July 12, 1938. R. A. HETZER 2,123,304

DRYING TUMBLER

Filed Jan. 27, 1936 3 Sheets-Sheet 1

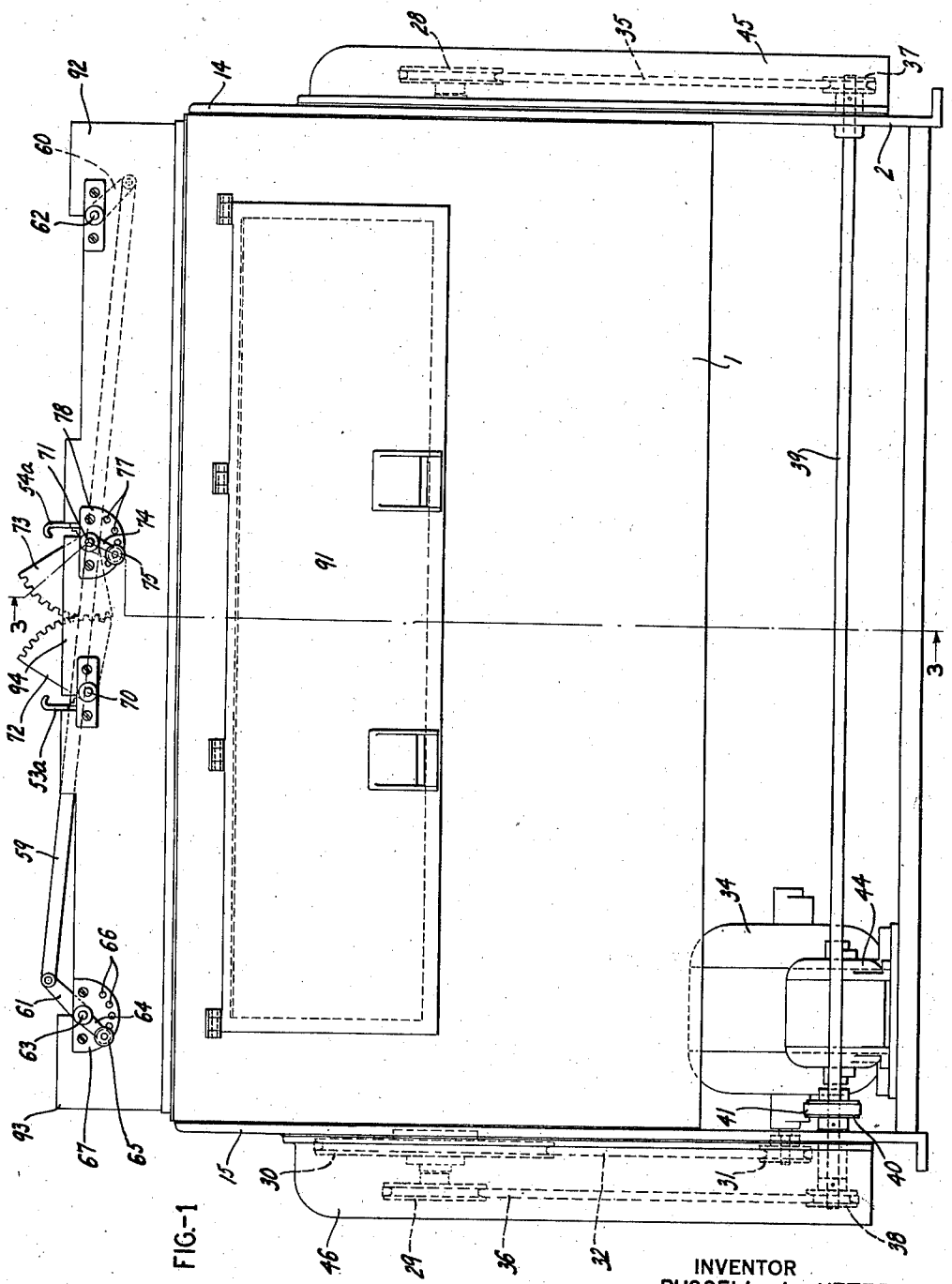


FIG-1

INVENTOR
RUSSELL A. HETZER

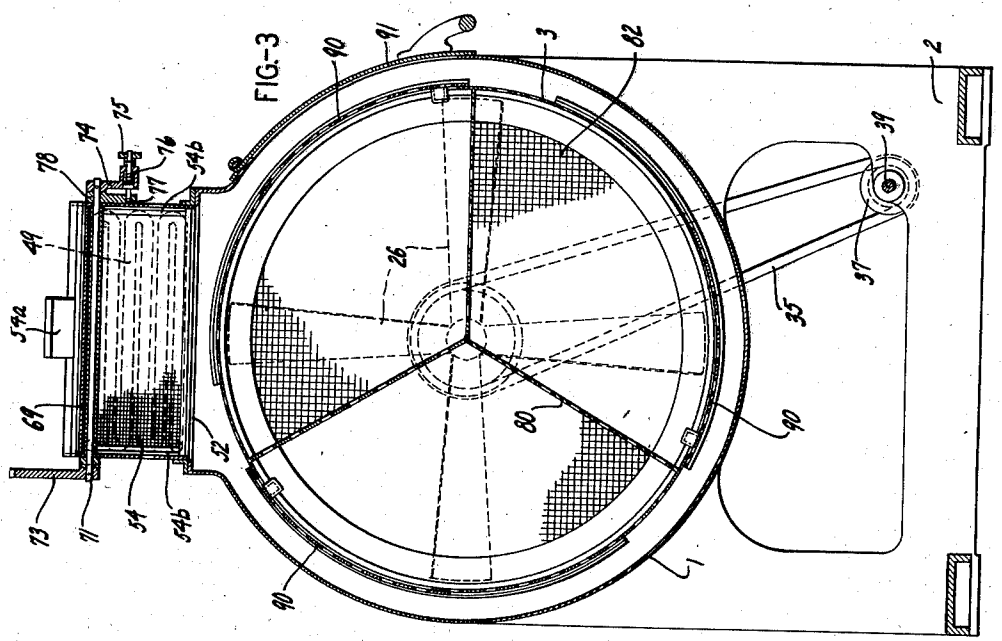
BY
Brockett, Hyde, Higley & Meyer
ATTORNEYS

July 12, 1938. R. A. HETZER 2,123,304

DRYING TUMBLER

Filed Jan. 27, 1936 3 Sheets-Sheet 2

FIG.-3



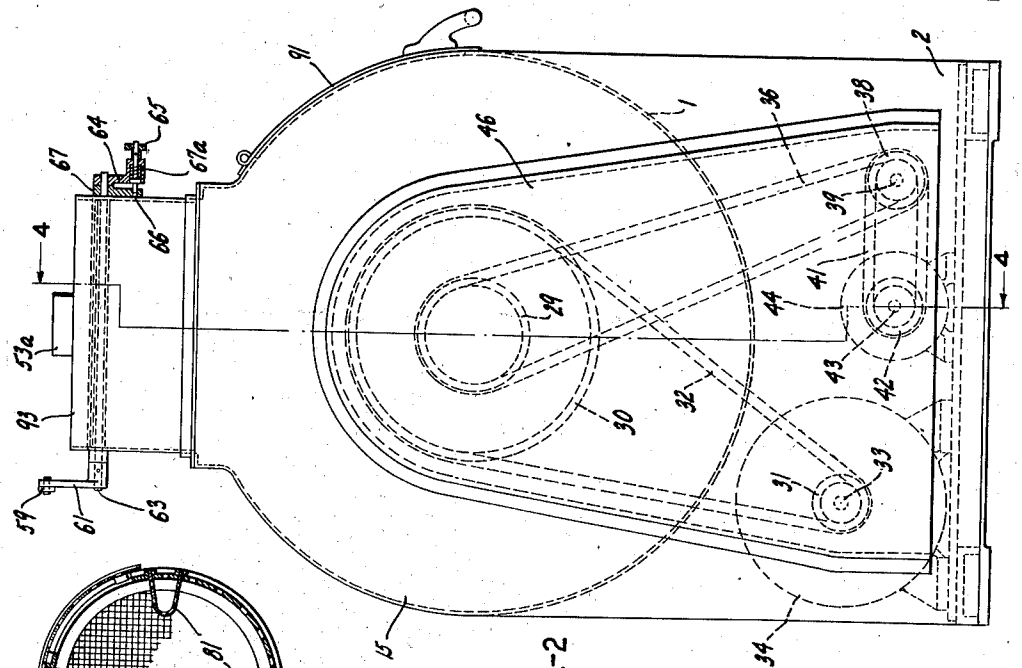


FIG.-2

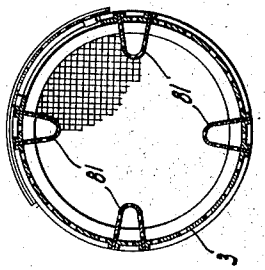


FIG.-5

INVENTOR
RUSSELL A. HETZER
BY
Brockett, Hyde, Higley & Meyer
ATTORNEYS

July 12, 1938. R. A. HETZER 2,123,304

DRYING TUMBLER

Filed Jan. 27, 1936 3 Sheets-Sheet 3

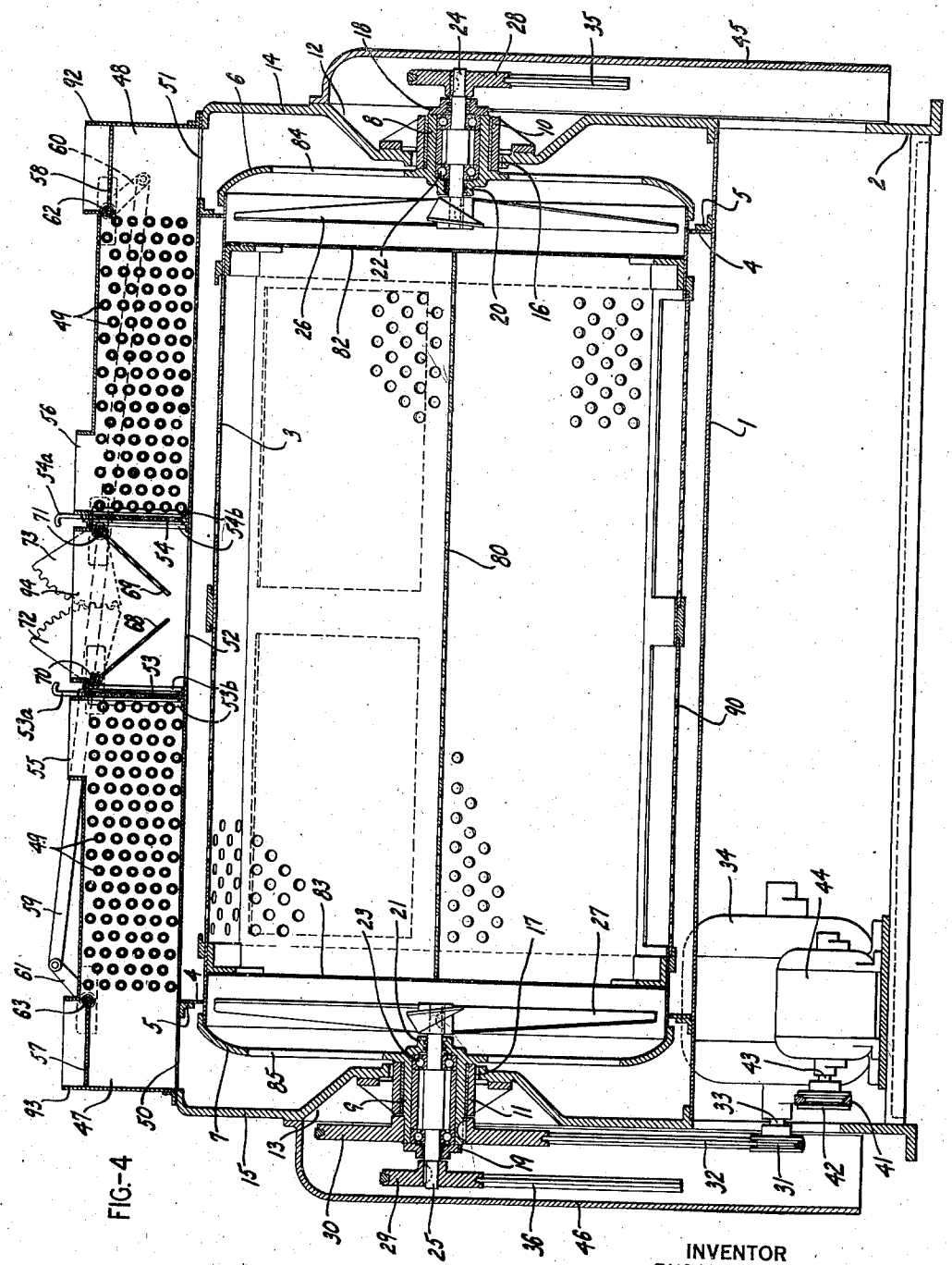


FIG.-4

INVENTOR
RUSSELL A. HETZER
BY
Brockett, Hyde, Higley & Meyer
ATTORNEYS

Patented July 12, 1938 2,123,304

UNITED STATES PATENT OFFICE

2,123,304

DRYING TUMBLER

Russell A. Hetzer, Madeira, Ohio, assignor to The American Laundry Machinery Company, Norwood, Ohio, a corporation of Ohio

Application January 27, 1936, Serial No. 60,947

14 Claims. (Cl. 34—5)

My invention relates to drying machines and more particularly to an improved machine of this type for drying and deodorizing fabric.

In drying machines comprising a stationary casing and a rotatable perforated drum, it has been the practice to first introduce heated air and then atmospheric air into the casing to dry and deodorize the fabric. In such machines, however, the air which is introduced into the casing must be forced through the perforated drum and consequently most of its kinetic energy is lost before it comes into contact with the goods to be dried and deodorized. Furthermore, the introduction of air in such a manner renders it almost impractical to utilize a work containing drum which is divided into compartments, such as drums having Y-pockets, because the drying and deodorizing air is only passed through each pocket one-third of the time.

To overcome this defect, attempts have been made to introduce the air into the rotating drum by means of perforated gudgeons which form a bearing for the work containing drum. In such construction, however, the inflowing blast of air is limited to the size of the gudgeon and it is impossible to secure proper air distribution.

It is therefore an object of my invention to provide an improved drying machine in which air for drying and deodorizing the fabric may be introduced at a comparatively high velocity into the work containing drum and will be thoroughly distributed through the fabric being dried or deodorized.

Another object of my invention is to provide an improved apparatus for drying fabric by means of which air may be introduced at a comparatively high velocity into both ends of the work containing drum and by means of which the air may be thoroughly heated and recirculated through the drum.

A further object of my invention is to provide an improved apparatus for deodorizing fabric by means of which atmospheric air may be forced at a comparatively high velocity through the fabric and expelled to the atmosphere.

A still further object of my invention is to provide an improved structure by means of which heated or atmospheric air may be thoroughly and uniformly distributed at a comparatively high velocity through the various compartments of a rotatable goods container.

My invention will be better understood by reference to the accompanying drawings in which Fig. 1 is a front elevational view of my improved treating apparatus; Fig. 2 is an end elevational view of the same; Fig. 3 is a cross sectional view on the line 3—3 of Fig. 1; Fig. 4 is a cross sectional view on the line 4—4 of Fig. 2; and Fig. 5 is a cross sectional view, showing a modified rotatable drum.

Referring to the drawings, my improved fabric treating apparatus comprises a casing 1 which is supported on a suitable frame 2. Supported within the casing 1 is a rotatable goods containing drum 3 and interposed between the casing and drum adjacent opposite ends of the drum are two annular baffles 4 which are affixed to angle irons 5 attached to the wall of the casing for purposes to be described. A slight clearance exists between the baffles 4 and the drum to permit rotation of the drum without friction. The drum 3 comprises a cylindrical perforated body to which end plates 6 and 7 are attached. End plates 6 and 7 are provided with collars 8 and 9 which are supported by bearings 10 and 11 respectively. The bearings 10 and 11 fit into recesses 12 and 13 formed in the respective ends 14 and 15 of the casing and extend through openings 16 and 17 formed in the ends of the casing.

The outer ends of collars 8 and 9 are provided with additional outwardly extending collars 18 and 19 of reduced diameter which provide a housing for sealing rings and the inner portion of each collar 8 and 9 is reduced and extends inwardly to form annular projections 20 and 21. A housing is thus provided for bearings 22 and 23 which support shafts 24 and 25. Fans or propellers 26 and 27 are attached to the inner end and pulleys 28 and 29 are keyed to the outer end of each shaft. An additional pulley 30, keyed to collar 9, is connected to a pulley 31 by means of a belt 32. Pulley 31 is attached to shaft 33 of motor 34 which supplies power for rotating the drum.

Fan pulleys 28 and 29 are connected by belts 35 and 36 to pulleys 37 and 38 which are supported on a longitudinally extending shaft 39, as illustrated in Figs. 1 and 2 of the drawings. An additional pulley 40 is also fastened to shaft 39 which is connected by means of a belt 41 to a pulley 42, attached to the shaft 43 of motor 44, the motor serving to rotate shaft 39, thereby supplying power for rotating fans or propellers 26 and 27. Frames 45 and 46 extend outwardly from the ends 14 and 15 of casing 1 and form a housing for collars 8 and 9 and associated pulleys.

Extending upwardly from casing 1 and supported thereon is an additional casing which is divided into chambers 47 and 48 containing heating tubes 49. End openings 50 and 51 and a cen-

tral opening 52 are provided between chambers 47 and 48 and the casing 1, thereby forming air passageways from each chamber to the end plate adjacent thereto, and a passageway from the perforated container for returning air to the heating chambers or expelling it to the atmosphere. Screens 53 and 54 are interposed between the opening 52 and heating chambers 47 and 48 which serve to prevent lint from passing into the chambers. As illustrated in the drawings, the lint screens may be inserted through transverse slots in the upper wall of the heating chambers and are provided with lugs or projections 53a and 54a by means of which they may be readily removed. Spaced angle irons 53b and 54b secured to the walls of the casing serve to guide the screens into the proper position during insertion.

Chambers 47 and 48 are provided with breathing tubes or ports 55 and 56 by means of which air may be drawn from the atmosphere and passed through the heater and thence through the drum. Chambers 47 and 48 are also provided with dampers 57 and 58 which are connected to a link 59 by means of levers 60 and 61 which are affixed to the damper rods 62 and 63. A handle 64 is attached to the opposite end of damper rod 63 which is provided with an aperture to receive a headed latch 65 which is forced into notches 66 in a semi-circular plate 67 by means of a spring 67a. By pulling the head of the latch outwardly, rotating arm 64 and releasing the head so that the shank of the latch extends into different notches, the dampers may be slightly, partially or completely opened. When the dampers are completely opened, the heating chambers 47 and 48 are completely shut off and air passes directly from the atmosphere to the end plates through openings 50 and 51.

Dampers 68 and 69 which control the exhaust of air from casing 1 are connected to the respective shafts 70 and 71 of segmental gears 72 and 73 which are in meshing relationship. A handle 74 is attached to the opposite end of shaft 71 and is provided with an aperture to receive the shank of a latch 75 which is forced by the action of a spring 76 into notches 77 formed on a plate 78. By pulling the latch outwardly, rotating the handle 74 and releasing the latch so that the shank will extend into the desired notch 77 on plate 78, dampers 68 and 69 may be maintained slightly, partially or completely open. When the dampers are completely open they close the passageway into heating chambers 47 and 48 and air from casing 1 is passed directly to the atmosphere.

As illustrated in the drawings, the drum is divided into compartments by the Y-shaped partition 80, although it will be understood that a drum of ordinary construction or one having inwardly extending perforated ribs 81 as illustrated in Fig. 5 of the drawings may be employed if desired. The Y-partition is supported at each end by means of screens or perforated plates 82 and 83 which are spaced inwardly a short distance from the fans or propellers 26 and 27. End plates 6 and 7 which are spaced outwardly a short distance from the propeller blades are provided with openings 84 and 85 which form a passageway for the air which is forced into the perforated drum. Slidable closures 90 on the drum and a pivoted closure 91 on the casing are provided for introducing fabric into and removing it from the compartments.

The operation of my improved apparatus will now be apparent. The fabric is first introduced into the rotatable drum, dampers 68 and 69 are maintained slightly or partially open and air is drawn from heating chambers 47 and 48 through openings 50 and 85 and 51 and 84, respectively, and is forced through the tumbler. The air passing through the perforations in the tumbler is forced through the passageway 52 and screens 53 and 54 into the heating chambers 47 and 48, the baffles 4 preventing the return of air to the fans or propellers without passing through the heating chambers. The heated air is then returned to propeller 26 through openings 51 and 84, and to propeller 27 through openings 50 and 85. A certain proportion of the vapor laden or vapor saturated air is expelled through the opening between dampers 68 and 69 which is compensated for by air being drawn into the heating chambers through ports 55 and 56. When the fabric has been thoroughly dried, dampers 57, 58, 68 and 69 are completely opened. The passageways through the heating chambers 47 and 48 are thus completely closed and air from the atmosphere is drawn in through conduits 92 and 93 and exhausted through opening 52 and conduit 94 to the atmosphere. The fabric may therefore be thoroughly dried and deodorized. Instead of passing air through the heating chambers for recirculation through the tumbler during the drying process, dampers 68 and 69 may be completely opened, thereby closing the openings through screens 53 and 54 leading into the heating chambers. Air may then be drawn through ports 55 and 56, heating chambers 47 and 48, openings 50, 51, 84 and 85 to the propellers which forces the air through the tumbler and outwardly through the perforations and conduit 94 to the atmosphere.

From the foregoing specification it will be apparent that I have provided an improved fabric treating apparatus by means of which heated or atmospheric air may be introduced into the treating drum over a wide area at a comparatively high velocity. The fabric may therefore be dried and cooled or deodorized in an efficient and economical manner.

It will also be seen that in my improved apparatus air may be heated, forced through the rotating drum at a comparatively high velocity and reheated until it closely approaches saturation, and means are provided whereby a predetermined amount of fresh air may be drawn into the casing and a predetermined amount of vapor laden or saturated air may be discharged to the atmosphere.

It will also be seen that by providing fans or propellers which extend over substantially the entire end area of the drum, air may be forced into all the compartments of the drum during the entire period of rotation.

Since the propellers are operated from a source of power which is independent of the source of power which rotates the drum, it will also be apparent that the direction of rotation of the drum may be reversed at desired intervals without interfering with the operation of the propellers.

It will also be seen that by providing a fan at each end of the rotating drum and an outlet into the heating chambers or to the atmosphere at approximately the central portion of the drum, the air forced into the drum will have more kinetic energy than air introduced into the casing and will therefore be more effective in the drying and deodorizing operations.

To those skilled in the art many modifications and different embodiments of my invention will suggest themselves without departing from the

spirit and scope thereof. My improved apparatus and the disclosure herein are merely illustrative and are not intended to be in any sense limiting.

What I claim is:

1. A fabric treating device comprising a casing, a work containing drum arranged in said casing having end plates with air passages therein and a perforated cylindrical body portion, perforated partitions in said drum spaced inwardly from the end plates, and air propelling means interposed between said end plates and said partitions whereby air may be forced at a high velocity into both ends of said drum, through the fabric contained therein, and outwardly through the perforations in the cylindrical body.

2. A fabric treating device comprising a casing, a work containing drum having a cylindrical perforated body arranged in said casing, end plates for said drum having air passages therein and perforated partitions spaced inwardly from the end plates, air propelling means interposed between the perforated partitions and end plates, said casing being provided with air inlets adjacent the end plates and an air outlet adjacent the body portion of said drum, and means for drawing air from the atmosphere through the inlet openings in the casing and forcing it through the perforated partitions and the fabric in said drum and outwardly through the perforated body and the outlet opening into the atmosphere to deodorize the fabric in said drum.

3. A fabric treating device comprising a casing, a work containing drum having a cylindrical perforated body arranged in said casing, an end plate for said drum having an air passage therein, a perforated partition spaced inwardly from the end plate, air propelling means interposed between the perforated partition and the end plate, said casing having an air inlet opening adjacent the end of said drum and outlet opening adjacent the body of said drum, and means for drawing air from the atmosphere and forcing it through the perforated partition and the fabric in said drum and outwardly through the perforated body and the outlet opening into the atmosphere to deodorize the fabric in said drum.

4. A fabric treating device comprising a casing, a work containing drum having a cylindrical perforated body arranged in said casing, end plates for said drum having air passages therein and perforated partitions spaced inwardly from the end plates, an additional casing containing heating chambers associated with the main casing and communicating therewith at points adjacent the central and end portions of said drum and air propellers interposed between the perforated partitions and end plates for forcing air from the heating chambers through the end portion of said drum and outwardly through the perforated drum body into the heating chambers for drying fabric in said drum.

5. A fabric treating device comprising a main casing, a work containing drum having a cylindrical perforated body arranged in said casing, an end plate for said drum having an air passage therein, a perforated partition spaced inwardly from the end plate, an additional casing containing a heating chamber associated with the main casing and communicating therewith at a point adjacent the end plate and at a point adjacent the perforated body and means interposed between the end plate and the perforated partition for drawing air from the heating chamber and forcing it through the end portion of said drum and outwardly through the perforated drum body into the heating chamber for drying fabric in said drum.

6. A fabric treating device comprising a casing having an outlet opening, a work containing drum having a cylindrical perforated body arranged in said casing, a pair of heating chambers associated with said casing, one of which communicates with said casing adjacent one end portion of said drum and the other of which communicates with said casing adjacent the opposite end portion of said drum, each of said chambers being provided with an inlet opening, and means for drawing air from the atmosphere through the inlet openings of the heating chambers and forcing it through the end areas of said drum and expelling it outwardly through the perforations in said drum and thence to the atmosphere through the outlet opening in said casing.

7. A fabric treating device comprising a casing having an outlet opening, a work containing drum having a perforated cylindrical body arranged in said casing, a pair of heating chambers associated with said casing, one of which communicates with said casing adjacent one end of said drum and the other of which communicates with said casing adjacent the opposite end of said drum, means for drawing air from the heating chambers and forcing it through the end areas of said drum outwardly through the perforations to the outlet opening in said casing, and means whereby the current of air passing through the outlet opening is divided so that a portion of said air is expelled to the atmosphere and another portion is returned to the heating chambers, said heating chambers being provided with inlet openings from the atmosphere whereby a sufficient amount of air may be drawn in through the inlet openings of said heating chambers to compensate for the air expelled to the atmosphere.

8. A fabric treating device comprising a casing, a work containing drum having a perforated cylindrical body arranged in said drum, a pair of heating chambers associated with said casing each of which has an inlet opening from the atmosphere, communicating means between one of said heating chambers and one end of said drum, communicating means between the other heating chamber and the other end of said drum, said casing having an opening to the atmosphere adjacent the body portion of the drum, means located adjacent one end of the drum for drawing air from the atmosphere through one of said heating chambers and forcing it through the perforations in the drum and the opening in the casing to the atmosphere, and means located adjacent the other end of the drum for drawing air from the atmosphere through the other heating chamber and forcing it through the perforations in the drum and the openings in the casing to the atmosphere.

9. A fabric treating device comprising a casing having inlet openings and an outlet opening, a work containing drum having a perforated body portion and perforated end portions arranged inside of said casing, a pair of air moving means arranged inside the casing, one of which is located inside the casing adjacent one end of said drum and which extends over substantially the entire perforated end area thereof, and the other of which is arranged inside the casing and which extends over substantially the entire area of the other perforated end, said air moving means serving to draw air into the casing through said inlet openings and force it at a high velocity through substantially the entire end areas of said drum

into contact with the work therein and outwardly through the perforations in the body of said drum and through outlet opening of said casing.

10. A fabric treating device comprising a casing having inlet openings adjacent each end and an outlet opening arranged adjacent the central portion, a work containing drum having a perforated body portion and perforated end portions arranged inside of said casing, a pair of air moving means, one of which is located inside the casing adjacent one end of said drum and which extends substantially over the entire end area of said drum and the other air moving means being located inside of said casing adjacent the other end of said drum and extending over substantially the entire area thereof, said air moving means serving to draw air through the inlet openings and force it at a high velocity into the drum through substantially the entire end areas thereof and in contact with the work therein and thence outwardly through the outlet opening.

11. A fabric treating device comprising a casing, a work containing drum having a perforated body portion and perforated end portions arranged in said casing, a heating chamber associated with the exterior of said casing and communicating therewith at points adjacent the body portion and an end portion of said drum, and air moving means located inside the casing adjacent the end portion of said drum and extending over substantially the entire end area of said drum for drawing air from the heating chamber and forcing it at a high velocity through substantially the entire end area of said drum into contact with the work and outwardly through the perforations in the perforated body into said heating chamber.

12. A fabric treating device comprising a casing, a work containing drum having a perforated body portion and perforated end portions arranged in said casing, a heating chamber associated with the exterior of said casing and communicating therewith at points adjacent the body portion and the end portions of said drum, and a pair of air moving means arranged inside the casing, one of which is located inside the casing adjacent one end of said drum and which extends over substantially the entire end area thereof and the other of which is arranged inside the casing and which extends over substantially the entire end area of the other perforated end, said air moving means serving to draw air from the heating chamber and force it at a high velocity into opposite ends of said drum into contact with the work therein and outwardly through the outlet opening into said heating chamber.

13. A fabric treating device comprising a casing having an inlet opening and an outlet opening, a work containing drum having a perforated body portion and a perforated end portion rotatably mounted inside said casing, and an air moving means arranged inside said casing in close proximity to the perforated end of said drum and extending over substantially the entire end area thereof, said air moving means serving to draw air into the casing through the inlet opening of said casing and force it at a high velocity through substantially the entire end area of said drum into contact with the work therein and outwardly through the perforations in the body of said drum and thence through the outlet opening of said casing.

14. A fabric treating device comprising a casing having an inlet opening and an outlet opening, a work containing drum having a perforated body portion and a perforated end portion rotatably mounted inside said casing, an air moving means arranged inside said casing in close proximity to the perforated end of said drum and extending over substantially the entire end area thereof, said air moving means serving to draw air into the casing through the inlet opening of said casing and force it at a high velocity through substantially the entire end area of said drum into contact with the work therein and outwardly through the perforations in the body of said drum and thence through the outlet opening of said casing, and means for preventing air which has been passed through the perforated drum from being returned inside of the casing to the air moving means.

RUSSELL A. HETZEL.