Dec. 3, 1940. A. W. FRENCH, JR 2,223,514

SPACING MEANS FOR THE CAGE BARS OF PRESSES

Filed Dec. 24, 1937

Fig. 1.

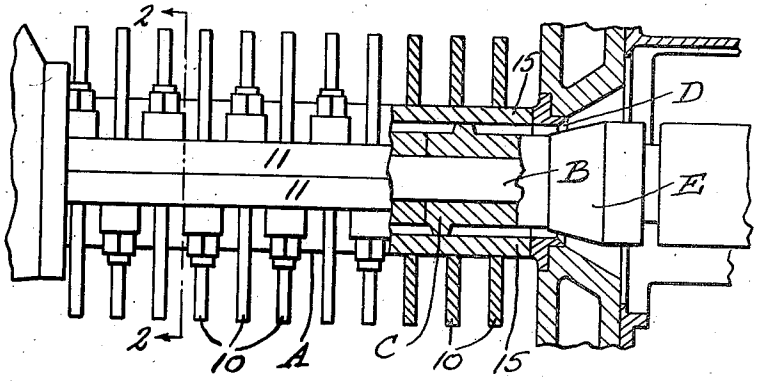


Fig. 2.

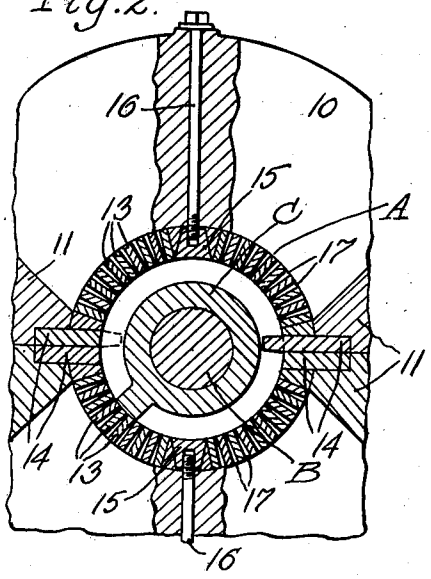
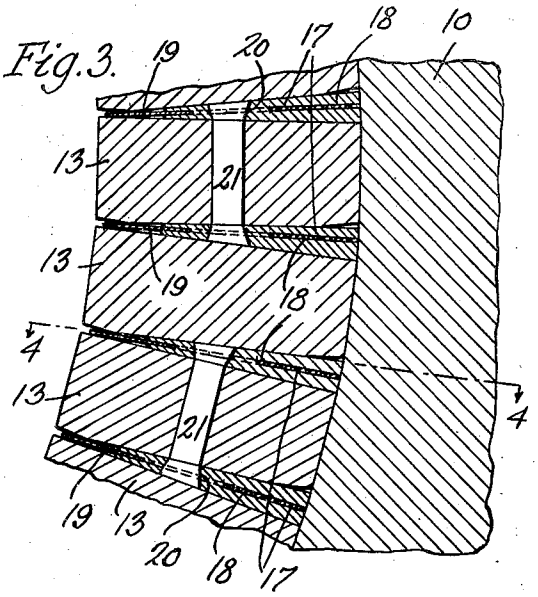


Fig. 3.



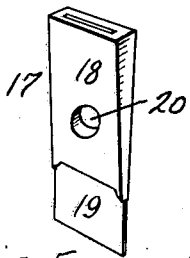


Fig. 5.

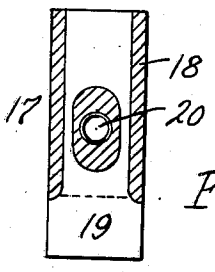


Fig. 6.

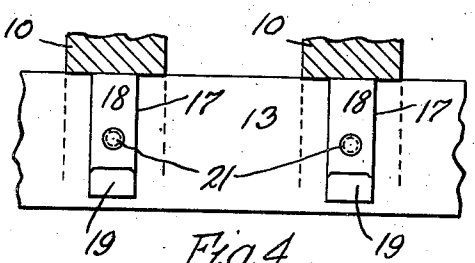


Fig. 4.

INVENTOR.
Alfred W. French Jr.
By Parker, Prochnow & Farmer.
ATTORNEYS.

Patented Dec. 3, 1940 2,223,514

UNITED STATES PATENT OFFICE

2,223,514

SPACING MEANS FOR THE CAGE BARS OF PRESSES

Alfred W. French, Jr., Piqua, Ohio, assignor to The French Oil Mill Machinery Company, Piqua, Ohio

Application December 24, 1937, Serial No. 181,559

3 Claims. (Cl. 100—48)

This invention relates to improvements in spacing means or devices for the cage bars of presses used for pressing materials to express oils or liquids therefrom.

In continuous or screw presses of the type comprising an axial screw or worm rotating in a cage or cylinder for forcing liquid-containing material through the cage and through a restricted opening at one end of the cage, thereby creating pressure which squeezes liquid from the material, the cage walls are commonly composed, in part at least, of separate longitudinal bars spaced apart to form between them narrow drainage slits for the escape of the expressed liquid. The great pressure and the movement of the material against the cage bars wears them rapidly and tends to break, distort or displace the bars and, therefore, these cages should be constructed so as to permit convenient adjustment and replacement of the bars either singly or collectively. In a well known construction intended to facilitate such adjustment and replacement, the bars are arranged in groups of separate bars which are removably secured in place by crowding or pressing the bars and their interposed spacing means together between clamping or pressure means acting on opposite sides of the group of bars so that all the bars of the group are simultaneously secured in place by a single or common clamping means, and when the clamping means is operated to unclamp the bars, the whole group of bars is released, and any one, several or all of the bars, can be readily adjusted or removed. In such an arrangement, in which each bar is not individually fastened in place, it is essential to proper performance and efficiency of the press that bar spacing means be used which will not allow the bars to shift so as to vary the widths or uniformity of the slits between the bars.

The spacing devices embodying my invention are particularly desirable for spacing the bars in such continuous press cages, and the objects of the invention are to provide means by which the cage bars can be accurately spaced so as to provide extremely narrow slits of definite and uniform width between the bars, and which will prevent shifting or displacement of the bars so as to change the widths or uniformity of the slits between them in the use of the presses; also to provide bar spacers which are of simple and inexpensive but durable construction, which will prevent change of form or dimensions of the spacers so as to permit shifting or change of position of the bars with which they are used; which are of substantially wedge shape and made with integral hardened plates at their thin ends so that such ends can be made very thin and yet made precisely of the different gages or thicknesses necessary to give different required widths of the narrow slits between the inner edges of the cage bars; which consist of cast metal wedges, the thin edges of which are formed by thin, hardened or spring steel plates integral with the cast bodies of the wedges.

In the accompanying drawing:

Fig. 1 is a view, partly in elevation and partly in section, of a screw press having a cage with bars spaced by spacing devices embodying my invention.

Fig. 2 is a transverse, sectional elevation thereof on line 2—2, Fig. 1.

Fig. 3 is a fragmentary, enlarged, transverse section showing several of the cage bars and the intervening spacers.

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

Fig. 5 is an enlarged perspective view of one of the spacers, showing the spacer larger than actual size.

Fig. 6 is a longitudinal, sectional view of the spacer.

Said drawing illustrates the use of the spacers for spacing the cage bars of a continuous screw press of known construction, comprising a press cage A and a rotating worm shaft B extending axially therein and equipped with one or more pressure worms or screws C, the cage having the usual extrusion opening D at one end for the exit of the solid material, and an adjustable cone or device E for regulating the area of the extrusion opening. Except as regards the spacers for the drainage bars, the press cage may be of usual or any suitable construction.

The cage shown comprises a skeletonized outer frame formed by separable, longitudinally divided sections each having substantially semicircular, spaced transverse ribs 10 joined at their opposite ends by longitudinal side members 11 at diametrically opposite sides of the cage, and a circumferential drainage wall formed by separate longitudinal drainage bars 13 secured against the inner edges of the ribs 10. As shown, the drainage bars are secured in groups between fixed longitudinal abutment bars 14 and an adjustable key or clamping bar 15 on each cage section between the two abutment bars. The key bars may be of wedge shape in cross section and adjusted for clamping the groups of drainage bars between the key bars and the opposing abut-

ment bars in any suitable way, as by means of the usual screws **16** passing out through holes in the ribs to enable their operation for drawing the key bars outwardly to crowd together the group of drainage bars between each key bar and a cooperating abutment bar.

17 represents the spacers, which are arranged between the drainage bars so as to hold them apart and form a drainage slit or opening between each two adjacent drainage bars. Usually several spacers are arranged at spaced intervals between each two drainage bars **13**, with one spacer in the plane of each of the ribs **10** of the cage. The drainage bars being substantially rectangular in cross section and arranged radially of the cage, the spaces between them increase in width from the inner to the outer periphery of the slatted wall formed by the bars, the spaces or openings thus forming narrow slits between the bars at their inner edges so as to obstruct the passage therethrough of solid material, while any foots which escape through the slits can more readily escape from the openings, by reason of their outwardly increasing width, and not clog the openings. In expressing liquid from some materials, such for example as oil from finely ground oil bearing seeds or meal, it is necessary for the slits between the inner edges of the bars to be very thin. These slits may range, for example, from three thousandths of an inch to twenty-five thousandths of an inch or more in width, depending upon the material which is to be pressed in the cage, and it is important to maintain the width of the slits between the various bars constant and uniform and prevent shifting or displacement of the bars in the cage in such a way as to alter the widths or uniformity of the drainage slits.

In order to accomplish these results and realize the stated objects of the invention, the spacers are made of tapering or substantially wedge shape in cross section with opposite, preferably rectangular side faces, adapted to bear flat against the faces of the drainage bars between which the wedges are located when the drainage bars occupy their normal radial positions. Preferably each spacer comprises a substantially wedge-shaped body **18**, of cast metal, and a thin, flat plate **19** of hardened or spring steel having parallel opposite faces, which is rigidly connected to and integral with the cast wedge body. This end plate projects out from the cast body and forms the thin end of the wedge spacer. This spacer can be readily produced to very precise dimensions by die casting, the hardened plate which forms the thin end of the spacer being inserted in the die casting mold, so that when casting the body of the spacer, the hardened plate will be integrally and rigidly connected with and preferably embedded partially in the cast body, as shown in the drawing. The spring steel end plates can be fabricated to the precise required gage or thinness, even if that be as thin as three thousandths of an inch, and since the inner edges of the drainage bars bear against the opposite faces of the end plates, the latter accurately determine the width of the slits between the inner edges of the drainage bars. These end plates being of spring or hardened steel, the pressure of the drainage bars thereon in the use of the press cannot compress, deform or mutilate the thin ends of the spacers, as happens with cast or malleable metal spacers. Therefore, the drainage bars cannot be crowded or loosened and shifted out of their normal radial positions by mutilation or deformation of the spacers, due to pressure on the drainage bars. Die cast spacers of the described construction can be produced cheaply and with much greater precision to required dimensions than spacers made by milling or machining, and they are more durable than spacers made wholly of cast metal. It has been found under operating conditions that the thin ends of all-cast spacers made from the toughest metal that can be die cast would squash out, and reduce the space between the drainage bars of the cage and thus loosen and displace the bars. This cannot happen with the described spacers; the thicker portions of the spacers will not compress or crush under the pressure thereon, and the thin steel ends cannot be compressed or deformed, and therefore, neither the inner nor outer edge portions of the drainage bars can shift so as to loosen or displace the bars and alter their spacing.

Since the spacers are clamped between the drainage bars by the clamping means for the bars, it is not absolutely essential to otherwise fasten the spacers. Preferably, however, each spacer is secured to a drainage bar. For instance, the spacers on opposite sides of each alternate bar may be riveted thereto by rivets **21** passing through holes in the bar and having their ends upset to form tapered heads seated in inwardly tapering holes **20** in the spacers. The rivet heads are made flush with or below the outer faces of the spacers so that the rivets will not project out and prevent said faces of the spacers from bearing flat against the adjacent drainage bars throughout the full length of the spacer bodies. Thus, the rivets cannot prevent the accurate positioning and holding of the bars by the accurately formed wedge spacers, as would occur if the bars bore against or were held apart by the heads of rivets, since in such case it would be practically impossible to form all of the heads of the same dimensions and inclination, which would be necessary for accurate and uniform spacing and holding of the bars.

I claim as my invention:

1. A spacer for the drainage bars of press cages, comprising a substantially wedge-shaped metal body and a thin flat plate of harder metal than the body fixedly connected to said body and projecting from the thin end thereof, said plate having parallel opposite faces.

2. A spacer for the drainage bars of press cages, comprising a substantially wedge-shaped cast metal body and a hardened steel thin flat plate with parallel opposite faces fixed in said cast body and forming the thin end of the spacer, said body and plate having anchoring portions interlocking with each other.

3. A spacer for the drainage bars of press cages, comprising a substantially wedge-shaped cast metal body and a thin flat hardened steel plate with opposite parallel faces embedded in and integral with said cast body and projecting lengthwise from the thin end of the body.

ALFRED W. FRENCH, JR.