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F. J. BISBEE

FILTER PRESS

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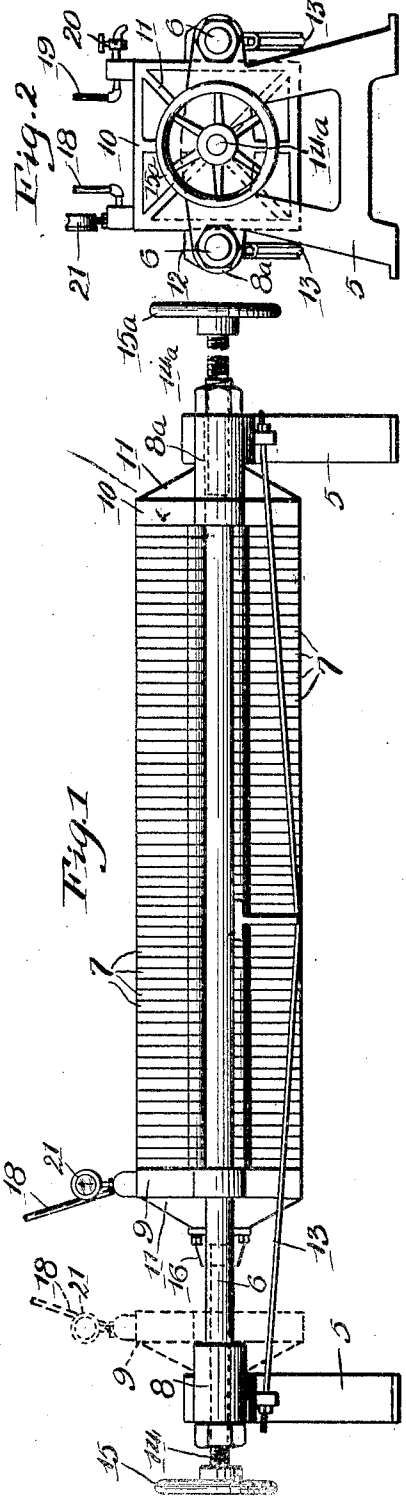


Fig. 1

Fig. 2

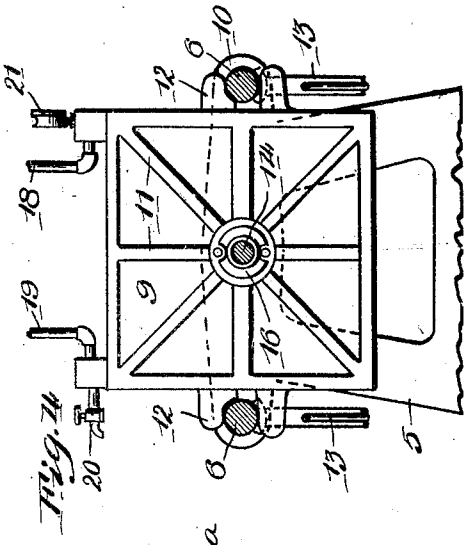


Fig. 4

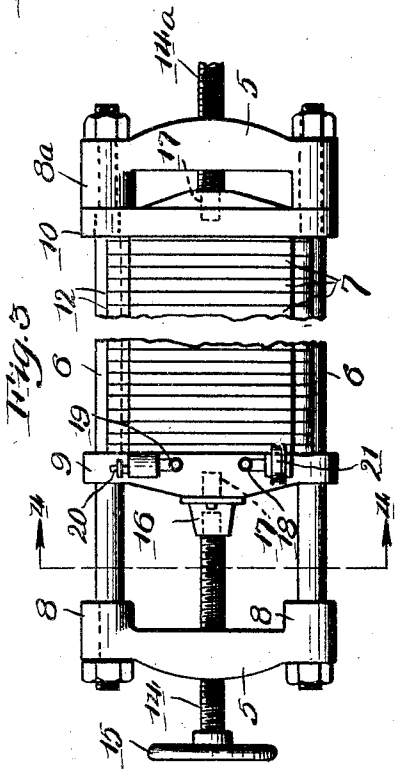


Fig. 3

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FRANK J. BISBEE, OF NOBLE, PENNSYLVANIA.

FILTER PRESS.

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This invention relates to improvements in filter presses and particularly to such machines of the plate and frame type adapted for commercial use in the refining of oils, beet and cane sugar and other liquids.

Heretofore, as is well known, it has been common practice to provide in filters of this kind a series of vertical plates carrying the filter cloths or screens arranged face to face upon suitable horizontal supports. Provision is made for pressing the plates firmly one upon another to prevent leakage in operation and for allowing separation of the plates for cleaning when the screens have become clogged by continued use. In these old types of filters there is a stationary head or abutment at one end of the machine while the other end has a movable head which may be backed away from the plates to permit the necessary opening of the filter for cleaning. With such machines, this cleaning operation is extremely tedious because each of a large number of heavy plates and frames must be moved at least twice, viz, first away from the stationary head to allow access to the filter cloths or screens and then back toward said head into engagement therewith or with an abutting plate. Upon each movement of a plate its abutting surfaces must be thoroughly cleansed of all solid matter which would otherwise separate the plates sufficiently to allow leakage in operation.

It is the object of this invention to minimize the work and consequent expense of operation of a filter press by providing means which obviate the necessity for more than a single movement of each plate during the cleaning operation.

The accompanying drawings illustrate the best form of my device at present known to me.

Referring to the drawings, Figure 1 is a side elevation of my improved filter press; Fig. 2 is an end view of the same; Fig. 3 is a fragmentary plan view of the device and Fig. 4 is a section taken on the line 4—4 of Fig. 3.

In the drawings, I have used the numeral 5 to indicate end standards which are rigidly joined by a pair of horizontal supporting members 6 for filter plates 7. The end standards 5 are formed with bosses 8 and 8ª respectively, adapted to severally constitute stationary abutments for movable heads 9 and 10. These movable heads 9 and 10 are slidable longitudinally on the members 6 and formed with reinforcing webs 11. The faces of the heads 9 and 10 adjacent to the plates 7 are smooth and formed to constitute a closure for the end plates. Each of the plates 7 has a pair of lugs 12 projecting laterally therefrom to rest upon the members 6. To prevent bending of the member 6 under the weight of the plates 7, suitable trusses 13 are provided and connected at their ends with the standards 5.

Threaded centrally in the standards 5 in axial alignment with the plates 7 are large screws 14 and 14ª adapted to be turned by hand wheels 15 and 15ª respectively. The inner ends of these screws 14 and 14ª are freely revoluble in the movable heads 9 and 10. On the head 9, as shown in Figs. 1 and 2, a thrust bearing 16 is provided which projects from said head and is readily removable therefrom. Each of the heads 9 and 10 is formed with a recess 17 adapted to receive the end of one of the screws 14 or 14ª. The heads 9 and 10 and plates 7 may be moved to the left (Figs. 1 and 3) against the stationary head 8, and the thrust bearing 16 may be placed between the end of the screw 14ª and head 10 as hereinafter described.

An inlet pipe 18 for the liquid to be filtered communicates with the several filter plates 7 through suitable internal passages therein, and a withdrawal pipe 19 is also connected with the several plates at the discharge side of the filter screens. These pipes 18 and 19 are preferably made flexible or jointed to permit movement of the head 9 from its full line to its dotted line position shown in Fig. 1. A cock 20 is adapted to be manipulated to withdraw filtrate for testing purposes, and a gauge 21 indicates the pressure upon the liquid at the inlet side of the plates. As no novelty is claimed herein for any particular form of plates 7, and as such plates are old and well known in the art, I have not illustrated or described the internal arrangement thereof. Obviously hydraulic rams or other power driven or manually operated thrust means might be substituted for the screws and hand wheels shown in the drawings, without departing from the spirit of my invention.

Operation.

In operation the liquid to be filtered is forced through the flexible pipe 18 and the

filtrate is withdrawn through the pipe 19. After continued use, the residue will accumulate in sufficient quantity to clog the interstices in the plates 7 and it is then necessary to open the filter and cleanse the plates. To clean the filter, the wheel 15 is first rotated to back the head 9 away from the plates. The thrust bearing 16 may now be removed from the head 9 to allow the end of the screw 14 to enter the recess 17, the head 9 being placed against the stationary head 8 in the position indicated in dotted lines in Fig. 1. One at a time the plates are now cleansed and moved along the members 6 against the head 9, care being taken to remove all solid matter from the abutting surfaces. When the plates have all been cleansed, the head 10 is merely moved along the members 6 to abut against the end plate 7. Finally the thrust bearing 16 is attached to the head 10 and the screw 14^a is turned by means of the wheel 15^a to firmly close the filter and prevent leakage between the plates. The filter is now ready for a further period of use, after which the cleaning operation may be repeated. During this second cleansing operation, the plates are moved back to the right (Figs. 1 and 3) against the head 10, which now abuts against the stationary head 8^a.

As will now be readily understood, for each cleansing of the filter, it is only necessary to move the plates in one direction along the horizontal supports with consequent saving of time and expense in the operation of the filter.

Having described my invention what I claim as new and desire to protect by Letters Patent is:

1. In a filter press, a longitudinal unobstructed support, a series of filter plates disposed face to face and abutting on said support and movable longitudinally thereon, said plates being arranged to be moved to open position by separating the same one from another toward one end, stationary abutments disposed near each end of said support and arranged to alternately constitute abutments, toward which all of said plates may be moved, movable heads mounted near the ends of said support and thrust means arranged to severally actuate said movable heads and thereby move said plate toward the stationary head near the opposite end of said support.

2. In a filter press a longitudinal unobstructed support, a series of filter plates disposed face to face and abutting on said support and movable longitudinally thereon, a stationary and a movable abutment head mounted at each end of said support, and thrust means for each of said movable heads adapted to be actuated to press the same against said plates and thereby move all of said plates towards the stationary head at the opposite end of said support.

3. In a filter press, a pair of spaced, horizontal members, supports for the ends of said members, a single pair of stationary abutment heads, severally disposed on said supports, a series of filter plates mounted face to face on said horizontal members and arranged to be opened for cleaning by separating the plates one from another and thrust means on each of said heads adapted to be actuated to press said plates one upon another and thereby move all of the same towards the stationary head at the opposite ends of said horizontal members.

4. In a filter press, a longitudinal, unobstructed support, a series of filter plates disposed face to face and abutting on said support, said plates being arranged to be separated for cleaning by longitudinal movement thereof on said support, an abutment near each end of said support and thrust means near each end of said support adapted to severally actuate said plates and thereby move all of the same towards the abutment at the opposite end of said support.

In testimony whereof, I have hereunto signed my name to this specification.

FRANK J. BISBEE.