May 10, 1949. A. A. LOCKE 2,469,882

CONTINUOUS DRIER

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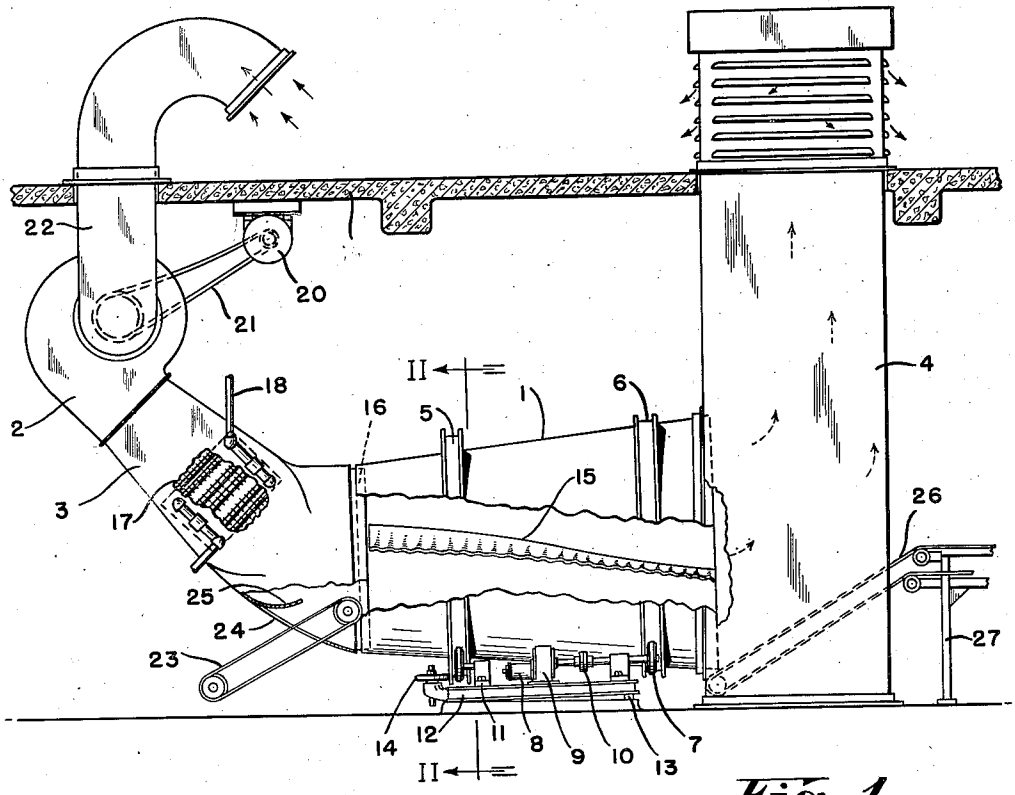


Fig. 1

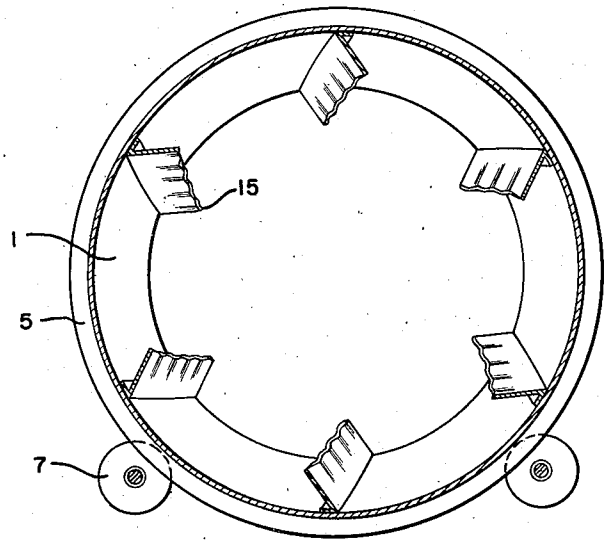


Fig. 2

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CONTINUOUS DRIER

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7 Claims. (Cl. 34—136)

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This invention relates to a continuous dryer and, in particular, it relates to means for drying articles such as laundry in a continuous and progressive manner.

Most conventional methods and apparatus used for drying laundry comprise generally a perforated barrel or sleeve type container into which a quantity of wet laundry is placed. The perforated sleeve is rotated while hot air is circulated through the container. Upon completion of the drying operation, rotation of the sleeve is stopped and the contents thereof are manually removed. This conventional dryer is generally referred to as a batch type dryer.

It is among the objects of my invention to provide a drying apparatus for laundry which is continuous in operation; to provide a drying apparatus in the form of a rotating sleeve having inwardly projecting ribs in which the ribs pick up the laundry and drop the laundry in a manner as to cause advancement of the laundry along the length of the sleeve; to provide a drying apparatus of the rotating sleeve type in combination with forced air in which the inlet end of the sleeve is smaller than the outlet end, thereby causing a differential in the force of the air as it moves through the sleeve; and, to provide a drying apparatus which is automatic and efficient in operation and which is economical to manufacture and operate. These and other objects and advantages will appear more fully in the following detailed description when considered in connection with the accompanying drawing, in which:

Figure 1 is a side elevational view, partly broken away, of a drying apparatus forming an embodiment of my invention; and,

Figure 2 is a transverse view, in section, of a dryer sleeve taken along lines II—II of Figure 1.

With reference to the drawing, I show an embodiment of my invention comprising, in general, a sleeve 1, a blower 2 and a duct 3 connecting the blower with the sleeve. An outlet duct 4 connects with the opposite end of the sleeve 1. The sleeve 1 is of a cone or truncated shape in the form of a shell having open inlet and outlet ends. The smaller end of the sleeve is the inlet end and the larger end of the sleeve is the outlet end.

A pair of annular channels 5 and 6 are attached to the outer circumference of the sleeve, and function as a track for engaging with supporting wheels 7. At least one of the supporting wheels 7 is driven by means of a motor 8 connected to one of the wheels 7 through a reduction unit 9 and flexible coupling 10. The wheels 7 are supported by bearings 11 mounted on a

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frame 12. An adjusting screw 13 provides means for raising or lowering the frame relative to the floor line for the purpose of changing the angle of the sleeve. Also associated with the frame 12 is a thrust wheel 14 which rides against the track 5 and restrains the sleeve 1 against axial movement.

Within the sleeve 1 is a plurality of ribs 15. These ribs are attached to the inner wall of the sleeve and project inwardly thereof. The number of ribs as provided within the sleeve may be varied in number and are equally spaced around the circumference of the sleeve. Preferably, six such ribs are employed in the present embodiment. It is the function of these ribs 15 to pick up laundry as it enters the sleeve and to elevate the laundry to a point equal to about three-quarters of the height of the sleeve.

At this point the laundry slides off of the ribs 15 and is dropped to the bottom of the sleeve. The exact moment when the laundry slides off of the rib is dependent somewhat on the speed of rotation of the sleeve. In the present case the sleeve is rotated at a speed of approximately 15 revolutions per minute. On this basis, it is desirable that the rib should not extend radially of the sleeve but should be provided with a backward slope forming an angle of approximately 15 degrees with a radial line extending to the center of the sleeve. It is also desirable, although not necessary, that the ribs 15 be bent or positioned against the inner surface of the sleeve in a slight helical formation. This is desirable to prevent all of the laundry picked up by the rib from dropping simultaneously. In other words, the helical rib permits a progressive dropping of the laundry from the rib to permit a greater uniformity of the distribution of hot air against the laundry as it is dropped. It is also desirable that the ribs 15 be corrugated to prevent the laundry from sliding longitudinally along the rib. By this arrangement a better control is maintained in regard to the progressive advancement of the laundry through the sleeve.

By means of the adjusting screw 13 the axis of the sleeve may be varied slightly from a horizontal position. In this way it is possible to control the extent of advancement of the laundry as it is dropped from the rib. Since the force of air, as it moves through the sleeve, also functions to advance the laundry through the sleeve, it is necessary in some cases that the axis of the sleeve be adjusted so that the laundry normally drops from the rib to a backward position, closer to the inlet end. The forced air, however, as it enters the

small end of the sleeve prevents such a condition and causes at all times an advancement of the laundry, as it is dropped from the rib, in a progressive movement through the outlet end of the sleeve.

Associated with the inlet end of the sleeve 1 is a duct 3. This duct does not contact the sleeve but is in close fitting relation therewith. A flange 16 projecting from the duct 3 extends a short distance within the inlet end of the sleeve.

Located within the duct 3 is a heating unit formed of a plurality of finned coils 17. These coils 17 are connected with a circulating steam line 18. The blower 2 is supported from a ceiling 19 and connects with the duct 3. A motor 20 also attached to the ceiling 19 drives the blower 2 through a belt 21. The inlet end of the blower connects with a duct 22 which, for practical purposes of air control, has its inlet at some remote location, such as outside of a building.

Associated with the inlet end of the sleeve 1 is a continuous conveyor 23. This conveyor is in an inclined position and is adapted to conveying laundry which is positioned thereon into the feed end of the sleeve 1. The conveyor is driven from and may form a part of other continuous means (not shown) for washing and wringing out laundry. An opening 24 is provided in the duct 3 through which the conveyor 23 extends. A baffle 25 deflects and prevents any substantial loss of air due to the opening 24.

The duct 4 at the opposite end of the sleeve 1 is in the form of a vertical column and communicates in close engagement with the outlet end of the sleeve. Clearance, however, is provided to permit free rotation of the sleeve without interference with the duct. The outlet end of the sleeve projects slightly within the duct to prevent any direct loss or forced air. As in the case of the inlet duct it is preferable that the outlet end of the duct 4 extend to some remote location, such as outside of a building, in order to dispose of the moist air.

Extending within the duct 4 and positioned at the bottom outlet end of the sleeve 1 is a belt conveyor 26. The principal portion of the conveyor 26 is supported on a table-like structure 27. The purpose of the conveyor 26 is to receive laundry as it is ejected from the outlet end of the sleeve and to carry the laundry over the table-like structure 27 where it is sorted, folded, or where other disposition is made. An opening is made of a sufficient size in the wall of the duct 4 to permit the conveyor to extend therethrough, and at the same time allowing sufficient clearance for the laundry as it rests upon the conveyor belt.

In the operation of the dryer, as herein described, the sleeve is caused to rotate at approximately 15 revolutions per minute. The steam is turned on to heat the coils 17 and the blower 2 is set into operation. Also, the conveyors 23 and 26 are driven. A blast of hot air now follows a course through the sleeve and out through the duct 4. Wet laundry is positioned on the conveyor 3 and moved into the inlet end of the sleeve 1. The laundry which enters the present drying apparatus is usually subject to a wringing operation so that the greater part of the water is already removed from the laundry. As the wet laundry drops into the inlet end of the sleeve it is picked up by one of the ribs 15 to a point approximately three-quarters of the height of the diameter of the sleeve. At this point it slides off of the rib and is dropped to the bottom of the sleeve. The hot blast of air reacts against the

dropping laundry to remove moisture therefrom. At the same time, the force of the hot air advances the laundry along the length of the sleeve. This operation is repeated a number of times until practically all of the moisture is removed from the laundry. As the laundry becomes dryer its weight is reduced and, consequently, the forced air reacts to move the laundry in greater increments of advancement. To off-set this condition, the sleeve is larger at the outlet end than the inlet end, thus the force of the air is reduced in effectiveness. Finally, the dried laundry is blown out of the end of the sleeve and onto the conveyor belt 26 where it is removed from the drying apparatus.

From the foregoing description, it is believed apparent that I have provided a novel arrangement for drying laundry which is continuous in operation and which provides a control over individual articles of laundry to insure that such laundry will not be removed from the apparatus until the laundry is completely dried.

While I have shown a preferred embodiment of my invention, it is to be understood that it is susceptible of those modifications which appear within the spirit of the invention and as appearing particularly within the scope of the appended claims.

Having thus described my invention what I claim is:

1. A continuous laundry dryer comprising a sleeve having open inlet and outlet ends, means for rotating the sleeve, the outlet end of the sleeve being larger in diameter than the inlet end and the peripheral wall of the sleeve being uniformly tapered from the inlet end to the outlet end, a duct communicating with the inlet end of the sleeve and an outlet duct communicating with the opposite end of the sleeve, said inlet duct at its point of communication with the inlet end of the sleeve being substantially equal in area to the area at the inlet end of the sleeve, means within the sleeve for picking up laundry and dropping it from an elevated position upon rotation of the sleeve, and forced air means directed from the inlet duct for advancing the laundry toward the outlet end of the sleeve.

2. A continuous laundry dryer comprising a sleeve having open inlet and outlet ends, means for rotating the sleeve, the outlet end of the sleeve being larger in diameter than the inlet end and the peripheral wall of the sleeve being uniformly tapered from the inlet end to the outlet end, the axis of the sleeve at the inlet end being positioned at a lower elevation than the axis of the sleeve at its outlet end, a duct communicating with the inlet end of the sleeve and an outlet duct communicating with the opposite end of the sleeve, means within the sleeve for picking up laundry and dropping it from an elevated position upon rotation of the sleeve, and forced air means directed from the inlet duct for advancing the laundry toward the outlet end of the sleeve.

3. A continuous laundry dryer comprising a sleeve having open inlet and outlet ends, means for rotating the sleeve, the outlet end of the sleeve being larger in diameter than the inlet end and the peripheral wall of the sleeve being uniformly tapered from the inlet end to the outlet end, adjustable means associated with the sleeve for tilting the axis of the sleeve, a duct communicating with the inlet end of the sleeve and an outlet duct communicating with the opposite end of the sleeve, said inlet duct at its point of communication with the inlet end of the sleeve

being substantially equal in area to the area at the inlet end of the sleeve, means within the sleeve for picking up laundry and dropping it from an elevated position upon rotation of the sleeve, and forced air means directed from the inlet duct for advancing the laundry toward the outlet end of the sleeve.

4. A continuous laundry dryer comprising a sleeve having open inlet and outlet ends, the outlet end of the sleeve being larger in diameter than the inlet end and the peripheral wall of the sleeve being uniformly tapered from the inlet end to the outlet end, means for rotating the sleeve, a plurality of ribs projecting from the inner surface of the sleeve wall and extending along the length of the sleeve, a duct communicating with the inlet end of the sleeve and an outlet duct communicating with the opposite end of the sleeve, said inlet duct at its point of communication with the inlet end of the sleeve being substantially equal in area to the area at the inlet end of the sleeve, and forced air means directed from the inlet duct for advancing the laundry toward the outlet end of the sleeve.

5. A continuous laundry dryer comprising a sleeve having upon inlet and outlet ends, the outlet end of the sleeve being larger in diameter sleeve being uniformly tapered from the inlet end than the inlet end and the peripheral wall of the to the outlet end means for rotating the sleeve, a plurality of ribs projecting from the inner surface of the sleeve wall and extending along the length of the sleeve, each of the ribs having corrugations the length of which extend in a direction transversely of the axis of the sleeve, a duct communicating with the inlet end of the sleeve and an outlet duct communicating with the opposite end of the sleeve, said inlet duct at its point of communication with the inlet end of the sleeve being substantially equal in area to the area at the inlet end of the sleeve, and forced air means directed from the inlet duct for advancing the laundry toward the outlet end of the sleeve.

6. A continuous laundry dryer comprising a sleeve having open inlet and outlet ends, the outlet end of the sleeve being larger in diameter than the inlet end and the peripheral wall of the sleeve being uniformly tapered from the inlet end to the outlet end means for rotating the sleeve, a duct communicating with the inlet end of the

sleeve and an outlet duct communicating with the opposite end of the sleeve, said inlet duct at its point of communication with the inlet end of the sleeve being substantially equal in area to the area at the inlet end of the sleeve, means within the sleeve for picking up laundry and dropping it from an elevated position upon rotation of the sleeve, forced air means directed from the inlet duct for advancing the laundry toward the outlet end of the sleeve, and heated surface means within the inlet duct for heating the air moved by the forced air means.

7. A continuous laundry dryer comprising a sleeve having open inlet and outlet ends, means for rotating the sleeve, the outlet end of the sleeve being larger in diameter than the inlet end and the peripheral wall of the sleeve being uniformly tapered from the inlet end to the outlet end, adjustable means associated with the sleeve for tilting the axis of the sleeve, the axis of the sleeve at the inlet end being normally positioned at a lower elevation than the axis of the sleeve at its outlet end, a plurality of ribs projecting from the inner surface of the sleeve wall and extending along the length of the sleeve, and forced air means directed from the inlet duct for advancing the laundry toward the outlet end of the sleeve.

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