Sept. 22, 1925. 1,554,791

E. I. CUTTER

DRYING TUMBLER STRUCTURE

Original Filed May 26, 1920 3 Sheets-Sheet 1

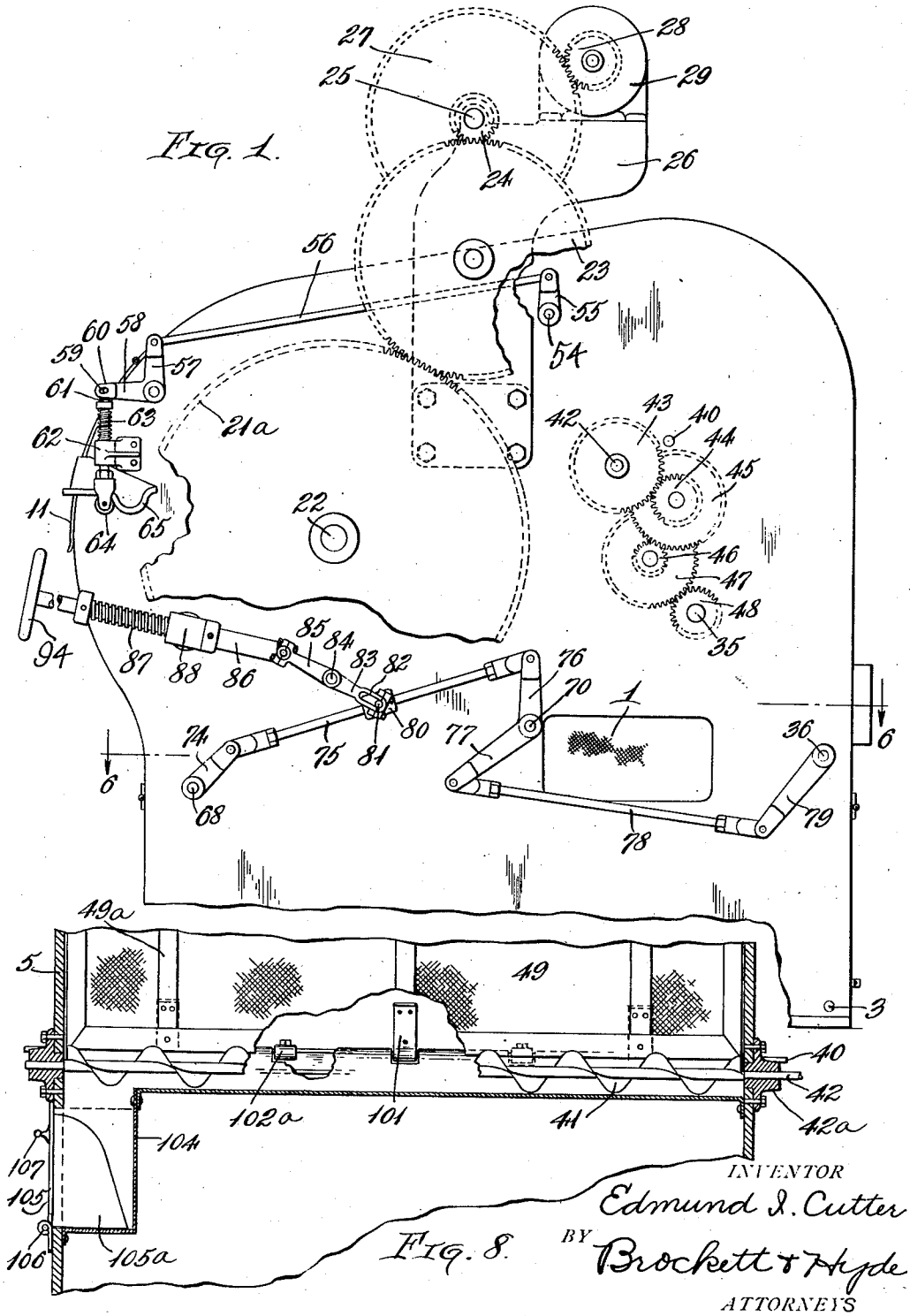


FIG. 1.

FIG. 8.

INVENTOR
Edmund I. Cutter
BY Brockett & Hyde
ATTORNEYS

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FIG. 2.

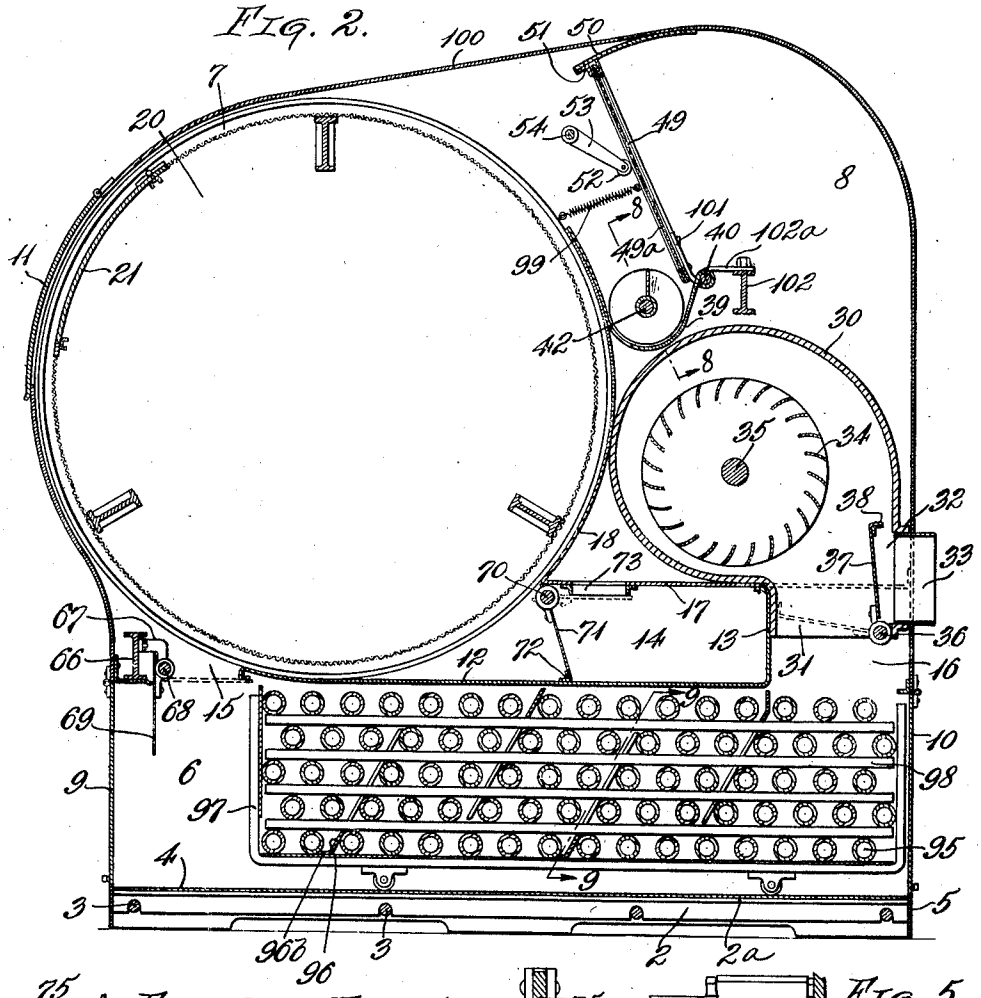


FIG. 3.

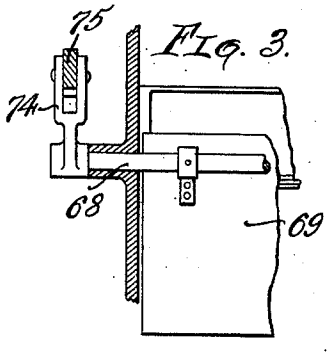


FIG. 4.

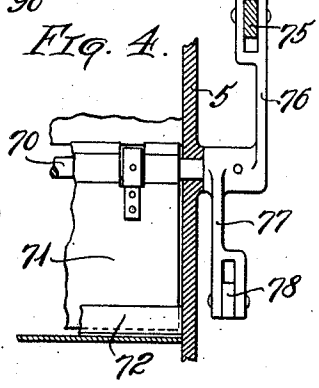
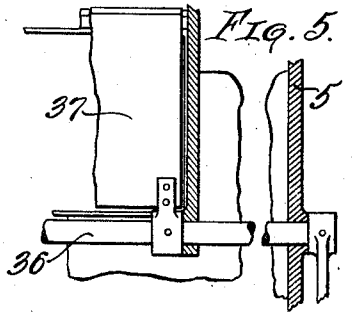


FIG. 5.



INVENTOR
Edmund I. Cutter
BY Brockett & Hyde
ATTORNEYS

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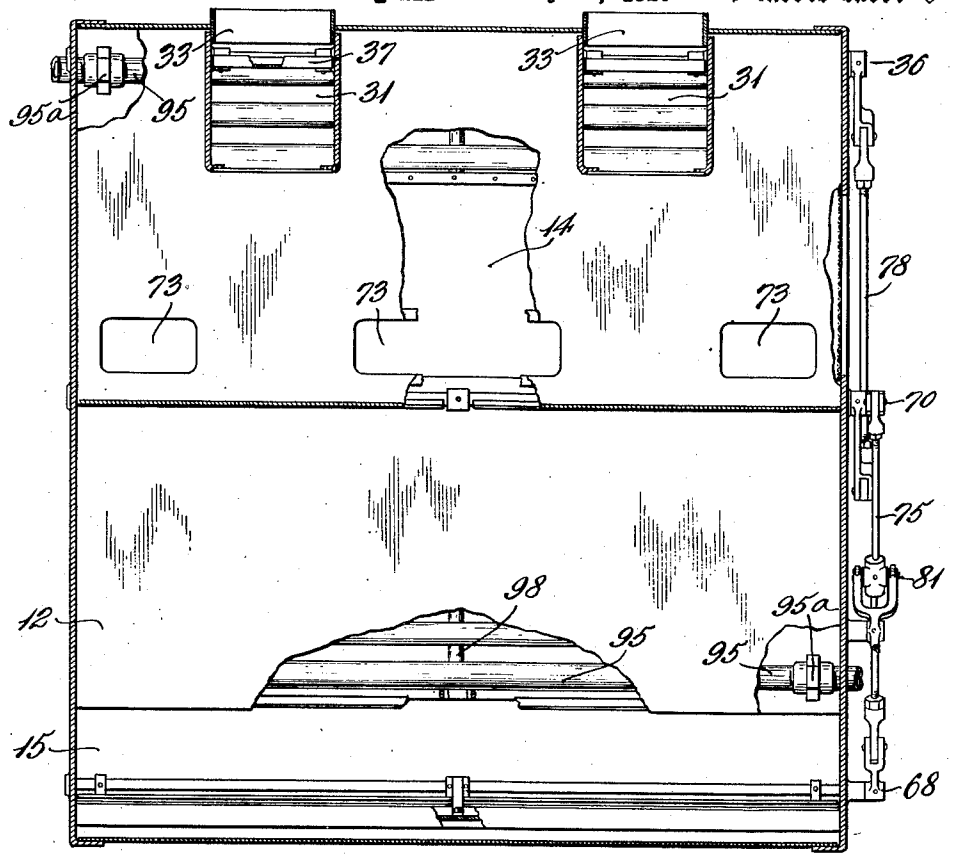


FIG. 6.

FIG. 7.

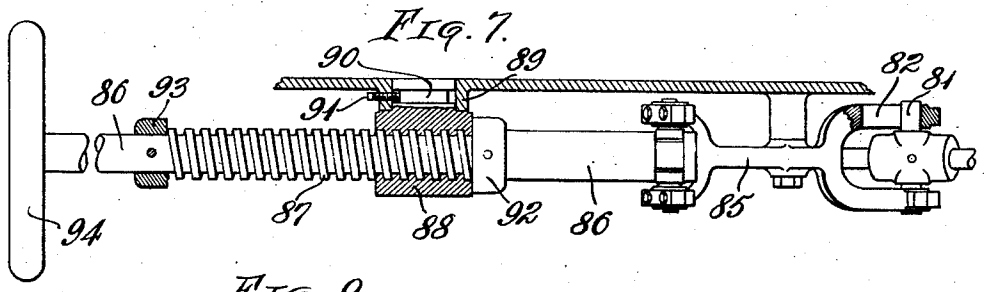
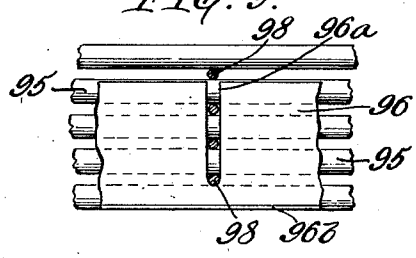


FIG. 9.



INVENTOR
Edmund I. Cutter
BY Brockett & Hyde
ATTORNEYS.

Patented Sept. 22, 1925. 1,554,791

UNITED STATES PATENT OFFICE.

EDMUND I. CUTTER, OF NORWOOD, OHIO, ASSIGNOR TO THE AMERICAN LAUNDRY MACHINERY COMPANY, OF NORWOOD, OHIO, A CORPORATION OF OHIO.

DRYING-TUMBLER STRUCTURE.

Application filed May 26, 1920, Serial No. 384,454. Renewed October 12, 1922. Serial No. 594,197.

To all whom it may concern:

Be it known that I, EDMUND I. CUTTER, a citizen of the United States, residing at Norwood, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Drying-Tumbler Structures, of which the following is a specification.

This invention relates to drying apparatus and particularly to that type of such mechanism utilized in the laundry industry, as for example, a drying tumbler. This application covers an improvement over the apparatus shown in applicant's Patent No. 1,424,994, August 8, 1922.

A machine of this type usually includes a main casing having therein a drying chamber receiving a tumbler cylinder, a fan and screen chamber communicating with the drying chamber and a heating chamber in communication with the fan and screen chamber and with the drying chamber. One object of this invention is to provide suitable dampers or controls arranged in such a manner that the operator may recirculate the air within the apparatus, or may recirculate the major portion of the air within the apparatus, discharge a small amount thereof and supply a limited quantity of atmospheric air to account for the small portion discharged. The operator may still further, by the manipulation of the controls referred to, direct atmospheric air through the drying chamber without passing it through the heating chamber for the purpose of cooling the drying chamber and the materials therein.

Another important feature of the present invention is the arrangement of the heating elements or coils so that they may be disconnected from the steam line and withdrawn as a unit from the apparatus.

Still another feature of the invention is the arrangement of the baffles among the heating pipes or coils so as to cause the air passing therethrough to travel in a circuitous route and be more efficiently heated.

Another important feature of the invention is the provision of means for removing the lint from the screen and discharging this lint from the machine.

Other features and details of the invention may appear from the following description and claims.

Referring to the drawings, Fig. 1 is a side elevation of a machine constructed according to my invention with parts broken away; Fig. 2 is a vertical transverse section from front to rear; Fig. 3 is a detail view showing a portion of the parts about one end of the heating chamber damper; Fig. 4 is a similar view about the air inlet damper; Fig. 5 is a similar view showing the discharge damper; Fig. 6 is a horizontal section on the line 6—6, Fig. 1; Fig. 7 is a detail view showing the damper operating device; Fig. 8 is a view in elevation upon the line 8—8, Fig. 2, with parts broken away; and Fig. 9 illustrates the slots formed in the baffle plates on line 9—9, Fig. 2. Three T-irons 2 extend across the bottom part of the casing 5 and are supported upon rods 3 extending from one side of the casing to the other. The horizontal webs 2^a of these T-irons 2 support a bottom plate 4 upon which rolls the truck 97. Casing 5 encloses a heating chamber 6 and above it a drying chamber 7 and a fan and screen chamber 8.

The lower portion of the casing, forming the heating chamber, is provided with front and rear doors 9 and 10 respectively. The drying chamber is also provided with a door 11 of the usual type. Arranged in the lower part of the casing and forming the upper wall of the heating chamber is a plate member 12, extending along and bent up at the rear, as at 13, about the fresh air chamber 14. This plate 12 extends near the front of the main casing and there provides an opening 15 which establishes communication at the front between the heating chamber and the drying chamber. The portion 13 is spaced from the rear of the main casing to provide a passage-way 16, which, as will appear, establishes communication between the fan and the heating chamber. Above the upper edge of the chamber 14 and extending from side to side of the main casing is a platform 17 which extends forward and merges in a curved partition 18, forming the rear wall of the drying chamber. This platform 17 and the upper wall 12 of the heating chamber provide an opening between the drying chamber and the chamber 14. The partition 18 is extended upward in a curved arrangement as shown, and terminates at a considerable distance from the top

of the main casing to provide an opening between the heating chamber and the screen and blower chamber as will appear. Screened opening 1 allows air to be drawn into chamber 14.

The arrangement of the partition 18 and the main casing is such that the drying chamber is of cylindrical form so that it will receive the drier drum 20 which is provided with the usual door 21. This drum is driven in the usual manner by a suitable gear 21ª secured to one of the trunnions such as 22, and this gear meshes with a gear 23, which, in turn meshes with a pinion 24 mounted upon a shaft 25 supported by a base 26 and driven by a gear 27, which, in turn meshes with a motor pinion 28 carried by a motor 29.

Mounted upon the platform 17 is a blower casing 30 of the snail shell type with its central inlet communicating with the chamber 8 and having discharge connections extending in two directions; one discharge, as 31, extending into the passage 16, and other discharges, as 32, projected into nipples or discharge pipes 33 leading to the atmosphere. Mounted within the blower casing 30 is a rotor 34 arranged upon a shaft 35 driven in any suitable manner. Secured to the blower casing 30 at the junction of the two discharge openings is a blower discharge damper shaft 36 extending to the outside of the casing and provided within the casing with a damper 37, having a lip 38. This damper is adapted to assume the position as shown in dotted lines in Fig. 2, where it will close the opening 31, and in another position, such as shown in full lines in Fig. 2, where it will control the discharge of the blower through the opening 32.

Arranged above the blower casing 30 in the blower and screen chamber 8 is a trough 39 extending from one side of the casing to the other and secured to the partition 18 on one side and bent around a rod 40 on the other. Rotatably mounted in this trough is a suitable flight or conveyor 41 supported on a shaft 42 extending outside of the casing and there provided with a gear 43 connected by a train of gearings 44, 45, 46, 47 and 48 to the blower shaft 35. This trough 39 is just back of the partition 18 and above the blower casing 30, and extending above from the rear of this trough is a screen 49 hinged upon rod 40 by means of hinge members 101 secured through screen 49 to strips 49ª. I-beam 102 which is mounted in and extends across said casing has straps 102ª secured thereto with their other ends wrapped about rod 40 to brace said rod. The trough 39 has its one edge portion wrapped around rod 40, and is cut away at places so as to allow strap members 101 and 102ª to be wrapped about said rod, as shown in Fig. 8.

Bearings 42ª are provided for the ends of shaft 42. The trough 39 discharges at one end into a box 104, secured within the casing wall, as in Fig. 8. The door 105 hinged at 106 has side wings 105ª and can be opened by means of handle 107. In this way the lint can be removed.

An arc shaped plate 50 extends downwardly and forwardly from the top of the main casing and a suitable stop 51 is arranged along the front edge of this plate 50 to limit the forward swinging movement of the screen. The screen normally tends to fall against the stop 51 by gravity but is drawn back to normal rest position against stop 51 by spring 99, which has its ends secured in any suitable manner to the frame of screen 49 and the machine casing, respectively. Screen 49 is moved away from the stop by means of rollers 52, which bear against strips 49ª. These rollers are carried by arms 53 mounted upon a shaft 54 which extends to the outside of the casing where it is provided with an operating arm 55. This arm 55 is connected by a rod 56 with a bell crank lever 57 pivoted upon the end of the main casing and having its other arm 58 provided with a slot 59 for receiving a pin 60 which is carried by a reciprocating rod 61. Rod 61 is supported in a bracket 62 secured to the casing and normally held in its upper position by a spring 63. Below the bracket 62 the rod 61 is provided with a cam roller 64 adapted for engagement with a cam 65 carried by the main casing door 11. The arrangement of these parts is such that when the door is opened or closed the screen will be moved from its stop and allowed to drop back in place with the result that the lint deposited thereon will be jarred therefrom, caught upon the spiral conveyor in the trough and be conveyed thereby to the box 104. Extending inward from the front of the machine and in horizontal alignment with the top wall 12 of the heating chamber is an I-beam 66 which forms a support for brackets 67. These brackets support a drying chamber damper shaft 68. This shaft supports a suitable drying chamber damper 69 adapted to be swung counterclockwise, as shown in Fig. 2 to the dotted line position shown in such figure, when it will close the opening 15 between the heating chamber and the drying chamber by engagement with the under side of the front edge of the top member 12 of the heating chamber.

Supported to the under side of the platform 17 and near the front edge of such platform where it meets the partition 18 as shown clearly in Fig. 2, suitable brackets are provided supporting an outside or atmospheric air damper shaft 70 which projects to the outside of the machine as shown in Fig. 1, and is provided within the casing with a damper 71 adapted for engagement with the stop 72 arranged upon the

upper surface of the top wall 12 of the heating chamber, and with thimbles 73 secured to platform 17 and encircling openings in such platform, these openings establishing communication between the outside air opening 14 and the screen and blower chamber 8. It will be seen that when the damper 71 is in full line position as shown in Fig. 2 it will close communication between the outside air and the drying chamber, and when it is moved into the dotted line position and against the thimbles 73 it will close communication of the outside air with the heating and screen and fan chambers.

Any suitable mechanism may be provided for controlling the three dampers 37, 69 and 71, but a suitable apparatus is shown in Fig. 1 and this apparatus comprises a heating chamber damper arm 74 connected by a link 75 with one arm 76 of a bell crank lever which is secured to the shaft 70 of the outside air damper. The other arm 77 of this bell crank lever is connected by a link 78 with a blower discharge damper arm 79 secured upon the shaft 36. These several arms and links are connected so that the dampers may assume therethrough full line position as shown in Fig. 2, or the dotted line position as shown in this figure, or they may assume intermediate positions. The dampers are shifted by means of any suitable mechanism, but that shown in Fig. 1 is considered preferable, and in that arrangement a block 80 is provided upon the link 75 and it is provided with a pin 81 engaging in a slot 82 formed in one arm of a lever 83, pivoted at 84 on the side of the casing. An oppositely extending arm 85 of this lever has floating pivotal connection with an actuating rod 86 which is provided with a threaded portion 87, engaging in a nut 88 supported upon a shank 89 pivotally mounted in the casing. This shaft has an annular recess 90 receiving a set screw 91 secured in the casing as shown in Fig. 7. The threaded portion 87 of the actuating rod 86 is provided with suitable stops 92 and 93 which limit the movement of the actuating rod to the maximum positions of the dampers as already described. A suitable hand wheel 94 is provided upon the actuating rod 86 for manipulation.

The steam coil 95 is so arranged that it can be disconnected from the outside steam supply, as at the union connections 95^a, so that when it is desired to clean the steam coil it may be bodily removed from the heating chamber by opening either door 9 or 10 and rolling out the truck 97 carrying the coil with its spacing rods 98 and baffle plates 96. The plates 96 are slotted as at 96^a in Fig. 9 so that they can be set in place after the coils and spacing rods have been assembled, the slots 96^a being provided according to the arrangement of the plates with reference to the spacing rods. The lower edges of the plates are flanged as at 96^b to better position them with respect to the coils, as shown in Figs. 2 and 9.

Thus this device will be seen to possess several distinct advantages. First, during the drying operation, the dampers 37, 69 and 71 will occupy full line position, whereby the air is forced from chamber 14 through passages 73 and 31 to the heating chamber, thence through passage 15 to the drying chamber, from which point it passes through the delinting screen 49 and back to the fan. Now part of the same air may be recirculated through the machine while part of it is expelled through outlet 33. Then when it is desired to cool the clothes preparatory to removal of the same from the cylinder, the dampers 37, 69 and 71 are changed to dotted line positions, so that the heating chamber is now eliminated from the circuit, the air passing from chamber 14 through the drying chamber, through the delinting screen and back to the fan, from which point it is entirely expelled through outlet 32, while fresh air is supplied from chamber 14. The positions of these dampers are changed by a single operation through the operation of hand wheel 94. Upon turning hand wheel 94 until stop 92 comes against nut 88, the dampers will be moved to dotted line positions; and when stop 93 is brought to bear against nut 88, they will occupy full line position.

Both when the materials are being dried and when being cooled, the air from the drying chamber will pass through the lint screen, the top part of the machine casing, as at 100, assisting as a deflecting means for the air. The lint will be filtered out by the screen 49 to which it will adhere due to the moisture carried by the lint. This screen will be automatically rocked away from its stop 51 upon opening or closing of the door of the casing, and will be pulled back by spring 99 against stop 51, thereby receiving a jarring action which will shake the lint into the spiral conveyor for disposal out through the casing wall. The lint will adhere to the screen 49 because of the moisture carried from the drying chamber, but it soon dries sufficiently to be readily shaken from the screen and to be carried off by the spiral member. The spiral conveyor 41 receives its operation from the fan as indicated in Fig. 1.

The arrangement of baffle plates 96 causes the air to be deflected in its course through the heating chamber, with the result that the air becomes more thoroughly heated since it traverses a greater surface area of the steam heated body. Then whenever de-

sired, the truck carrying the steam coil, spacing rods 98 and baffle plates can be removed from the heating chamber for cleaning as above described.

Other advantages will be apparent to those who are skilled in the art to which this invention relates, as for instance the ability to remove the heating means as a unit from the lower part of the casing without being hindered or interfered with by the operating mechanism for adjusting the dampers.

What I claim is:

1. In a drying machine, a heating chamber, heating means in said chamber and provided with a detachable connection through a wall of said chamber with an outside source of heat, and said heating means being adapted to be disconnected therefrom and removed intact as a unit from said chamber.

2. In a drying machine, a heating chamber, said chamber having a door, heating means in said chamber and provided with a detachable connection through a wall of said chamber with an outside source of heat and adapted to be disconnected therefrom and removed as a unit through the door of the heating chamber.

3. In a drying machine, a heating chamber, a door in the side wall of said chamber, heating means in said chamber and provided with a detachable connection through a wall of said chamber with an outside source of heat, and said heating means being adapted to be readily disconnected therefrom and removed as a unit through the door of the heating chamber.

4. In a drying machine, a heating chamber and a drying chamber, said heating chamber having a door at a level below that of the drying chamber, heating means in said chamber and provided with a detachable connection through a wall of said heating chamber with an outside source of heat, and said heating means being adapted to be readily disconnected therefrom and removed as a unit through the door of said heating chamber.

5. In a drying machine, a heating chamber, heating means in said chamber and provided with a detachable connection through a wall of said chamber with an outside source of heat, and said heating means being adapted to be readily disconnected therefrom and removed horizontally as a unit from said heating chamber.

6. A drying machine comprising a casing provided with a drying chamber in the upper part thereof and a heating chamber in the lower part thereof, drying mechanism in said drying chamber, and heating means in said heating chamber having detachable connection with an outside source of heat, said heating means being readily disconnectible therefrom and removable as a unit from said heating chamber.

7. A drying machine comprising a casing provided with a drying chamber and a heating chamber having inter-communication, heating means in said heating chamber and having detachable connection with an outside source of heat, said heating means being readily disconnectible therefrom and removable as a unit from said heating chamber, and means for controlling communication between said heating and drying chambers without interfering with the removal of said heating means from the heating chamber.

8. A drying machine comprising a casing provided with a drying chamber and a heating chamber having inter-communication, heating means in said heating chamber and having detachable connection with an outside source of heat, said heating means being readily disconnectible therefrom and removable as a unit from said heating chamber, valve means for controlling communication between said heating and drying chambers, and means for operating said valve means without interfering with the removal of said heating means from said heating chamber.

9. In a drying machine, a heating chamber, a door in the wall of said chamber, a truck adapted to be contained in said chamber and to be removed through said door, heating coils carried by said truck and having means for detachable connection through a wall of said chamber with an outside source of heat whereby said coils can be disconnected from the main source of heat and conveyed as a unit from said heating chamber.

10. In a drying machine, a machine casing, the lower part of said casing constituting a heating chamber, the upper part divided into a drying chamber and a screen and blower chamber, the lower part of said last named chamber being partitioned off as a fresh air chamber and having a passage-way communicating with said drying chamber, and also a passage-way communicating with the other part of said screen and blower chamber, a common damper for control of said passage-ways, the fan chamber having a passage-way communicating with the outside atmosphere through said casing wall, and also a passage-way communicating with said heating chamber, a common damper for control of said last named passage-ways, said heating and drying chambers having a communicating passage-way and a damper for controlling said last named passage-way.

11. In a drying machine, a machine casing, the lower part of said casing constituting a heating chamber, the upper part being divided into a drying chamber and a screen

and blower chamber, the lower part of said last named chamber being partitioned off as a fresh air chamber and having a communicating passage-way with said drying chamber and also a passage-way communicating with the other part of said screen and blower chamber, the fan chamber having a passage-way communicating with the outside atmosphere through said casing wall, and also a passage-way communicating with said heating chamber, a common damper for control of said last named passage-ways, said heating and drying chambers having a communicating passage-way, a damper for controlling said last named passage-way, and a single operating means for adjusting the positions of said dampers so as to close the passage-way between said fresh air chamber and said drying chamber, to open the passage between said fan chamber and the heating chamber, and to open the passage between said heating and drying chambers, or vice versa, whereby the said heating chamber may be included in or excluded from the circuit of air through the machine.

12. In a drying machine, the combination of a fan chamber, a heating chamber, a drying chamber, means for forcing air through the said several chambers, a lint collector arranged at an incline so as to intercept the lint laden air after its passage through the drying chamber, means for discharging the lint from said collector, a spiral lint conveyor located so as to receive the lint after its discharge from said collector, and means for operating said conveyor.

13. In a drying machine, the combination of a fan chamber, a heating chamber, a drying chamber, means for forcing air through the said several chambers, a perforate lint collector arranged so as to intercept the lint-laden air after its passage through the drying chamber, means for discharging the lint from said collector, a spiral lint conveyor located so as to receive the lint after its discharge from said collector, and means connected with said forcing means for operating said conveyor.

14. In a drying machine, the combination of a fan chamber, a heating chamber, means for forcing air through the said several chambers, a perforate lint collector arranged to intercept the lint-laden air after its passage through said drying chamber, means for discharging the lint from said collector, a curved channel member extending below said collector, a spiral conveyor rotatably mounted within said channel member and means for operating said conveyor so as to carry off the lint after its discharge from said collector.

15. In a drying machine, the combination of a screen and fan chamber, a heating chamber, a drying chamber, means for forcing air through said several chambers, a rockably mounted lint collector arranged at an incline so as to intercept the lint ladened air after its passage through said drying chamber, means for supporting said collector in normal rest position, a spring to hold said collector normally against said supporting means, and means for momentarily rocking said collector against the tension of said spring.

16. In a drying machine, the combination of a screen and fan chamber, a heating chamber, a drying chamber, means for forcing air through said several chambers, a rockably mounted lint collector arranged at an incline so as to intercept the lint-laden air after its passage through said drying chamber, a plate member having a curvature corresponding to the arc described by said collector during its rocking action arranged in close proximity to the free edge of said collector, a stop on said plate to support said collector in normal rest position, a spring to hold said collector normally against said stop, and means for momentarily rocking said collector against the tension of said spring.

17. In a drying machine, the combination of a screen and fan chamber, a heating chamber, a drying chamber, means for forcing air through said several chambers, a rockably mounted lint collector arranged at an incline to intercept the lint-laden air from the drying chamber, a channel member having at its one side edge portion a common support with the axis of said collector and being secured at its other side to the wall of said drying chamber, a spiral conveyor supported within said channel member and means for operating said conveyor.

18. In a drying machine, the combination of a screen and blower chamber, a heating chamber, a drying chamber, means for forcing air through the said several chambers, a rockably mounted lint collector arranged at an incline to intercept the lint-laden air from the drying chamber, a channel member having at its one side edge portion a common support with the axis of said collector and being secured at its other side to the wall of said drying chamber, a spiral conveyor supported by said casing walls and within said channel member, and means provided at one end of said spiral conveyor for discharge of the lint from said channel member.

19. In a drying machine, a casing, a door in said casing, said casing enclosing a screen and blower chamber, a heating chamber, a drying chamber, means for forcing air through said several chambers, a perforate rockably mounted lint collector arranged within said casing at an incline so

as to intercept the lint-laden air after its passage through said drying chamber, means for rocking said collector, said means comprising a lever arm, a rod having one end connected to said lever arm, a bell crank lever having one arm pivoted to the other end of said rod, a spring pressed rod connected at one end to the other arm of said bell crank lever, the other end of said spring pressed rod carrying a roller and a cam member carried by said door and adapted to actuate said roller against the tension of said spring, whereby the passage of said cam over said roller will cause a rocking of said collector.

20. In a drying machine, a heating chamber, heating means in said chamber for the heating of a current of air that might be passed through said chamber, and means other than said heating coils and separate from said chamber for deflecting the current of air throughout its passage through said heating chamber whereby the air will be thoroughly warmed.

21. In a drying machine, a heating chamber, heating means in said chamber for the heating of a current of air that might be passed through said chamber, baffle plates separate from said chamber and arranged in said heating chamber for deflection of the air in its circuit through said chamber, and means for supporting said baffle plates in said chamber.

22. In a drying machine, a heating chamber, heating coils in said chamber for the heating of a current of air that might be passed through said chamber, means for spacing said coils, baffle plates supported by said spacing means and arranged for deflection of the air in its circuit through said chamber.

23. In a drying machine, a heating chamber, heating coils in said chamber for the heating of a current of air that might be passed through said chamber, spacing rods extending between said coils, baffle plates having openings through which said rods extend, said plates being arranged for deflection of the air in its course through said chamber.

24. In a drying machine, a heating chamber, heating coils in said chamber for the heating of a current of air that might be passed through said chamber, spacing rods extending between said coils, staggered baffle plates having slots through which said rods extend, said plates being arranged for deflection of the air in its course through said chamber.

In testimony whereof I affix my signature.

EDMUND I. CUTTER.