Aug. 5, 1924. 1,503,673

C. B. UPTON

DRAINAGE PLATE FOR EXPRESSING PRESSES

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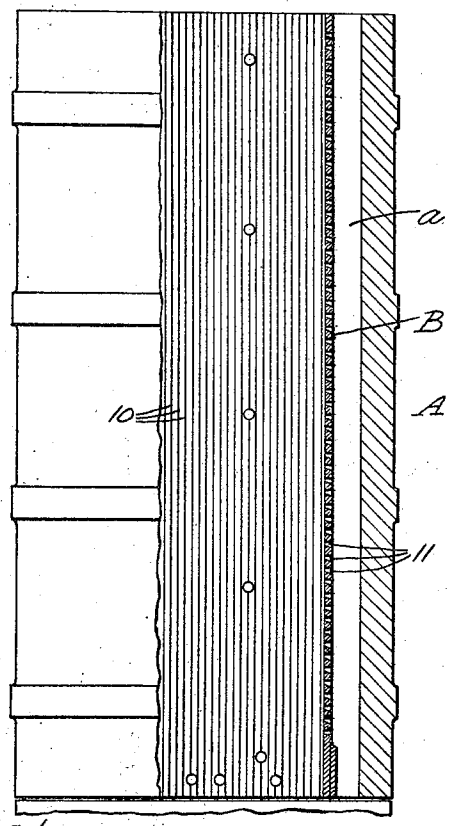
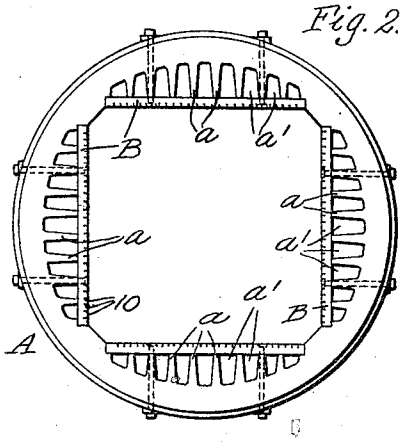


Fig. 1.

Fig. 2.



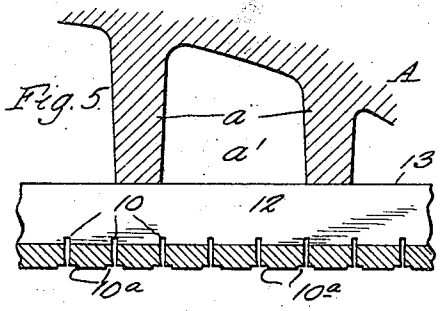


Fig. 5.

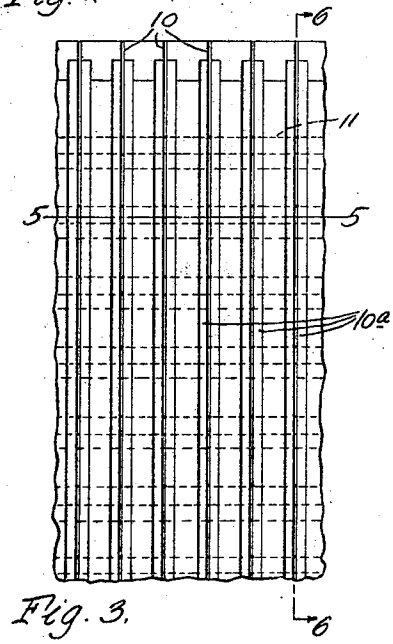


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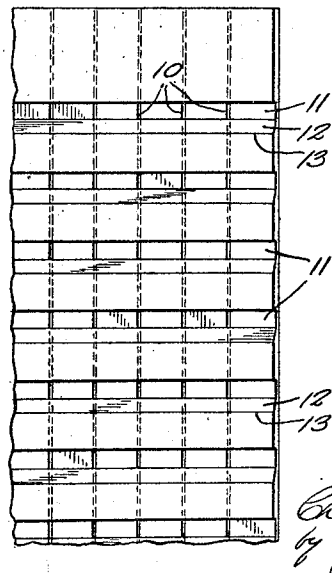


Fig. 4.

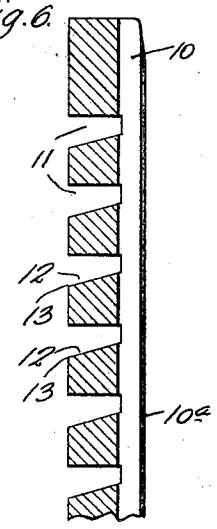


Fig. 6.

INVENTOR.
Charles B. Upton
by Parker & Rockwood.
ATTORNEYS.

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C. B. UPTON

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Fig. 7.

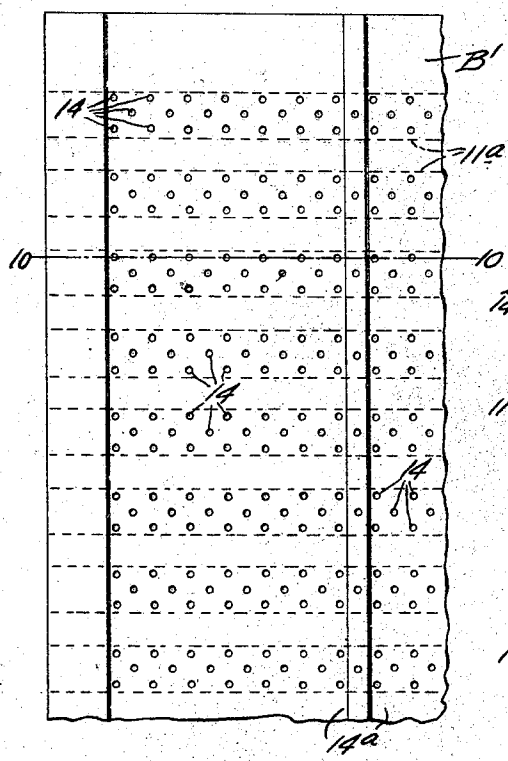


Fig. 8.

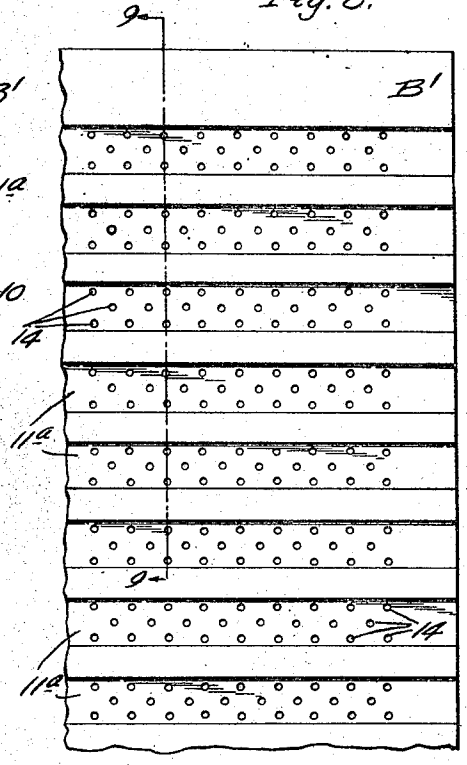
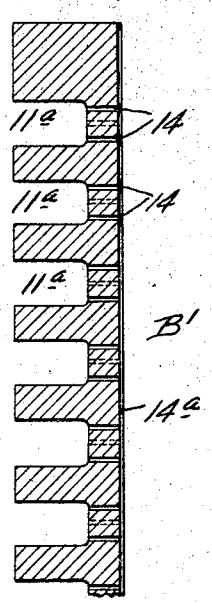


Fig. 9.



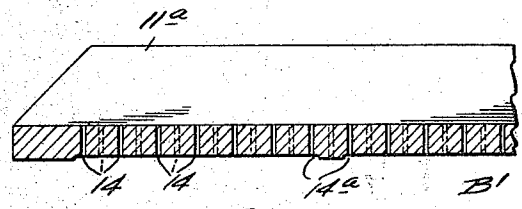


Fig. 10.

INVENTOR.
Charles B. Upton
by Parker & Rockwood
ATTORNEYS.

Patented Aug. 5, 1924. 1,503,673

UNITED STATES PATENT OFFICE.

CHARLES B. UPTON, OF PIQUA, OHIO.

DRAINAGE PLATE FOR EXPRESSING PRESSES.

Application filed February 7, 1922. Serial No. 534,820.

To all whom it may concern:

Be it known that I, CHARLES B. UPTON, a citizen of the United States, residing at Piqua, in the county of Miami and State of Ohio, have invented a new and useful Improvement in Drainage Plates for Expressing Presses, of which the following is a specification.

This invention relates to oil drainage plates or cages for oil expressing presses and more particularly to the side lining or drainage plates of the open-ended vertical cages employed in presses of the cage type.

In the use of cage presses, the charges or superimposed layers of material in the cage are usually separated by loose plates and press cloths and, as pressure is applied to the material, the oil expressed from the material finds its way through these separating plates and cloths to the sides of the press cage and escapes through small drainage openings in the side walls of the cage. In some cages the drainage openings are formed by narrow spaces left between separate parallel slats or bars. These cages are of complicated construction and difficulty is frequently experienced in preventing the bending or displacement of the slats or bars. In other cages, lining plates in the cage are provided with small drill holes through which the oil passes to flow channels formed back of the lining plates in the walls of the cage. These drill holes must be very small at their inner ends to prevent as far as possible the escape of the solid material through the holes, and in order to afford adequate drainage, each of the lining plates must have a great number of these small perforations. After such plates, as heretofore made, have been used for a period of time, the material packs into and clogs the minute holes and considerable time is required and expense incurred in the removal of the material from the holes in order to maintain adequate drainage. In other plates narrow oil escape slits are provided in the inner faces of the plates which slits communicate with drill holes or cavities in the backs of the plates.

It has been found in the use of plates of these constructions that as the oil bearing material is pressed, portions of the solid material are extruded through the small holes or slits in the inner side of the plate, and this material squeezing through the small holes or slits gradually accumulates and packs in the larger holes in the back of the plate, and as the material continues to be squeezed through the smaller holes or slits, the accumulated material in the larger holes is pushed out in the form of ropes or worms the full size of the larger holes. These ropes curl up in and fill the flow channels in the cage wall back of the lining plate, and thus result in clogging the drainage openings and interfering with the proper drainage of the oil. The packing of the material in the larger holes in the back of the lining plate itself prevents a free drainage of the oil through the drainage plate and is objectionable.

One object of this invention is to provide a non-clogging oil drainage plate of the type set forth and to accomplish this in an oil drainage plate which is economical of manufacture. Further objects are to provide improvements in cage presses and oil drainage plates therefor in the other respects hereinafter described and claimed.

In the accompanying drawings:

Fig. 1 is a fragmentary elevation partly in section of a portion of a cage press provided with lining or drainage plates embodying the invention.

Fig. 2 is a plan view thereof.

Fig. 3 is an elevation of a portion of the inner face of the lining plate.

Fig. 4 is a similar view of the outer face of the lining plate.

Fig. 5 is a fragmentary horizontal section of the plate on line 5—5, Fig. 3.

Fig. 6 is a fragmentary vertical section thereof on line 6—6, Fig. 3.

Figs. 7 and 8 are fragmentary elevations of the inner and outer sides respectively of a lining plate of modified construction.

Fig. 9 is a fragmentary vertical section thereof on line 9—9, Fig. 8.

Fig. 10 is a fragmentary horizontal section thereof on line 10—10, Fig. 7.

A represents a cage of a cage press. With the exception of the construction of the drainage or lining plates B and the provision of suitable vertical flow channels at the outer sides of the lining plates, the cage may be of any usual or suitable construction. The cage shown consists of a hollow, open-ended shell or casting provided interiorly with vertical, spaced ribs *a* and having the drainage or lining plates B suitably secured in upright position against the inner edges of the ribs *a* at four sides of the

cage. The drainage plates are provided with openings through which the oil from the material escapes into the relatively large vertical flow channels *a'* formed in the walls of the cage between the ribs *a*.

According to the invention, means are provided for preventing solid material forced through the small openings in the inner sides of the plates from clogging up or blocking the oil drainage openings.

Each of the drainage plates B is provided in its inner side, i. e., that side which is presented to the material in the cage, with a multiplicity of small or narrow openings which extend part way through the plate, and in its outer side or portion with a series of relatively larger openings, preferably transversely extending grooves, which extend to and communicate with the small openings in the inner side of the plate and the flow channels in the walls of the cage. Means are also provided at its outer side for breaking up any solid material extruded from the drainage plate so as to prevent the material from packing at the back of the plate and clogging the drainage openings. As shown in Figs. 1 to 6, the small openings in the inner side of the plate are preferably in the form of narrow slits 10 which extend longitudinally of the plate and continuously from the upper to the lower ends of the plate and are preferably located in shallow depressions 10^a formed in the inner face of the plate. 11 designates the grooves in the back of the plate, these grooves being of greater width than the slits 10 and preferably formed with outwardly diverging walls, the grooves shown having downwardly inclined lower sides 12 which terminate in abrupt edges or shoulders 13. The grooves 11 preferably extend transversely the full width of the plate and intersect the slits 10. Material forced out through slits 10 passes into the grooves 11 in the form of thin tapes, and the formation of the grooves 11 as described, reduces the frictional contact of the edges of the tapes of material with the walls of the grooves and ensures that the tapes will readily pass out of the grooves into the flow channels *a'* at the back of the plate. The continuous grooves having the diverging sides or sloping bottoms thus prevent the material from packing or building up in the grooves, and as the material is squeezed out in the form of very thin tapes, the weight of the overhanging ends of the tapes as they project beyond the abrupt shoulders or edges 13 of the grooves, will cause the tapes to separate or break at the shoulder 13, before they have traveled very far beyond the shoulder, and fall in small flakes or pieces to the bottoms of the flow channels, from which they will be washed out by the oil.

In Figs. 7–10 there is illustrated a modified form of the invention, in which small drill holes 14 are provided in the inner side of the plate B' instead of the longitudinal slits hereinbefore described. These holes, as in the case of the slits, extend part way through the plate, and are preferably disposed in shallow depressions 14^a in the inner face of the plate in positions to communicate with the respective transverse grooves 11^a.

The sloping bottoms of the grooves 11 materially aid in preventing the material from accumulating in the grooves because the solid material passing through the small slits or drill holes is readily washed off of the sloping bottoms by the accompanying oil. Furthermore, the grooves being continuous across the plate make it much easier to remove any possible accumulations therefrom. All material that may collect in any groove can be quickly removed by one stroke of a suitable implement along the groove, whereas if the small holes or slits connected with separate larger holes or cavities in the back of the plate, each hole would have to be cleaned individually, thus causing a great loss of time in cleaning the plates, and making the cleaning operation much more difficult. When a cast outer shell is used for the cage, the ribs against which the drainage plates bear are not always absolutely uniformly spaced, and one or more of the ribs may come directly back of and cover some of the drainage holes, thereby closing the holes and preventing drainage through them if separate or disconnected holes are used in the back of the plate. By the use of the continuous grooves instead of disconnected holes in the back of the plate, there will be a free opening on each side of the ribs for the oil and material to escape, thus insuring better drainage. Each groove 11 crosses and communicates with all of the flow channels *a'* back of it in the cage, so that if one or more of the flow channels should become clogged the oil could escape through the remaining open flow channels.

The positioning of the slits or holes in the depressed portions of the inner side of the plate prevents burring or wearing of the plate at the slits or holes which would tend to close the slits or holes and which might otherwise occur through contact with the movable, horizontal separating plates used in the cage between the superimposed charges of material.

Referring to the construction of the plates of this invention, the relatively wide grooves 11 may be readily planed in the backs of the plates, such operation requiring less time and involving less expense than to drill separate holes in the backs of the plates of prior constructions. The narrow slits in the inner faces of the plates of the preferred construction, first described, can be formed in any suitable way, such for instance as described

in Patent No. 1,311,160, of July 29, 1919, to Alfred W. French.

I claim as my invention:

1. A side lining plate for press cages having spaced vertically disposed drainage slits in the side thereof which faces the material being pressed, a plurality of horizontally extending open faced grooves in the opposite side of the plate and each connecting with a plurality of said slits, whereby solid material forced through said slits passes out of the open faces of said grooves transversely of said grooves in the form of thin tapes, and parts at said opposite side of said plate for causing said tapes to break up as they pass out of said grooves.

2. A side lining plate for press cages consisting of a unitary body having spaced drainage openings of small cross section in the side thereof which faces the material being pressed, and a plurality of relatively wide grooves transversely disposed in the opposite side of the plate and each connecting with a plurality of said small openings, said grooves having outwardly diverging side walls and open portions, whereby material forced through said small openings will pass transversely out of said grooves.

3. A side lining plate for press cages consisting of a unitary body having spaced drainage openings of small cross section in the side thereof which faces the material being pressed, and a plurality of relatively wide grooves transversely disposed in the opposite side of the plate and each connecting with a plurality of said small openings, said grooves having outwardly and downwardly sloping bottoms terminating in abrupt shoulders, whereby material forced through said small openings will pass out of said grooves and be broken off at said shoulders.

4. A side lining plate for press cages consisting of a unitary body having spaced drainage openings of small cross section in the side thereof which faces the material being pressed, and a plurality of relatively wide grooves transversely disposed in the opposite side of the plate and each connecting with a plurality of said small openings, each of said grooves having an inclined side wall for facilitating the escape from said groove of material forced through said small openings.

5. A side lining plate for press cages having spaced drainage openings of small cross section in the side thereof which faces the material being pressed, and a plurality of relatively wide grooves transversely disposed in the opposite side of the plate and each connecting with a plurality of said small openings, each of said grooves having an inclined side wall and an abrupt edge having portions spaced from the outer walls of said cage for facilitating the escape from said groove and the breaking up of material forced through said small openings.

6. A side lining plate for presses consisting of a unitary body having narrow drainage slits in the side thereof which faces the material being pressed, a plurality of grooves in the opposite side of the plate and each connecting with a plurality of said slits, whereby solid material forced through said slits passes out of said grooves in the form of thin tapes, and means at said opposite side of said plate for causing said tapes to break up as they pass out of said grooves.

7. A side lining plate for presses having narrow drainage slits in the side thereof which faces the material being pressed, a plurality of grooves in the opposite side of the plate and each connecting with a plurality of said slits, whereby solid material forced through said slits passes out of said grooves in the form of thin tapes, and abrupt shoulders at the outer edges of said grooves and spaced from the adjacent side walls of the press and over which the tapes travel for causing said tapes to be broken into pieces as they pass out of said grooves.

8. A side lining plate for presses consisting of a unitary body having a plurality of drainage openings of small cross section in the side thereof which faces the material being pressed, a plurality of openings in the opposite side of the plate and connecting with said first-mentioned openings, whereby material forced through said first-mentioned openings passes out through said second-mentioned openings, and means at said opposite side of the plate for causing the material to break into pieces as it passes out of said openings.

9. In a cage press, the combination with cage walls having relatively large vertical flow channels therein, of an inner side lining plate consisting of a unitary body having spaced drainage openings of small cross section in the side thereof which faces the material being pressed, and a plurality of relatively wide grooves transversely disposed in the opposite side of the plate and each connected with a plurality of said small openings, said transverse grooves communicating with said vertical flow channels, whereby material forced through said small openings will pass out of said grooves into said flow channels.

10. A new article of manufacture for use as a press plate consisting of a unitary body having in its under face a plurality of spaced relatively wide grooves said body having a plurality of relative narrow spaced slots leading in from the top face of the body and communicating with the grooves, the slots being arranged to extend across the body substantially transversely of the grooves.

CHARLES B. UPTON.