

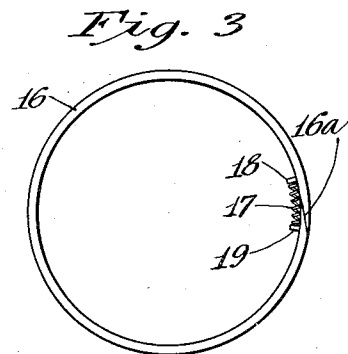
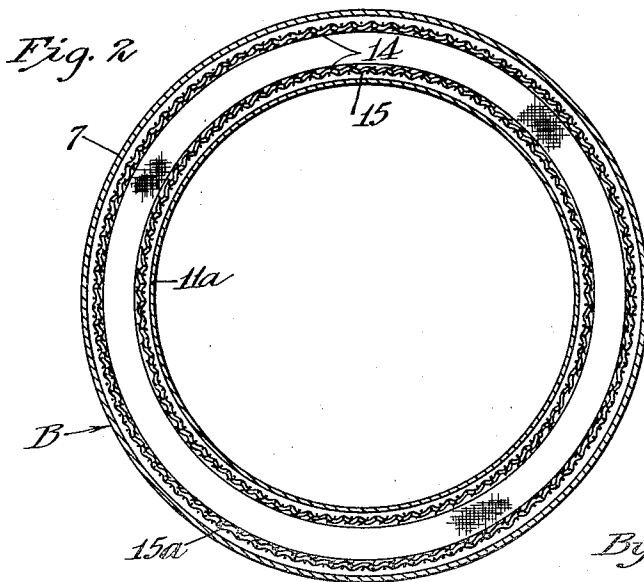
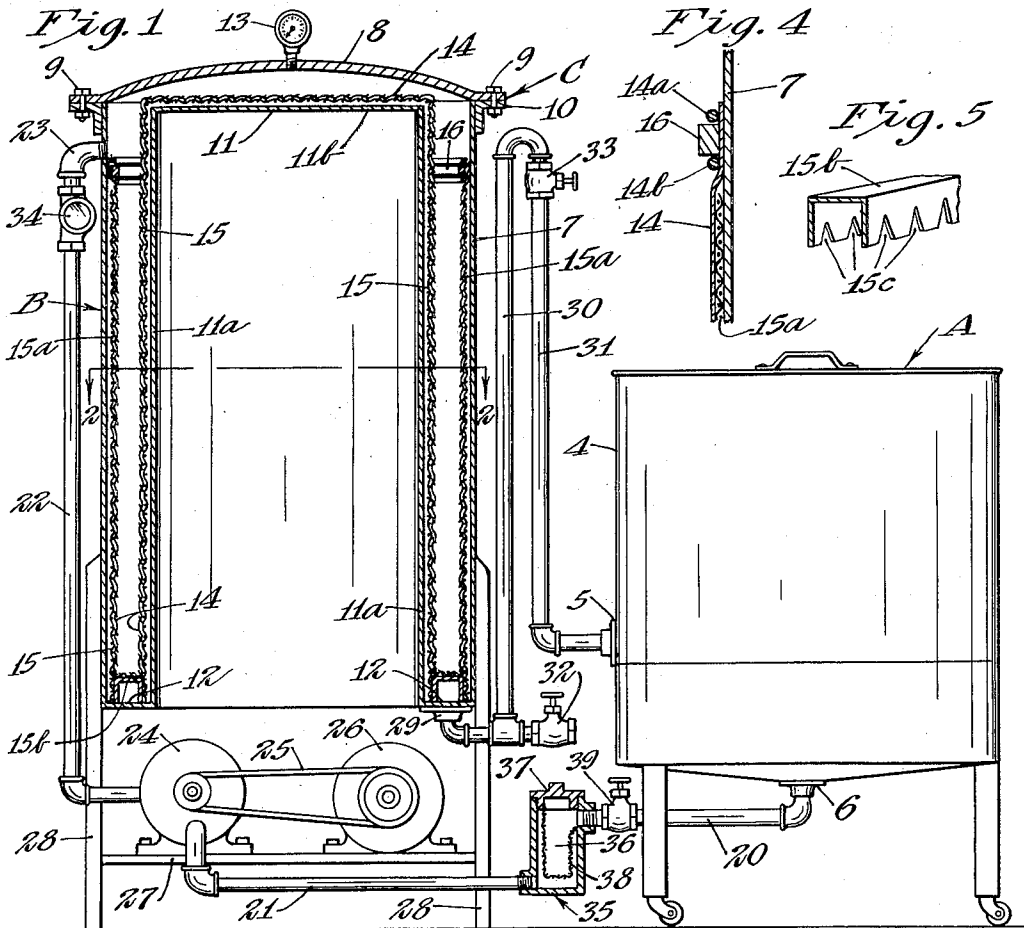
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W. W. CARRIER ET AL

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## DRY CLEANING APPARATUS

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## UNITED STATES PATENT OFFICE

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## DRY CLEANING APPARATUS

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## 1 Claim. (Cl. 210—183)

Our invention relates to dry cleaning apparatus and particularly to such apparatus including means for continuously filtering cleaning fluid contained therein.

5 In ordinary dry cleaning apparatus the cleaning fluid therein becomes contaminated with dirt and lint during the first portion of a cleaning operation and hence the last part of a cleaning operation either is relatively ineffective or else  
10 necessitates replacement of the contaminated cleaning fluid with fresh cleaning fluid.

An object of our invention is to provide dry cleaning apparatus wherein articles being cleaned are subjected to continually clean and clear  
15 cleaning fluid throughout a cleaning operation.

A more specific object is to provide dry cleaning apparatus including means for continuously removing dirt and lint from cleaning fluid in use therein and continuously clarifying the fluid.

20 Another object is to provide such apparatus including a filter for filtering the cleaning fluid therein and pumping means for continuously circulating the cleaning fluid through the filter.

Still another object is to provide such apparatus having a filter of particularly effective construction which is adapted for containing a fluid-clarifying agent therewithin and which is particularly convenient and easy to clean and service.

30 Yet another object is to provide such apparatus having a lint trap included therein.

A further object is to provide such apparatus of light, compact, simple, durable and inexpensive construction.

35 These and other objects and advantages of the invention will be more fully set forth in the following description made in connection with the accompanying drawing, in which like reference characters refer to similar parts throughout the several views, and, in which:

40 Fig. 1 is a general vertical view of an embodiment of our invention with certain portions thereof cut away to appear in vertical section;

45 Fig. 2 is a horizontal sectional view taken along the line 2—2 of Fig. 1 as indicated by the arrows;

Fig. 3 is a detail view of a retaining ring included in our apparatus;

50 Fig. 4 is a vertical sectional view illustrating the manner in which the filter bag of our apparatus is supported; and

Fig. 5 is a perspective, partially broken away, partially sectional view of a part of our apparatus.

Referring to the drawing, the letter A indicates a washing machine of conventional design

including the usual tub or tank for containing articles to be cleaned and cleaning fluid. In accordance with our invention the tank 4 is provided with a fluid inlet element 5 on the side thereof and a fluid outlet element 6 in the bottom thereof.

In connection with the fluid inlet 5 and the fluid outlet 6 we provide means for filtering cleaning fluid used in the tank 4 and means for continuously circulating the fluid out of the outlet 6 through our filtering means and back into the tank 4 through the fluid inlet 5.

The embodiment of our cleaning fluid filter illustrated in the drawing includes a casing C having an outer vertically disposed cylindrical portion 7. The upper end of the cylindrical portion 7 is open but may be closed by means of a cover or closure plate 8. The marginal portion 7 is secured as by means of bolts 9 to an annular flange 10 provided on the upper end of the cylindrical portion 7 and projecting radially outwardly therefrom.

Within the interior space of the cylindrical portion 7 is an upstanding cylindrical member 11 which may consist of a tubular portion 11a having at its upper end a circular closure 11b. The lower end of the tubular element 11a is connected to the lower end of the cylindrical portion 7 by means of a flat annular element 12 which is secured and sealed at its respective inner and outer edges to the tubular element 11a and the cylindrical portion 7. The cylindrical element 7, top closure 8, upstanding cylindrical member 11, and annular element 12 together define a chamber having a U-shaped diametrical cross-section. Preferably the closure 11b of the cylindrical member 11 is spaced a slight distance below the top cover 8. The top cover 8 may be provided with a pressure gauge 13 to provide indication of the pressure in the chamber described above.

Within the chamber B we provide means for filtering cleaning fluid used in the tank 4. The filtering means consists principally of a sack 14 which is constructed of flexible reticulated sheet material and is preferably of tubular form with one end thereof open and the other end thereof closed. When the sack 14 is in normal position, the closed end thereof rests upon the upper end of the cylindrical member 11. The free edge portion of the sack 14 is removably attached to the upper portion of the internal periphery of the cylindrical portion 7 of the apparatus. The length of the sack 14 is such that the medial portion of the sack will depend from the top of

the cylindrical member 11 and the point of removable attachment to the cylindrical portion 7 into the annular space between the cylindrical member 11 and the cylindrical portion 7 to form an annular open topped pocket.

We provide means for maintaining the pocket formed by the sack 14 in spaced relation with the tubular portion 11a of the cylindrical member 11 and the cylindrical portion 7 of the apparatus. For this purpose we provide a basket disposed within the chamber B and so associated with the sack 14 as to maintain the same in spaced relation with the tubular member 11a and cylindrical member 7. The basket includes two members 15 and 15a formed of relatively rigid reticulated material such as heavy wire screen and shaped to correspond respectively with the shapes of the inner and outer sides of the sack 14 when the same is in normal position as described above. The member 15 is positioned relative to the sack 14 to lay against the inner side thereof or, in other words, to be disposed at the side of the material forming the sack 14 toward the top and side walls of the cylindrical member 11 and the member 15a is of tubular shape to lie between the outer side of the sack 14 and the cylindrical portion 7. The combination of the sack 14 and the member 15 rests at the closed upper end thereof on the upper end of the cylindrical member 11 and the lower edges of both of the members 15 and 15a rest upon the element 12 of the tank.

Means is provided for supporting and reinforcing the lower end of the sack 14 and also affording an unobstructed annular passage leading from all parts of the lower portion of the tank to the tank outlet 29. An annular, inverted channel-shaped member 15b is placed between the lower marginal portions of the reticulated members 15 and 15a as shown best in Fig. 1 and rests at its free edges on the bottom member 12 of the tank. As shown in Fig. 4, each of the flanges of the member 15b is cut away to provide an annular series of spaced notches 15c therein. The notches 15c enable passage of fluid from the space between the sack 14 and the interior surfaces of the tank into the interior space of the member 15b for flow therethrough to the tank outlet 29. The reticulated members 15 and 15a and the channel member 15b together comprise a basket for containing and reinforcing the filter bag 14 to prevent bulging thereof and engagement thereof with the tubular member 11a and the cylindrical member 7.

The free edge portion of the sack 14 is removably anchored to the upper portion of the interior periphery of the cylindrical member 7 above the upper limit of the reticulated member 15a by means of an expansive ring 16 positioned as indicated in Figs. 1 and 4 and constructed as best seen in Fig. 3. The ring 16 is severed at one point therealong to form a split 16a therein whereby the circumference of the ring 16 may be varied. The split 16a may be diagonally disposed as shown in Fig. 3 if desired. Means is provided for resiliently urging the severed ends of the ring 16 defining the split 16a apart so as to increase the circumference of the ring 16. The resilient means may consist of a helical compression spring 17 placed in somewhat compressed condition between lugs 18 and 19 formed on the ring 16 at opposite sides of the split 16a. With the sack 14 placed as shown in Fig. 1 the ring 16 may be compressed to its minimum circumference, placed in the position thereof shown

in Fig. 1, and released whereupon the ring 16 will expand outwardly to press the sack 14, at its upper edge portion, into firm frictional engagement with the internal periphery of the cylindrical member 7. As best shown in Fig. 4, the sack 14 is provided in its marginal portion with a pair of spaced annular elements 14a and 14b formed preferably of ropes suitably secured to the sack and disposed respectively above and below the portion of the sack 14 normally engaged by the clamping ring 16.

Means is provided for delivering fluid into the pocket formed by the sack 14 to be filtered through the material of which the sack 14 is formed. Means is also provided for conducting filtered fluid from the lowermost portion of the chamber B. Sections of piping or conduits 20, 21, and 22 form a path from the outlet element 6 of the tank 4 to an inlet fitting 23 communicating, as shown, with the upper portion of the chamber B in such position as to deliver fluid from the bottom of the tank 4 into the pocket formed by the sack 14. A fluid pump 24 is connected between the conduit sections 21 and 22 for pumping fluid from the bottom of the tank 4 into the pocket formed by the sack 14. The pump 24 is driven by suitable means such as the belt 25 by a source of rotary mechanical power such as the motor 26. The pump 24 and motor 26 may be mounted on a shelf 27 supported from legs 28 which extend downwardly from the cylindrical portion 7 of the apparatus. The lower portion of the chamber B is provided with an outlet element 29 carried by a suitably apertured part of the annular element 12. The outlet element 29 is connected to a section of conduit 30 which extends vertically and exteriorly of the cylindrical member 7 to a point adjacent the upper end of the cylindrical member 7. The upper end of the conduit 30 is connected through a downwardly extending section of conduit 31 to the inlet fitting 5 of the tank 4. Obviously fluid delivered through the chamber B by means of the pump 24 will pass through the conduits 30 and 31 into the tank 4 of the washing machine A. A drain valve 32 may be provided on the lowest portion of the conduit 30 and a stop valve 33 may be interposed between the conduits 30 and 31. Another stop valve 34 may be interposed between the conduit 22 and the inlet fitting 23 at the upper portion of the cylindrical member 7.

For removal of lint from fluid leaving the outlet element 6 of the tank 4 a lint trap 35 is provided. The lint trap 35 consists of a casing defining a chamber 36, the upper end of which is connected to the conduit 26 and the lower end of which is connected to the conduit 21. The upper end of the lint trap may be provided with a movable closure 37. Within the lint trap 35 there is provided a screen 38 through which fluid must flow in passing through the lint trap 35 from the conduit 20 to the conduit 21. If desired a stop valve 39 may be interposed between the conduit 20 and the inlet of the lint trap 35.

In operation of the above described apparatus, articles to be cleaned and cleaning fluid are placed in the tank 4 of the washing-machine A. Sufficient cleaning fluid may be placed in the described apparatus to fill the conduits 20, 21 and 22 up to a suitable level and also fill the chamber B up to a suitable level. The washing-machine A is placed in operation and the motor 26 is placed in operation to drive the pump 24.

Obviously cleaning fluid will be continuously circulated and re-circulated from the tank 4 through the pump 24 and the filtering apparatus thereafter and back into the tank 4. Thus the fluid in the tank 4 will be continuously cleaned by the filtering apparatus and lint from articles being cleaned in the tank 4 will be caught on the screen 33 of the lint trap 35.

Our filter bag 14, when disposed in its normal position in our apparatus, is particularly adapted for containing an agent such as clarifying powder for clarifying the cleaning fluid whereby the cleaning fluid will be continually clarified in addition to being continually filtered. During the process of cleaning fabrics or other articles with my apparatus, the articles to be cleaned will be constantly subjected to clean filtered and clarified cleaning fluid rather than being subjected, as in the ordinary dry cleaning process, to cleaning fluid which contains dirt and lint from the articles being cleaned.

It is apparent that we have invented a novel, effective, compact, light, and inexpensive apparatus capable of carrying on a particularly efficient dry cleaning process producing an improved result.

While the filtering apparatus comprising a part of our cleaning system has been illustrated and described as applied to use in connection with dry cleaning, it is to be understood that our filtering apparatus is readily adaptable for use in filtering many kinds of liquids used in many types of apparatus.

It will, of course, be understood that various

changes may be made in the form, details, construction and proportions without departing from the scope of our invention.

What is claimed is:

A filter including a vertically disposed cylindrical casing, a cylindrical member disposed within said casing and extending from the bottom thereof to a point adjacent the top thereof to form an annular chamber defined by said casing and said member, a tubular filtering element substantially longer and somewhat larger in diameter than said member, formed of flexible reticulated sheet material, and having one end thereof closed, said filtering element being disposed within said chamber with the closed end thereof resting upon the upper end of said member and the open end thereof supported from the inner side of said casing adjacent the upper end thereof whereby the medial portion of said element will depend to form an annular, open-topped pocket disposed in said chamber, means for conducting fluid to be filtered into said pocket to be filtered through the material thereof, and an annular member interposed between the bottoms of said pocket and said casing and having an annular interior space therewithin, said annular member having therein an annular series of openings for accommodating passage of fluid from said chamber into said interior space and said casing having a fluid outlet in communication with said interior space.

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