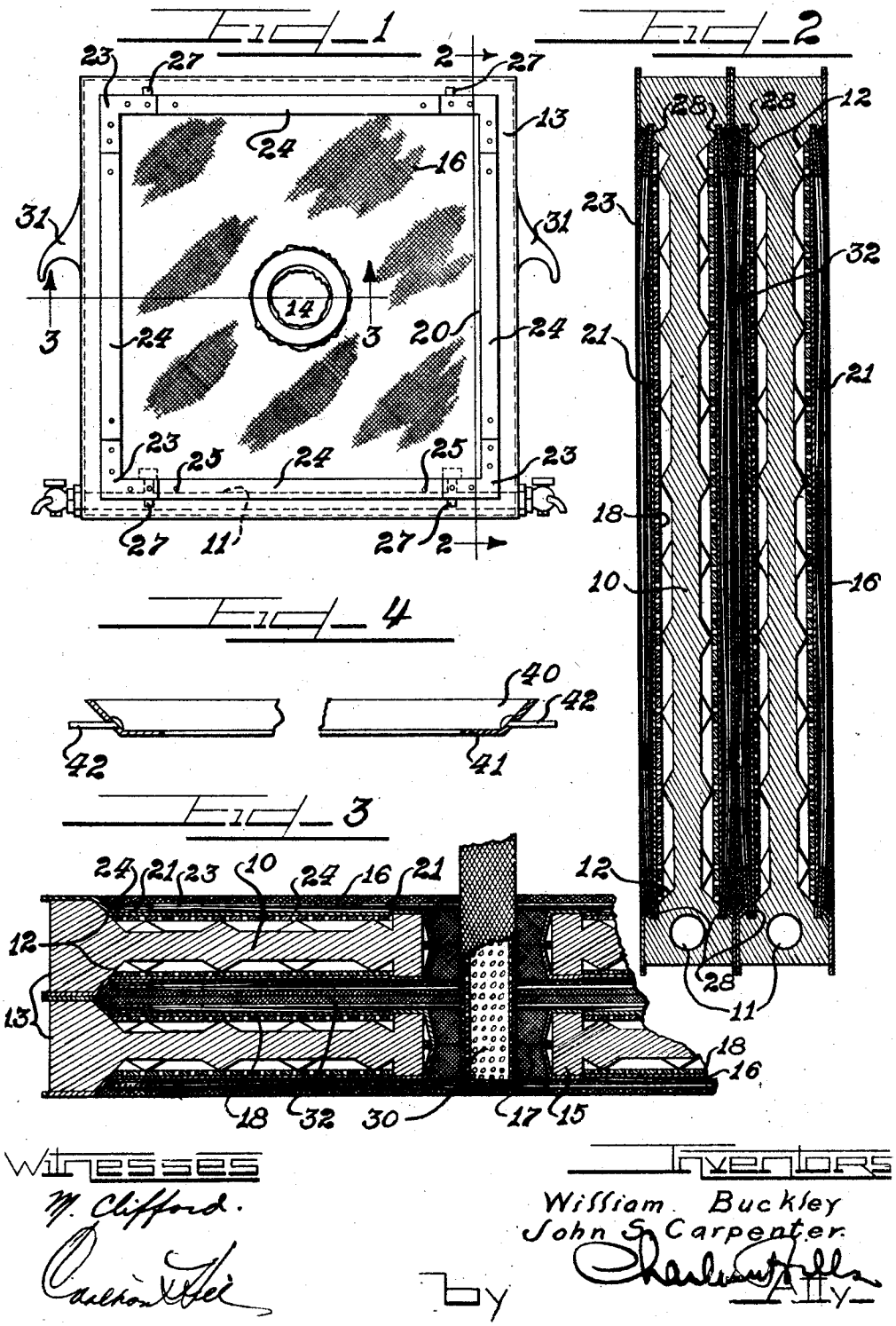
June 2, 1925. 1,540,251

W. BUCKLEY ET AL

CLOTH HOLDER FOR FILTER PRESSES

Filed Feb. 28, 1923



Witnesses

W. Clifford.

Inventors

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John S. Carpenter.

by

Atty

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UNITED STATES PATENT OFFICE.

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CLOTH HOLDER FOR FILTER PRESSES.

Application filed February 28, 1923. Serial No. 621,722.

To all whom it may concern:

Be it known that we, WILLIAM BUCKLEY and JOHN S. CARPENTER, both citizens of the United States, and residents of the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in a Cloth Holder for Filter Presses; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the numerals of reference marked thereon, which form a part of this specification.

It is an object of this invention to provide a device which shall hold the cloth in a filter press cell smoothly in place while the press is being assembled.

It is a further object of this invention to provide a device of the class mentioned which shall exert a firm pressure over the whole length of each edge of the cell, although fastened only at the corners.

It is a further object of this invention to provide a device of the class described which shall be inexpensive to manufacture, readily and easily applied and not likely to deteriorate with use.

It is a further object of this invention to protect the cloth of a filter press cell from undue strain and rapid deterioration.

Other and further important objects of this invention will be apparent from the disclosures in the specification and the accompanying drawings.

The invention (in a preferred form) is illustrated in the drawings and hereinafter more fully described.

On the drawings:

Figure 1 is a side view of a filter press plate with the cloth in place and the cloth holding frame applied thereto.

Figure 2 is a section upon a larger scale on the line 2—2 of Figure 1.

Figure 3 is a section upon a still larger scale upon the line 3—3 of Figure 1.

Figure 4 is a detail section showing a modification.

As shown on the drawings:

The cells of the filter press are made in the usual way by providing a series of base plates 10, so that cells are formed between each pair of adjacent base plates. These base plates have the usual ducts 11 for draining away the filtered liquid and the usual extra thickness at their edges providing sloping shoulders 12. The thicker part of the base plates outside of these shoulders constitutes a frame 13 completely surrounding the thinner portions of the base plate and serving to receive and transmit the pressure when the plates are forced toward one another in the filter press. At the center of each base plate is a hole 14 surrounded by a collar 15 which extends up above the general level of the base plate, but not as high as the frame 13.

Each base plate is covered with fabric 16, the two sheets of fabric upon the two faces of the base plate being united by portions which pass through the hole 14, as indicated by the seam 17 in Figure 3. Between each sheet of fabric and the base plate are the usual foraminated plates or screens 18 supported at frequent intervals by projections on the base plate. None of these projections, however, extend as high as the collar 15. The outer margins of the fabric 16 extend over the frame 13 so that, when the plates 10 are forced against one another by the action of the press, these margins of the filter fabric are tightly secured in place.

Between the margin and the central portion, the fabric 16 passes over the shoulders 12. When the liquid to be filtered is introduced into the press and pressure is exerted to force the liquid through the filter, the strain on the fabric is largely localized at the shoulders. If, therefore, the fabric can be held in place against the perforated plate 18 during the act of assembling the press so that when the hydrostatic pressure acts the fabric will be certainly supported by the perforated plate 18 and will not be dragged across the shoulders 12 or pulled at these shoulders, a considerable strain upon the fabric will be saved with the consequence that the fabric will last longer even when the liquids filtered are of a kind that tend to deteriorate the fiber of the fabric.

For this purpose, a frame 20 of sheet material is provided to hold the fabric in place closely contacting with the perforated plate 18. This frame is made of sheet material of an elastic nature. Sheet brass may be used except in those cases where the liquid to be filtered attacks brass. The frame 20 is built in two layers. The lower layer 21 is preferably all in one piece. The layer is therefore in the form of a hollow rectangle. The upper layer is made of corner pieces

23 and of strips 24 extending from each corner piece to the next. The corner pieces 23 are riveted to the layer 21. Holes for rivets are made in the strips 24 and in the corresponding part of the layer 21, but these holes, when the frame is being assembled, do not register, the holes in the strips 24 being slightly nearer together than the corresponding holes in the layer 21, so that the layer 21 must be caused to buckle or bend in order to get the rivets into the holes 25.

After the two layers of the frame are thus secured together, the frame does not lay flat, but the several sides buckle or curl slightly. The curling or bending is illustrated in Figure 2, but it is there very much exaggerated for the sake of showing it. In the actual construction, the departure from a flat frame is very much less than is shown in this figure. At the four corners the frame is provided with tongues 27 which enter corresponding recesses in the shoulders 12, as may be seen at 28 in Figure 2.

In the use of the device, when assembling the filter press, the screens 18 are first placed against the base plate 10. The cloth belonging with any base plate is made of two parts sewed together at the seam 17. One of these two parts is passed through the hole 14. Each of the two parts is then spread out over its face of the base plate and made to lie flat against its screen 18. The frame 20 is then bent enough to enable the tongues 27 to be introduced into the slots 28. Preferably the fabric 16 is provided with holes which, when the fabric is in place, register with the slots 28 and so afford passage for the tongues. When the tongues have been introduced into the slots 28, the frame will lie nearly flat against the cloth.

The buckling or curling of the layer 21 and the fact that the strip 24 is shorter than the corresponding part of the layer 21 will cause the central part of each side of the rectangular frame to press elastically against the cloth, bringing it snugly into position where the screen 18 meets the shoulder 12. The shorter strip 24 and the corresponding longer part of the layer 21 give to each side of the frame a structure very like a truss so that, although held only at each end, the middle part of the side will press against the cloth practically as well as the ends do. Moreover, since the arcuate member of the truss is only very slightly bowed, the pressure thereof against the cloth flattens a very considerable length of said member with the result that an effective pressure is exerted against the cloth over almost the whole length of the side. Thus, before the press is assembled, the cloth is made to lie snugly against the screen 18 along all four edges.

Application of fluid pressure to the cloth will therefore not cause any further tendency for the margin of the cloth to creep inward over the edge of the screen 13. Consequently the fact that these margins are clamped when the press is tightened will not induce any strain at the angle between the flat face of the frame 13 and the oblique shoulder 12, nor any strain at the angle between this shoulder and the screen 18. Because the fabric is wholly supported by the screen 18 or the oblique face of the shoulder 12, no increase in pressure against the fabric will cause any pull across said oblique face.

When the cloth has thus been fastened in position by application of the frame 21, the several units are united in the filter press by being strung along the feeding tube 30, the several plates being supported during this assembly of the press by means of the ears 31. When the press is tightened, the pressure of each plate 10 against its neighbor causes the margins of the fabric to be pinched between the faces of the frames 13. When liquid with its suspended solids is introduced through the pipe 30, it passes into the space 32. From there the liquid passes through the fabric 16 leaving the solids in the space 32. As the solids accumulate on the inner face of the fabric, the pressure tending to urge the liquid through the fabric presses the fabric more and more firmly against the screen 18, but no motion of the fabric takes place and therefore no stretching at its edges or corners, because the fabric is already flat against the screen 18. No matter how great the pressure exerted by the liquid is, it produces no tendency to tear the cloth at the very points where heretofore it was most frequently torn.

In the modification shown in Figure 4, the frame is shown in the form of a tray with its bottom cut away. The beveled sides 40 stand at such an angle to the bottom 41 that they fit the beveled shoulders 12. The frame is in its structural character like an angle bar and consequently will exert pressure against the cloth throughout the whole length of each side of the frame without the necessity of the two-layer structure explained in connection with Figure 1. At each of the four corners tongues 42 are provided to co-operate with the slots 28 in the same way as the tongues 27. These tongues are secured to the frame 40 in any desired way.

We are aware that numerous details of construction may be varied through a wide range without departing from the principles of this invention, and we therefore do not purpose limiting the patent granted otherwise than necessitated by the prior art.

We claim as our invention:

1. In a filter press unit, a base plate, a frame connected with said base plate by oblique shoulders, said frame being of great-

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R. N. CHAMBERLAIN

STORAGE BATTERY

Filed Aug. 27, 1921

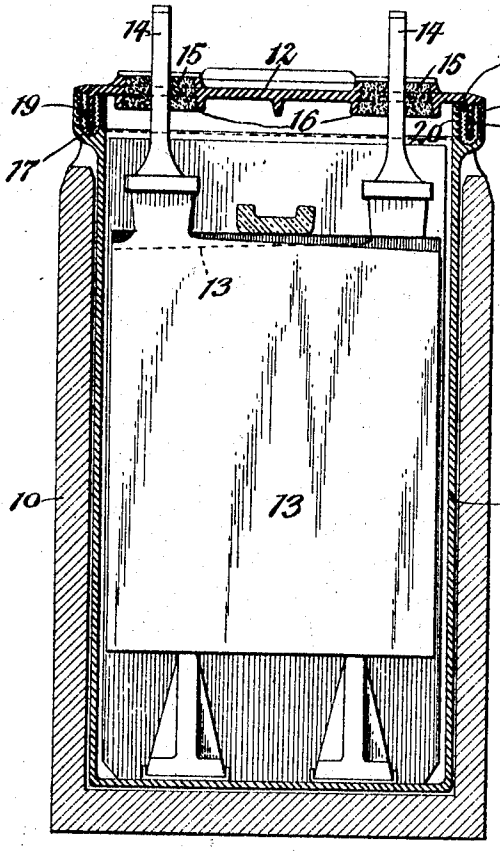


Fig. 1.

Fig. 5.

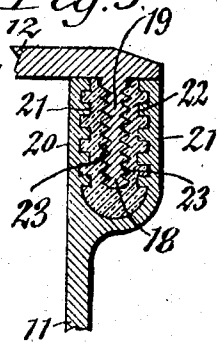


Fig. 2.

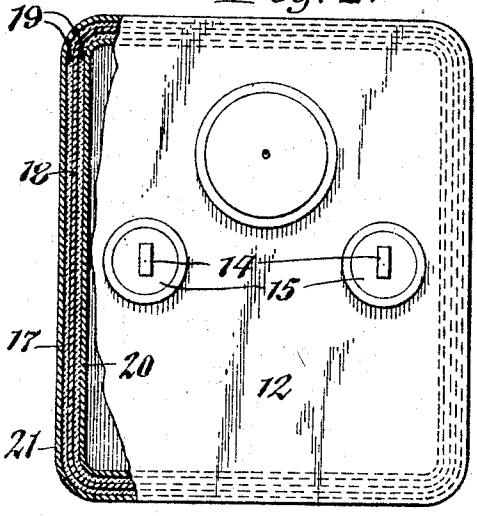


Fig. 3

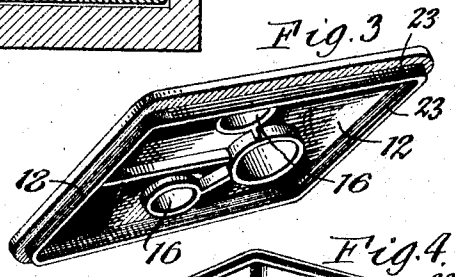
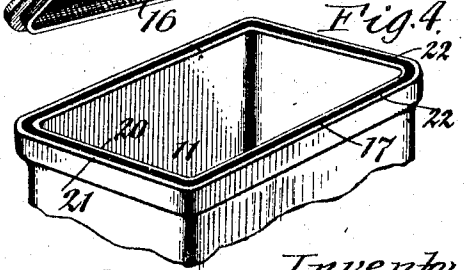


Fig. 4.



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