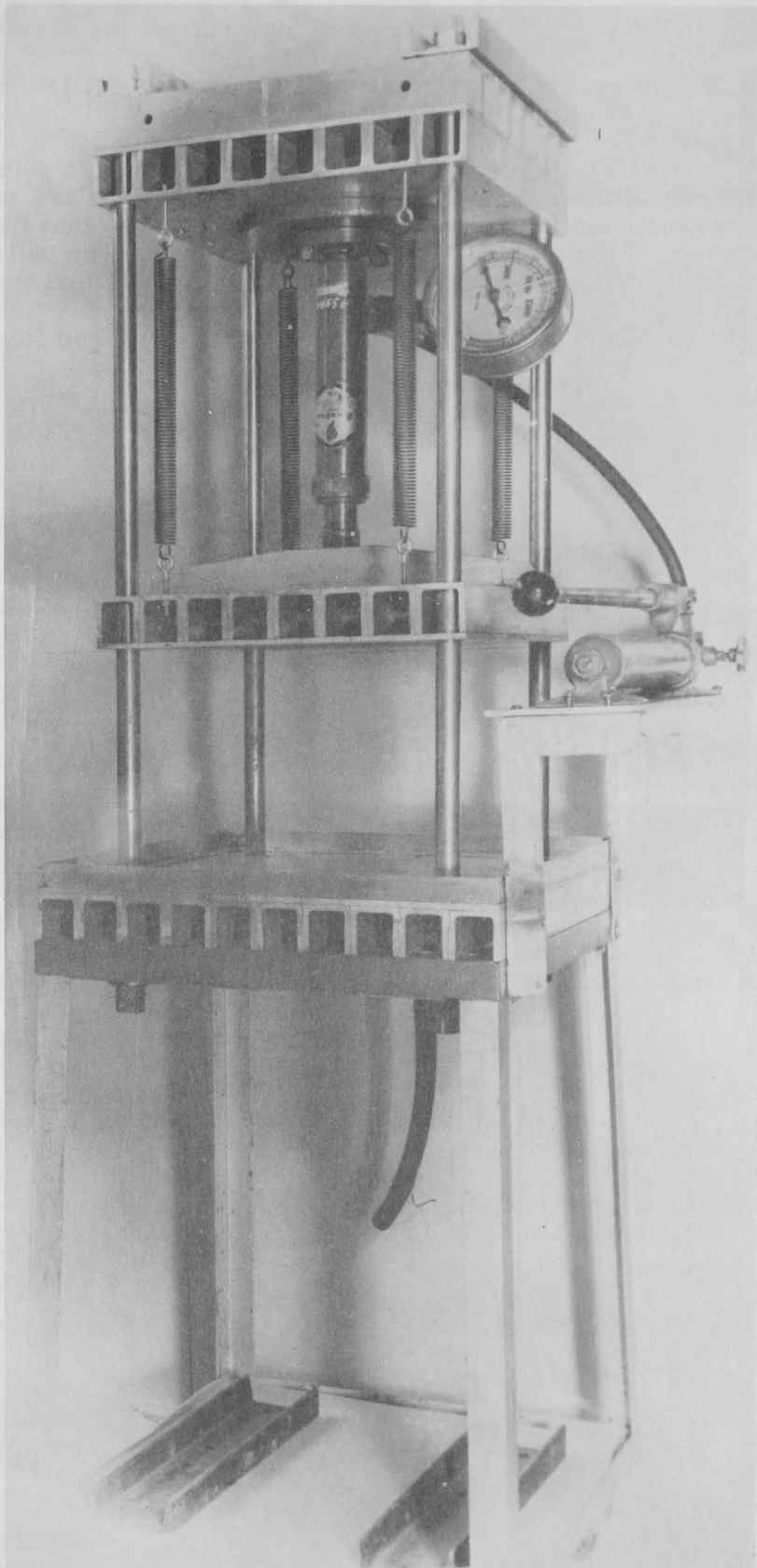


Fig. 1 - Hydraulic press for laboratory preparation of fish press cake.

and lay one of the steel-mesh screens on top. (The channel serves as a spacer to keep the bottom pad of material away from the liquid that accumulates on the stationary platen.)

6. Lay a pad of the cooked material on the screen and cover it with another screen.

7. Repeat this process until the press is filled, taking care to keep the pile of pads and screens straight.

8. Make a preliminary press to compact the pile of pads and make room for the insertion of additional pads. If at this point the pads are not flattening out evenly, release the pressure and move the entire stack of pads so that the high side is more nearly under the center of the platen. Again apply pressure. The pads should flatten evenly. If they do not, turn the pads within the stack so that the thick and thin sides of the pads will level each other.

9. Complete the final press until all the free liquid has been removed.



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