

No. 765,277.

PATENTED JULY 19, 1904.

G. W. GERLACH.
PRESSURE FILTER.

APPLICATION FILED MAR. 7, 1904.

NO MODEL.

Fig. I.

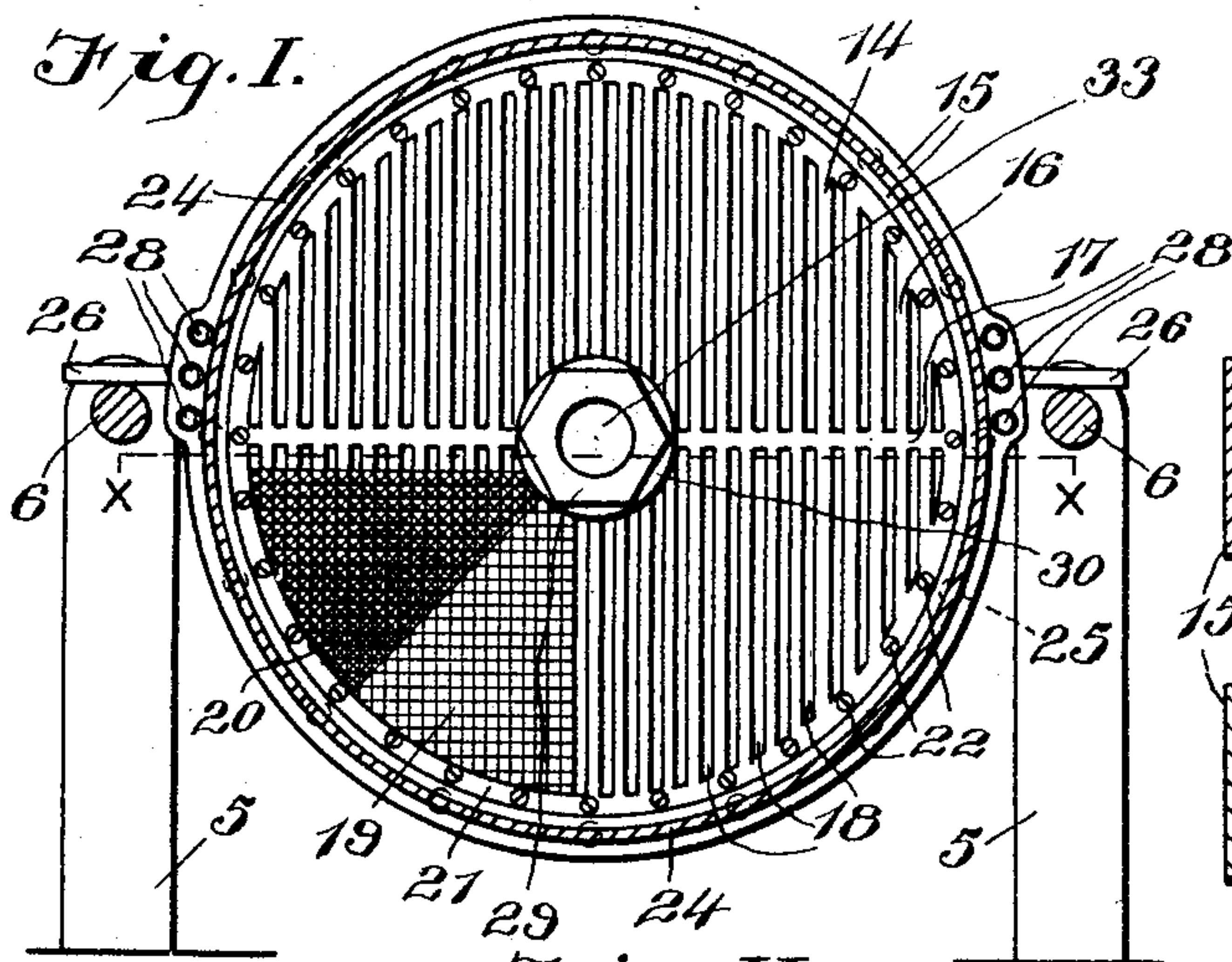


Fig. III.

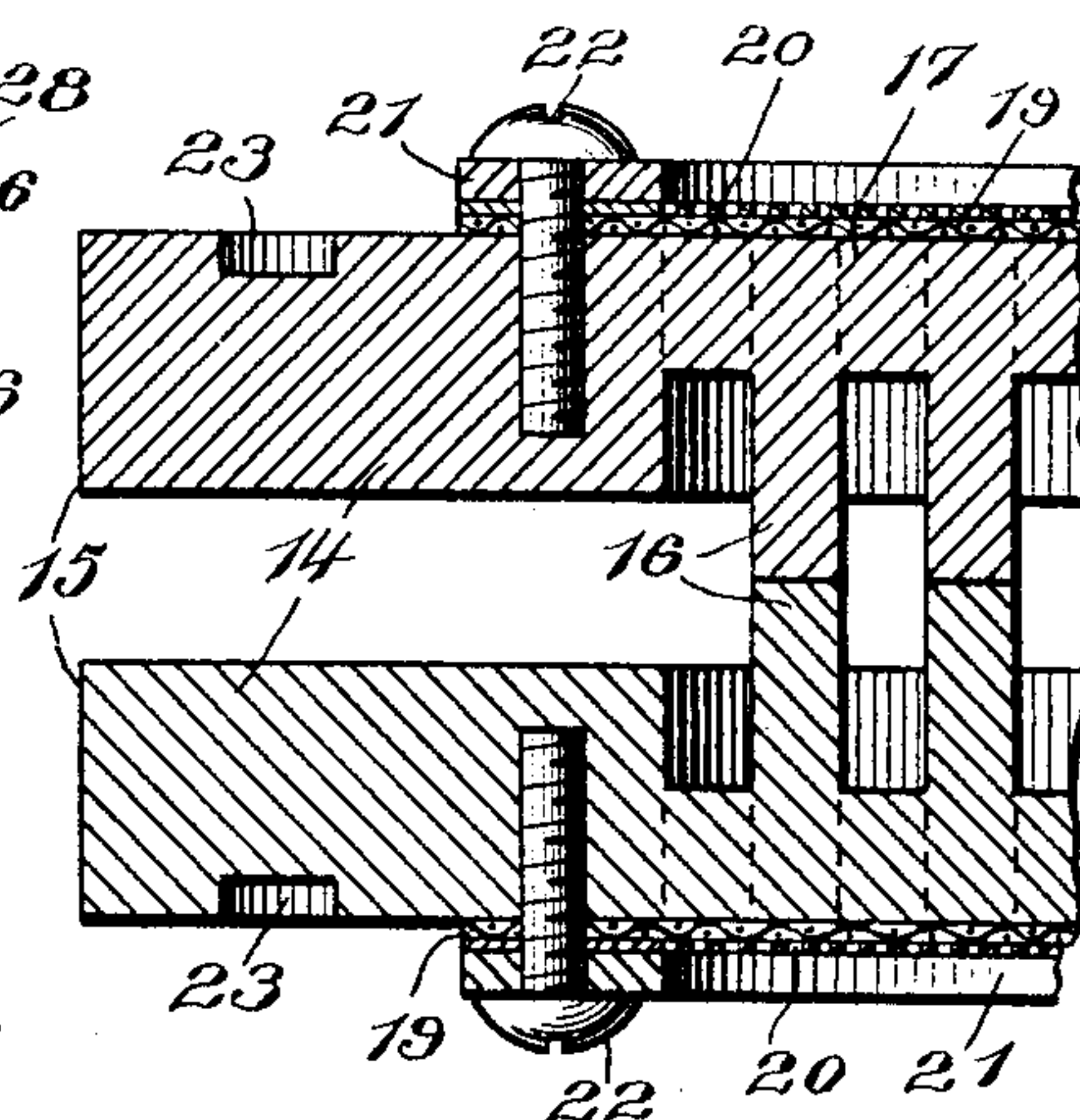


Fig. II.

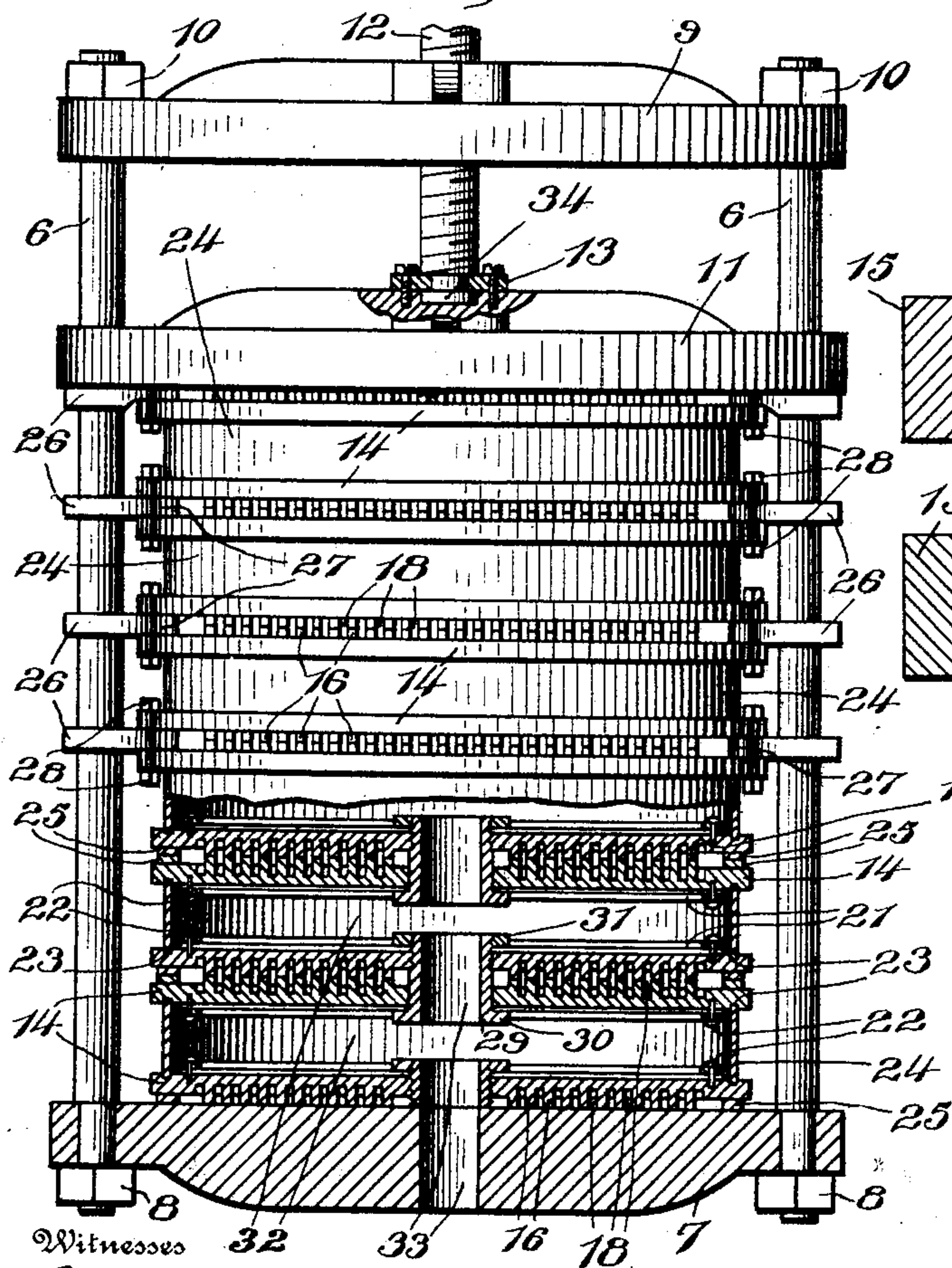


Fig. IV.

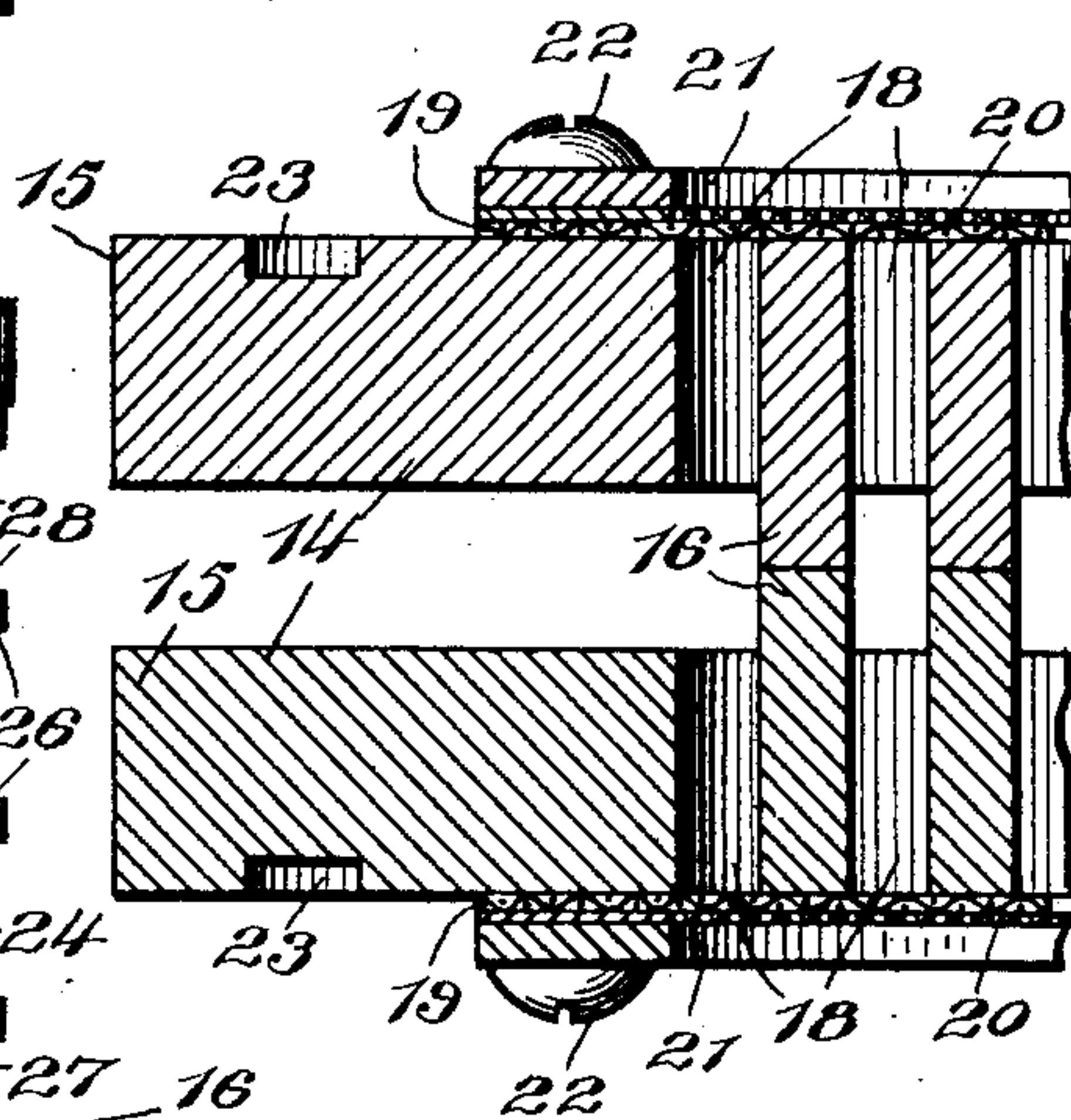
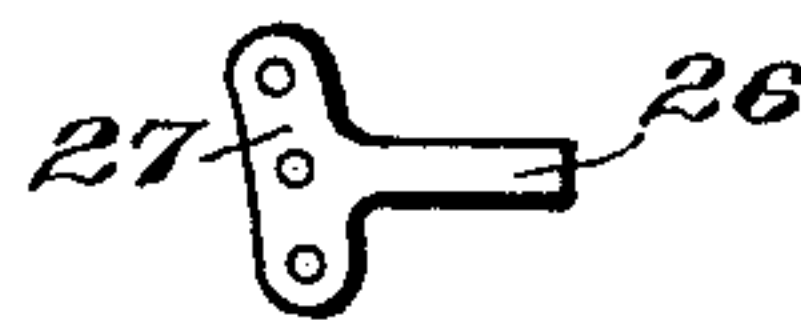


Fig. V.



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PRESSURE-FILTER.

SPECIFICATION forming part of Letters Patent No. 765,277, dated July 19, 1904.

Application filed March 7, 1904. Serial No. 196,978. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. GERLACH, a citizen of the United States, residing at Louisville, in the county of Jefferson and State of Kentucky, have invented a new and useful Improvement in Pressure-Filters; and I do hereby declare the following to be a full, clear, and exact description of the same.

This invention relates in general to mechanical means for forcibly separating solids from fluids, and more particularly to pressure-filters; and its object is to so construct and arrange metallic filtering-plates as, first, to form adequate supports for filtering-screens of any degree of fineness under pressure and yet permit entire freedom for drainage of the fluids expressed and, secondly, so as to render the screens accessible for cleaning while in service.

To this end my invention consists in the construction and combination of parts forming a pressure-filter hereinafter more fully described, and particularly defined in the claims, reference being had to the accompanying drawings, in which—

Figure I represents a transverse vertical section of a pressure-filter according to my invention looking upon the face of a filtering-plate. Fig. II is a top view, partially in longitudinal horizontal section at line *z*, Fig. I. Fig. III represents, on a larger scale, a central longitudinal horizontal section of a fragment of a pair of filtering-plates with screens attached as in service; and Fig. IV represents a similar section to that shown in Fig. III, but taken below the central cross-bar. Fig. V is a face view of a trunnion.

Numeral 5 represents legs supporting two horizontal parallel bars 6, which pass through the heavy front end plate 7 and are rigidly secured thereto by means of screw-nuts 8. 9 is a stiff yoke secured upon the opposite end of the side bars 6 by means of screw-nuts 10.

11 is the rear end plate, mounted to slide longitudinally on the side bars 6, and 12 is a screw which is threaded through the yoke 9 and stepped against the plate 11 to push the plate forward on the side rods, and 13 is a

collar which is secured to the plate 11 to engage a neck behind the head 34 of the screw 12, whereby the plate may be retracted with the screw.

14 represents my filtering-plates, which are the principal subject of this invention. Each one of these plates comprises a ring portion 15, vertical ribs 16, and a rib-supporting cross-bar 17, all cast in one piece. The ribs are each about three-eighths of an inch wide by one and a quarter inches thick, their thickness extending about a quarter of an inch through and beyond the thickness of the plate, and the openings 18 between the ribs 16 are slots about a quarter of an inch wide extending directly through the plate from front to back. The cross-bars 17 are about the same thickness as the ribs, and the ribs, with slots between them, extend across the backs of the cross-bars.

19 represents a sheet of stiff wire webbing of about one-quarter-inch mesh resting on the front face of the filtering-plate 14, and 20 represents the filtering-screen, which may be made of finely-perforated sheet metal or of finely-meshed wire-cloth or of any other fabric or material suitable for such purposes.

21 represents a ring plate secured to the screen-plate 14 by means of screws 22 and located on the edge of the screen 20 to bind it and the webbing 19 back of it upon the screen-plate, so that they cannot be pushed out of place in service.

23 represents an annular groove in the front face of each screen-plate near its edge to receive the edge of a drum 24.

25 represents either washers placed upon the back of each screen-plate or studs projecting therefrom to rest against each other and support the edges of the plates.

26 represents trunnions, each having a T-shaped head 27. One of these heads is secured between the two plates 14 of each pair, at each side edge thereof, by means of bolts 28. These bolts, furthermore, serve to hold the two plates of a pair firmly together to be handled and moved about as one piece, and

the trunnions 26, being placed upon the side bars 6, support the pairs of filtering-plates in line between the end plates 7 and 11.

29 represents a hub having a flange 30 at one end and a screw-nut 31 threaded upon the other end. The hub is also screw-threaded into one of the plates, the head 30 and the nut 31 projecting to bind the central portion of the screen 20 and the wire webbing 19 firmly upon the screen-plates 14. At the ends of the press a single plate 14 is backed against the end plate. When the two plates of a pair are placed back to back as in service, the projecting edges of their ribs 16 meet and keep their rims 15 separated about a half-inch all the way around, thus forming a free outlet for each slot 18 at both its ends. When the screw 12 is turned home, it binds between the end plates, the filtering-plates 14, and the drums 24, thus forming a cylindrical drum with a series of chambers 32 between the pairs of filtering-plates and surrounded, respectively, by the individual drums 24.

33 is a central opening through the end plates 7 and 11 and through the hub 29 of each filtering-plate for admitting to these chambers the slop to be filtered. The slop may be delivered into the press under pressure in any usual manner, and any suitable means may be used to keep the slop in circulation within the chambers or from one chamber to another.

The filtering-screen 20 may be coarse or fine, according to the conditions presented and required, and the supporting-webbing 19 may be stiffer or lighter to meet these conditions.

The only object in making these filtering-plates in two parts and then joining them in pairs is in order that the casting may be done without cores in a common two-part flask. It is evident that the plates would operate in every respect as hereinafter described whether they are made in pairs joined together, as above stated, or by casting the two plates of a pair in one piece. In the latter case the ribs would extend through from face to face of what has been described as a pair of plates, and the openings between the ribs would extend to the annular space between the rear faces of the rims; but in casting such double plates or two plates in one piece either a three-part flask would have to be used or the annular space between the rear faces of the rims would have to be made by a core. I therefore prefer making the plates to be joined in pairs to act as one with filtering-screens on both front faces of the latter, and the claims are intended to cover both of these constructions.

In operation the slop to be filtered is let into the chambers 32 under pressure and the liquid starts to running through the screen 20, the wire webbing 19, and the slots 18, which

deliver freely all around the lower half of the plates between their rims.

In filtering some kinds of material the backs of the screen become coated with sticky matter that impedes and sometimes prevents further filtration. With my press-plates a hose-nozzle may be directed into the upper end of each slot 18, so as to readily wash the back of the screen while the latter is in service, thus effecting a great saving of time over such presses as have to be stopped and opened to clean the backs of the screens. I can thus continue the process of screening without interruption until the chambers are filled with solid matter. Then by means of the screw 12 the end plate 11 may be drawn away, leaving the chambers free to be successively opened and cleared. By keeping the backs of the screens clean less pressure is required and the press will continue to run until nearly all the solids are separated from the fluid in the press, thus effecting a great saving of nutritive properties from the refuse of distillery-slop, brewers' grains, starch, glucose, casava-root, &c. These plates being of cast-iron will not warp, and the manner of securing and supporting the screens against pressure prevents injury to them, and they can be used over and over many times, and they can be readily removed and changed for different kinds of work. The fluid discharge may be caught in a trough or pans located under the press.

Having thus fully described my invention, what I believe to be new, and desire to secure by Letters Patent, is the following:

1. The combination in pressure-filters, of filtering-plates, each comprising a rim and a series of ribs which are thicker than the rim and project beyond the rear face thereof, leaving open slots through the plate between the ribs; each slot having free delivery at both its ends between the rims; a sheet of stiff webbing located on the face of the plate; a screen supported on the said webbing, a drum surrounding the space in front of the screens; heads for supporting the plates and drums longitudinally of the press and means for binding the whole together and for admitting material to be filtered.

2. In pressure-filters, filtering-plates comprising each a rim and a series of ribs extending vertically across the inner opening of the rim, and the slots between the ribs extending through the plate; the ribs being thicker than the rims of the plates and extending beyond the rear faces of the rims; the plates being secured together back to back in pairs with the ribs of the two plates registering together and resting on each other, whereby a delivery-opening is left between the rims for each slot to discharge into.

3. In pressure-filters, a filtering-plate com-

prising a rim and a series of ribs separated by slots which extend through the plate; the said ribs being thicker than the rim and extending beyond the rear face thereof, and there being
5 free delivery for the slots behind the rim.

4. In pressure-filters, filtering-plates comprising rims, and ribs extending across the inner opening thereof; the ribs extending through beyond the planes of the rear faces

of the rims, and the spaces between the ribs 10 having open delivery at their ends between the rims, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE W. GERLACH.

Witnesses:

S. H. ABSHER,

J. W. BILES.