Oct. 13, 1959 H. W. F. FUHRING 2,908,086

MACHINES FOR CHEMICAL CLEANING OF TEXTILE ARTICLES

Filed March 26, 1958

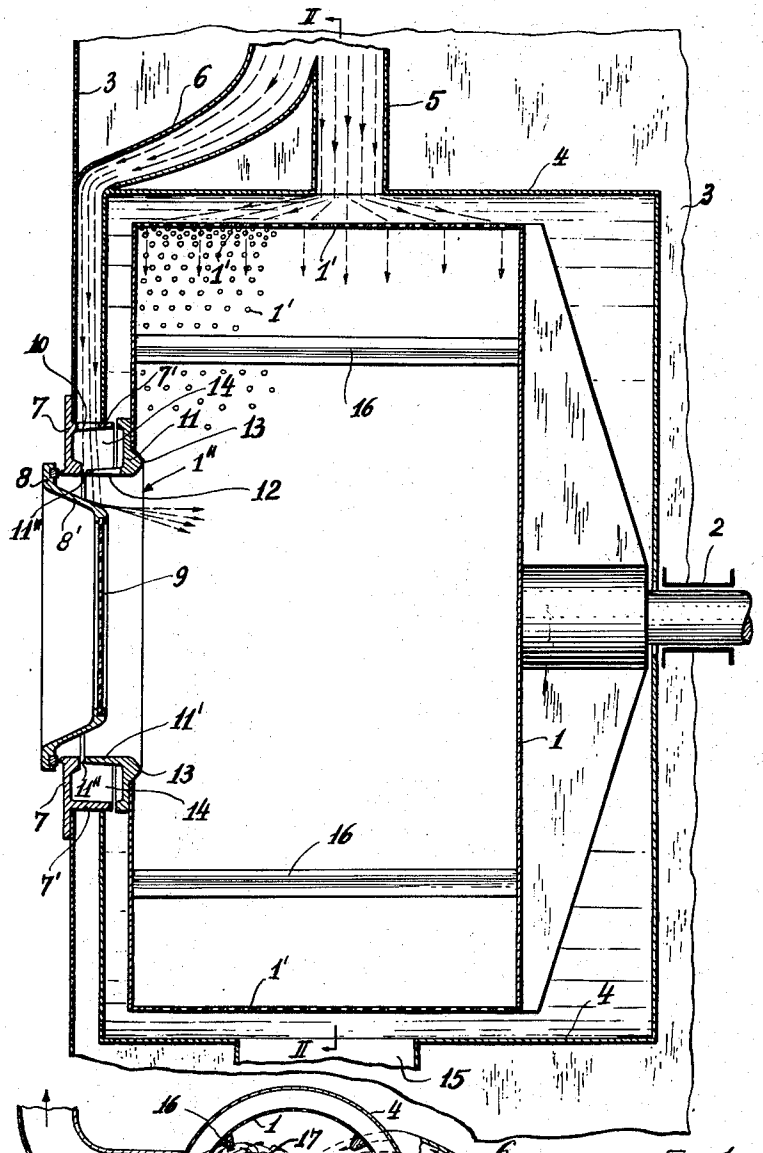

FIG. 1

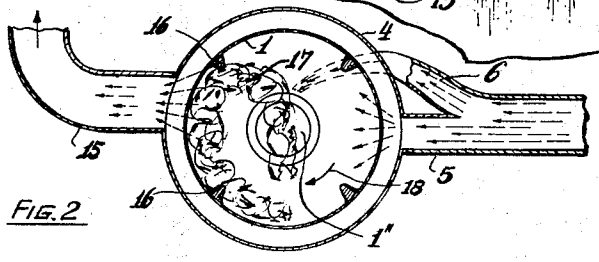

FIG. 2

INVENTOR.

BY Armand E. Mentern

Attorney

United States Patent Office 2,908,086
Patented Oct. 13, 1959

2,908,086

MACHINES FOR CHEMICAL CLEANING OF TEXTILE ARTICLES

Heinrich Werner Friedrich Führing, Augsburg, Germany, assignor to Böhler & Weber Kommanditgesellschaft, Augsburg, Germany

Application March 26, 1958, Serial No. 724,043

Claims priority, application Germany April 8, 1957

6 Claims. (Cl. 34—133)

The present invention concerns a machine used for chemically cleaning textiles, for example, garments, which are disposed in a rotating drum provided peripherally with bores or slots, whereby through the bores or slots solvents are at first introduced and discharged and subsequently drying air passed through the materials for cleaning. The invention consists in the fact that from a compressed air pipe directed against the drum periphery, if necessary an air injection pipe, there is branched a pipe having a considerably tapering cross section, which leads along the housing wall of the cleaning machine to the charging door and there is directed against a deflecting element which deflects the air issuing at high speed axially into the drum. The branch pipe preferably branches off in the manner of a siphon pipe, whereby both cross sections are equal at the junction. It is also possible for the branch pipe to be connected already at the blower. In some instances it is also fitting for each pipe to be connected to a blower, whereby this rather costly procedure is of particular advantage if the air supply in one pipe, for example the one which injects the air radially into the drum, is to be throttled back or to be set at zero.

It is possible within the scope of the invention for the frame of the inspection glass of the charging door extending in the direction of the drum and conically tapering to act as deflecting element for the air stream. It is, however, also possible for a separate deflecting means favourable to the flow to be provided.

In order to prevent the material to be cleaned from becoming wedged between the drum and the housing during the rotation of the drum it has proved advisable to lead the branch pipe up to an annular shoulder of the charging door mounting projecting in direction of the drum, which shoulder in turn is adapted to enclose a collar-shaped enlargement extending in the direction of the seat of the charging door of an annular flange located at the drum charging opening by forming a ring-shaped chamber. Furthermore, it is possible for the collar-like enlargement of the annular flange to enclose the frame of the inspection glass of the charging door and be provided with any desired number of closely located air inlet apertures, for example, slots or bores, the cross section of which is conveniently smaller than buttons, buckles and the like to prevent the latter from being caught in the openings. For the same reason it is advisable for the front edge of the collar-like enlargements of the ring flange to be drawn forwardly to near the mounting of the charging door.

The air streaming axially into the drum from the branch pipe causes the material to be cleaned to be pushed away from the charging door and causing the material to be cleaned which is carried along by the periphery of the rotating drum to execute a tumbling movement, which material finally drops again due to its weight and thus gets into the axial air stream which forces the individual textile articles to be turned. This turn may according to the invention also be brought about

in that the ring flange has an annular enlargement projecting into the interior of the drum, against which the textile articles strike when the drum is rotating and therefore tend to tip over. It is possible in particular for the ring flange to be removably mounted on the front wall of the drum.

Known drum-type cleaning machines have a single air supply pipe which is so arranged that the air can enter directly through the openings formed in the periphery of the drum. Consequently there is created an air stream directed transversely to the drum axis, which is deflected to an irrelevant extent by the textile articles contained in the drum. The effective degree of drying and ventilation is not very favourable as certain points despite the rotation of the drum are not directly affected by the drying air and therefore dry slowly. Moreover it is a disadvantage that the textile articles during the rotation of the drum collect in front of the inspection glass of the charging door, thus not allowing the state of dryness to be clearly judged from the outside. Moreover the textile articles come into frictional contact with the charging door and with points of contact between the drum and the housing wall in the region of the drum charging opening, thus often causing buttons to become detached or other damage to the textile articles.

To remove this disadvantage it has already been proposed to guide the drying air axially into the drum whereby the textile articles though kept away from the charging door, did not allow the efficiency of the drying and ventilating to be substantially improved.

According to the invention it has been recognised that it is a considerable advantage in addition to the radial air stream corresponding to known cleaning machines to direct an additional axial air stream into the drum, thus allowing the efficiency of the drying and ventilating to be increased and also garments and other textile articles to be kept away from the charging door. Over and above this it has also been recognized that the additional axial air stream is the more effective the greater the velocity, because it causes a contra-flow directed against the falling movement of the material to be cleaned brought about by the rotation of the drum, which causes the material to be cleaned to turn over during the falling movement. It is thus ensured that during the rotation of the drum all parts of the material to be cleaned are in direct contact with the drying air stream. Moreover, the drying time and intensity is substantially increased by the fact that as soon as the drum starts to rotate a negative pressure sets in, caused on the one hand by the suction pipe of large cross section and on the other hand by the branch pipe having a small cross sectional area and thus causing an increased resistance, and furthermore due to the sealing effect of the articles to be cleaned lying against the openings formed in the drum periphery. It is also possible for several branch pipes to be provided directed from different directions relative to the deflecting means.

The effect of the axially directed additional air stream may moreover be increased also by a special design of the drum inlet opening. The object of the annular enlargement projecting into the drum according to the invention is to deflect the articles being dried revolving therein from the charging door during the rotation of the drum, so that there is as little friction as possible and wedging effect between the articles to be dried and the wall of the housing.

It is evident from the example of the invention that it is possible by way of branch pipes and possibly with specially shaped drum inlet openings for a variation of solutions to be developed to the problem based on the invention, in which the devices in particular which deflect the air stream carried in the branch pipes in direction of the drum axis may be of any constructional design,

Therefore the invention is not limited to the subject matter shown by way of example.

The invention will be described further by way of example, with reference to the accompanying drawings, in which:

Fig. 1 is a horizontal section through a part of the cleaning machine with the drum, charging door and air pipes; and

Fig. 2 is a section taken on the line II—II according to Fig. 1 but on a smaller scale.

The drum 1 of the cleaning machine shown in section is mounted unilaterally in the bearing 2 of the housing 3 of the cleaning machine in the same manner as hitherto known arrangements. Arranged around the drum 1 is a cage 4 closed on all sides having the discharge opening for the solvent not shown in Fig. 1 and the extraction pipe 15 for the drying air. An air injection pipe 5 through which the drying air is injected in the direction of the jacket of the drum 1 provided with openings 11, is connected with this cage 4. This drying air arrives in the drum 1 in which garments and the like, not shown in the drawings, are kept in motion during the rotation of the drum, so that when the solvent has been discharged, residues thereof are evaporated and discharged. On the air injection pipe 5 there is provided a branch pipe 6 the cross section of which tapers considerably, thus causing the air passing through to travel at an increased speed. In the example of Fig. 1, the branch pipe 6 is disposed between housing wall 3 and the cage 4. It may, however, also be laid within the wall of the housing 3. The branch pipe 6 leads in at the shoulder 7' projecting in the direction towards the drum 1 of the seat 7 for the charging door 8 in which there is provided an inspection glass 9. At the point where the branch pipe 6 and the shoulder 7' meet there is formed a bore 10 which corresponds approximately to the inner cross section of the branch pipe 6. The air passing through the branch pipe 6 thus arrives through the bore 10 on to the frame 8' of the inspection glass 9 of the charging door 8 from where it is deflected axially in the direction towards the drum 1 and gets into the interior of the drum 1 through the charging opening 1''. For this purpose the frame 8' is drawn forwards in the direction towards the drum 1 and of conical design. It is of course also possible to provide differently designed and constructed deflecting means in place of the frame 8'.

It is further evident from Fig. 1 that the drum 1 has an annular flange 11 at the charging opening 1'', the collar-like enlargement 11' of which projecting in the direction of the seat 7 of the charging door extends closely past the mounting 7, thus preventing the garments contained in the drum from becoming wedged between the seat 7 and the collar-like enlargement 11'. This collar-like enlargement 11' has openings 12, such as slots, holes and the like distributed over the whole periphery thereof through which the air issuing from the branch pipe 6 passes. The air striking the material of the annular enlargement 11' between the openings 12 is distributed in the annular space 14 formed between the shoulder 7' and the enlargement 11', from where it arrives in the drum 1 due to the pressure. The openings 12 have a cross section which is smaller than buttons, so that garments cannot be caught therein. Similarly, the distance between the front edge 11'' of the collar-like enlargement 11' and the seat 7 of the charging door 8 is very small, and the front edge 11'' is remote from the drum charging opening 1'' hence preventing any textile articles from getting into the region of the parting line.

The function of the cleaning machine is evident from Fig. 2. The articles to be dried contained in the drum 1 during the rotation of the drum are carried along by means of engaging ledges 16 in the direction indicated by the arrow 18 approximately to the level of the suction pipe 15 and in turn allowed to drop down again. During the falling movement the textile articles 17 get into the range of the air entering through the charging opening 1'' so that in addition to the turning movement caused by the drum they are additionally subjected to a transverse turn. Due to this tumbling movement all parts of the articles to be dried are in fact in contact with the air stream, thus causing a substantially more favourable drying time and intensity than in known apparatus. Moreover there is credited a negative pressure in the drum which assists the drying operation, as the cross sectional dimensions on the suction side are greater than on the pressure side. With a constantly circulated air supply, the pipes of smaller cross sectional area put up a greater resistance to the air stream thus causing the pressure difference between the pressure pipes and the drum to be smaller than between the drum and the suction pipe. Thus a sudden negative pressure is created in the drum.

The example shown in the drawing makes it evident that different variations may be provided. Therefore the invention is not limited to the example, but also embraces the different variations.

I claim:

1. In a machine for the chemical cleaning of textile articles such as garments, a rotary drum having a peripheral wall perforated for passage of solvent and subsequently of drying air therethrough, a fixed housing surrounding said drum and having a peripheral wall spaced from the peripheral wall of said drum, said drum and said housing each having an end wall and a door aperture of circular outline coaxial with the axis of rotation of the drum in each of said end walls, an air supply pipe connected to said peripheral wall of the housing over the perforated peripheral wall of the rotary drum, a branch pipe tapering to a reduced cross section extending from said air supply pipe between sadi end walls towards said door apertures, a discharge pipe connected to the peripheral wall of said housing diametrically opposite said air supply pipe and over the perforated peripheral wall of the rotary drum, and a door having a coniform peripheral surface and being adapted to fit the door aperture of the housing and to project into the door aperture of the drum, the branch pipe being positioned so as to discharge air on to the coniform door surface and thence to deflect said air into the drum.

2. A structure according to claim 1 including a door seat defining the door aperture in the housing and presenting an inwardly projecting generally cylindrical flange, a door collar defining the door aperture in the drum and presenting an outwardly projecting generally cylindrical flange of smaller diameter than the flange of said seating, whereby an annular chamber is formed between said flanges for distributing air discharged by said branch pipe.

3. In a machine for the chemical cleaning of textile articles such as garments, a rotary drum having a peripheral wall perforated for passage of solvent and subsequently of drying air therethrough, a fixed housing surrounding said drum and having a peripheral wall spaced from the peripheral wall of said drum, said drum and said housing each having an end wall and a door aperture of circular outline coaxial with the axis of rotation of the drum in each of said end walls, the housing including a door seat defining the door aperture in the housing and presenting an inwardly projecting generally cylindrical flange having a bore therethrough, the drum having a door collar defining the door aperture in the drum and presenting a generally cylindrical flange of smaller diameter than the flange of said seating, whereby an annular chamber is defined by said flanges, an air supply pipe connected to said peripheral wall of the housing over the perforated peripheral wall of the rotary drum, a branch pipe tapering to a reduced cross section extending from said air supply pipe between said end walls towards said door apertures, and terminating adjacent said flange bore, a discharge pipe connected to the peripheral wall of said housing diametrically opposite said air supply

pipe and over the perforated peripheral wall of the rotary drum, a door having a coniform peripheral surface and being adapted to fit the door aperture of the housing and to project into the door aperture of the drum, and means for directing air discharged into said chamber from the branch pipe on to the coniform door surface and thence to deflect said air into the drum.

4. A structure according to claim 3 in which the flange of the drum door collar surrounds an inwardly projecting portion of the door, said means for directing air discharged by the branch pipe into said annular chamber being constituted by a plurality of apertures in the said drum door collar flange.

5. A structure according to claim 4 in which said drum door collar flange has a front edge disposed adjacent the door seating.

6. A structure according to claim 4 in which said drum door collar flange has an inwardly directed toroidal portion.

References Cited in the file of this patent

UNITED STATES PATENTS

2,688,197	Kercheral	Sept. 7, 1954
2,724,905	Zehrbach	Nov. 29, 1955
2,818,719	Cline	Jan. 7, 1958
2,830,384	Zehrbach	Apr. 15, 1958