

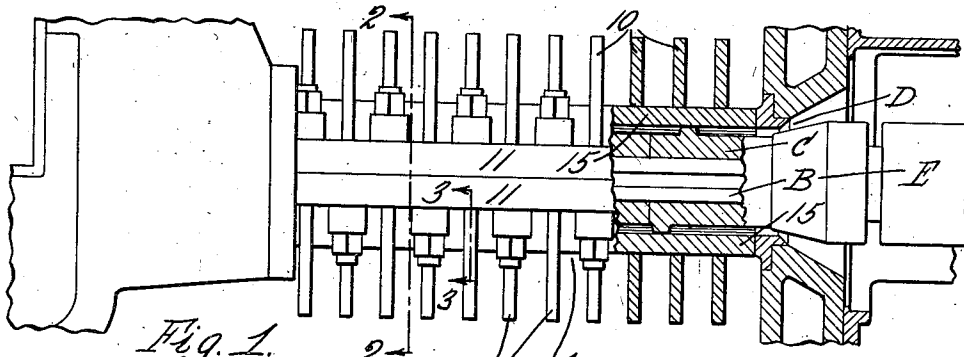
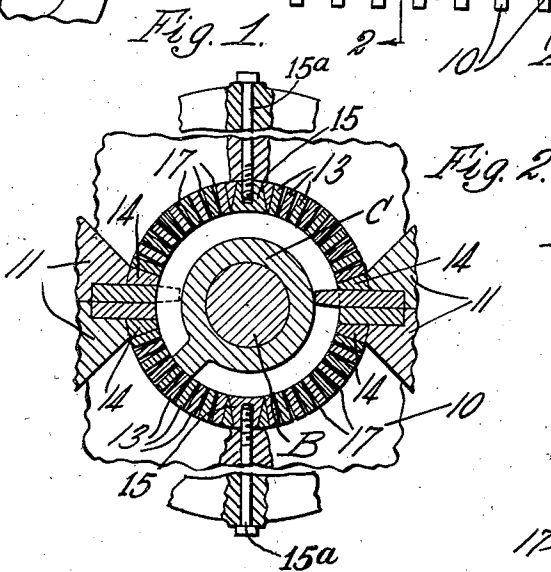
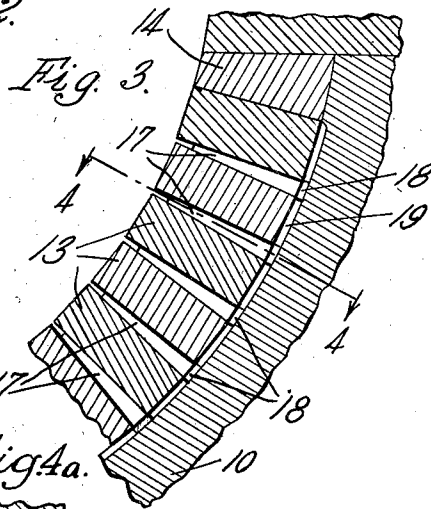
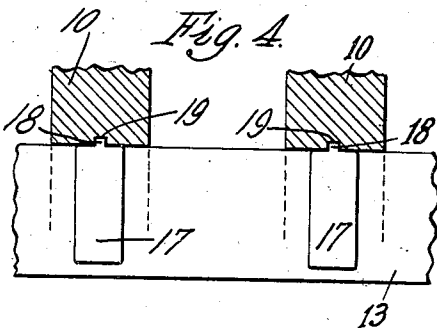
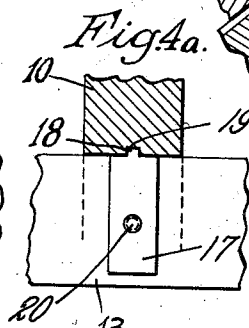
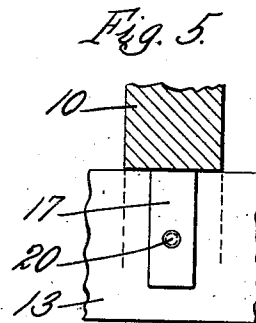
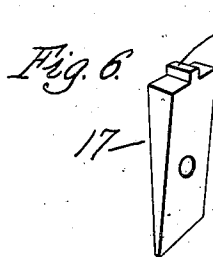
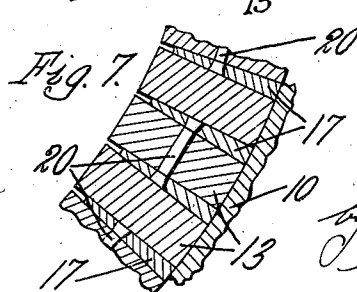
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C. B. UPTON

2,118,992

PRESS CAGE

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## UNITED STATES PATENT OFFICE

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## PRESS CAGE

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Application February 19, 1935, Serial No. 7,236

4 Claims. (Cl. 100—48)

This invention relates to press cages and more particularly to improvements in the cages of continuous presses of that kind used for expressing oil or liquid from materials, which comprise a drainage cage or barrel into which the material is fed and in which an axial rotating shaft having one or more screws or worms advances the material lengthwise through the cage and extrudes the solid material through an opening at the end of the cage, thus creating pressure which squeezes from the material its oil or liquid, which escapes through the drainage openings of the cage.

The circumferential walls of the cages of such presses are commonly composed of longitudinal bars separated by narrow spaces which form the drainage slits or openings for the expressed liquid, and in a well known construction, these spaced bars are separate or disconnected and are removably clamped in place in a surrounding skeletonized reinforcing shell or structure with spacing elements interposed between the bars for spacing them the required distance apart to form the narrow drainage slits.

In the operation of these presses, the action of the rotating worm or screw produces a great pressure on the material which reacts laterally as well as longitudinally on the the drainage bars and tends to displace the bars from their intended uniformly spaced positions. The bar spacing devices heretofore used become deformed or displaced sooner or later by the pressure on them and on the bars and permit the bars to pile up or stack at one side in the cage so as to close or restrict the drainage slits between some of the bars and enlarge or widen those between other bars, and thus seriously interfere with the proper drainage and efficient operation of the press, the restricted or closed slits preventing adequate escape of the liquid and the enlarged spaces allowing the foots or solid material to escape there-through with the liquid. Such displacement of the bars furthermore results in frequent breakage of the bars, and to avoid this, it has been the practice to use thicker bars than would otherwise be necessary. Obviously, the thicker the bars are, the less number of bars and intervening drainage slits there will be in a cage of given diameter.

The primary object of my invention is to provide positioning means for the drainage bars of press cages which will effectually prevent such displacement of the bars and ensure the intended spacing of the bars, and thus increase the efficiency of the press and at the same time enable

the use of thinner bars and a greater number of bars in a cage of given diameter.

Other objects of the invention are to provide spacing means for press cage drainage bars which are of simple, inexpensive construction but will be efficient and reliable in operation; and also to provide spacing means for cage drainage bars having the other features of improvement and advantage hereinafter described and set forth in the claims.

In the accompanying drawing:

Fig. 1 is a fragmentary, side elevation, partly in section, of a press provided with spacing means embodying my invention for the cage drainage bars.

Fig. 2 is a transverse section thereof, slightly enlarged, on line 2—2, Fig. 1.

Fig. 3 is a fragmentary, transverse section, on an enlarged scale, on line 3—3, Fig. 1.

Fig. 4 is a longitudinal, sectional elevation on line 4—4, Fig. 3.

Fig. 4a is a view similar to Fig. 4, but showing one of the spacers riveted to a drainage bar.

Fig. 5 is a similar longitudinal, sectional elevation showing a slightly modified construction.

Fig. 6 is a perspective view of one of the spacers.

Fig. 7 is a transverse section showing an arrangement in which a pair of spacers are secured on the opposite faces of alternate cage bars.

A represents the cage of the press and B the rotating worm shaft extending axially there-through and equipped with one or more pressure worms or screws C. D is the usual extrusion opening for the solid material and E the usual cone or adjusting device for regulating the width of the extrusion opening.

Except as regards the spacing means for the cage drainage bars, the cage may be of any usual or suitable construction, and the cage shown is of known construction, comprising a longitudinally divided, two-part, skeletonized reinforcing shell or structure, each section of which is made with spaced, transverse ribs 10 joined at their opposite ends by connecting members 11 disposed lengthwise at diametrically opposite sides or portions of the cage. The parts of the cage are separably secured together, as by bolts connecting the adjacent members 11 of the two cage parts. The circumferential drainage wall of the cage is formed by the separate spaced drainage bars 13 secured against the inner edges of the ribs 10 of the cage parts, for instance, as shown, between fixed abutment bars 14 and an adjustable key or clamping bar 15 on each of the two

cage parts. The key bars may be wedge-shaped and adjusted for clamping the drainage bars by any usual or suitable means, such as screws connected to the key bars and passing out through the ribs to enable their operation to draw the wedge bars outwardly. Fig. 2 shows one of these operating screws 15a for each key bar.

17 represents the spacers or spacing devices between the drainage bars 13 for spacing the latter apart. These spacers are arranged at suitable intervals between adjacent drainage bars, for instance, the spacers between each two adjacent bars corresponding in number with and being arranged in the planes of the ribs. The spacers are of wedge shape and extend radially of the cage with their thick, outer ends contacting with the curved inner edges of the ribs 10, and the spacers are made of suitable metal having the necessary hardness and rigidity to withstand the pressure and wear to which they are subjected. They may, for instance, be made of steel, die castings or forgings, which are practically non-compressible or non-deformable.

As shown in Figs. 3 and 4, each wedge spacer 17 is provided at its outer thick end with a rectangular lug or projection 18 adapted to enter and fit in a circumferential groove 19 in the inner edge of the rib 10. The engagement of these lugs in the grooves of the ribs prevents displacement of the spacers lengthwise of the drainage bars, and when the drainage bars with the intervening spacers between them are clamped in place in the cage, the lugs and the wedge form of the spacers prevent the spacers from being twisted or shifted out of their intended radial position, perpendicular to the long edges of the drainage bars, by the pressure of the material on the spacers. The engagement of the lugs in the rib grooves, the wedge shape of the rigid, incompressible spacers and the abutment of the thick ends of the spacers against the inner edges of the ribs all cooperate to prevent the spacers from being twisted or shifted to oblique positions by the pressure and movement of the material in the cage.

While the spacers thus formed and arranged will operate efficiently without being fixed or fastened to the drainage bars, but by being simply clamped in position between the bars with their outer ends against the ribs and the lugs entering the rib grooves, the spacers may be fixedly attached to the drainage bars. For instance, the spacers may be secured on opposite sides of alternate drainage bars, as by rivets passing through the bar and through the spacers on opposite sides thereof, as shown in Figs. 4a and 7. Fig. 6 also shows the spacer as provided with a transverse hole for the securing rivet, and this hole is preferably tapered inwardly or toward that side of the spacer which contacts with the drainage bar to which the spacer is riveted, as shown in Fig. 7, so that the rivets can be headed to secure the spacers in place without having the rivet heads project beyond the flat outer faces of the spacers.

As shown in Figs. 5 and 7, the spacers are of the wedge formation described, but are not provided with the lugs or projections 18, and they are riveted on the opposite sides of each alternate drainage bar with the thick, outer ends of the spacers abutting against the inner edges of the cage ribs 10. With the thick edges of the spacers thus abutting against the inner edges of the ribs, the single small rivet for each pair of wedges on opposite sides of a drainage bar will securely retain the wedges in place against longitudinal or oblique displacement, but by providing the spacers

with the end lugs seated in the grooves 19 in the ribs, the lugs will further cooperate with the rivets to rigidly fix the spacers in position. In case the spacers are not fixed or attached to the drainage bars, the provision of the lugs 18 on the spacers greatly facilitates the assembling of the bars and spacers in the cage, since the drainage bars can be laid in position one after another in each cage section and the spacers placed against the exposed face of each bar with their lugs in the rib grooves. The grooves thus serve to properly align or position the spacers and to retain them in position until all of the drainage bars are put in place and, together with the interposed loose spacers, are clamped in position in the cage section.

It should be noted that the spacers are practically non-deformable solid blocks of hard steel or the like, and if they are riveted to the bars, the rivet heads do not project beyond the side faces of the spacers so that the spacers bear directly and flatly against the bars at their opposite sides. Therefore the rivets do not directly take the pressure of the bars and the rivets can be made of copper or soft metal and of small size. This is very different from previous constructions in which the bars contact with projecting rivet heads, which, necessarily being relatively soft, would crush under pressure and permit displacement of the bars. The described constructions produce improved results greatly superior to the previously used thin riveted spacing plates with projecting rivet heads, and the spacers formed up into wedge shape from thin spring or sheet metal and which collapse or crush in use under the pressure thereon. The spacers can be made by die-casting with great accuracy any thickness required to make drainage slots of any width desired between the cage drainage bars. The spacers usually being die cast, the width of slot they produce can be indicated on the spacers by casting thereon numbers showing the slot widths in thousandths of an inch, such as .010", .015", .020", etc. making it easy to distinguish one size from another.

I claim as my invention:

1. A press cage comprising spaced longitudinal drainage bars, a reinforcing structure having bar-supporting faces against which the outer edges of the drainage bars are secured, and rigid spacers arranged between the drainage bars transversely thereof for spacing the bars apart and having end lugs engaging in grooves extending across the outer edges of the drainage bars in said bar-supporting faces, said bars and spacers being movable on said faces in the direction of the length of said grooves for crowding the bars and spacers together, and means for so crowding the bars and spacers together to secure them in place.

2. A press cage comprising an outer reinforcing structure having transversely curved inner bar-supporting faces, spaced longitudinal drainage bars arranged with their outer edges against said curved faces, wedge-shaped spacers arranged radially between said bars and having at their thick outer ends lugs engaging in grooves extending across the outer edges of said bars in said curved faces, said bars and spacers being movable on said faces in the direction of the length of said grooves for crowding the bars and spacers together, and means for forcing said bars and spacers together for securing them in place.

3. A press cage comprising an outer reinforcing structure having transversely curved inner bar-supporting faces, spaced longitudinal drainage

bars arranged against said curved faces, wedge-shaped spacers arranged between said bars and having at their thick outer ends lugs engaging in grooves extending transversely of said bars in said curved faces, and means for crowding and clamping said bars and interposed spacers together in said reinforcing structure.

4. A press cage comprising an outer reinforcing structure having transversely curved inner bars supporting faces, spaced longitudinal drainage

bars arranged against said curved faces, wedge-shaped spacers arranged between said bars and having at their thick outer ends lugs engaging in grooves extending transversely of said bars in said curved faces, rivets securing the spacers to alternate drainage bars on opposite sides thereof, and means for crowding said bars together to secure them in place.

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