Dec. 10, 1940 L. PIERCE 2,224,608

METHOD OF AND MECHANISM FOR OPERATING A DRYING APPARATUS

Filed Nov. 2, 1937

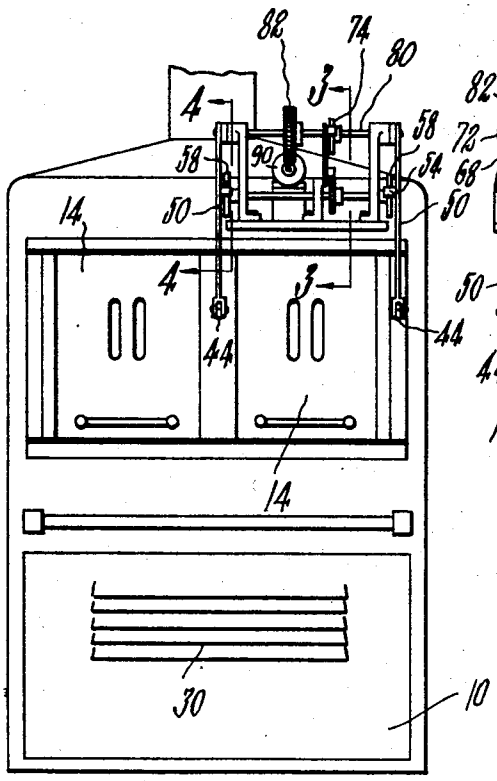


Fig. 1.

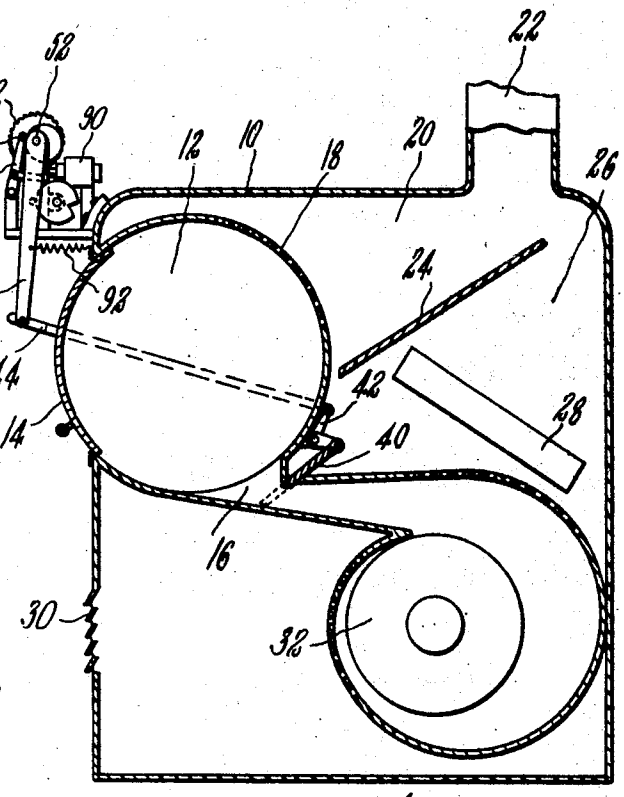


Fig. 2.

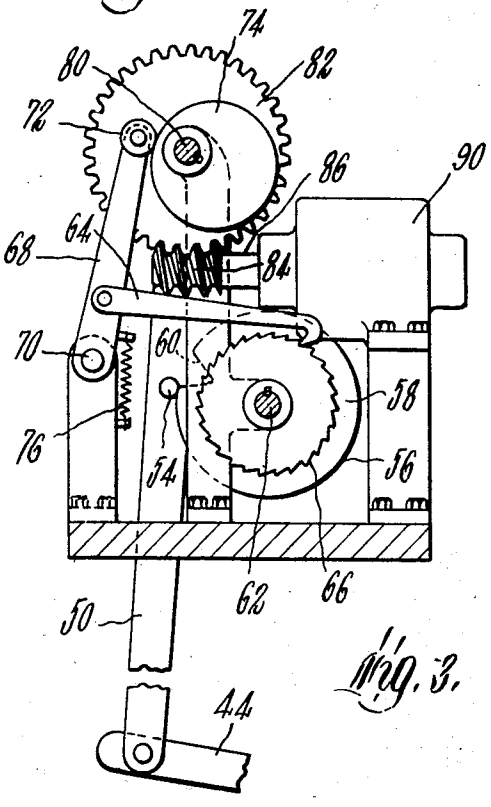


Fig. 3.

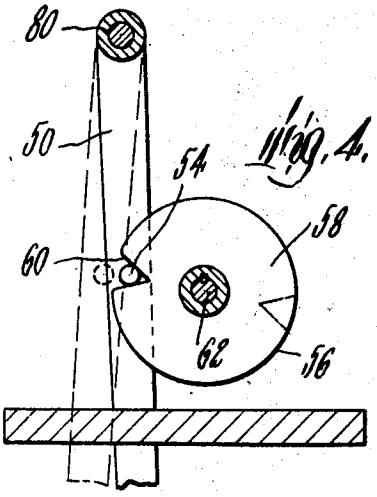


Fig. 4.

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Patented Dec. 10, 1940

2,224,608

UNITED STATES PATENT OFFICE

2,224,608

METHOD OF AND MECHANISM FOR OPERATING A DRYING APPARATUS

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Application November 2, 1937, Serial No. 172,415

9 Claims. (Cl. 34—7)

This invention relates to a method of and means for operating a drying apparatus such as is useful for tumbling and drying clothes and the like in laundries.

The invention has to do with a drying machine of the tumbling type including an approximately cylindrical chamber into which the clothes, etc. are introduced for the purpose of being dried. A blast of heated air under pressure is introduced tangentially into the chamber, preferably at its bottom, so that the clothes are swept around the chamber and tumbled as they are being dried, the air escaping through a foraminous portion of the chamber wall near the top thereof.

In the operation of driers of this type, difficulty has been experienced by a tendency on the part of the contents of the chamber to flatten against a wall thereof instead of tumbling in the air stream. For example, a light piece of cloth may fly against the foraminous outlet and be held there, blocking the exit of the air. Furthermore, the air stream may not be strong enough to lift a batch of heavy articles such as wet bath towels, blankets and the like. In order to overcome these difficulties, suitable mechanism is provided according to the present invention to vary the intensity of the air stream at predetermined intervals. More specifically, the air stream may be periodically reduced in velocity or cut off altogether. This causes any portion of the contents of the chamber which may be clinging to the wall of the chamber to drop to the bottom of the chamber where it can be picked up by the air stream the normal velocity of which is resumed after a very brief interval. Such reduction or cutting off of the air stream can be supplemented by occasional brief increases in the velocity of the stream so as to lift and put in motion the contents of the chamber when too heavy to be raised by the normal air stream. According to the invention, the gate which controls the stream of air entering the chamber is automatically operated by suitable driven mechanism so that the gate is periodically closed for brief periods, such periods being spaced by considerable intervals of time so that the effective drying operation of the machine will not be materially diminished.

Drying machines of the tumbling type, particularly for use in laundries, are often constructed with a pair of chambers to which streams of air are supplied from a common source. According to the invention, control mechanism is provided to operate the gates for the two chambers in such a manner that the gates will be operated in alternation to shut and reopen. During the brief periods in which either gate is closed, the air supply from the common source will be directed to the other chamber only so that air will enter this chamber at a materially increased velocity. Thus in the operation of a machine having two chambers, the velocity of the air stream will be periodically altered, being alternately increased and diminished or cut off altogether. Suitable apparatus may be provided as desired for actuating the gates in the manner described. Such apparatus is hereinafter described and is illustrated on the drawing of which

Figure 1 is a front elevation of a drying machine of the tumbling type, including apparatus embodying the invention.

Figure 2 is a side elevational view of the operating device and a cross sectional view of the drying machine on a front to rear vertical plane.

Figure 3 is a section on the line 3—3 of Figure 1.

Figure 4 is a section on the line 4—4 of Figure 1, showing in dotted lines the different positions of the lever arm during the movement of the operating device and also showing in dotted lines the position of the notch in one of the cam disks when the follower is moved into the notch of the other cam disk.

As illustrated in Figure 2, a drying machine of the tumbling type may comprise a housing 10 within which is a cylindrical chamber 12 adapted to receive the clothes or other articles to be dried. The clothes are inserted through a front opening which is normally closed by a sliding gate 14. At the bottom of the chamber 12 is an opening 16 through which a stream of air may be introduced tangentially into the chamber whirling around in the chamber about a horizontal axis and being exhausted through perforations 18 into a chamber 20 within the casing 10. Part of this air is exhausted through a discharge vent 22, the remainder being circulated around a baffle plate 24 into a chamber 26 where it may pass through a heated radiator 28 for recirculation. To this recirculated air is added a stream of fresh air entering through a grid 30 in the casing 10. This air mixes with the recirculated air and is impelled by a centrifugal air pump 32 through the entrance 16 into the chamber 12. As indicated in Figure 1, the drying machine is made with two chambers 12 arranged coaxially, each chamber having its individual door or gate 14 for the admission of

clothes to be dried. Each chamber is likewise provided with an entrance port 16 which communicates with the housing of the fan 32 so that the fan constitutes a common source of supply for the two chambers. Each of the chambers 12 is supplied with a gate 40 which is actuable to control the air stream entering its chamber. The gates 40 may be operated by any suitable mechanism. As shown, each gate is connected by a bell crank 42 to a rod 44 which projects from the front wall of the housing 10. If the rod 44 is pulled forward, the corresponding gate 40 opens, but, if it is pushed toward the rear, the gate 40 may be partly or fully closed so as to reduce or cut off the stream of air entering the chamber 12 through the port 16.

It is evident that various mechanical devices can readily be constructed to operate the rod 44 and the gate 40. An illustrative device is shown on the drawing and comprises a lever arm 50 which is pivoted at 52, the lower end of the arm being connected to the outer end of the rod 44. This connection is preferably made in such a manner that the arm can readily be disconnected from the rod 44 for manual operation of the latter. The arm 50 is provided with a cam follower 54 which rides on the edge 56 of the disk cam 58. This cam is circular in contour except for a notch 60. As shown, the cam is mounted on a shaft 62 which is rotated step-by-step by means of a pawl 64 which engages in the teeth of a circular ratchet 66 mounted on the shaft 62. The pawl 64 is attached to an arm 68 pivoted at 70. At the end of the arm 68 is a cam follower 72 which is held against the edge of an eccentric disk 74 by a spring 76. The eccentric 74 is mounted on a shaft 80 on which is also mounted a worm gear wheel 82 meshing with a worm 84 on a shaft 86 which is driven by a suitable motor 90. As indicated in Figure 1, the cam disks 58 for both of the chambers 12 may be mounted on the shaft 62, these disks being preferably arranged so that their notches 60 reach the respective cam followers 54 at different times as indicated in Figs. 1 and 4 and by full and dotted lines in Fig. 4. Thus the gates 40 controlling the air streams to the two chambers 12 are never operated simultaneously.

The motor 90 is preferably driven at a constant speed so that the gear wheel 82 rotates at a slower but constant speed and the arm 68 rocks at regular intervals. Each rocking movement of the arm 68 toward the left advances the ratchet wheel 66 one tooth, this advance being sufficient to cause the cam follower 54 to ride from the position shown in Figure 3 to the position shown in Figure 4. This results in a partial or complete closing of the corresponding gate 40, according to the depth of the notch 60 in the cam disk 58. The next rocking movement of the arm 68 toward the left causes the cam follower 54 to ride out of the notch 60. Thus the gate 40 is closed for only a brief period, being reopened by the next successive stroke of the pawl 64. It is not closed again until the cam follower 54 rides around the disk and into the notch 60 again. The closing of either gate 40 directs the entire air supply into the other chamber so that the velocity of the stream of air entering the other chamber is materially increased during the brief interval in which the gate 40 is closed. When the gate is reopened, the air streams of the two chambers resume normal velocity. The other gate 40 is thereafter briefly closed, increasing momentarily the stream of air entering the first chamber. For instance, as shown in the drawing, the ratchet wheels 66 have twenty-eight teeth. Assuming that the ratchet wheel 66 makes one revolution every five minutes, each of the gates 40 will be alternately closed for approximately ten seconds during that period. The reduction or cutting off of the air supply by one of the gates permits garments which may be clinging to the outlet of the chamber, the air supply of which is controlled by that gate, to drop to the bottom where they may be picked up when the air stream resumes normal velocity. The periodical surges or increases in the air stream in the other chamber caused by the closing of the gate in the companion chamber serve to dislodge clothes or other articles which may be too heavy or wet to be raised initially by the normal air stream.

It is evident that by using cam disks 58 with only one notch 60 in each disk, the brief periods of alteration of velocity of the air streams will be followed by very much longer intervals of time in which the air flow to both of the chambers is normal. If desired, the cam members 58 may be made with more notches arranged as desired. The closing movement of the gates 40 may be under the influence of gravity, or, if desired, springs 92 may be provided to ensure proper closing movement of these gates. If two or more drying machines are set side by side, a single cam shaft 62 may extend past all of the machines to carry all of the cams 58 for these machines. Other alternative features and details of construction such, for example, as the use of channel cams instead of the edge cams shown, may be employed, and alterations and modifications may be made in the apparatus illustrated without departing from the spirit or scope of the invention defined in the following claims.

I claim:

1. In a drying machine having an approximately cylindrical chamber, means for blowing a stream of air tangentially into the chamber to tumble clothes or the like which have been inserted therein to be dried, and a gate for controlling said air stream; a device for closing and promptly reopening said gate, means for operating said device at predetermined intervals, and means for driving said operating means.

2. In a drying machine having a pair of approximately cylindrical chambers, a common means for supplying air under pressure, means for directing a stream of air tangentially into each said chamber from said common supply means, and a gate for each said stream operable to control the flow of each stream into the corresponding chamber; operating means for each gate to close and promptly reopen the gate, and means for actuating said operating means alternately at predetermined intervals.

3. A drying machine having an approximately cylindrical chamber for the fabric, means for introducing a stream of air substantially tangentially into the lower portion of said chamber to tumble fabric therein, means for controlling said air stream, a device for regulating said controlling means to increase or lessen the intensity of the air stream at periodic intervals, and power means for operating said device.

4. A drying machine having an approximately cylindrical chamber for the fabric, means for blowing a stream of air substantially tangentially into the lower portion of said chamber to

tumble fabric therein, means for controlling said air stream, a device for at least partially closing said air stream to lessen the velocity of the air at periodic intervals, and power means for operating said device.

5. A drying machine having at least two approximately cylindrical chambers, common means for supplying air under pressure to both of said chambers, and means for controlling the flow of air into each of said chambers, a device associated with each chamber for regulating the intensity of the air stream into each chamber at periodic intervals, and power means for operating said devices to lessen the flow of air into one of said chambers and simultaneously increase the flow of air into the other chamber at periodic intervals.

6. A drying machine having a casing formed to provide a plurality of substantially cylindrical drying chambers, each having a perforated wall portion, air moving means communicating with each of said chambers, shut off valve means between the air moving means and each chamber, and means arranged to close the valve means of said chambers intermittently and in order for such short periods during a drying cycle to prevent articles lodged against said perforated wall to fall away therefrom, and to periodically increase for such short periods the velocity of the air stream flowing into each chamber during the drying cycle to cause tumbling of heavy fabric therein.

7. The method of drying fabric which comprises placing the moist fabric into an approximately cylindrical chamber having outlet openings in its upper portion and an opening leading into its lower portion, introducing a stream of air into said chamber through the lower opening, and periodically altering the velocity of the air stream for brief periods during the drying operation.

8. The method of drying fabric which comprises placing the moist fabric into an approximately cylindrical chamber having outlet openings at its upper portion and an opening leading into its lower portion, introducing a stream of air into said chamber through the lower opening to tumble the fabric while it is being dried, and periodically decreasing the velocity of the air stream during the drying operation to permit fabric obstructing the outlet openings to fall to the bottom of the container.

9. The method of drying fabric which comprises placing a portion of the fabric into each of two approximately cylindrical chambers each having an outlet opening at its upper portion and an opening leading into its lower portion introducing a stream of air into each of said chambers through its lower opening to tumble the fabric therein while it is being dried, and periodically decreasing the velocity of the air stream flowing into one of said chambers while simultaneously increasing the velocity of the air stream flowing into the other chamber during the drying operation, whereby light fabric obstructing the outflow of air in one chamber is permitted to fall to the bottom of this chamber, while the increased velocity of the air flowing into the other chamber tumbles heavy fabric.

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