

April 5, 1927.

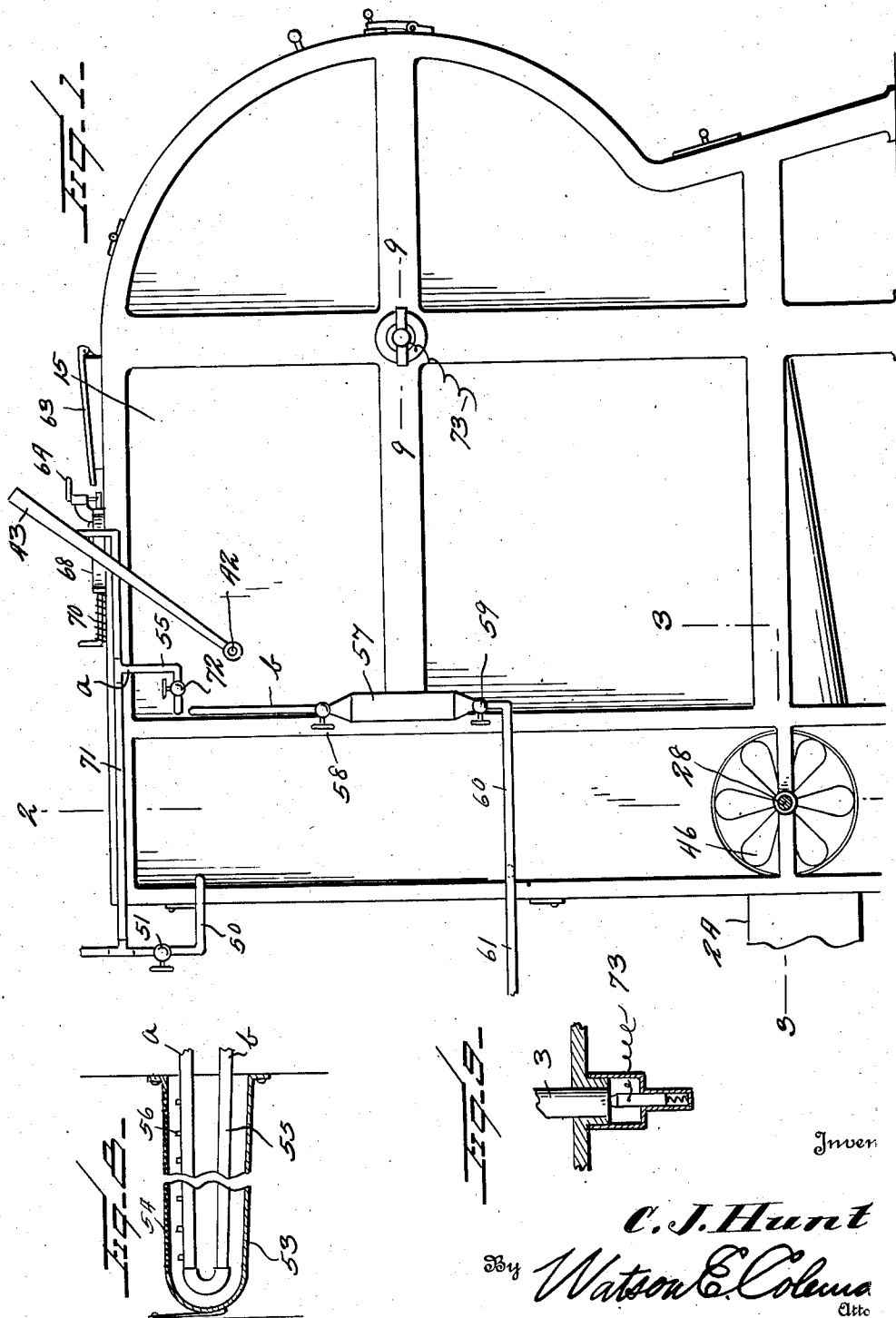
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C. J. HUNT

DRYING APPARATUS

Filed Nov. 20, 1926

3 Sheets-Sheet 1



April 5, 1927.

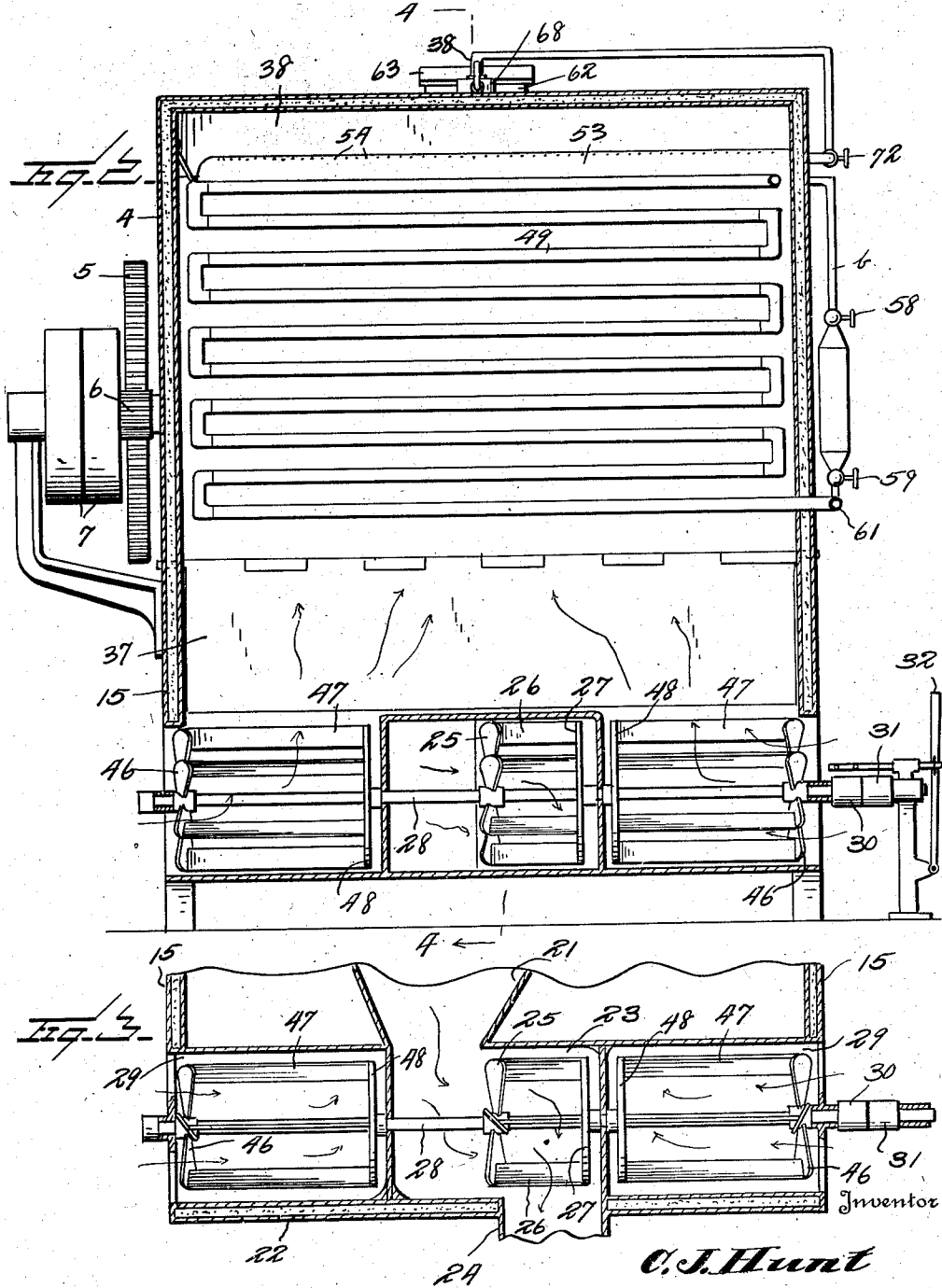
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DRYING APPARATUS

Filed Nov. 20, 1926

3 Sheets-Sheet 2



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April 5, 1927.

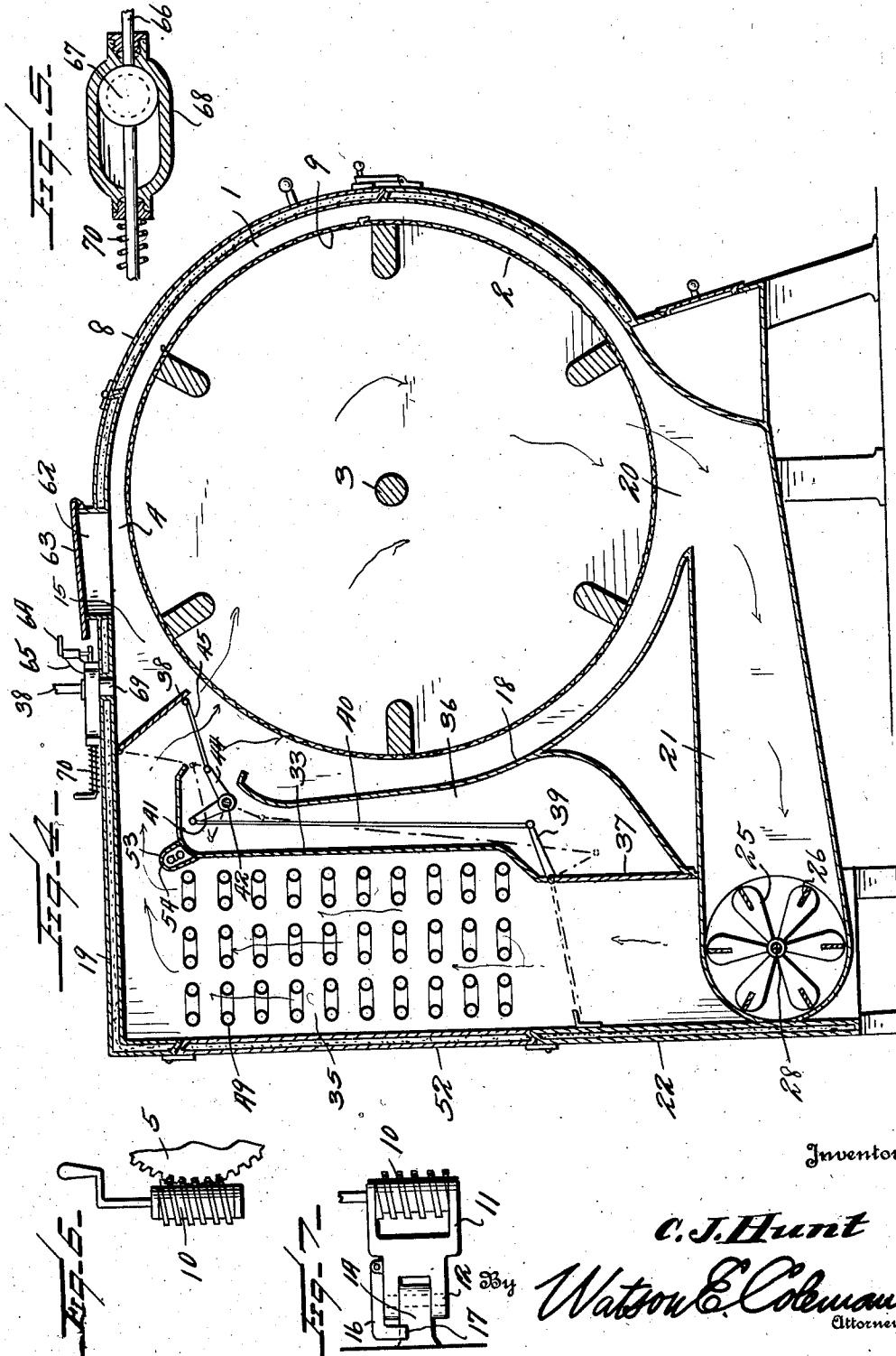
C. J. HUNT

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DRYING APPARATUS

Filed Nov. 20, 1926

3 Sheets-Sheet 3



Patented Apr. 5, 1927.

1,623,540

UNITED STATES PATENT OFFICE.

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TO EARL G. INFELD, OF BARNSDALL, OKLAHOMA.

DRYING APPARATUS.

Application filed November 20, 1926. Serial No. 149,691.

This invention relates to drying apparatus and it is an object of the invention to provide an apparatus of this kind embodying a rotating drum or tumbler together
5 with means for causing air to have effective travel or circulation through such drum or tumbler.

Another object of the invention is to provide an apparatus of this kind wherein the
10 air before entering the drum or tumbler may be heated together with means for discharging dry steam within the air shortly before the same enters the drum or tumbler.

An additional object of the invention is to
15 provide a device of this kind embodying a housing or casing in which is mounted a drum or tumbler together with means operable upon explosion within the casing or
20 housing to effect discharge therein of a fire extinguishing medium.

The invention also has for an object to provide an apparatus of this kind embodying a drum or tumbler together with means
25 for forcing air through the drum or tumbler by two spaced fans with a third fan positioned between said first two named fans for drawing the air whereby an effective circulation is assured.

The invention consists in the details of
30 construction and in the combination and arrangement of the several parts of my improved drying apparatus whereby certain important advantages are attained and the device rendered simpler, less expensive and
35 otherwise more convenient and advantageous for use, as will be hereinafter more fully set forth.

The novel features of my invention will hereinafter be definitely claimed.

40 In order that my invention may be the better understood, I will now proceed to describe the same with reference to the accompanying drawings, wherein:—

45 Figure 1 is a view in side elevation illustrating a drying apparatus constructed in accordance with an embodiment of my invention;

Figure 2 is a sectional view taken substantially on the line 2—2 of Figure 1;

50 Figure 3 is a fragmentary sectional view taken substantially on the line 3—3 of Figure 1;

Figure 4 is a vertical sectional view taken through the machine as herein disclosed;

55 Figure 5 is a fragmentary detailed sec-

tional view partly in elevation and partly in plan of the valve for controlling the entry into the housing or casing of the fire extinguishing medium;

Figure 6 is a fragmentary elevational
60 view illustrating a means for manually imparting rotation to the drum or tumbler;

Figure 7 is a view in front elevation of the structure as illustrated in Figure 6;

Figure 8 is a fragmentary view partly in
65 section and partly in elevation of a portion of the means for discharging dry steam into the air before entering the drum or tumbler;

Figure 9 is a detailed sectional view taken
70 substantially on the line 9—9 of Figure 1.

As disclosed in the accompanying drawings, my improved apparatus embodies a structure provided with a casing or compartment 1 in which is rotatably mounted a drum or tumbler 2 of any desired type. The supporting shaft 3 of the drum or tumbler 2 extends beyond a side wall 4 of the structure and has engaged therewith a gear 5 meshing with a pinion 6. This pinion 6 is carried by a suitably supported shaft carrying the pulleys 7, one of said pulleys being tight and the other loose for coaction in a well known manner with a drive belt. It is to be understood, however, that I do not desire to limit myself to any particular driving
75 means for the drum or tumbler 2.

The upper portion of the structure is provided with a loading door 8 of any desired construction while the peripheral wall of the drum or tumbler 2 is provided with a door 9. When the door 9 is in proper position with the door 8 clothing or the like to be subjected to the drying action of an air circulation may be readily placed within the drum or tumbler. In the event the drum or
80 tumbler 2 should come to a standstill with the door 9 out of position with respect to the door 8, a manually operated gear 10 may be swung into operative engagement with the gear 5 to effect the desired rotation of the drum or tumbler 2 until the door 9 is properly positioned with respect to the door 8. This gear 10, as particularly illustrated in Figure 7 of the accompanying drawings, is rotatably supported by a bracket 11 pivotally connected, as at 12, with a lug or arm 14 suitably located upon the adjacent side wall 15 of the structure. When the gear 10 is in operative engagement with the gear 5, the bracket 11 is locked against swinging
85 90 95 100 105 110

movement by the holding arm 16 carried by the bracket 11 and having a forked extremity 17 adapted to straddle the arm or lug 14.

The inner wall of the compartment 1 comprises an upwardly disposed wall 18 terminating a predetermined distance below the top wall 19 of the structure and leading from the opening 20 affording communication between the central portion of the casing or compartment 1 at the bottom thereof and the inner end portion of a conduit 21. The conduit 21 adjacent to the rear wall 22 of the structure is laterally offset to provide a chamber 23 in communication, as at 24, with the atmosphere.

Arranged within the chamber 23 is a suction fan 25 having associated with each of its blades a throw-off blade 26, said blade 26 being interposed between and supported by a blade of the fan 25 and a disc 27. The fan 25 and the disc 27 are mounted upon a shaft 28 extending transversely of the structure at the lower rear portion thereof and which are also disposed through the transversely aligned chambers 29 arranged at opposite sides of the chamber 23 and the adjacent outer portion of the conduit 21. This shaft 28 extends beyond the side wall 15 of the structure and said extended portion is provided with a fixed pulley 30 and a loose pulley 31 with which a drive belt is adapted to coact in a well known manner through the medium of a belt shifter 32.

Disposed vertically within the structure and interposed between the side walls 15 thereof is a partition 33 having its upper portion forwardly disposed, as at 34, to provide a delivery conduit from the upper portion of the heating air chamber 35 provided between the partition 33 and the rear wall 22 of the structure. The space 36 between the partitions 18 and 33 provides what may be termed a cold air conduit, the extension 34 of the partition 33 serving to properly direct the discharge from the conduit 36 toward the drum or tumbler 2. The flow of air through the conduit 36 is under control of a swinging damper 37 while the discharge from the upper portion of the heating air chamber 35 is under control of the swinging damper 38. These dampers 37 and 38 operate in unison but in reverse directions so that when one is in open position the other is in closed position.

In the present embodiment of my invention, the hinged or pivoted end portion of the damper 37 is provided with a rock arm 39 extending within the conduit 36 and has operatively engaged therewith a rod 40 also operatively engaged with a rock arm 41 carried by a shaft 42. This shaft 42 is supported by the side walls 15 of the structure and an end portion of said shaft extends outwardly of its associated side wall and has fixed thereto an operating lever 43. The

shaft 42 is also provided with a second rock arm 44 operatively connected by the rod 45 with the damper 38. The relation of the rock arms 41 and 44 is such that upon rocking of the shaft 42 through the medium of the lever 43, the dampers 37 and 38 will be moved or swung into either open or closed positions in accordance with the requirements of practice.

Each of the chambers 29 has its outer end open to the atmosphere through a side wall 15 of the structure. Affixed to the shaft 28 within each of such chambers 29 at the induction or entrance end thereof is a suction fan 46 each of the blades of which being provided with a throw-off and guiding blade 47 leading to and further supported by a disc 48 carried by the shaft 29 adjacent the inner or closed end of the chamber 29. As the shaft 28 rotates each of the fans 46 serves to draw a current of air within its chamber 29 while the blades 47 operate to draw and guide such air upwardly into either the chamber 35 or conduit 36 in accordance with the position of the damper 37. When the damper 37 is in its full open position it intersects the lower portion of the chamber 35 thus assuring the air blast to pass through the conduit 36 to effect a circulation of what might be termed cold air through the drum or tumbler 2.

Suitably supported within the upper portion of the chamber 39 is a heating unit 49 herein disclosed as comprising a pipe coil through which steam or kindred heating fluid is adapted to circulate. This coil 49 is in communication with a suitable source of steam supply or the like by the pipe 50, flow through which being controlled by the valve 51 of any desired type. When the damper 37 is closed, and consequently the damper 38 opened, the air will pass upwardly through the chamber 35 and be effectively heated through the medium of the coil 49.

The rear wall 22 of the structure is provided in its upper portion with the door 52 whereby convenient access may be had to the unit 49 as desired and also to permit the ready application or removal of such coil.

The upper portion of the partition 33 has extending thereacross a casing 53 extending inwardly of the upper portion of the chamber 35 and being provided in its outer portion with the minute discharge or jet openings 54 through which dry steam is adapted to be projected to intersect the air blast as it passes from the chamber 35 to further assure the effective heating thereof. Extending within this casing 53 and disposed substantially entirely therealong is a returned steam pipe 55, the upper member of which being provided with the jets 56 directed toward the jets 54 hereinbefore referred to. This results in the steam as discharged within the chamber 35 being what might be

termed superheated or dried as any condensation which may be within the lead *a* of the steam pipe 55 will be carried off by the return *b*. The return *b* leads to an exteriorly supported receptacle 57 carried by a side wall 15 of the structure which serves to collect such condensation. Entry to the receptacle 57 is under control of a valve 58 interposed in the exterior portion of the return *b* while discharge from such receptacle is under control of the valve 59. This valve 59 is interposed in a pipe line 60 leading from the lower portion of the receptacle 57 to a suitable point of discharge.

It is to be understood that when it is desired to empty the container 57 the valve 58 is closed before the valve 59 is opened. It is also preferred that the pipe line 60 deliver within the carry-off or returned pipe 61 leading from the coil 49.

The top wall 19 of the structure above the drum or tumbler 2 is provided with an opening 62 normally closed by a swinging door 63. This opening 62 is of such size that in the event an explosion should occur within the casing or compartment 1, the door 63 will be swung open under the force of such explosion. As this door swings outwardly it comes into contact with a trigger 64 carried by a bracket 65 and releases such trigger from the stem 66 of a valve 67. The bracket 65, as herein disclosed, is carried by the casing 68 in which the valve 67 operates. As is clearly indicated in Figure 5 of the accompanying drawings, the valve 67 is of a sliding type and normally closes the communication 69 between the valve casing 68 and the interior of the casing or compartment 1. The stem 66 has associated therewith a spring 70 which, upon release of the trigger 64 from the stem 66, assures the valve 67 moving into open position.

The casing 68 has in communication therewith the steam line 71 leading from the line 50 hereinbefore referred to so that when the valve 67 is in open position steam will be caused to discharge within the casing or compartment 1 in such volume to extinguish any fire which may occur therein as a result of explosion.

The lead *a* of the returned pipe line 55 has interposed therein the controlling valve 72.

I find it of advantage to have in electrical connection with the shaft 3 of the drum or tumbler 2 a conductor 73. This conductor 73 is suitably grounded and serves to carry-off such electricity as may be generated during the operation of my improved machine.

From the foregoing description it is thought to be obvious that a drying apparatus constructed in accordance with my invention is particularly well adapted for use by reason of the convenience and facility with which it may be assembled and oper-

ated, and it will also be obvious that my invention is susceptible of some change and modification without departing from the principles and spirit thereof and for this reason I do not wish to be understood as limiting myself to the precise arrangement and formation of the several parts herein shown in carrying out my invention in practice except as hereinafter claimed.

I claim:—

1. A device of the class described comprising a structure provided with a tumbler compartment, a tumbler working therein, means for drawing air from the opposite sides of the structure and discharging the same in the upper portion of the compartment, and an intermediate means for drawing the air from the lower portion of the compartment.

2. A device of the class described comprising a structure provided with a tumbler compartment, a tumbler working therein, means for drawing air from the opposite sides of the structure and discharging the same in the upper portion of the compartment, an intermediate means for drawing the air from the lower portion of the compartment, and means for heating the air before entering the compartment.

3. A device of the class described comprising a structure provided with a tumbler compartment, a tumbler working therein, means for drawing air from the opposite sides of the structure and discharging the same in the upper portion of the compartment, an intermediate means for drawing the air from the lower portion of the compartment, and means for delivering steam within the air before entering the compartment.

4. A machine of the class described comprising a structure including a tumbler compartment, a tumbler working therein, the inner wall of the compartment terminating below the top wall of the structure, a partition interposed between the inner wall of the compartment and the adjacent wall of the structure providing an air chamber and chute, the upper ends of the chamber and chute delivering within the upper portion of the compartment, means for drawing air from opposite sides of the structure and discharging the same upwardly through the air chamber or chute, means interposed between said air drawing means for drawing the air out from the bottom of the compartment, dampers for controlling the flow through the air chamber and the compartment, and means for connecting said dampers for unitary movement in reverse directions whereby one of the dampers is open while the other is closed.

5. A machine of the class described comprising a structure including a tumbler compartment, a tumbler working therein,

the inner wall of the compartment terminating below the top wall of the structure, a partition interposed between the inner wall of the compartment and the adjacent wall of the structure providing an air chamber and chute, the upper ends of the chamber and chute delivering within the upper portion of the compartment, means for drawing air from opposite sides of the structure and discharging the same upwardly through the air chamber or chute, means interposed between said air drawing means for drawing the air out from the bottom of the compartment, dampers for controlling the flow through the air chamber and the compartment, means for connecting said dampers for unitary movement in reverse directions whereby one of the dampers is open while the other is closed, and a heating medium within the chamber.

6. A machine of the class described comprising a structure including a tumbler compartment, a tumbler working therein, the inner wall of the compartment terminating below the top wall of the structure, a partition interposed between the inner wall of the compartment and the adjacent wall of the structure providing an air chamber and chute, the upper ends of the chamber and chute delivering within the upper portion of the compartment, means for drawing air from opposite sides of the structure and discharging the same upwardly through the air chamber or chute, means interposed between said air drawing means for drawing the air out from the bottom of the compartment, dampers for controlling the flow through the air chamber and the compartment, means for connecting said dampers for unitary movement in reverse directions whereby one of the dampers is open while the other is closed, and means arranged exteriorly of the structure for operating the dampers.

7. A machine of the class described comprising a structure including a tumbler compartment, a tumbler working therein, the inner wall of the compartment terminating below the top wall of the structure, a partition interposed between the inner wall of the compartment and the adjacent wall of the structure providing an air chamber and chute, the upper ends of the chamber and chute delivering within the upper portion of the compartment, means for drawing air from opposite sides of the structure and discharging the same upwardly through the air chamber or chute, means interposed between said air drawing means for drawing the air out from the bottom of the compartment, dampers for controlling the flow through the air chamber and the compartment, means for connecting said dampers for unitary movement in reverse directions whereby one of the dampers is open while the other is closed, and means arranged exteriorly of the structure for operating the dampers.

chamber and chute, the upper ends of the chamber and chute delivering within the upper portion of the compartment, means for drawing air from opposite sides of the structure and discharging the same upwardly through the air chamber or chute, means interposed between said air drawing means for drawing the air out from the bottom of the compartment, dampers for controlling the flow through the air chamber and the compartment, means for connecting said dampers for unitary movement in reverse directions whereby one of the dampers is open while the other is closed, a casing disposed along the upper portion of the partition and extending inwardly of the air chamber, said casing being provided with jet openings, and means for delivering steam within said casing for discharge into the air chamber through the jet openings.

8. A device of the class described comprising a structure provided with a tumbler compartment, a tumbler working therein, means for drawing air from the opposite sides of the structure and discharging the same in the upper portion of the compartment, an intermediate means for drawing the air from the lower portion of the compartment, means for delivering steam within the air before entering the compartment, and means for separating moisture from the steam before the steam is delivered within the air.

9. A machine of the class described comprising a compartment, a tumbler working therein, a steam line in communication with the compartment, a normally closed valve interposed in said steam line, a wall of the compartment having an opening in communication therewith, a swinging door for closing said opening and moving outwardly upon explosion within the compartment, a trigger for holding the valve in open position, said door in its outward swinging movement striking the trigger to release the valve from its normal position, and means for moving the valve into open position when released to permit the steam to enter the compartment.

In testimony whereof I hereunto affix my signature.

CHARLES J. HUNT.