

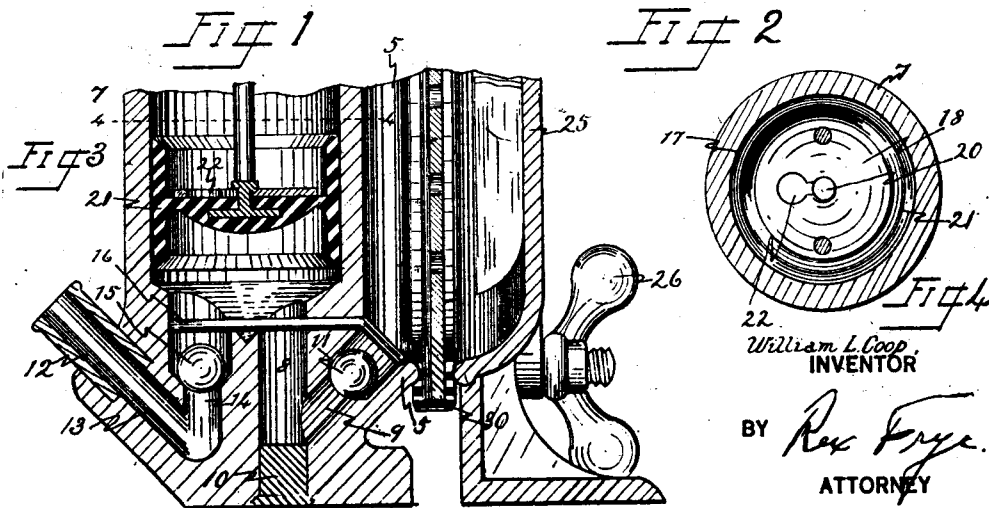
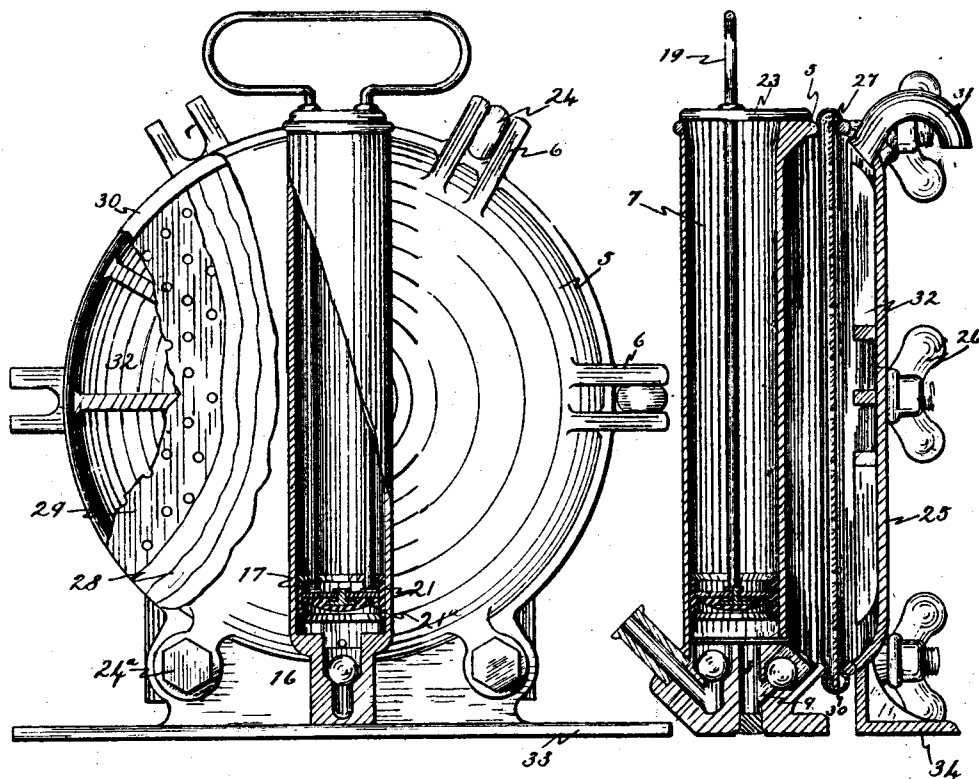
Oct. 6, 1925.

W. L. COOP

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FILTER

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William L. Coop.
INVENTOR

BY *Rex Frye.*
ATTORNEY

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UNITED STATES PATENT OFFICE.

WILLIAM L. COOP, OF DETROIT, MICHIGAN, ASSIGNOR, BY MESNE ASSIGNMENTS, TO
BRIGHTON MANUFACTURING COMPANY, A CORPORATION OF MICHIGAN.

FILTER.

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To all whom it may concern:

Be it known that I, WILLIAM L. COOP, a citizen of the United States, and resident of Detroit, in the county of Wayne and State of Michigan, have invented new and useful Improvements in Filters, of which the following is a specification.

This invention relates to an apparatus for eliminating rapidly precipitates, impurities, etc. from liquids supporting same, such as muddy water, cloudy cider, yeasty beer, fermented wine or any liquid now filtered by gravity through the usual filter paper or its equivalent.

The principal object of my invention is the rapid forcing of such liquids through a series of filter members arranged to eliminate all precipitates and other solid particles, while preventing the packing of such precipitates, etc. on the surface of the filter.

Another object of my invention is the arrangement of a plurality of filter members in vertical position between a pump and outlet with provisions for readily removing and renewing the filter members.

A further object of my invention is the construction of a filter and handpump combined that is of extreme simplicity in design and operation, and which is comparatively inexpensive to produce.

Other objects and advantages will be apparent from the following description, wherein reference is made to the accompanying drawings illustrating a preferred embodiment of my invention and wherein similar reference numerals designate similar parts throughout the several views.

In the drawings:

Fig. 1 is a side elevation of my improved filter, with parts broken away and shown in section.

Fig. 2 is a central vertical section thereof.

Fig. 3 is an enlarged detail view of the pump valves and adjacent mechanism, and

Fig. 4 is a detail section taken substantially on the line 4—4 of Fig. 3.

Referring now to the drawings, the numeral 5 designates a main body member substantially circular in contour with a plurality of ears 6 arranged in circumferentially spaced pairs about its periphery. The body member 5 is of dished formation with its central portion in a vertical plane remote from the plane of its peripheral edge,

whereby a space is provided for the passage of the liquid to be filtered and for storing the precipitates while allowing the use of the peripheral edge of the body member for clamping purposes, as hereinafter described. The body member 5 is preferably formed as a casting with a pump barrel 7 integral therewith, the pump barrel being arranged substantially centrally of the body member and open at its upper extremity to facilitate machining (note Figs. 1 and 2). The lower portion of the pump barrel 7 is connected with the lower portion of the body member 5 by means of the vertically arranged passage 8 opening at its upper extremity into the pump barrel and the inclined passage 9 extending from the lower portion of the vertical passage 8 into the body portion 5. As best illustrated in Fig. 3 I preferably core the vertical passage 8 through the lower extremity of the casting, and then plug the bottom of the passage with a snugly fitting plug 10. A ball 11 normally seats in the passage 9 so as to prevent the flow of liquid downwardly through the passage 9, but when sufficient force is applied through the pump the ball 11 is automatically lifted from its seat to permit the flow of liquid upwardly through the passage 9. Liquid is admitted to the pump barrel through an inlet pipe 12 opening into an inclined passage 13 communicating with the lower extremity of the vertical passage 14, which opens into the lower portion of the pump barrel 7. A ball 15 normally seats in the vertical passage 14 so as to prevent the flow of liquid downwardly through this passage, but when sufficient suction is engendered within the pump barrel, the ball 15 is lifted to permit the passage of liquid into the pump barrel. A pin 16 is preferably arranged across the upper extremities of the passages 9 and 14 to prevent the accidental movement of the balls 11 and 15 beyond the extremities of their passages.

The piston 17 comprises a disc 18 secured to the lower extremity of a bent wire handle member 19 and formed with a key-hole slot 22 for the reception of a button 20 molded or otherwise firmly secured in a rubber packing member 21 adapted to snugly fit against the internal wall of the pump chamber. As best shown in Figs. 1-3 the rubber packing member 21 is preferably formed with an elongated peripheral por-

tion of rubber, fiber or other suitable material, with a diaphragm 21^a formed substantially centrally thereof and having an enlarged central portion for the reception of the fastening button 20. By virtue of this construction the rubber packing member may be quickly secured upon the metal disc 18, and as quickly removed for cleansing. The handle member 19 is herein shown as comprising a single strip of wire bent substantially centrally of its length to form a hand engaging portion with a pair of parallel end portions adapted to be riveted or otherwise secured to the metal disc 18. This provides a secure method of fastening the disc 18 to the handle member while permitting the arrangement of the keyhole slot 22 in the central portion of the disc. The vertical portions of the handle member 19 pass through suitable bosses in a cover plate 23 adapted to be screwed or otherwise secured over the top of the pump chamber.

A securing bolt 24 is pivotally mounted between each pair of ears 6 on the body member and is adapted to pass through suitably aligned apertures in a cover member 25, the free ends of the bolts being threaded to receive the thumb screws 26 or the like. The cover member 25 is preferably dished substantially as shown in Figs. 2 and 3 and formed with a curved peripheral portion for engagement with the filter members 27, as hereinafter described. The filter members 27 may be formed of a plurality of sheets of filter paper 28 or the like backed by a perforated metallic plate 29 (note Fig. 1) and are superimposed one upon the other and their edges covered with a ring 30 of rubber or the like. As best shown in Fig. 3 the rubber ring 30 is adapted to overlies the periphery and adjacent portions of the several sheets of filter material so as to preserve them in accurate alignment, and also forms a cushioning member for sealing the edges of the filter member against leakage when the cover member 25 is suitably clamped upon the body member 5 of my improved apparatus. The cover member 25 carries an outlet pipe 31 adjacent its upper extremity whereby the clear liquid is adapted to pass out of the filter.

To assemble my improved filter, the desired number of sheets of filter paper 28 are laid upon the perforated metallic sheet 29 and firmly secured thereto by the rubber ring 30. The filtering unit is then held against the peripheral edge portion of the body member 5 and the cover plate 25 then mounted on the plurality of securing bolts 24 so as to bring its peripheral portion into engagement with the opposite side of the rubber ring 30. The thumb nuts 26 are then turned down until the filtering unit is firmly clamped between the cover member and the body portion of the apparatus.

In operation the inlet pipe 12 is suitably connected with a jar, barrel, etc. containing the liquid to be filtered and the outlet pipe 31 suitably connected with the receptacle for the clear liquid. Then the handle member 19 of the pump is grasped and the plunger reciprocated as rapidly as desired. On the upstroke of the plunger the liquid to be filtered is drawn through the inlet pipe 12 and passages 13 and 14 into the pump barrel, and upon the down movement of the pump plunger the liquid then in the pump barrel is forced through the passages 8 and 9 into the body portion 5 of the apparatus, whence it passes through the filtering unit into the dished cover plate 25. The balls 15 and 11 move toward and from their seats in accordance with the pressure thereon due to the movement of the pump plunger. As the quantity of liquid in the body portion 5 of the apparatus increases, the pressure increases to force the liquid through the filtering unit and out through the pipe 31. The constant intake of new liquid adjacent the bottom of the body portion 5 prevents the settling of the precipitates so as to choke the passage 9, and the circulation in the body portion as new liquid is admitted prevents the precipitates so attaching themselves to the surface of the filtering unit as to block the passage of the clear liquid therethrough. The vertical arrangement of the filtering unit also serves to prevent the attachment of the solid particles on the surface of the unit.

It has been found that as the pressure increases the filtering unit tends to bow toward the cover plate 25, and I preferably provide a series of radial ribs 32 on the inner wall of the cover plate in position to be contacted by the metallic plate 29 of the filtering unit when sufficiently bowed. This reinforces the filtering unit while leaving sufficient space between the inner wall of the cover plate and the filtering unit to permit the passage of the clear liquid to the outlet pipe 31.

The base of the body portion 5 is preferably formed with oppositely extending feet 33 to provide sufficient support for the apparatus to prevent accidental toppling of the apparatus during the pumping action. A foot 34 may also be formed with or suitably secured upon the cover plate 25 and extends at right angles to the feet 33 of the body portion to give a wider base with a minimum weight. As shown in Fig. 1 the base may be perforated to provide for the passage of the lowermost securing bolts 24^a in lieu of forming spaced ears at this portion of the apparatus.

While it will be apparent that the illustrated embodiment of my invention herein disclosed is well calculated to adequately fulfill the objects and advantages primarily

stated, it is to be understood that the invention is susceptible to variation, modification and change within the spirit and scope of the subjoined claims.

5 Having described my invention, I claim:

1. Filtering apparatus comprising a hand pump carrying a body portion having a vertically disposed clamping edge, a cover portion having a vertically disposed clamping edge, a filtering unit adapted to be held
10 between said clamping edges, means for drawing one of the clamping edges toward the other, an inlet for liquids to the pump, an intermediate passageway from the pump
15 to the body portion, and an outlet pipe carried by the cover portion.

2. Filtering apparatus comprising a hand pump carrying a dished body portion having a vertically disposed clamping edge,
20 a dished cover portion having a vertically disposed clamping edge, clamping bolts carried by one of said portions and passing through apertures in the other of said portions, a filtering unit adapted to be
25 secured between said clamping edges, means on said bolts for drawing one of the clamping edges toward the other, an inlet for liquids to the pump, an intermediate passageway from the pump to the lower extremity of the body portion, and an outlet pipe
30 secured in the upper extremity of the cover portion.

3. Filtering apparatus comprising a hand pump carrying a dished body portion having a vertically disposed clamping edge, a
35 dished cover portion having a vertically disposed clamping edge, clamping bolts carried by one of said portions and passing through apertures in the other of said portions, a filtering unit adapted to be secured
40 between said clamping edges, including a perforated metallic plate and a plurality of layers of filter paper, means on said bolts for drawing one of the clamping edges toward the other, an inlet for liquids to the
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pump, an intermediate passageway from the pump to the lower extremity of the body portion, and an outlet pipe secured in the upper extremity of the cover portion.

4. Filtering apparatus comprising a hand pump carrying a dished body portion having a vertically disposed clamping edge, a dished cover portion having a vertically disposed clamping edge, clamping bolts carried by one of said portions and passing through
55 apertures in the other of said portions, a filtering unit adapted to be secured between said clamping edges, including a perforated metallic plate and a plurality of layers of filter paper, means on said bolts for drawing
60 one of the clamping edges toward the other, an inlet for liquids to the pump, an intermediate passageway from the pump to the lower extremity of the body portion, and an outlet pipe secured in the upper extremity of
65 the cover portion, the cover portion being formed with spaced internal ribs adapted to limit the bowing of the filtering unit under pressure.

5. Filtering apparatus comprising a hand pump carrying a dished body portion having a vertically disposed clamping edge, a dished cover portion having a vertically disposed clamping edge, clamping bolts carried
70 by one of said portions and passing through apertures in the other of said portions, a filtering unit adapted to be secured between said clamping edges, means on said bolts for drawing one of the clamping edges toward
75 the other, an inlet for liquids to the pump, an intermediate passageway from the pump to the lower extremity of the body portion, an outlet pipe secured in the upper extremity of the cover portion, oppositely extending
80 feet on the body portion, and a laterally extending foot on the cover portion.
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In witness whereof I hereunto set my hand and seal.

WILLIAM L. COOP. [L. s.]