

Dec. 18, 1928.

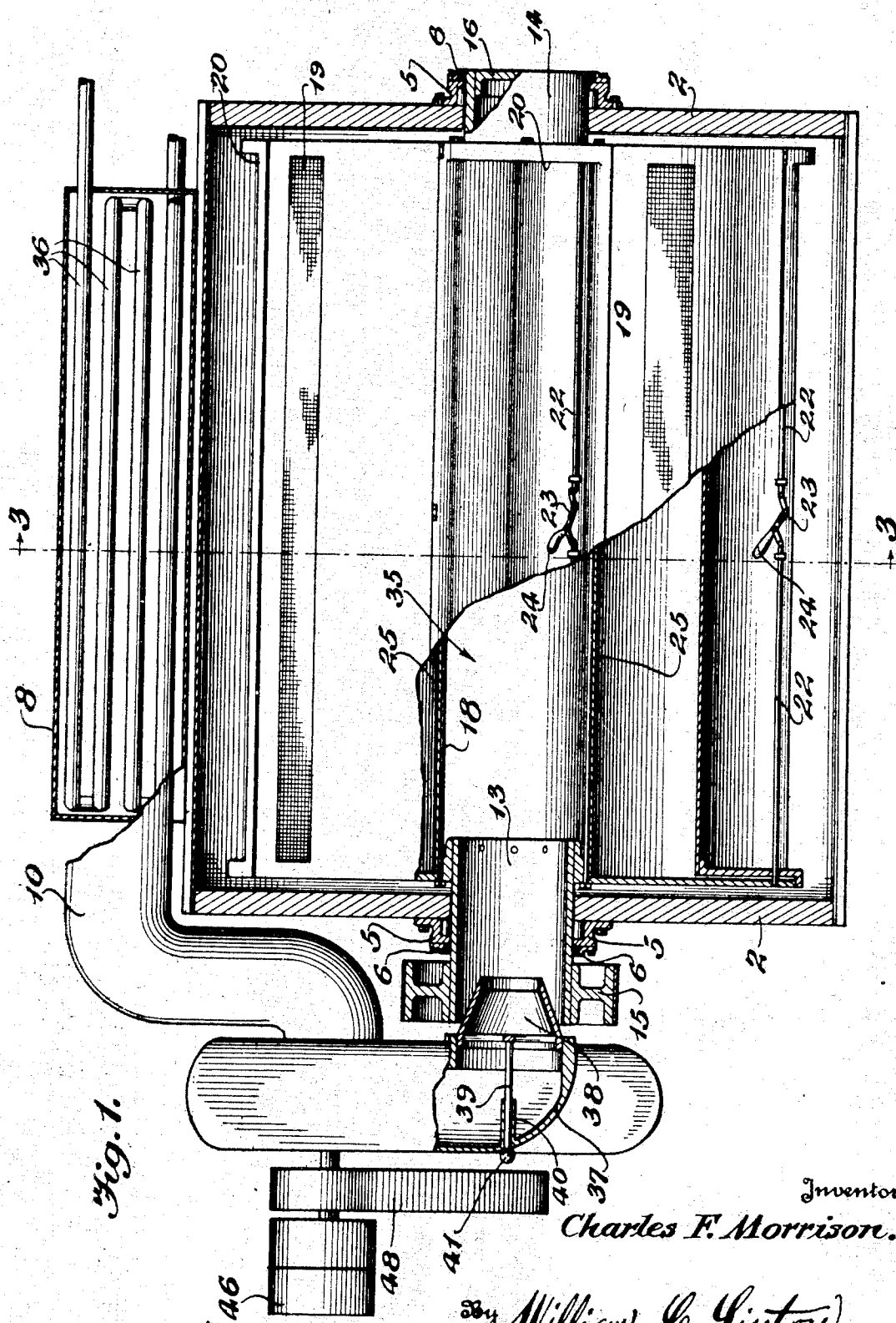
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1,696,172

DRIER

Filed Nov. 2, 1927

3 Sheets-Sheet 1



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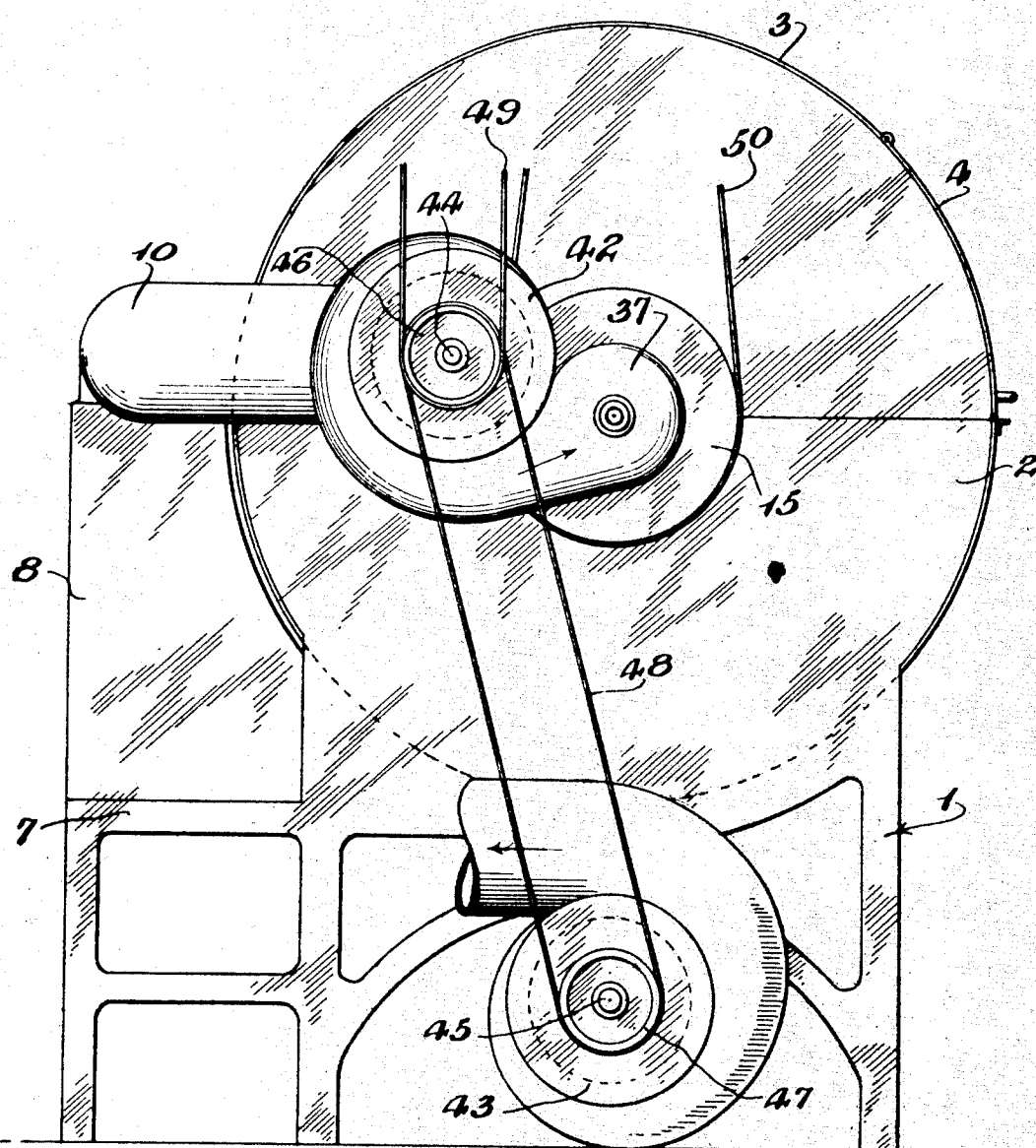
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DRIER

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3 Sheets-Sheet 2

Fig. 2.



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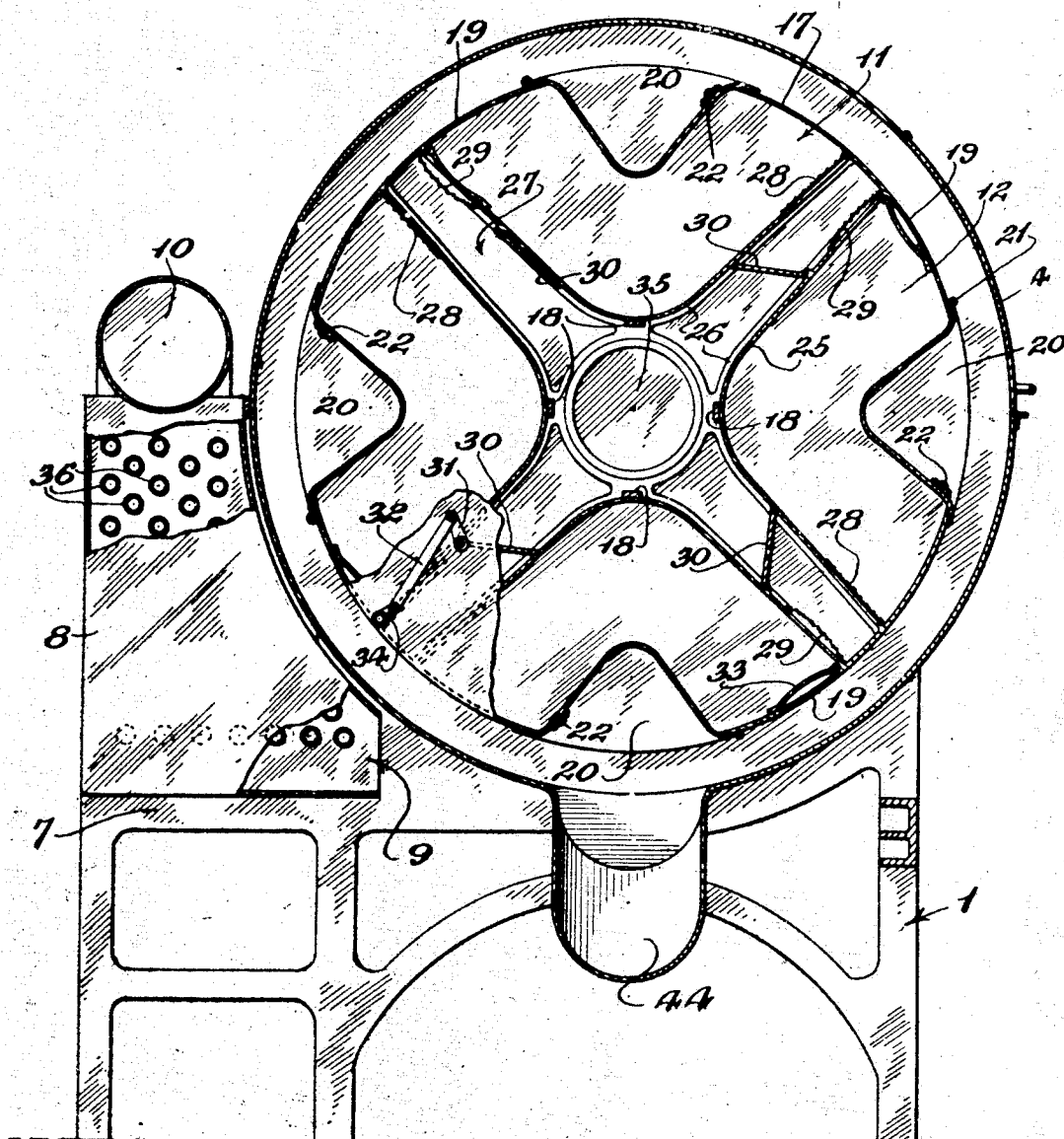
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BRIEF

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3 Sheets-Sheet 3

Fig. 3.



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UNITED STATES PATENT OFFICE.

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DRIER.

Application filed November 2, 1927. Serial No. 230,598.

This invention has for an object to provide a drier of the rotary type especially advantageous for the use in drying and deodorizing of fabrics or garments cleaned by the so-called methods of "dry cleaning," permitting of the drying of fabrics or garments of different texture in a single operation and in a materially less period of time as well as allowing the introduction of drying air currents of selectively proportioned intensities to be directed onto and through the different classifications of matter within the device, that an efficient drying and deodorizing of the same will result.

It is also amongst the principal desiderata of the invention to provide a rotary driver so constructed as to permit of the segregation of one class of grade or texture of matter from another or others within the same, hence, ensuring efficient treatment of each classification according to its particular or peculiar properties or requirements and likewise, the separation of matter of different colors whereby to prevent discoloration.

The invention also aims to provide a drier wherein the temperature of the drying and deodorizing air currents may be regulated to that particular nicety of degree as will insure a satisfactory processing of the matter therein without liability of damaging the same.

Other objects of the invention will be in part obvious and in part pointed out herein-after.

In order that the invention and its mode of operation may be readily understood by those skilled in the art to which it appertains, I have in the accompanying illustrative drawings and in the detailed following description based thereupon, set out one possible embodiment of the invention.

In these drawings:

Figure 1 is a fragmentary horizontal longitudinal section through the drier,

Figure 2 is an end elevation of the same, and

Figure 3 is a vertical transverse section therethrough.

Having more particular reference to the drawings, in connection with which like characters of reference will designate corresponding parts throughout, the improved drier may be stated to comprise a supporting frame generally indicated by the numeral 1 includ-

ing sectional circular opposite side portions 2 over which a sheet metal or other suitable form of covering 3 having a hinged door 4 provided therein, is arranged, thus constituting a hollow cylindrical housing or casing for the drier proper; coaxially disposed bearings 5 being arranged upon the circular sides 2 and equipped with packing rings 6, the purpose of which will be subsequently described.

A shelf like shoulder 7 is provided upon one portion of the supporting frame 1 and received thereupon the casing 8 of the air heating means of the improved drier, the upper portion of the inner side wall of said casing being substantially arcuate to conform to the curvature of the peripheral portion of the hollow cylindrical housing constituted by the sides 2 and the covering 3; the lower end and side of the casing being open as is indicated by the numeral 9 to provide an air inlet way whereas an air discharge conduit 10 communicates with and is arranged above the upper side of said casing 8.

Rotatably supported within the hollow cylindrical casing or housing of the device is a drier drum or tumbler indicated in its entirety by the numeral 11, said tumbler being of hollow cylindrical formation and having circular metal end walls 12 each of which are provided with coaxially disposed hollow bearings 13 and 14 received in and extending through the bearings 5 provided therefor in the opposite sides 2 of the device housing; the bearing 13 being extended for a distance beyond its respective bearing 5 and having a pulley wheel 15 fixedly mounted thereupon whereas the bearing 14 extends substantially flush with the packing 6 of its respective bearing 5 and is preferably closed by removable plug or cap like device 16. A sheet metal or other suitable form of covering designated by the numeral 17 is provided for the tumbler 11, being engaged over and suitably connected to the peripheral portions of the circular end walls 12, which, as will be noted upon reference to the Figures 1 and 2, are rigidly interconnected through the medium of cross sectionally flattened connecting or trussing bars 18 the opposite ends of which extend through openings in adjacent portions of said walls and have locking nuts or other suitable securing means turned into engagement therewith.

Ports of substantially rectangular forma-

tion are formed in the peripheral portion of the tumbler constituted by the covering 17, said ports extending longitudinally throughout approximately the entire length of the tumbler and being covered by a screen or other reticulated device 19 whereby to permit of the discharge or outlet of air from the tumbler, at times. Ways of access are also formed in equi-distant portions of the peripheral part of the tumbler 11 and these ways are adapted to be normally closed by individual concavo-convex doors or closures 20 which, as will be noted upon reference to the Figure 3, have convex portions thereof radially and inwardly disposed within said tumbler whereby to afford the same with a fabric or garment engaging and agitating means, hereinafter more fully described. That the various doors or closures 20 may be moved to opened or closed positions, portions of each thereof are pivoted or hinged to portions of the peripheral covering 17, while to allow such closures to be locked in their respective closed positions, pairs of relatively opposed slidable bolts 22 are mounted upon the free portions of each of said doors longitudinally thereof, as is shown in the Figure 1 and the adjacent or inner ends of these bolts are interconnected by means of a toggle connection for each thereof, designated by the numeral 23; a handle 24 extending from the various toggle connections 23 so that with rocking of the same in one direction, the bolts 22 connected thereto will be drawn to their retracted or unlocked positions, whereas with movement of the handle 24 in an opposite direction, said bolts connected to the same will be moved to their distended or locked positions at which time the outer or free ends of the bolts will engage in keepers or opening provided therefor in adjacent portions of the circular end walls 12. Also, it will be noted that the handles 24 are of a size such as will lend weight thereto so that with rotation of the tumbler 11, the centrifugal force thereof will tend to outwardly stress the weighted handle and in so doing, will insure the retention of the various pairs of slidable bolts 22 connected thereto in their locked positions, hence, avoiding the accidental opening of the closures 20 during operation of the drier.

With a view toward providing the tumbler 11 with means which will permit of the classification or segregation of fabrics or garments to be dried therein, said tumbler is divided into a plurality of segmental compartments, each of which communicates with one of the ways of access normally closed by the doors or closures 20, these segmental compartments being effected by the longitudinal arrangement of shelf-like sheet metal bodies 25 within the tumbler 11, said bodies having their respective inner ends abutting the adjacent sides of the different pressing bars 18, as is shown in the Figure 3, whereas the opposite

ends of the same find support upon inwardly disposed supporting ribs or ledges generally designated by the numeral 26 and preferably formed integral with the inner sides of the circular end walls 12 of said tumbler 11, as is also shown in the Figure 3. By reason of the juxtapositioning of the shelf like bodies 25 within the tumbler 11, it will be noted, especially upon reference to the Figure 3, that a plurality of radially disposed air ways designated by the numeral 27 are provided between the different segmental compartments and that the inner extremities of the airways 27 communicate with a central or main airway extended longitudinally throughout the central portion of the tumbler 11. Ways are formed in the outer extremities of the shelf-like bodies 25 of the different segmental compartments, and these ways are preferably covered by a wire mesh or reticulated material 28 and 29, thus allowing of communication as between the different compartments.

To regulate or control passage of air currents through the compartments of the tumbler 11, plate valves generally indicated by the numeral 30 are pivoted within portions of each of the airways 27 and are disposed longitudinally throughout the same, crank arms 31 being fixedly connected to the respective pivotal mountings of said plate valves 30, which, in turn, are pivotally connected with the adjacent ends of connecting bars 32.

Other plate valves designated, generally, by the numeral 33 and substantially of concavo-convex formation are pivotally mounted upon portions of the peripheral portion 17 of the tumbler 11 adjacent the various screens 19 engaging over the peripheral ports thereof and the respective pivotal mountings of the plate valves 33 each having crank arms 34 fixedly mounted thereupon and pivotally connected adjacent their free ends to the remaining ends of the adjacent connecting bars 32 in the fashion as is shown in the Figure 3. Thus, it will be understood that the plate valves 30 and 33 will be interconnected in curved relation so that concurrent movement of the different pairs will be caused with actuation of their respective connecting bars 32. Furthermore, it is of interest to note at this point that the connection of the various connecting bars 32 to the plate valves 30 and 33 is such that when the valves 30 are in their respective closed positions, their particularly paired valves 33 will be arranged in position over the air discharge ports covered by the screens 19 whereas with arrangement of the plate valves 30 in their open positions, the particularly paired valves 33 thereof will be swung away from the screens 19 of the air discharge ways to positions over the screens 29, thus closing these particular ports.

That heated air may be supplied the main or central airway identified by the numeral

35, and distributed into the branch ways 27. a steam circulating and heating coil 36 is supported in the casing 8 and is adapted to have fresh air delivered into engagement with the same by way of an inlet opening in the lower end of said casing, whereas the heated air discharge pipe 10 communicating with the upper portion of said casing 8 is extended and provided with an elbow portion 37 having an axially adjustable frusto conical valve 38 engaged or arranged in a suitable seat provided therefor in its free end, said free end of the elbow being arranged adjacent the open and extended end of the bearing 13 so that with passage of air from the pipe elbow 37, the same will be discharged by way of the bearing 13 into the central or main airway 35 of the tumbler 11 for distribution to the different segmental compartments thereof by way of the airways 27. To permit the admixture of fresh or cold air with the heated air discharge from the extension of the pipe 11 into the bearing 13, the frusto-conical valve 38 is provided with a rod 39 extending through a suitable guide sleeve 40 provided in an adjacent portion of said elbow 37 to a point exteriorly of the elbow whereat the rod is equipped with a knob or handle portion 41. By outwardly pulling the knob 41, it will be seen, upon reference to the Figure 1, that the frusto conical valve 38 will be drawn into the elbow 37 and in so doing, that it will form an annular fresh or cold air intake way thereabout, hence permitting a properly regulated or proportioned amount of cold or fresh air to be drawn from the atmosphere into and admixed with the heated air being discharged into the bearing 13.

Rotary blowers arranged in casings 42 and 43 are provided, the casing 42 being arranged in the hot air conducting pipe 10 whereas the casing 43 is arranged in the air discharge pipe or conduit 44 provided the drier housing and communicating with the under side of the same as is shown in the Figures 2 and 3; the blowers within said casings having their respective shafts 44 and 45 extended for distances beyond said casings and equipped with pulley wheels 46 and 47 about which suitable belt gearing 48 is engaged; other belt gearing 49 extending into engagement with a portion of the pulley 46 from a suitable source of power, not shown herein, for obvious purposes.

It will be also noted that belt or other suitable form of gearing indicated by the numeral 50 is extended about or engaged with the pulley wheel 15 of the tumbler 11 so that the latter may be caused to rotate at the desired velocity during a drying operation of the invention.

In operation of my improved drier, under certain conditions, as for example, the drying of fabrics or garments of substantially corresponding texture or other physical characteristics, it is desirable that a circuitous course of air drying current shall be maintained throughout the different segmental compartments of the tumbler 11 and to effect this particular coursing of the heated air delivered to the tumbler from the air heating medium contained within the casing 8, the plate valve 30 of one of the air ways 27 is moved to an open or partially open position, as indicated in the Figure 3. With the opening of the particular plate valve 30, it will be understood that concurrent pivotal adjustment or movement of its particularly paired plate valve 33 will be effected, thereby moving the latter valve into a position over the screen 29 of one of the ports of said air way whereby to close the same, but to allow the screen 28 of the opposite port to remain uncovered and open. With an arrangement of the valves 30 and 33 in this particular manner, it will be seen that the heated air discharged into the main or central airway 35 of the tumbler 7 will pass through the aforesaid airway 27 and will discharge through the screen covered port 28 whereupon it will circulate through the adjacent segmental compartment and will continue on through the now opened screened ports 28 and 29 of the remaining air ways 27 thus circulating through each of the succeeding segmental compartments until it reaches the last compartment whereupon the air will discharge through the opened screened port 19 adjacent the plate valve 33 now engaging over its particular screened port 29, the air so discharged passing into the hollow cylindrical housing of the drier whereupon it will travel under urge of the rotary blower in the casing 43 into and through the discharge pipe 44 from whence it will be delivered into the atmosphere at a suitable point.

Should it be required or desired to circulate individual drying air currents through the various segmental compartments within the tumbler 11, as for example when fabrics or garments of different classes, grades or textures are arranged in such compartments, each of the plate valves 30 is moved to its respective open position within the airway 27 adjacent which the same is mounted whereupon the particularly aired plate valves 33 will be simultaneously swung or pivoted to positions engaging over the adjacent screened ports 29. When this adjustment of the various paired valves 30 and 33 is effected, heated air will be delivered from the main or central airway 35 through the ways 27 from whence individual drying air currents will be discharged through each of the various screened ports 28 and said currents will be caused to circulate through the adjacent segmental compartments and ultimately to be discharged from said compartments by way of the opened screened peripheral ports 19

into the hollow cylindrical housing of the drier, whereupon the air under urge of the blower in the casing 43 will be exhausted from said housing into the atmosphere.

5 While I have in this particular embodiment of the invention disclosed a tumbler including four segmental compartments, it is to be understood that the number of these compartments may be either increased or de-
10 creased, such as conditions or preference may dictate and according to such increase or decrease of the segmental compartments, the number of paired and interconnected plate valves 30 and 33 will be regulated.

13 During the circulation of heated air through the compartments of the tumbler 11 in either of the matters heretofore described, it will be understood that said tumbler will be rotated by reason of the engagement of the
20 gearing 50 with the pulley wheel 15 of the same; likewise, that a continuous passage or discharge of heated air into the central or main airway 35 will be effected from the hot air supply pipe 10 communicating with the
25 air heating means comprising the casing 8 and the steam heated pipes 36 supported within the same. During rotation of the tumbler 11, the fabrics or garments received or arranged within the segmental compart-
30 ments will be agitated, that is, continuously shifted to different positions and this agitation will be facilitated by reason of the inwardly disposed or convex portions of the various closures 20, which, as will be readily
35 understood, will, with rotation of the tumbler, act as agitating arms, engaging and moving the fabrics or the garments to different positions.

The arrangement of the segmental compartments and various closures 20 with their convex portions also advantageously serve
40 to control and limit the fall of the fabrics or garments during rotation of the tumbler.

In conventional driers now in use, the garments treated are subjected to a relatively
45 great fall by reason of the construction of the tumbler, causing premature tear and wear of the fabrics or garments, especially those of a lighter texture, such as silks, rayons, etc.
50 With my improved tumbler on the contrary the fabrics are controlled and limited in their fall due to the cooperating walls of the various compartments and their convexly arranged closures defining, as clearly shown in
55 the drawings, an angular space within the compartments. Moreover, it will be understood that the cooperating walls of the compartments and convex portion of the closure serve as a duct for directly forcing air
60 through the fabrics or garments, rather than around or about the same, as is generally the case in known driers. By providing these small angular shaped compartments a greater efficiency is obtained from machines of this
65 character, as practically none of the air in-

troduced into the compartment is lost, but comes in direct contact with the fabrics or garments treated.

The improved drying machine may be as
equally advantageously used in the drying
of garments in fabrics of the so-called "wet
cleaning" processes as well as those cleaned
by the so termed "dry cleaning" processes,
thus rendering the device useful in laundries
as well as cleaning plants. Furthermore, the
drier, if desired, may be successfully used
in mills for the drying of pulp, fibre and simi-
lar compositions worked therein.

Manifestly, the construction shown is ca-
pable of considerable modification and such
modification as is within the spirit of my
claims, I consider within the scope of my in-
vention.

I claim:

1. A drier comprising a housing having
air inlet and outlet means, a rotary tumbler
mounted therein having a plurality of in-
dividual compartments arranged within the
same and equi-spaced with respect to each
other, the arrangement of said compartments
within said tumbler constituting a central
and branch air conducting ways therebe-
tween, said branch conducting means com-
municating with the compartments and ad-
justable valve means cooperable with said
conducting means and compartments for se-
lectively establishing a circular coursing of
air through the compartments individually
or in series.

2. A drier comprising a housing having
air inlet and outlet means, a tumbler mounted
therein having a plurality of individual com-
partments within the same and arranged in
equi-spaced relation, closures for each of said
compartments each of said closures having
agitator means adapted to be extended with-
in their respective compartments, the ar-
rangement of the compartments within said
tumblers being such as to provide within the
tumbler main and branch air ways, said
branch air ways communicating with the
compartments, and a plurality of paired in-
ter-connected and adjustable valves cooper-
atively associated with said branch ways and
compartments for selectively establishing a
circuitous coursing of air through the com-
partments, individually or in series.

3. A drier comprising a housing having
air inlet and outlet means, a rotary tumbler
mounted therein having a plurality of in-
dividual compartments within the same ar-
ranged in equi-spaced relation, closures for
each of said compartments consisting of con-
cavo-convex bodies, portions of which extend
into their respective compartments whereby
to provide agitator means, the arrangement
of said compartments within the tumbler be-
ing such as to provide said tumbler with in-
tercommunicating main and branch airways
and interconnected valve means cooperatively

associated with said branchways and said compartments for selectively establishing a circuitous coursing of air through the compartments, individually or in series.

4. A drier comprising a housing having air inlet and outlet means, a rotary tumbler mounted in the housing having a plurality of spaced compartments within the same, air ducts between said spaced compartments, and means cooperatively associated with said air ducts and compartments for circulating air through the latter, individually or in series.

5. A drier comprising a housing having air inlet and outlet means, a rotary tumbler mounted therein having a plurality of spaced compartments within the same, air ducts between said spaced compartments, and adjustable valve means cooperatively associated with said air ducts and compartments for circulating air through the compartments, individually or in series.

6. A drier comprising a housing having air inlet and outlet means, a rotary tumbler mounted therein having a plurality of radially disposed and equi-spaced compartments within the same, air ducts between said compartments, and adjustable valve means cooperatively associated with said air ducts and compartments for circulating air through the compartments, individually or in series.

7. A drier comprising a housing having air inlet and outlet means, a rotary tumbler mounted therein, a plurality of radially disposed and spaced compartments longitudinally extending throughout the tumbler, movable closures for the outer portions of each of said compartments, each of said closures carrying agitator means within their respective compartments, and means for circulating air through the compartments, individually or collectively.

8. A drier comprising a housing having air inlet and outlet means, a rotary tumbler mounted therein having a plurality of radially disposed and equally spaced compartments within the same, closures for the compartments, each of said closures being formed with agitator portions extending throughout the length of their respective compartments, and valve means for effecting a circuitous coursing of air through the compartments, individually or in series.

9. A drier comprising a housing having air inlet and an outlet means, a rotary tumbler mounted therein having a plurality of equi-spaced compartments within the same, air ducts between the spaced compartments, air heating means connected to the housing inlet means, and other means cooperatively associated with said air ducts and compartments for circulating air through the compartments, individually or in series.

10. A drier comprising a housing having air inlet and outlet means, a rotary tumbler

mounted therein having a plurality of radially disposed and equi-spaced compartments arranged within the same, air ducts between said compartments, air heating means communicating with the air inlet means of the housing, closures for each of the compartments, each closure carrying agitator means extending throughout the length of their respective compartments, and adjustable valve means cooperatively associated with the compartments and air ducts therebetween for circulating air through the compartments individually or in series.

11. A drier comprising a housing having air inlet and outlet means, a rotary tumbler mounted therein having a plurality of equi-spaced compartments within the same, air conducting means within the tumbler, branch air-ways communicating with said air conducting means and extending between the spaced compartments, and valve means operable with said branch air-ways and compartments for establishing a coursing of air through said compartments individually or in series.

12. A drier comprising a housing having air inlet and outlet means, a rotary tumbler mounted therein having a plurality of equi-spaced compartments within the same, closures for each of said compartments having agitator means extending inwardly into their respective compartments, air conducting means within the tumbler, branch airways communicating with said air conducting means and extending between the spaced compartments, each of said compartments having outlet ports discharging into said housing, and valve means cooperable with said branch airways and compartments for establishing a coursing of air through the compartments, individually or in series.

13. A drier comprising a housing having air inlet and outlet means, a tumbler mounted in said housing and having air conducting means therein, a plurality of compartments formed within said tumbler and having communication with each other and with the air conducting means in the tumbler, each of said compartments being provided with air outlet ports, and means for controlling the communication between the air conducting means of the tumbler, said compartments and outlet ports whereby the air may be conducted to and from the compartments individually or in series.

14. A drier comprising a tumbler, means for conducting air within said tumbler, a plurality of compartments formed within said tumbler, passageways arranged between each compartment establishing a means of communication between said compartments and said air conducting means of the tumbler and valves for controlling said means of communication between the air conducting means and compartments whereby the

air may be caused to travel through any one or all of the said compartments.

15. A drying tumbler comprising a cylindrical casing having a plurality of angularly
5 formed compartments therein, air conducting means communicating with the compartments in said casing, and means for controlling the flow of air from said conducting means to the compartments whereby air may
10 be caused to flow through the compartments individually or in series.

16. A drying tumbler comprising a cylindrical casing, having a plurality of radially

disposed compartments, agitating means projecting within each compartment and defining an angular space therein of substantially the same width throughout, and means for directing a flow of air through said angular space of each compartment whereby the flow of air will be caused to pass directly
20 through all of the articles to be dried placed within any one or all of said compartments.

In witness whereof I have hereunto set my hand.

CHARLES FRANCIS MORRISON.