March 25, 1952 C. J. FUSCO 2,590,242

MULTIPLE DISK FILTER

Filed Nov. 23, 1945 2 SHEETS—SHEET 1

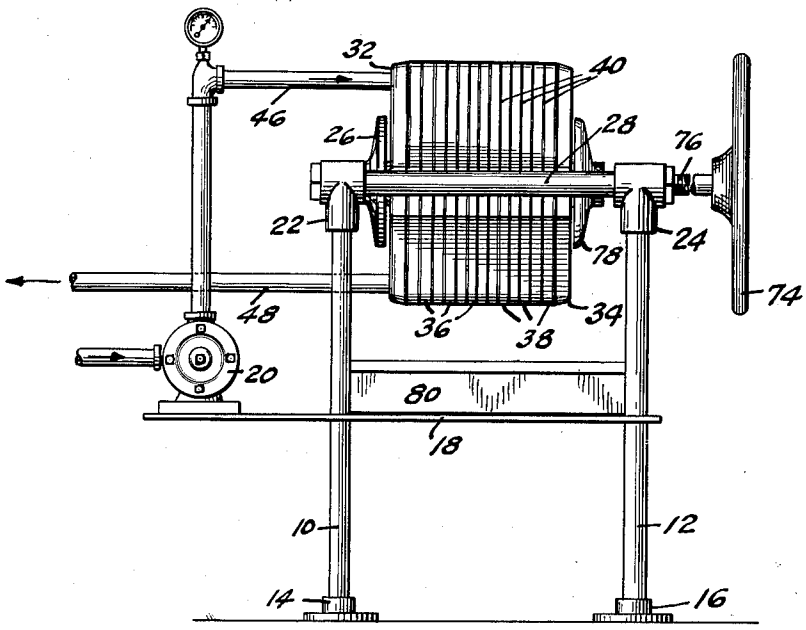


FIG. 1.

FIG. 2.

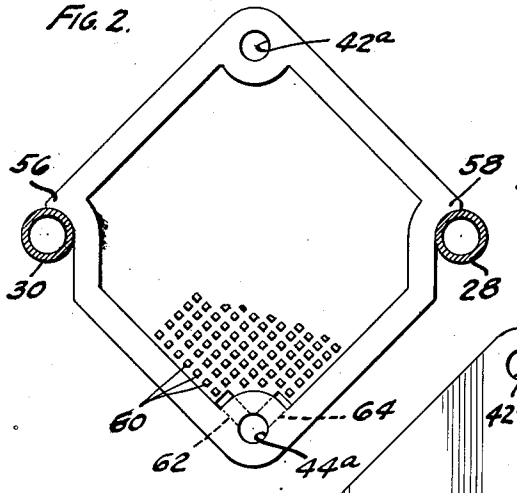
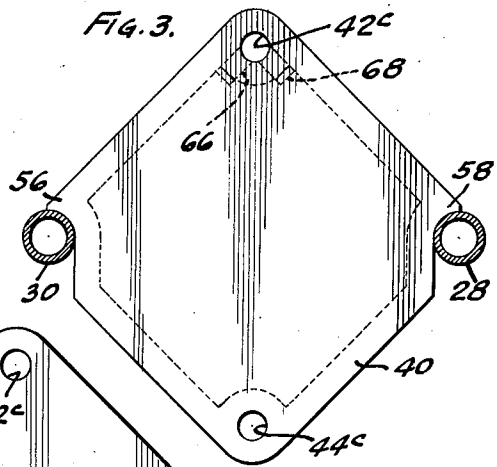


FIG. 3.



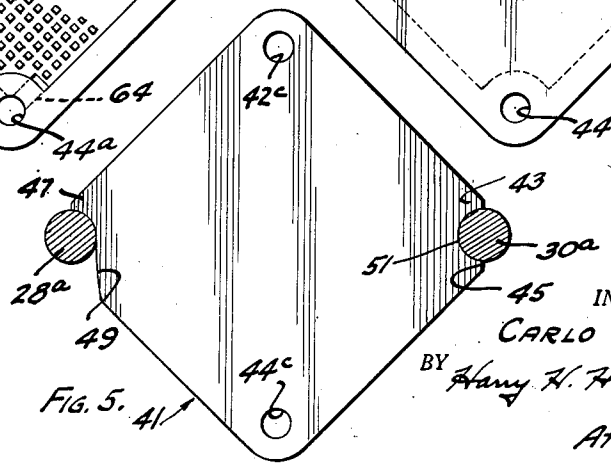


FIG. 5.

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MULTIPLE DISK FILTER

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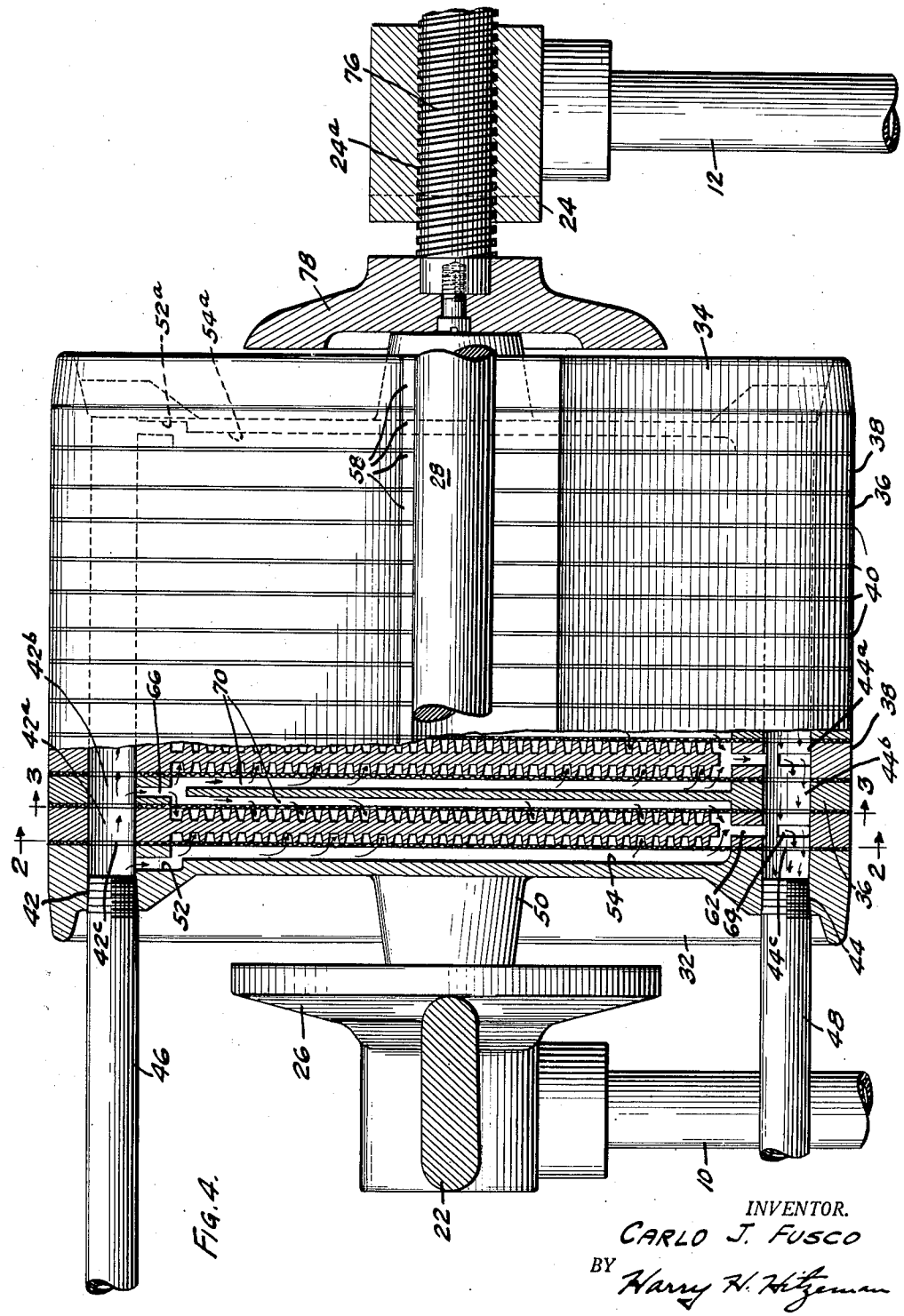

FIG. 4.

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MULTIPLE DISK FILTER

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2 Claims. (Cl. 210—188)

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My invention relates to filters and relates more particularly to filter presses of the type utilizing a plurality of filter sheets and filter plates.

The principal object of my invention is to provide an improved construction of multiple disc filter composed of a minimum number of different parts and so arranged that assembly or disassembly is easily and quickly accomplished.

A further object of my invention is to provide an improved low cost filter having a large filter area and adapted to be easily dis-assembled to increase or decrease the filter area.

A further object is to provide an improved filter sheet of such shape and so arranged in the press that there is practically no waste of material in making the sheets.

A further object is to provide sheets of the type described and co-operating plates so constructed that individual sheets and plates are accurately and rigidly supported and clamped together, but when the clamping means are loosened each sheet or plate may be lifted out of the assembly, or additional plates and sheets added quickly and easily.

Other objects and advantages will be more apparent from the following description wherein reference is had to the accompanying two sheets of drawings, upon which

Fig. 1 is a side elevational view of my improved filter;

Fig. 2 is a cross-sectional view thereof taken on the lines 2—2 of Fig. 4;

Fig. 3 is a similar sectional view thereof taken on the lines 3—3 of Fig. 4;

Fig. 4 is a generally longitudinal sectional view of the filter taken generally in the plane of Fig. 1, with parts broken away in section to more clearly show other parts, and

Fig. 5 is a cross-sectional view of a modified form of filter sheet.

In the embodiment of the invention which I have chosen to illustrate, in Fig. 1 I have shown a supporting framework which may include the upright post members 10 and 12 provided with suitable base plates 14 and 16. Two of the uprights 10 and two of the uprights 12 are provided. A shelf 18 of sheet metal or other material may be suitably secured to the four posts and extend forward to provide a platform for a pump 20.

At the upper end of the post 10 I provide the cross-frame member 22 and at the upper end of the posts 12 I provide a similar cross-frame member 24. The back cross-frame member 22 may be provided with a medially disposed stop member 26. Parallel rods 28 and 30 may connect the

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members 22 and 24 and form a support for the filter plates and sheets later to be described.

The filter unit may consist of two similarly shaped end plates 32 and 34, in-plates 36, out-plates 38, and filter sheets 40. The end plate 32 is provided with a pair of tapped openings 42 and 44 to receive inlet and outlet conduits 46 and 48. This plate is also provided with a centrally disposed boss 50 which, when the plates are clamped together, is pressed against the pad 26 on the cross-frame 22. The bore 42 may have a passageway 52 connected thereto and communicating with a shallow depression 54 in the wall of the plate which terminates short of the bore 54.

The out-plates 38, as most clearly shown in Fig. 2, are provided with bores 42*a* and 44*a* adapted to be aligned with the bores 42 and 44 when the plates are hung in position on the rods 28 and 30. I provide hook members 56 and 58 on both end plates, the in- and out-plates and the filter sheets for the purpose of supporting them on the side rails 28 and 30. The out-plate 38 is further provided on both faces with a plurality of rows of humps 60 and passageways 62 and 64 communicating with the bore 44*a*.

Each of the in-plates 36 is provided with a bore 42*b* and 44*b* aligned with the bores 42 and 44 and passageways 66 and 68 communicating with shallow depressions 70 upon opposite sides of the plate.

The filter sheets 40 comprise filter paper of any desirable thickness, but preferably sufficiently rigid to be self-supporting when placed upon the side rails 28 and 30. These sheets are also provided with openings 42*c* and 44*c* aligned with the bores 42 and 44. The front end plate 34 has a passageway 52*a* and chamber 54*a* similar to the end plate 32.

With the construction provided, when a plurality of filter sheets 40, in- and out-plates 36 and 38 and two end plates 32 and 34 are assembled together, the material to be filtered will enter the filtering unit through conduit 46, and as shown by the arrows, pass downwardly through the various filter sheets and out through the conduit 48.

In order to firmly hold the filter unit assembly together, I have provided a clamping mechanism which may include the hand wheel 74, the screw member 76, and the thrust member 78 rotatably secured to the forward end of the screw 76. The screw 76 may screw-threadedly engage a tapped bore 24*a* in a suitable boss in the frame member 24. A pan 80 may be disposed on the platform 18 below the filter unit to receive any material

which may be spilled or wasted during operation or during change of filter plates.

From the above and foregoing description it can be seen that I have provided a filter unit construction which is comparatively simple in operation and which is comparatively simple to manufacture and assemble. The speed with which filtering may be done will depend upon the number of filter sheets employed, and this may be easily and quickly varied by turning the hand-wheel **74** and either placing more filter sheets and plates on the support rods **28** and **30** or removing them.

Another advantage of this construction lies in the fact that practically the entire stock from which the filter sheets are made can be utilized because of the shape which I employ for both the filter sheets and the plates. By reason of the square construction and the hook members **56** and **58**, only small corner sections of the paper are removed in the stamping of the sheets from the material. Since filter sheets must be frequently changed, the most important maintenance cost of a filter unit lies in the supplying of new filter sheets, and with my construction, the medium form which the sheets are made is almost 100% utilized.

In Fig. 5 I have illustrated a modified form of filter wherein the filter sheets **41** are formed slightly different from those previously described. In this construction, and for the purpose of more easily centering the sheets upon the support rods **28***a* and **30***a*, the sheet **41** is provided with an arcuate groove **51** at the right side, and a pair of outwardly projecting ears **43** and **45**. The opposite side of the sheet has a single ear **47** and an arcuate edge **49** which is on a radius from the center of the rod **30***a*. In placing these sheets between the filter plates, the groove **51** and ears **43** and **45** are filtered about the rod **30***a*, and the sheet is then swung downwardly in an arc until the ear **47** seats upon the rod **28***a*.

With this construction it can be seen that the sheets are very easily centered upon the support rods so that the inlet and outlet openings **42***c* and **44***c* are more accurately aligned. It will of course be understood that the in- and out-plates **36** and **38**, as well as the end plates **32** and **34** may be of the same shape as the filter sheet **41**.

While I have illustrated and described a specific embodiment of the invention, it will be apparent to those skilled in the art that changes and modifications may be made in the exact details shown, and I do not wish to limit myself in any particular; rather what I desire to secure and protect by Letters Patent of the United States is:

1. A filter unit comprising a supporting frame having a pair of front upright post members and a pair of back upright post members, a cross-brace horizontally connected between said pair of front upright post members and a similar cross-brace connected between said pair of back upright post members, a pair of parallel horizontally disposed rod members connected between the two front and the two back cross-braces, a front and a back end plate, a fluid inlet conduit and a fluid outlet conduit connected to said back end plate, a medial boss on each of said end plates, the boss on said back end plate positioned against said back cross-brace, a plurality of generally square, similarly shaped filter plates and filter sheets, each filter plate and each filter sheet having hook members formed thereon by removing small portions thereof at opposite corners within the square, said hook members terminating in parallel side edges and adapted to engage on said rods to support said filter plates and filter sheets thereon, the rods being adjacent the parallel side edges and said plates and sheets being supported by gravity upon said rods, said plates and sheets having openings therein aligned with said fluid inlet and outlet, and clamping means screw-threadedly mounted in said front cross-brace adapted to bear against the boss on said front end plate to assemble said end plates, filter plates and filter sheets in operative relation against the boss on said back end plate.

2. A filter unit comprising a supporting frame having a pair of front upright post members and a pair of back upright post members, a cross-brace horizontally connected between said pair of front upright post members and a similar cross-brace connected between said pair of back upright post members, a pair of parallel horizontally disposed rod members connected between the two front and the two back cross-braces, a front and a back end plate, a fluid inlet conduit and a fluid outlet conduit connected to said back end plate, a medial boss on each of said end plates, the boss on said back end plate positioned against said back cross-brace, a plurality of generally square, similarly shaped filter plates and filter sheets, each filter plate and each filter sheet having hook members formed thereon by removing small portions thereof at opposite corners within the square, said hook members adapted to engage on said rods to support the same thereon, said plates and sheets having openings therein aligned with said fluid inlet and outlet, and clamping means screw-threadedly mounted in said front cross-brace adapted to bear against the boss on said front end plate to assemble said end plates, filter plates and filter sheets in operative relation against the boss on said back end plate.

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