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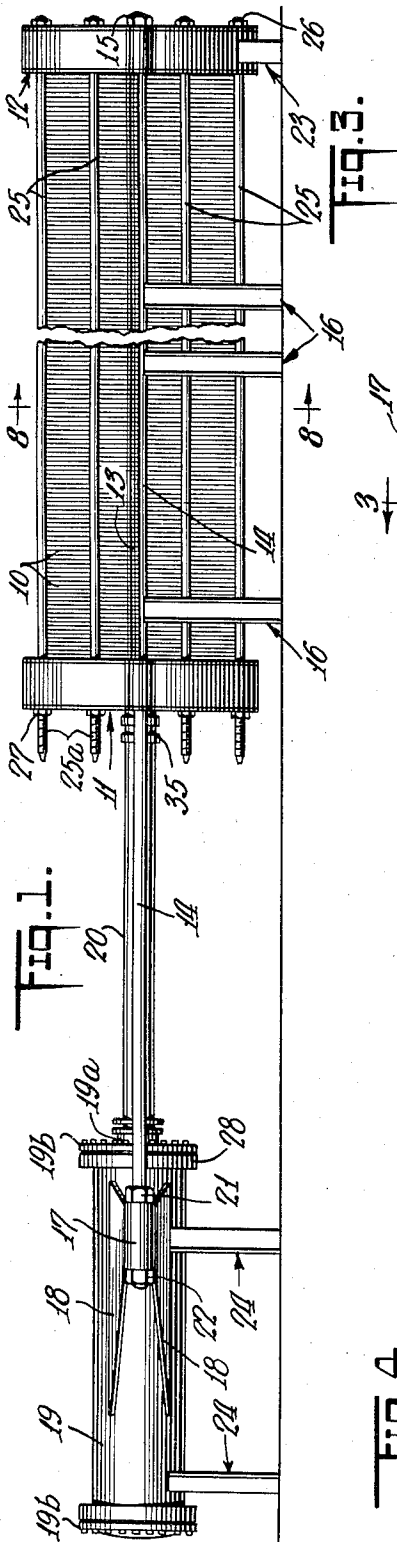
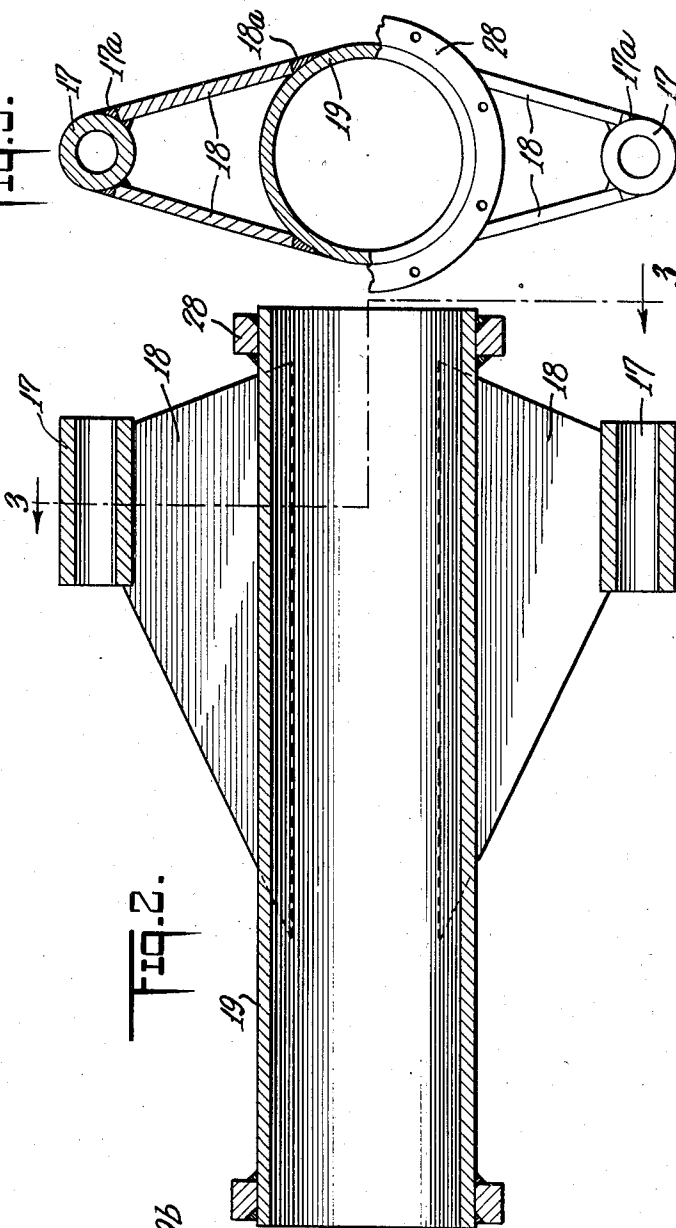
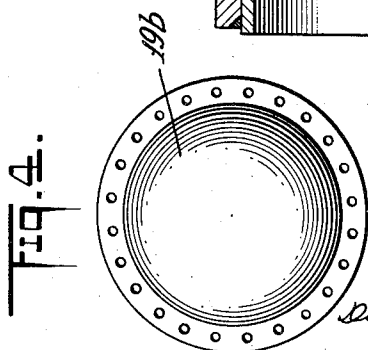
N. H. HILLER ET AL

1,977,480

FILTER PRESS

Filed Nov. 20, 1933

3 Sheets-Sheet 1



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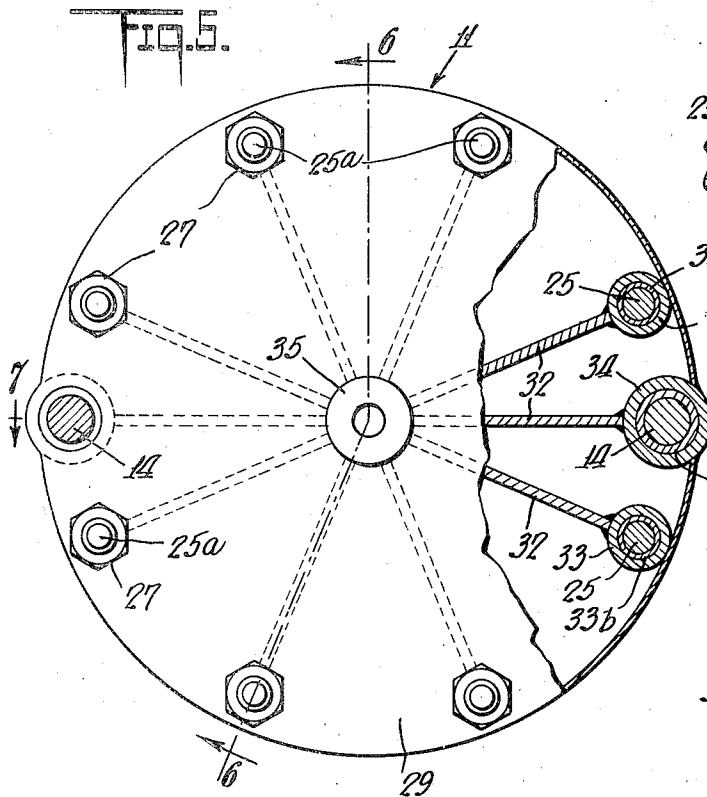
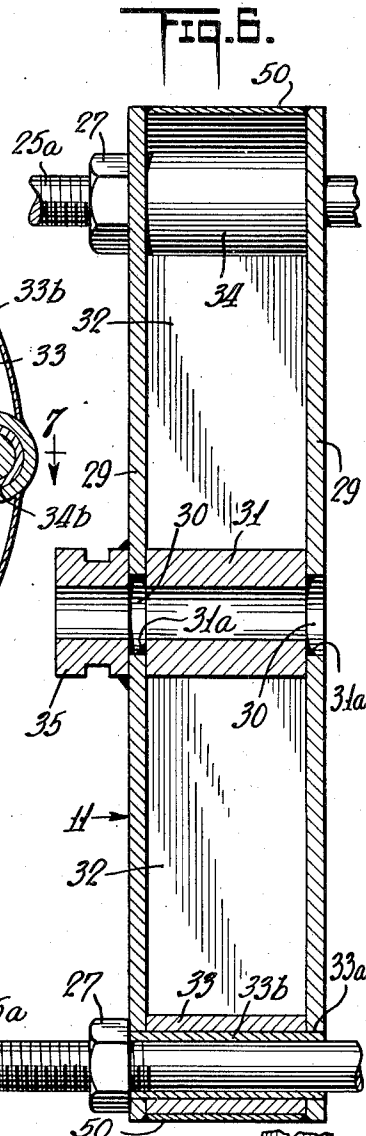
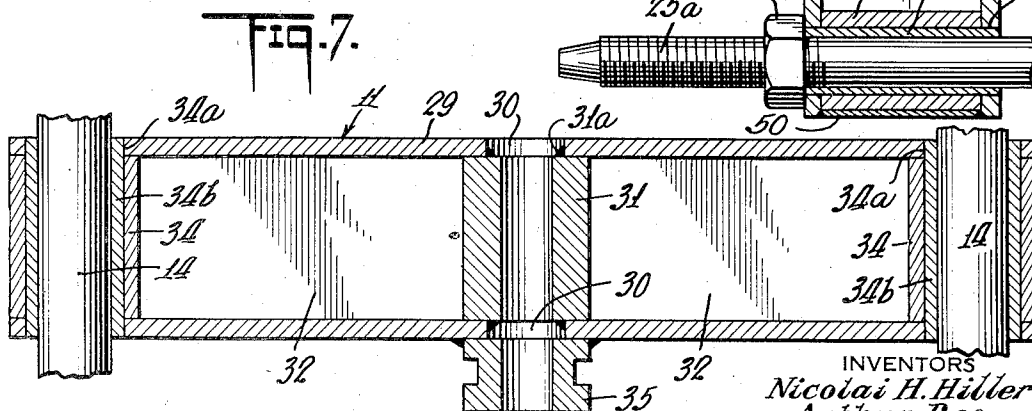
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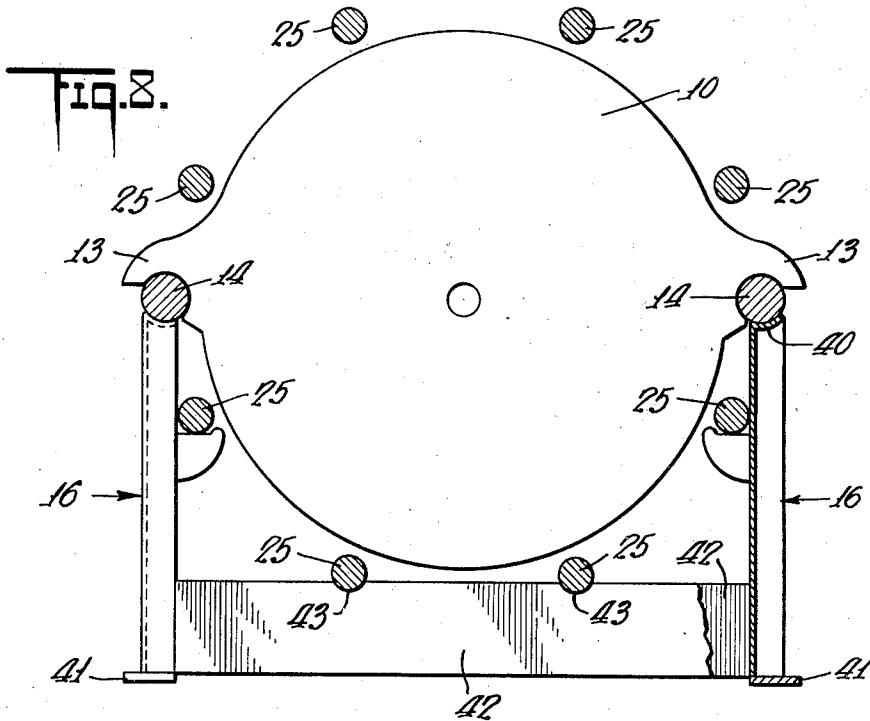
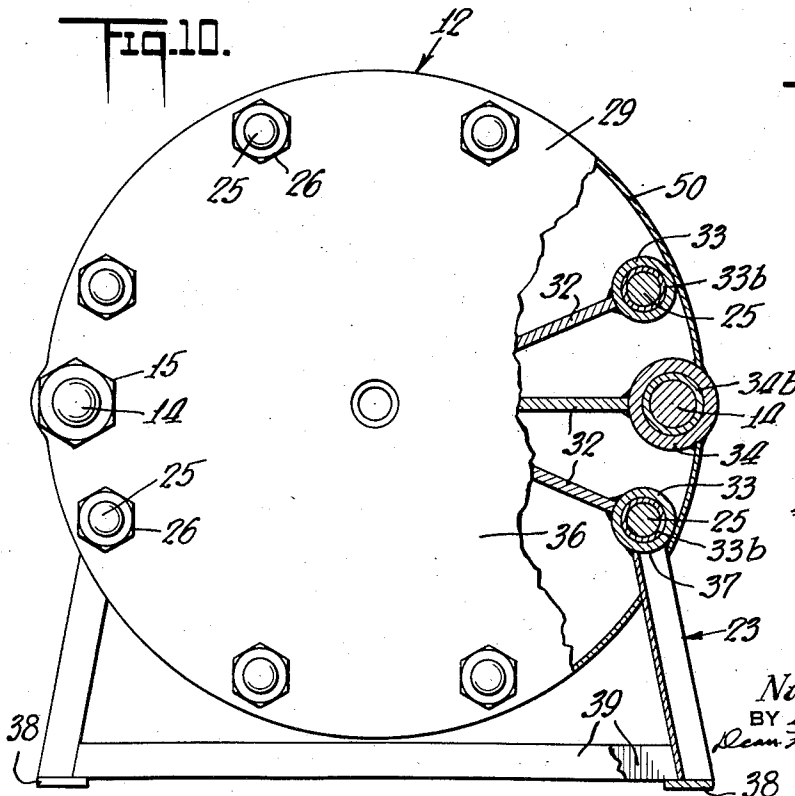
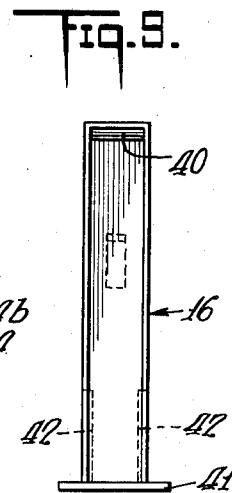
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FILTER PRESS

Filed Nov. 20, 1933

3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

1,977,480

FILTER PRESS

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Application November 20, 1933, Serial No. 698,740

8 Claims. (Cl. 210—188)

Our present invention relates to improvements in filter presses, particularly presses of the type commonly employed for filtering paraffin distillate or other wax-laden oils.

Such presses as heretofore constructed usually include a fixed and a movable platen with a plurality of filter plates or plate assemblages disposed between them. The distillate is introduced into closed chambers defined by these plates and the oil squeezed out through the fabric chamber walls leaving a paraffin deposit on the fabric removable by separation of the plates and "spudding" off of the wax layer thus formed.

A hydraulically operated piston and piston rod for actuating the movable platen is arranged in a fixed cylinder connected by guide bars to the fixed platen and the movable platen travels on these guide bars. Tie bars attached at one end to the fixed platen extend through openings in the movable platen and nuts on the tie bars may be tightened to hold the latter platen in any position to which it has been thrust by its actuating piston.

Certain of the filter plates include side lugs supported on the guide rails and a great number of these plates, say up to five hundred, may be incorporated in a single unit, and pressures of five hundred to one thousand pounds per square inch exerted in the movable platen to squeeze the filter plates together.

The press as thus far described is entirely conventional. Our present invention relates to improvements which effect substantial economies in the platen structure, hydraulic ram structure and framing and support means generally.

More specifically our invention eliminates the need for using massive castings for the platens, the cylinder, the guide rod supports and anchorages, the stationary platen support, etc., and provides lighter, stronger elements which materially reduce both the cost and the weight of the press.

Such elements, furthermore, are all especially designed to most efficiently resist the particular bending, compressing, tensioning or other stresses, imposed upon them as opposed to the present structural practice, where such resistance depends largely upon sheer weight and bulk which renders the structure needlessly heavy and expensive.

The invention may be more fully understood from the following description in connection with the accompanying drawings, wherein:

Fig. 1 is a broken side elevational view of our improved filter press.

Fig. 2 is an enlarged longitudinal sectional

view through the cylinder for the actuating plunger.

Fig. 3 is a view partly in transverse section and partly in end elevation of this cylinder.

Fig. 4 is a face view of one end of the cylinder end plates.

Fig. 5 is a view mainly in front elevation and partly in section of the improved movable platen.

Fig. 6 is an enlarged sectional view on the staggered line 6—6 of Fig. 5.

Fig. 7 is a transverse sectional view on the line 7—7 of Fig. 5.

Fig. 8 is an enlarged transverse sectional view on the line 8—8 of Fig. 1.

Fig. 9 is an elevational view of one of the guide rod support legs of Fig. 8 and

Fig. 10 is an elevational view of the fixed platen.

Inasmuch as the present invention is not concerned with the means for feeding distillate to the press or with the structural details of the filtering chambers or with the means for receiving and carrying off filtrate or wax, and inasmuch as all of such structure may be entirely conventional insofar as the invention herein claimed is concerned, such structure is not herein illustrated.

Referring first to Fig. 1 of the drawings the press includes the series of plates 10 disposed between the movable platen 11 and fixed platen 12 and having side lugs 13 resting on the guide rods 14 upon which the platen 11 slides.

These guide rods project through platen 12 and have nuts 15 screwed upon their ends and against the outer face of said platen. Support legs indicated generally at 16 sustain the guide rods intermediate their ends. The other ends of the guide rods extend through anchor sleeves 17 supported by converging webs 18 projecting laterally from the cylinder 19 of the hydraulically operated piston (not shown) which exerts pressure on platen 11 through piston rod 20 working through stuffing box 19a in one cylinder head 19b.

The cylinder is axially aligned with the platens 11, 12 and plates 10. Nuts 21 and 22 are screwed onto the guide rods 14 and abut opposite ends of the anchor sleeves 17. Legs 23 support platen 12. Legs 24 of a similar nature support the cylinder 19. Tie bars 25 anchored by nuts 26 to platen 12 lie without the peripheries of plates 10 and have threaded ends 25a projecting through platen 11. When the latter platen has been thrust toward platen 12 to the desired extent by the hydraulically operated piston, nuts 27 on the threaded ends 25a of the tie bars may be screwed home

against the platen 11 to hold it in such position and the pressure on the piston then relieved.

The cylinder 19, platens 11, 12 and the various support elements are all preferably formed of relatively light, strong stock, such parts as are of a composite nature, i. e., fabricated of several structural elements being welded throughout whereby the use of massive castings is avoided.

Cylinder 19 consists of a relatively light, strong drawn tube having a pair of rings 28 welded thereabout adjacent opposite ends. Bolted or welded to these rings are the cylinder heads 19b, 19b, one of which carries stuffing box 19a and the other of which, illustrated in Fig. 4, is devoid of openings. The pairs of converging tapered webs 18 are disposed substantially tangentially of the cylinder and welded along their shorter outer edges to the anchor sleeves 17 as at 17a. Thus a light, rigid, substantially triangular structure is defined to sustain the guide rod anchorages.

Our improved movable platen (Figs. 5 to 7) includes a pair of circular plates 29, 29 centrally apertured at 30, 30 and spaced apart by a hub member 31 to the ends of which both plates are welded as at 31a. A plurality of radially extending plates 32 (corresponding in number to the number of tie rods and guide bar openings in the platen) have their opposite elongated edges welded to the inner faces of the plates 29, their inner edges welded to hub 31 and their outer edges welded either to the tie bar receiving sleeves 33 or the guide rod bearing sleeves 34 as the case may be. The ends of sleeves 33 and 34 are welded to the inner faces of plates 29, the latter having openings 33a, 34a therein alined with the sleeves. Extending through openings 33a and 34a in plates 29, and terminating flush with the outer faces of these plates and being welded to the plates are bearing bushings 33b, 34b. Also welded in position between plates 29 is a rim 29a preferably made in two sections as clearly shown in Fig. 5.

A thrust receiving collar 35 welded to the center of the outer plate 29 is coupled in any suitable manner to the piston rod 20. The platen is so designed that despite its light weight and the comparatively thin stock of which it is formed, it will distribute the thrust of the piston at the center of the outer plate 29 over the full area of the inner plate 29, the plates 32 and sleeves 33, 34 aiding in such distribution of the lines of force and stoutly resisting any tendency of the composite platen to bend or warp at its periphery even when pressures in the order of five hundred pounds per square inch are to be applied on the filter plates 10.

The fixed platen 12 shown in Fig. 10 is constructed similarly to platen 11, save that an inlet coupling 36 for the filtrate replaces the thrust member 35. The parts of the fixed platen corresponding to parts of the movable platen are similarly numbered. The legs 23 which support the platen 12 are of channel iron with the channels facing outwardly. These legs have arcuate upper ends 37 cradling and welded to that pair of tie rods 25 which is located just below the guide rods 14. The legs diverge outwardly and downwardly toward the feet 38 which support them and to which they are welded. The legs are tied together near their lower ends by parallel cross plates 39 of relatively thin material spaced from each other and butt welded to the rear faces of legs 23.

The legs 16 which support guide rods 14 are also of channel iron (Figs. 8 and 9), and welded at their upper ends to cradling members 40 for

the rods 14. Feet 41 are preferably welded to the outwardly facing channel iron legs and the lower ends of these legs are connected by a pair of cross plates 42 parallel to and spaced from each other and having their ends butt welded to the legs. These plates are somewhat wider than the plates 39, so that the two lower tie rods 25 may rest in notches 43 in the upper edges of plates 42. Likewise the next lowermost pair of tie rods 25 may be supported on lugs 44 welded to and projecting inwardly from the legs 16.

The support means 24 for the cylinder 19 is preferably of similar construction to the support means for the platen 12 and the guide bars 14, and for this reason is not shown in detail.

While it is unnecessary to illustrate or describe the details of the conventional filtering chambers it may be noted that plates 10 constitute the relatively fixed imperforate center plates between a pair of filter blanket carrying plates (not shown) cooperating with plates 10 to define compressible chambers. Between adjacent blanket carrying plates there is sufficient space for the filtered oil to escape, the wax residue remaining on the blankets. When the tie rod nuts 27 are removed the various filter plates may be slid along one by one on these rods and the wax layer removed. This much explanation of the standard mechanism is introduced for the purpose of properly identifying the plates 10.

From the foregoing description it will be apparent that the machine in general is lightened in weight, many expensive castings are eliminated, and a more adequate support for the tie rods is afforded, all without sacrificing structural strength.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:—

1. A filter press of the character which includes a fixed and a movable platen, filter plates therebetween, a cylinder, a hydraulically operated piston therein, a piston rod connecting the piston to the movable platen, guide rods each anchored at one end to the fixed platen and upon which rods the movable platen slides and means on the cylinder for anchoring the other ends of the guide rods, said platens each including a pair of spaced circular plates and radially disposed thrust transmitting plates welded at their edges to the pairs of circular plates and spacing the plates of each pair apart.

2. A filter press of the character which includes a fixed and a movable platen, filter plates therebetween, a cylinder, a hydraulically operated piston therein, a piston rod connecting the piston to the movable platen, guide rods each anchored at one end to the fixed platen, and upon which rods the movable platen slides and means on the cylinder for anchoring the other ends of the guide rods, one of said platens including a pair of spaced circular plates and radially disposed thrust transmitting plates welded at their edges to the circular plates and spacing the plates apart, sleeves welded between the circular plates to accommodate the guide rods and the ends of certain of the thrust transmitting plates being welded to the sleeves.

3. A filter press of the character which includes a fixed and a movable platen, filter plates therebetween, a cylinder, a hydraulically operated piston therein, a piston rod connecting the piston to the movable platen, guide rods each anchored at one end to the fixed platen and upon which rods the movable platen slides and

- means on the cylinder for anchoring the other ends of the guide rods, one of said platens including a pair of spaced circular plates and radially disposed thrust transmitting plates welded at their edges to the circular plates and spacing the plates apart and center hubs to which the inner ends of the thrust transmitting plates are welded.
4. A filter press of the character which includes a fixed and a movable platen, filter plates therebetween, a cylinder, a hydraulically operated piston therein, a piston rod connecting the piston to the movable platen, guide rods each anchored at one end to the fixed platen and upon which rods the movable platen slides and means on the cylinder for anchoring the other ends of the guide rods, one of said platens including a pair of spaced circular plates and radially disposed thrust transmitting plates welded at their edges to the circular plates and spacing the plates apart, the means for anchoring the guide webs to the cylinder including pairs of flat tapered converging rods disposed tangentially to the cylinder and welded thereto and guide rod receiver eyes welded to the outer converging ends of said webs.
5. As a new element in a filter press, a platen including a pair of relatively thin circular plates, a centrally disposed hollow hub having its ends connected to said plates, and a plurality of radially extending thrust transmitting plates of similar width having their edges welded to the inner faces of the circular plates and spacing the latter apart.
6. As a new element in a filter press, a platen including a pair of relatively thin circular plates, a plurality of radially extending thrust transmitting plates of similar width having their edges welded to the inner faces of the circular plates and spacing the latter apart, and a hub concentric with and connecting the circular plates and to which the inner ends of the thrust plates are welded.
7. As a new element in a filter press, a platen including a pair of relatively thin circular plates, a plurality of radially extending thrust transmitting plates of similar width having their edges welded to the inner faces of the circular plates and spacing the latter apart, said plates having aligned openings therein adapted to accommodate rods, rod receiving sleeves aligned with said openings and welded to the inner faces of the circular plates, the outer ends of the thrust plates being welded to said sleeves.
8. As a new element in a filter press, a platen including a pair of relatively thin circular plates, a plurality of radially extending thrust transmitting plates of similar width having their edges welded to the inner faces of the circular plates and spacing the latter apart, said plates having aligned openings therein adapted to accommodate rods, rod receiving sleeves aligned with said openings and welded to the inner faces of the circular plates, the outer ends of the thrust plates being welded to said sleeves, a two part rim structure following the contour of the circular plates disposed between them and welded to them.
- NICOLAI H. HILLER.
ARTHUR ROE.