Aug. 19, 1941. E. D. PURKETT 2,253,047

ARTICLE CONDITIONING SHAKEOUT TUMBLER

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Fig. 1.

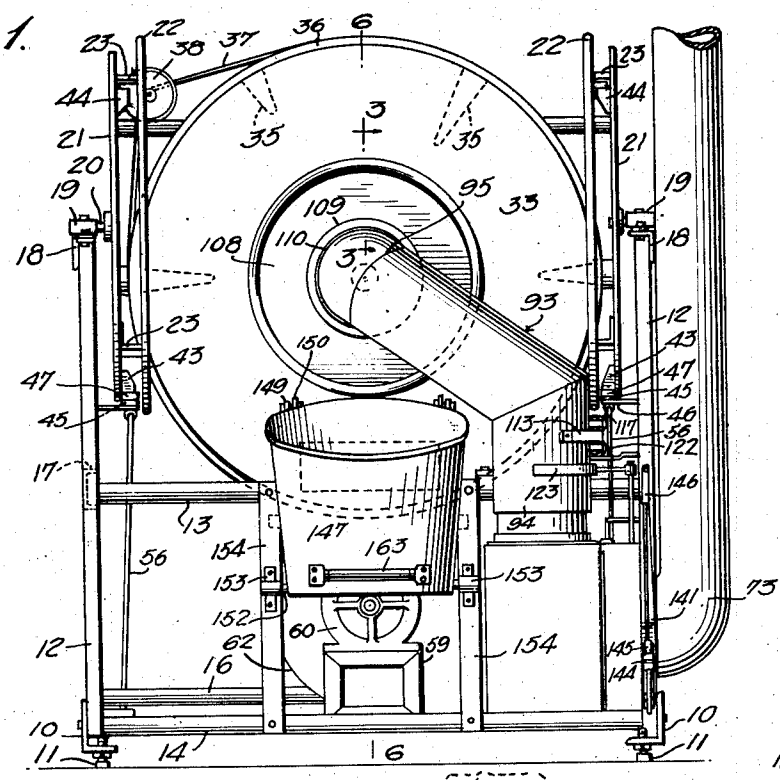


Fig. 2.

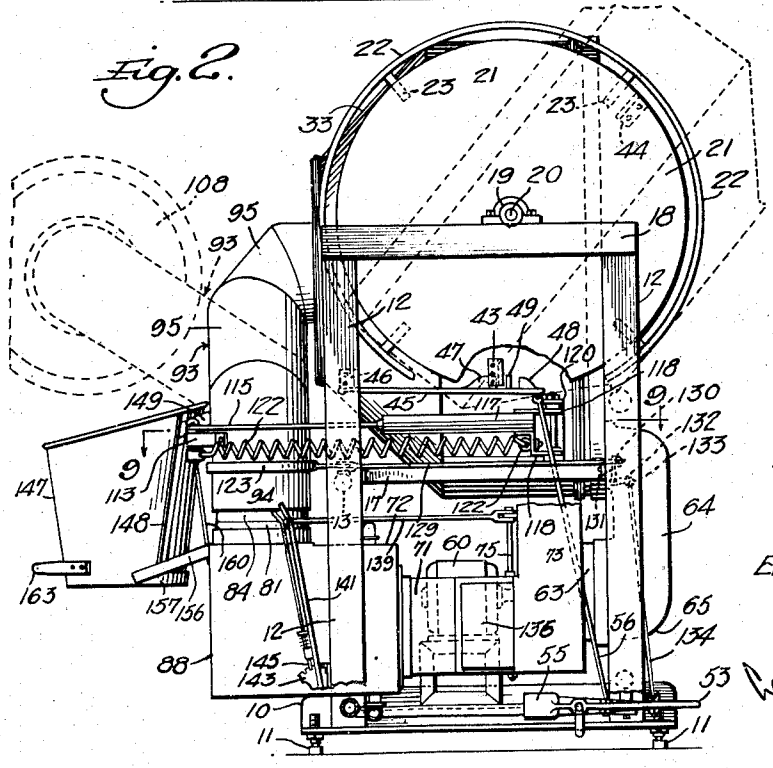
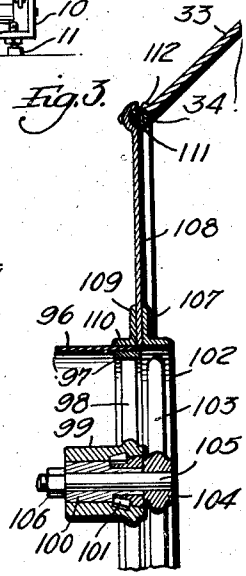


Fig. 3.



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Fig. 4.

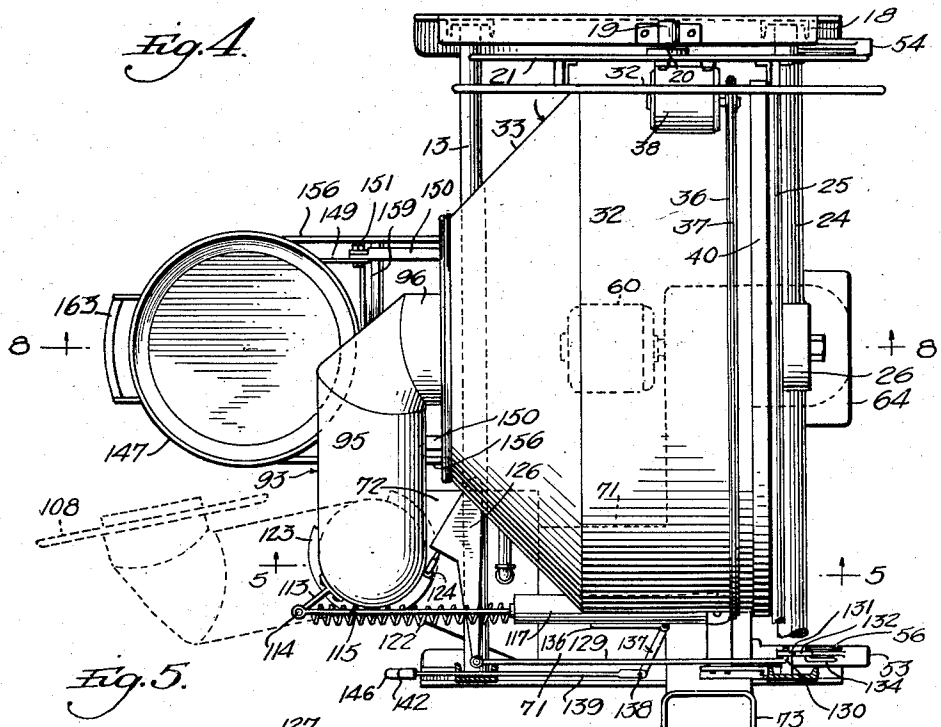
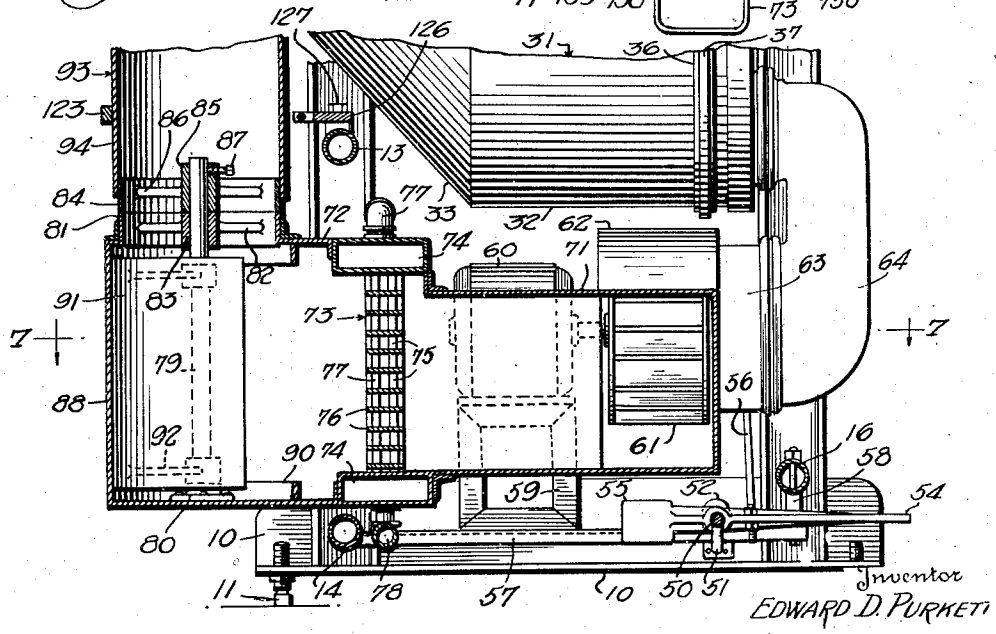


Fig. 5.



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Fig. 6.

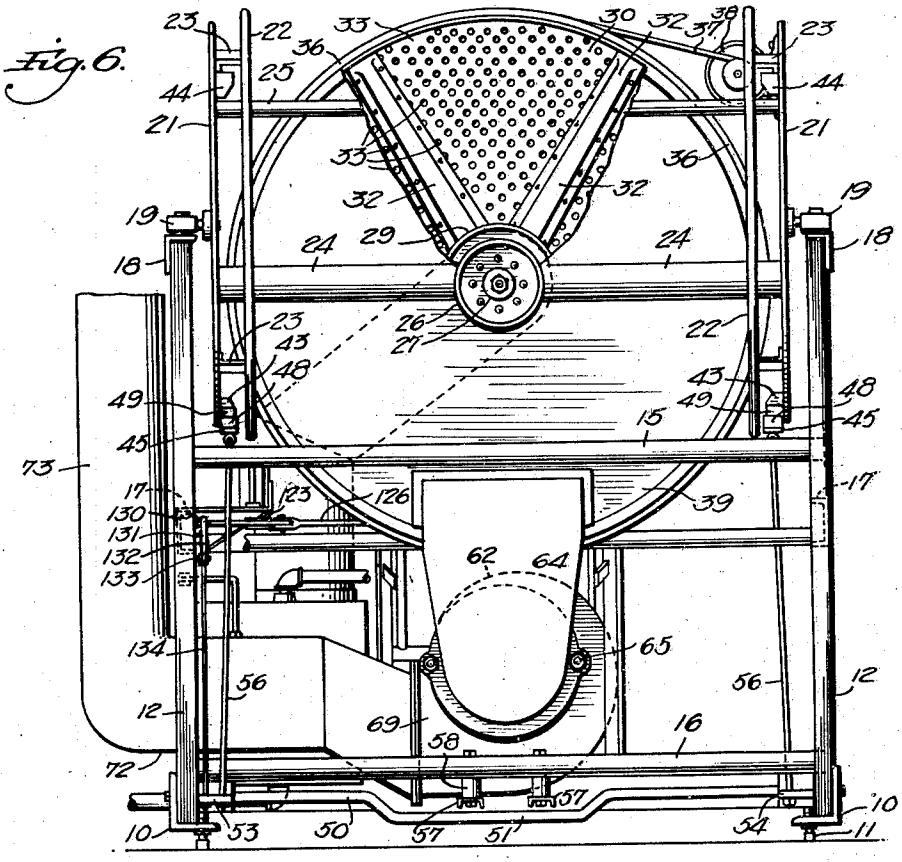
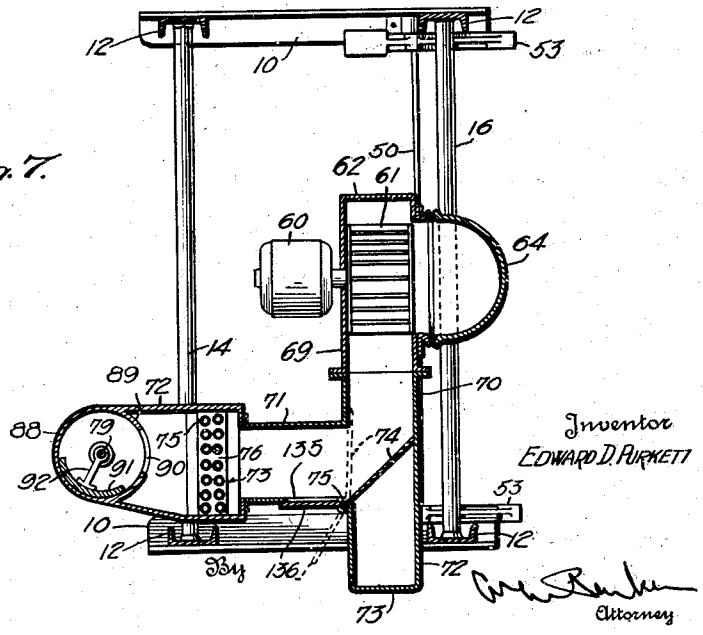


Fig. 7.



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Fig. 8.

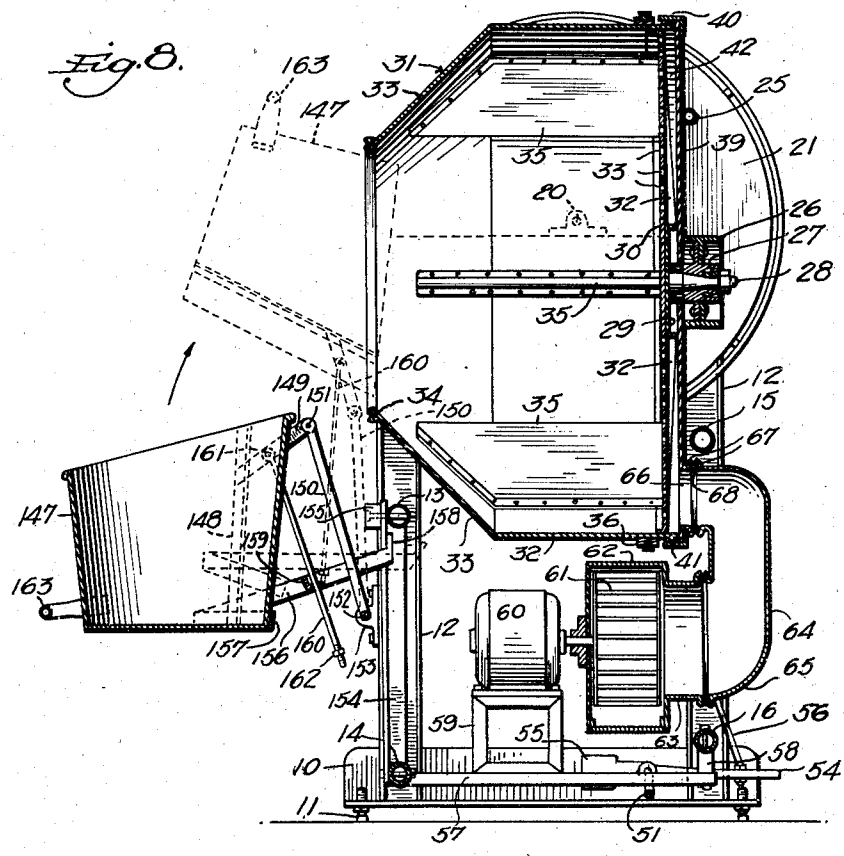


Fig. 10.

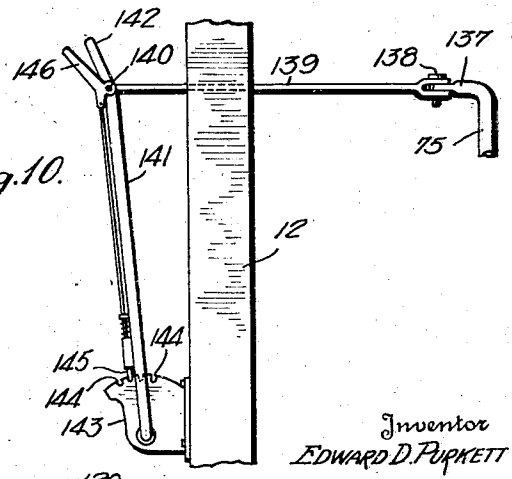
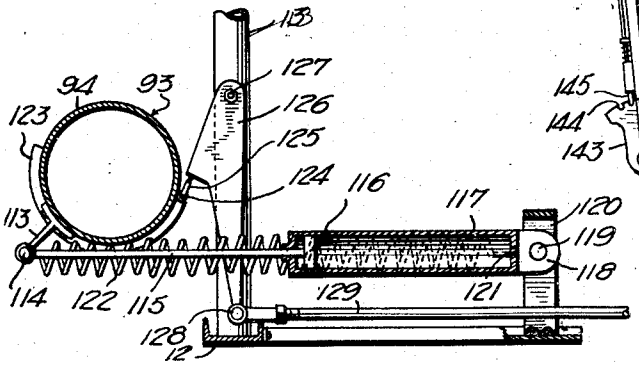


Fig. 9.



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UNITED STATES PATENT OFFICE

2,253,047

ARTICLE CONDITIONING SHAKEOUT TUMBLER

Edward D. Purkett, Joplin, Mo.

Application October 1, 1938, Serial No. 232,873

16 Claims. (Cl. 34—131)

This invention relates to laundry shake-out tumblers and is an improvement over the construction shown in my prior Patent No. 2,067,543, granted January 12, 1937.

It is the common practice in laundries to wring and twist such articles as towels, sheets and numerous others to substantially reduce the water therein prior to ironing the articles. The articles formerly were subjected to a rather severe shaking-out to loosen them preparatory to feeding them to the ironers to facilitate the ironing operation. In my prior patent referred to I have disclosed a construction which is particularly adapted for shaking-out articles of the character referred to prior to feeding them to the ironers, the prior construction comprising a tumbler which is rotated on its axis to successively lift and drop the articles within the tumbler to loosen them. After the articles are sufficiently loosened, the tumbler is rotated on a different axis to turn the tumbler to a discharging position, the tumbler being provided with a relatively large opening to facilitate both the loading and discharging of the tumbler.

In the prior construction the axis on which the tumbler is turned between loading and discharging positions is arranged perpendicular to the axis of the tumbler when the latter is in its normal operative position whereby the tumbler is relatively low in its loading and operating position and relatively high in its discharging position to facilitate the discharging of the loosened articles on a suitable table or the like. A hand wheel is arranged at each side of the tumbler to facilitate turning it between its loading and unloading positions.

The structure of my prior patent has proved highly successful in operation for its intended purpose, namely, shaking-out articles of clothing and the like while damp preparatory to feeding them to an ironer. For some purposes, the prior construction is not particularly advantageous for the reason that it is sometimes desirable to maintain the articles in a relatively highly heated condition to facilitate the ironing operation whereas the tumbling of the articles is accompanied by substantial evaporation of moisture from the articles which obviously reduces their temperature.

An important object of the present invention is to provide a tumbler of the general character disclosed in my prior patent referred to which embodies important improvements through which either or both the moisture content and the heat of the articles may be readily controlled so that the wrinkles and creases in the articles will straighten out more readily when ironed.

A further object is to provide a novel apparatus of the character referred to wherein the moisture content of the articles may be materially reduced to permit the ironers to dry the articles more rapidly while they are being ironed.

A further object is to provide an apparatus of the character referred to which permits the articles to be relatively highly heated thus preventing them from tending to cool and thus reduce the efficiency of the ironers.

A further object is to provide an apparatus having novel readily controllable means associated therewith whereby the moisture content of the articles may be reduced to any desired point to reduce the amount of moisture which must be removed by the ironers, and, after the moisture has been properly reduced, to heat the articles before feeding them to the ironers whereby the latter are permitted to perform their work much more rapidly and efficiently.

A further object is to provide novel means for maintaining a circulation of heated air through the tumbler and wherein the circulating means may be readily disconnected from a part of the tumbler to permit the latter to swing between its loading and discharging positions.

A further object is to provide a heating apparatus in conjunction with the circulating means and to provide the circulating means with dampers whereby fresh unheated air may be circulated through the tumbler to carry off moisture from the articles in the tumbler to reduce their moisture content, and whereby the same air may be circulated through the tumbler and heated so that further evaporation of the moisture may be reduced or prevented and the articles in the tumbler may be heated preparatory to being ironed.

A further object is to provide an apparatus of the character referred to wherein the tumbler and associated parts are so constructed as to force the air pumped into the tumbler to pass through the articles therein to thereby permit the moisture content and temperature of the articles to be more quickly and readily controlled.

A further object is to provide novel loading means associated with the tumbler to facilitate the loading of the tumbler when a portion of the circulating system is disconnected therefrom.

Other objects and advantages of the invention will become apparent during the course of the following description.

In the drawings I have shown one embodiment of the invention. In this showing:

Figure 1 is a front elevation of the apparatus shown in normal operating position,

Figure 2 is a side elevation of the same, parts being broken away,

Figure 3 is an enlarged fragmentary detail sectional view on line 3—3 of Figure 1,

Figure 4 is a plan view of the apparatus,

Figure 5 is an enlarged fragmentary sectional view on line 5—5 of Figure 4, parts being shown in elevation,

Figure 6 is a rear elevation of the apparatus, parts being broken away,

Figure 7 is a sectional view taken substantially on line 7—7 of Figure 5,

Figure 8 is a central vertical sectional view through the apparatus taken on line 8—8 of Figure 4,

Figure 9 is a fragmentary horizontal sectional view on line 9—9 of Figure 2, and,

Figure 10 is a detail side elevation of the damper control handle and associated parts.

Referring to the drawings the numeral 10 designates a pair of main base or supporting members preferably formed of angle section and provided with adjustable supporting screws 11 to permit the apparatus to be properly leveled on its supporting surface. The apparatus is provided at each side with a pair of relatively heavy vertical supporting frame members 12 the lower ends of which are preferably welded to the base members 10. The frame members 12 at the front end of the apparatus are braced with respect to each other by upper and lower preferably tubular members 13 and 14 while the frame members 12 adjacent the rear of the apparatus are similarly braced by preferably tubular brace members 15 and 16. The frame members 12 at each side of the apparatus may be suitably braced with respect to each other by horizontal channel members 17.

The upper ends of the frame members 12 at each side of the apparatus are connected to each other by horizontal angle members 18, one of these members being omitted from Figure 4 for the purpose of illustration. Each of the members 18 forms a support for a bearing 19 in each of which is mounted a stub shaft 20 secured at its inner end to supporting disks 21. Each of these disks is provided with an annular member 22 forming a hand wheel for a purpose to be described and secured to the disks as at 23.

A relatively heavy supporting member 24 (Figure 6) is connected between and preferably welded at its ends to the disks 21. The member 24 forms a support for a purpose to be described and also braces the disks 21 with respect to each other, and a supplemental brace member 25 for these disks is preferably arranged at a point spaced above the member 24. Centrally of its length, the brace member 24 is provided with a preferably cylindrical shell 26 in which is arranged a bearing structure 27 rotatably supporting a stub shaft 28. The inner end of the stub shaft 28 is secured to a cup-like member 29 which, in turn, is preferably welded to a back plate 30 forming a part of a tumbling drum indicated as a whole by the numeral 31. In order to stiffen the plate 30, radial brace members 32 are carried by the member 29 and are preferably welded to the plate 30, the latter being provided with perforations 33 between the radial braces 32.

The tumbler 31 is provided with a cylindrical preferably imperforate wall 32 the rear edge of which is secured to and extends beyond the plate 30 for a purpose to be described. The forward end of the tumbler is formed conical as at 33 and is provided with a relatively large opening 34 through which the tumbler may be loaded and unloaded in a manner to be described. The interior of the tumbler is preferably provided with ribs 35 to assist in lifting and dropping articles to provide the desired tumbling action. The tumbler has the cylindrical wall 32 thereof surrounded by an annular grooved member 36 forming a pulley for the reception of a belt 37 preferably of the V-type. This belt is driven by a small motor 38 secured to one of the disks 21 as shown in Figures 1 and 6.

A plate 39 (Figure 8) is arranged rearwardly of and spaced from the plate 30 and is carried by the shell 26 in any suitable manner. The periphery of the plate 39 is provided with an annular flange 40 concentric with the cylindrical wall 32 of the tumbler. The adjacent end of the wall 32 extends within the flange 40 and suitable packing 41 is arranged between these elements to form a reasonably leak-proof joint. The plate 39 provides a manifold by forming a space 42 adjacent the perforated plate 30 for a purpose to be described.

The tumbler normally rotates on its horizontal axis during the tumbling operation, and accordingly normally occupies the solid line position shown in the several views of the drawings. When the articles in the tumbler are to be discharged therefrom, the tumbler is rotated in a clockwise direction from the position shown in solid lines in Figure 2 to the position shown in dotted lines. The turning movement of the tumbler between its loading and discharging positions takes place about the common axis of the stub shafts 20, and means are provided for latching the tumbler in either of its two positions. Referring to Figure 2 the numerals 43 and 44 designate a pair of stop members carried by each of the disks 21 at circumferentially spaced points, the angle between the stop members of each disk 21 corresponding to the angle through which the tumbler is turned between its loading and discharging positions.

A locking device is provided for the stop members 43 and 44 of each disk 21. As shown in Figure 2 a spring member 45 has one end secured to a bracket 46 carried by each of the forward frame members 12 and is provided adjacent its free end with a pair of locking cams 47 and 48, these members having their remote ends sloping downwardly to provide cam surfaces engageable by one of the locking members 43 or 44 depending upon the direction of turning movement of the tumbler. The adjacent ends of the members 47 and 48 are spaced apart as shown in Figure 2, and a stop member 49 is arranged centrally between the members 47 and 48 for a purpose to be described. The structures of the members forming the latching mechanism just described may be identical with the structures of the corresponding elements in my prior patent and form no part per se of the present invention.

Means are provided for releasing the latch members 47 and 48 and for controlling other parts of the apparatus to be described. Referring to Figures 2, 4, 5 and 6 the numeral 50 designates a shaft extending transversely of the apparatus and having its central portion offset downwardly as at 51 (Figure 6) to clear certain parts of the apparatus as will become apparent. The shaft 50 may be journalled at its ends in

bearings 52 carried by the main supporting members 10. The ends of the shaft 50 are respectively provided with pedals 53 and 54 projecting toward the rear of the apparatus and having their forward ends preferably counterbalanced as at 55. Each pedal is provided with a rod 56 connected at its upper end to the free end of the associated spring member 45, as shown in Figure 2. The pedal 53 is also employed for controlling other parts of the apparatus, as will be described.

The principal feature of the present apparatus lies in the means for circulating air through the tumbler, and this air may be continuous fresh air from the outside, or it may be air continuously recirculated through the tumbler, or it may be partially made up of recirculated air and fresh air from the outside. It is this means which permits the ready controlling of the moisture content of the articles in the tumbler, as well as the controlling of the temperature of the articles, for the purposes stated. Referring to Figures 6 and 8 it will be noted that a pair of horizontal supporting rails 57 extend between the transverse supports 14 and 16. The members 57 may be directly connected at their forward ends to the transverse members 14, while the rear ends of the members 57 are secured to the members 16 by spacers 58. The members 57 carry a rectangular supporting frame 59 (Figure 8) on which is mounted a motor 60. This motor drives a centrifugal blower 61 rotatable in a housing 62 to which air is fed axially through an inlet 63.

Air is supplied to the blower housing from the manifold 42 through a conduit 64 (Figures 6 and 8) the lower end of the conduit 64 turning inwardly toward the inlet 63 as at 65 and terminating in a circular flanged end secured to the inlet 63 through a preferably packed joint. The upper end of the conduit 64 turns inwardly toward the plate 39 and has its end substantially rectangular as shown in Figure 6. The plate 39 is provided with an outlet opening 66 (Figure 8) communicating with the conduit 64 and the adjacent portions of the plate 39 and conduit 64 are provided with annular flanges 67 between which is arranged a circular packing member 68. This packing member may be circular in cross-section as shown, in which case the adjacent faces of the flanges 67 will be similarly shaped. The packing member 68 may be secured to either of the flanges 67 and is preferably carried by the flange at the upper end of the conduit 64. It will be apparent that the conduit 64 is stationary, and accordingly when the tumbler turns about the axis 20 from the position shown in Figure 8, the opening 66 moves away from the upper end of the conduit 64. These elements reassume the positions shown in Figure 8 when the tumbler is returned to its normal position.

The blower housing 62 is provided with a tangential outlet 69 (Figure 6) and a conduit 70 connects this outlet to a duct 71 extending along the side of the apparatus, the connection of the conduit 70 and duct 71 being clearly shown in Figure 7. The conduit 70 continues transversely toward the outside of the apparatus as at 72 and then turns upwardly to form a discharge stack 73 which preferably extends to the outside of the building to discharge moisture-laden heated air as will become apparent. A damper 74 (Figure 7) is mounted on a vertical shaft 75 to control communication between the conduit 70 and the duct 71 and stack 73. When the damper occupies the solid line position shown in Figure 7, all of the air discharged from the outlet of the blower will pass through the duct 71, while movement of the damper to the dotted line position shown in Figure 7 will result in all of the air passing from the blower being discharged through the stack. Obviously the damper 74 may be placed in any intermediate position to discharge part of the air and recirculate the remainder of the air. The means for controlling the shaft 75 will be referred to later.

Toward the forward end of the apparatus, the duct 71 is materially enlarged as at 72 and a heat exchanging device indicated as a whole by the numeral 73 is arranged in the rear end of the enlarged duct portion 72. The heat exchange device may be of any desired type and is shown in the present instance as comprising upper and lower headers 74 connected by pipes 75 (Figures 5 and 7) to which are connected heat radiating fins 76. Steam or hot water is circulated through the heat exchange device in any desired manner and for this purpose the device 73 is provided with inlet and outlet pipes 77 and 78 connected to the headers 74. Accordingly air passing forwardly through the duct 71 will become relatively highly heated.

A vertical shaft 79 is mounted within the enlarged duct portion 72 and the bottom of the latter carries a thrust bearing 80 in which the lower end of the shaft is arranged. The shaft projects from the open top of the duct portion 72 as shown in Figure 5. An annular flange 81 is arranged in the open top of the duct and is provided with spider arms 82 supporting a bearing 83 in which the shaft 79 is rotatable. An annular flange 84 is arranged above the flange 81 and corresponds in size thereto, the adjacent edges of these flanges being machined and arranged in contact with each other to provide a reasonably leak-proof joint. The flange 84 is provided with a hub 85 connected thereto by spider arms 86 and the hub is secured to the shaft 79 by a set screw 87. It will be apparent that rotation of the flange 84 will rotate the shaft 79, the latter turning in the bearings 80 and 83.

As shown in Figure 7 the forward end of the duct portion 72 is semicircular in cross-section as at 88 and the shaft 79 is arranged coaxially therein. A substantially semi-circular wall 89 is concentric with and forms a continuation of the wall 88 and is provided with an opening 90 through which air flowing through the duct 71 and duct portion 72 may flow into the forward end of the duct as defined by the walls 88 and 89. An arcuate damper 91 is connected to the shaft 79 by arms 92. When the shaft 79 is arranged in its normal position to be described the opening 90 is uncovered by the damper 91, while turning movement of the shaft 79 to a second position to be described causes the damper 91 to close the opening 90.

The conduit indicated as a whole by the numeral 93 conveys air from the duct previously described to the opening 34 of the tumbler. The conduit 93 comprises a lower vertical section 94 secured to the flange 84, intermediate angularly arranged sections 95 (Figure 1) and a horizontally extending end 96 arranged coaxial with the tumbler 31. Referring to Figure 3, the end of the section 96 is provided therein with a ring 97 carrying spider arms 98 to which is connected a bearing sleeve 99. A bearing member 100 is arranged within the sleeve 99 and these mem-

bers may be provided with anti-friction bearings 101 therebetween.

A wheel 102 is arranged adjacent the conduit section 96 and is provided with spider arms 103 carrying a hub 104 to which is secured a shaft 105, the inner end of this shaft being provided with a nut 106 for clamping the hub 104 to the inner bearing member 101. The wheel 102 is angular in cross-section as clearly shown in Figure 3 and accordingly includes a flange 107 perpendicular to the axis of rotation of the wheel 102. A circular plate 108 is secured to the flange 107 and engages against a flange 109 forming part of a ring 110 carried by the adjacent end of the conduit section 96. The peripheral portion of the plate 108 is shaped to partially receive an annular preferably tubular packing member 111 which engages a flange 112 forming a part of the conical wall 33 of the tumbler and formed arcuate in cross-section to fit the packing member 111. The packing member may be secured either to the flange 112 or to the adjacent portion of the plate 108 and is shown as being attached to the latter. During rotation of the tumbler, the plate 108 rotates with the tumbler about the axis of the shaft 105. However, this shaft connects the plate 108 to the conduit section 96 to be moved therewith away from the tumbler upon rotation of the shaft 79 (Figure 5) in a manner to be described.

The conduit 93 and parts connected thereto are latched in the normal operative positions shown in solid lines in the drawings and are biased to the inoperative position shown in dotted lines in Figures 2 and 4 whereby they will automatically move to such positions when the latching means is released. The conduit section 94 is provided with an arm 113 (Figures 4 and 9) the free end of which is pivotally connected as at 114 to one end of a rod 115 and the other end of this rod carries a plunger 116 operating in a cylinder 117. The right hand end of the cylinder 117 as viewed in Figures 2 and 9 is provided with upper and lower arms 118 pivotally connected as at 119 to a suitable bracket 120. The adjacent end of the cylinder 117 is provided with a restricted opening 121. It will be obvious that the piston 116 and cylinder 117 constitute a shock absorber for cushioning movement of the conduit 93 to the inoperative position shown in dotted lines in Figures 2 and 4, the area of the opening 121 governing the rate of movement of the piston 116.

A tension spring 122 has one end connected to the lower of the two arms 118 and the other end of the spring is connected to the pivot pin 114. This spring obviously tends to turn the conduit 93 to its inoperative position. The vertical conduit section 94 is provided with an arcuate member 123 one end of which is engageable by a roller 124 when the conduit 93 is in its normal operative position. The roller 124 is carried by a stem 125 secured to a lever 126, this lever being pivotally connected as at 127 to the transverse brace member 13.

As shown in Figures 2, 4 and 9 the free end of the lever 126 is pivotally connected as at 128 to one end of a rod 129 and the other end of this rod is connected as at 130 with the upper arm 131 of a bell crank lever 132. The horizontal arm of this lever is connected as at 133 to the upper end of a rod 134 and the lower end of this rod is connected to the pedal 53. Accordingly downward movement of the pedal 53, which takes place simultaneously with downward movement of the pedal 54, not only releases the latch bars 45 but also swings the lever 126 to release the conduit 93 to permit the spring 122 to swing the conduit to its inoperative position.

When the conduit 93 swings to its inoperative position the damper 91 (Figure 7) closes the opening 90 thus preventing any air from flowing through the conduit 93. Accordingly the opening 90 is controlled automatically in accordance with the position of the conduit 93. However, the damper 74 (Figure 7) is under the control of the operator regardless of any other parts of the apparatus and may be placed in any desired position according to the results which it is desired to obtain. In this connection it will be noted that when the damper 74 is moved to the dotted line position shown in Figure 7 air will not be recirculated through the tumbler and it is desirable to supply fresh air thereto. Accordingly the conduit 71 is provided in one side thereof with an opening 135 and a door 136 is adapted to close this opening. The damper 74 and door 136 are rigidly connected to each other and may be integral, and both are connected to the shaft 75 to be turned thereby.

As shown in Figures 4 and 10 the upper end of the shaft 75 is provided with a crank arm 137 the free end of which is pivotally connected as at 138 to a rod 139 and this rod is connected as at 140 to the upper end of a lever 141 having a handle 142 at its upper end. The lever 141 is pivotally connected at its lower end to a plate 143 carried by one of the supports 12. The upper edge of the plate 143 is formed concentric with the pivot of the lever 141 and is notched as at 144 to receive a detent 145 carried by the lever 141 and operable by a handle 146 at the upper end thereof. The detent 145 may be arranged in selected notches 144 in accordance with the desired positions of the damper 74 and door 136.

A novel mechanism is employed for feeding articles to the tumbler, and such mechanism is particularly adapted for use with the present mechanism. A bucket or tub 147 is mounted adjacent the front of the machine and normally occupies the position shown in Figure 8. The mechanism for supporting the tub is such that it is adapted to be swung upwardly to dump articles into the tumbler. Referring to Figures 2, 4 and 8, the tub is provided with a pair of reinforcing ribs 148 and adjacent the top of the bucket an arm 149 projects angularly upwardly toward the tumbler from each of the reinforcing members 148. A pair of links 150 are pivotally connected at their upper ends as at 151 to the free ends of the respective members 149 and the lower ends of the links 150 are connected to a shaft 152 journaled in bearings 153. These bearings are carried by upright members 154 which are connected at their upper and lower ends to the respective cross braces 13 and 14. A stop block 155 is carried by the upper end of each vertical support 154 and is engageable by one of the links 150 for a purpose to be described.

When the tub is in the normal position shown in solid lines in Figure 8 it is supported in such position by a pair of parallel arms 156 having their lower ends connected by an arcuate saddle 157 secured to the tub adjacent the bottom edge thereof. The free ends of the arms are provided with out-turned ends 158 engaging behind the

respective vertical members 154 to limit the outward movement of the arms 156 away from the apparatus as a whole. An angle member 159 is connected between the arms 156 and has its lower flange apertured for the passage of a pair of rods 160 as shown in Figure 8. Each of the rods 160 is pivotally connected at its upper end as at 161 to one of angular arms 149, and each rod is provided at its lower end with a stop nut 162 engageable against the bottom of the angle member 159 to limit the swinging movement of the tub 147 to a dumping position, as will become apparent. At the side opposite the apparatus as a whole, the tub is provided with a handle 163 adapted to be grasped by the operator to swing the tub to dumping position.

The operation of the apparatus is as follows:

Assuming that a load of laundered articles are to be placed in the tumbler, and assuming that the tumbler has just discharged a batch of clothes and is in the dotted line position shown in Figure 2, the operator will depress either of the pedals 53 or 54. These pedals are connected together to be simultaneously moved upon actuation of each pedal as previously explained, the pedals being fixed to each other by the transverse shaft 50. Upon operation of either pedal, therefore, both rods 56 (Figure 6) will be pulled downwardly and accordingly both of the resilient latch bars 45 will have their free ends pulled downwardly, thus releasing the catch 48 from the locking member 44, which will be arranged between the latch 48 and stop member 47 when the tumbler is in the discharging position.

It will be noted that when the tumbler is in the discharging position the motor 38 will be arranged a substantial distance to the left of the axis of the trunnions 30, thus greatly unbalancing the tumbler and biasing the tumbler for turning movement in a counter-clockwise direction from its unloading position. Upon the depressing of either pedal 53 or 54, therefore, one of the immediate results is the releasing of the tumbler for swinging movement back to its normal position as shown in solid lines in most of the figures of the drawings. The tumbler will be so overbalanced that when it is released in the manner stated it will swing completely to the normal position referred to, and assuming that the pedal mechanism has been released prior to the tumbler reaching its normal position, the lock member 43, as it approaches the position shown in Figure 2, will engage the cam surface of the latch 47, thus depressing the latch bar 45 to permit the locking member 43 to move into contact with the stop member 49 and thus stop the tumbler in its normal position. The latch member 47, of course, will lock the tumbler against turning movement in one direction while the stop member 49 will lock it against turning movement in the opposite direction.

Other and very important functions are accomplished by the depressing of the pedal 53 in the manner previously described. The action referred to not only releases the tumbler to permit it to return to its normal position, but also pulls downwardly on the rod 134 (Figures 2 and 6) thus turning the bell crank lever 132 in a clockwise direction as viewed in Figure 2 to transmit a pull to the rod 129. This rod is connected to the free end of the lever 126 (Figures 4 and 9) and accordingly this lever will be turned about its axis to release the roller 124 from the adjacent end of the arcuate locking member 123.

Upon the releasing of the roller 124 in the manner stated, the tension spring 122, acting through the arm 113 will immediately swing the conduit member 93 in a counter-clockwise direction as viewed in Figures 4 and 9, the conduit section 94 being carried by and turning on the axis of the shaft 79. As previously stated, the plate 108 (Figures 3 and 8), while rotatable with the tumbler, is carried by the adjacent end of the conduit 93 and accordingly swings therewith to the dotted line position shown in Figure 4 under the conditions described. Accordingly the opening 34 in the conical end of the tumbler will be opened ready to receive the laundered articles in a manner to be described. At the same time, the rotation of the shaft 79 (Figure 7), when the conduit 93 swings to its inoperative position, turns the damper 91 to close the opening 90 for a purpose also to be referred to later.

The tumbler is now ready to be loaded, and assuming that the laundered articles are arranged in the tub 147, the operator will grasp the handle 163 and swing the tub upwardly. This is accomplished by lifting the tub, and the links 150 (Figure 8) will swing about their lower ends until the links contact with the stop blocks 155 to limit the turning movement of the links. The tub then continues to move upwardly and inwardly toward the tumbler, swinging about the pivots 151. Just prior to direct engagement between the tub and the mouth of the tumbler, the nuts 162 will contact with the angle member 159, thus preventing any further movement of the tub toward the tumbler and preventing the tub from striking against the tumbler. This action, moreover, brings the movement of the tub to a sudden stop with the tub in the dotted line position shown in Figure 8, and accordingly the articles will be dumped into the tumbler.

The apparatus is now ready to perform its normal functions and the operator will manually swing the conduit 93 to its operative position shown in Figure 4. As soon as such position is reached, the roller 124 (Figure 9) will snap into position behind the arcuate member 123, thus locking the conduit 93 in its normal operative position.

The motor 38 is continuously operated regardless of the bodily movement of the tumbler between the loading and discharging positions. After the articles have been loaded into the tumbler the latter continues to rotate on the horizontal axis of the shaft 105 (Figure 3), the tumbler being in its normal operative position. The ribs 35 successively lift and drop the articles in the tumbler, thus greatly loosening the kinks and wrinkles which have been previously formed in the articles by the wringing operation. Thus the tumbler prepares the articles to be more readily and effectively ironed, this operation being the same as the operation performed with the structure of my prior patent previously referred to.

The present construction is intended to supplement the tumbling action with other highly desirable functions. In the tumbling operation, as carried out in my prior apparatus, a substantial amount of moisture will be naturally evaporated from the articles, thus materially reducing their temperature. Accordingly when the articles are discharged from the tumbler they are fed to the ironers relatively cold and consequently chill the ironers and retard and reduce the efficiency of the ironers. For efficiency, it is naturally desirable to run the ironers as rapidly as possible, and the feeding of cold articles to

the ironers obviously involves a substantial loss in time due to the retarding of the speed of the ironing operation. Attempts have been made to overcome this difficulty by merely heating the articles in the tumbler but the desired results cannot be quickly accomplished because the evaporation of moisture from the articles tends to reduce their temperature, as stated, thus requiring a substantial length of time for the heating of the articles.

Moreover, while some heavier articles contain an excess amount of moisture when supplied to the tumbler, many articles contain about the proper amount of moisture for ironing and the mere heating of the articles to raise their temperature when fed to the ironers results in reducing the moisture content of the articles below the point at which efficient ironing can be performed. The present apparatus provides effective and readily controllable means for heat- and moisture-conditioning the articles before leaving the tumbler so that the articles will be properly heated and will contain the proper amount of moisture when fed to the ironers, thus permitting the latter to perform their function more quickly and efficiently.

Assuming that the articles fed to the tumbler contain the proper amount of moisture and it is desirable to retain such moisture while raising the temperature of the articles, the handle **142** will be pulled to the left as viewed in Figures 4 and 10 and engaged in the last notch **144**. This operation will turn the damper **74** and door **136** to the positions shown in solid lines in Figure 7. Thus the outlet duct **70** of the blower will be entirely cut off from the exhaust stack **73** and will be placed in full communication with the duct **71**, the door **136** being completely closed to prevent outside air from entering the duct **71**. With all of the remaining parts in operative position it will be apparent that the blower will withdraw air from the tumbler through the perforations **33** and manifold **42**, thence into the blower through the conduit **64**. This air will be discharged by the blower through the duct **70** and thence through the duct **71** where the air will be heated by the heat exchange device **73**. The heated air will then pass through the opening **90**, the damper **91** being in open position, and the air will flow upwardly through the conduit **93** to be discharged into the conical end of the tumbler.

As previously stated, the plate **108** (Figures 1 and 3) rotates with the tumbler and has its joint therewith sealed by the packing **111**. The opposite end of the tumbler is substantially sealed with respect to the stationary flange **40** by the packing **41**. Accordingly leakage of air from the tumbler will be prevented. In this connection, it will be noted that there will be no tendency for air to leak from the tumbler since the pressure therein will not rise above atmospheric pressure, all of the air pumped to the tumbler having been withdrawn therefrom at the same rate by the blower. During the tumbling of the articles in the tumbler **31**, the heated air will pass through the articles, to be discharged into the manifold **42** and accordingly the articles will become relatively highly heated. In this connection it will be noted that the walls **32** and **33** of the tumbler are imperforate and it is necessary for at least a substantial proportion of the air to pass through the articles in order to reach the plate **30** and pass through the openings **33**. Accordingly there is an effective passage of air through the articles to heat them while they are being tumbled and loosened.

It will be apparent that under the conditions being considered the air pumped to and through the articles is the same air which previously has been drawn from the tumbler by the blower. In other words the same air is continuously recirculated through the tumbler, no fresh air from the outside being admitted to the apparatus. This is highly important when loosening and heating articles which, when placed in the tumbler, contain approximately the correct amount of moisture for ironing. It will be apparent that upon agitation of the tumbling and heating action, some moisture will be taken up by the air, but the air soon becomes relatively saturated, thus substantially eliminating any further evaporation of moisture from the articles. The reduction or the elimination of evaporation serves very useful purposes. In the first place, it maintains articles of the character referred to in the proper condition for ironing so far as moisture content is concerned since it maintains the moisture content at the proper point by eliminating substantial evaporation. In the second place, the elimination of evaporation prevents any tendency of the articles to become lowered in temperature, and accordingly it requires a minimum number of heat units to raise the articles to the proper temperature for ironing and permits the heating operation to take place within a minimum length of time.

Assuming that the articles which have been placed in the tumbler are of the substantially heavy type which hold an excessive amount of moisture for proper ironing, it is desirable during the tumbling operation to reduce the amount of moisture to the proper extent and the present apparatus is particularly adapted for this purpose. When the tumbler is loaded with relatively wet articles of this character, the handle **142** may be moved to the extreme right hand position as viewed in Figure 10, and this operation will swing the damper **74** (Figure 7) to the dotted line position, thus entirely disconnecting the conduit **70** from the duct **71** and connecting it to the stack **73**. All of the air withdrawn from the tumbler will then be discharged through the stack. At the same time, the door **136** will have been moved to the dotted line position shown in Figure 7, thus opening the duct **71** to the outside air.

Under such conditions the tumbler may be rotated by the motor **38** to perform the tumbling action as described, and during this operation all of the air withdrawn from the tumbler through the conduit **64** (Figure 8) will be discharged through the stack **73** and this air will be replaced by air flowing through the door **136** into the duct **71** to be heated by the heat exchange device **73**. This relatively dry heated air will pass into the tumbler through the conduit **93** and will take up moisture from the wet articles to be subsequently discharged through the stack **73**. This arrangement of parts is maintained until the moisture content of the articles in the tumbler has been reduced to the desired extent, the moisture-laden air being discharged through the stack while fresh air is drawn into the tumbler to evaporate moisture from the articles therein.

The handle **142** (Figure 10) may be moved back to its left hand or air-recirculating position after sufficient moisture has been evaporated from the articles, and continued operation of the apparatus under such conditions will perform

the functions described above in connection with the tumbling of articles containing the proper amount of moisture for ironing. The same air will be continuously recirculated to relatively highly heat the articles for ironing without effecting any further material reduction in the moisture content. When the proper temperature of the articles is reached, they are ready for ironing as will be apparent.

If desired, heavy relatively wet articles may be loosened in the tumbler while the damper **74** and door **136** are held in an intermediate position instead of first being turned to the dotted line position in Figure 7 and subsequently to the solid line position after the moisture content has been reduced to the proper point. If the door and damper are placed in the intermediate position referred to, part of the moisture-laden air will be discharged from the stack and part will be recirculated, while the partial opening of the door **136** will admit some outside air into the duct **71**. Under such conditions, the reduction in the water content of the articles will be slower, but on the other hand, the lower rate of evaporation of moisture will have less tendency to reduce the temperature of the articles. Under such conditions, both the heating and moisture-reducing operations will take place simultaneously and will require about the same length of time as the two separate operations previously described of first reducing the moisture content of the articles and then heating them.

When the tumbling, heating and moisture reducing operations have been completed it is desirable to discharge the articles from the tumbler prior to placing a new batch of articles therein. The tumbler will have been latched in operative position during the tumbling operation in the manner previously described and it will be apparent that the motor **38** will be arranged to the right of the axis of the trunnions **20** as viewed in Figures 2, 4 and 8. Accordingly the tumbler will be unbalanced to bias it away from its normal position in the same manner that it is biased from its discharging position as previously described. When it is desired to discharge the articles, therefore, the operator will depress one of the pedals **53** or **54**, in which case the conduit **93** will be released to swing to its inoperative position previously described, while the latch **47** (Figure 2) will be released from the stop **43** and the tumbler will start to rotate in a clockwise direction as viewed in Figures 2 and 8.

It will be apparent that rotation of the tumbler in a clockwise direction about the trunnions **20** (Figure 8) causes the outlet opening **66** to swing away from the adjacent end of the conduit **64**, the latter being stationary as previously described. The unbalancing of the tumbler swings it away from its normal operative position but the biasing force is not sufficient to move the tumbler completely to the discharging position shown in dotted lines in Figure 2. Accordingly, before the tumbler loses momentum, the operator may grasp the hand rail **22** and impart additional impetus to the tumbler to carry it fully to its discharging position as shown in dotted lines in Figure 2. When such position is approached, the locking member **44** will engage the cam surface of the latch **48** to depress the latter, and the member **44** will move into engagement with and be stopped by the stop member **49**, the latch **48** snapping into position behind the locking member **44**. Thus the tumbler will be locked in its discharged position.

It will be apparent that the tumbler, the discs **21**, hand rails **22** and motor **38** are mounted to turn as a unit about the axis of the trunnions **20**. Obviously the motor **38** maintains its position with respect to the tumbler in all positions of the latter and accordingly the motor can continue to operate to rotate the tumbler about the axis of the shaft **28** regardless of the position of the tumbler. Therefore the motor **38** not only rotates the tumbler to perform the tumbling operation while the tumbler is in its normal operative position, but also rotates it to discharge the articles therefrom when the tumbler is in the discharging position as shown in dotted lines in Figure 2. A suitable table or the like (not shown) is arranged in a position to receive the articles from the tumbler when the latter is in the discharging position referred to, and the rotation of the tumbler by the motor **38** lifts and drops the articles so that they are freely and quickly discharged from the tumbler, whereupon the latter may be returned to its normal position to be reloaded.

As is true in my prior patented construction referred to, the trunnions **20** are mounted above the horizontal plane of the shaft **28** when the tumbler is in its normal operative position. Accordingly the tumbler may be loaded at a relatively low level and unloaded at a relatively high level as distinguished from some prior constructions wherein it was necessary to lift the weight of the wet articles to a substantial height to load the tumbler, discharge the articles at a relatively low level into a basket or the like, and again lift them to a proper position to be fed to the ironers. In the present case, the loading action is greatly facilitated by the use of the tube **147** which is arranged at such a low level as to permit it to be readily filled with articles ready to be dumped into the tumbler.

From the foregoing it will be apparent that the present apparatus embodies all of the desirable characteristics of my prior construction so far as the effective shaking out of the articles is concerned, but possesses substantial additional advantages as to heat and moisture control. Articles which contain approximately the proper amount of moisture for ironing can be shaken out and heated without noticeable loss of moisture content by operating the apparatus with the damper **74** and door **136** in the positions shown in dotted lines in Figure 7. Heavy articles containing too much moisture for ironing can have the moisture content thereof reduced to the proper point by altering the positions of the damper **74** and door **136** in the manner described, and after the moisture content has been reduced to the proper point, the damper **74** and door **136** may be restored to the solid line positions shown in Figure 7. With either class of articles, it will be apparent that the operation of the apparatus is such that the articles are discharged from the tumbler in a thoroughly loosened condition containing the proper amount of moisture for ironing and at a relatively high temperature so as to avoid any chilling of the ironers. These factors therefore are such as to permit the ironing action to be very quickly and effectively carried out.

It will be apparent that the controlling of the various parts of the apparatus involves simple operations which are easily carried out. The depression of either of the pedals **53** or **54** releases the tumbler for movement either to its normal position or to its discharging position, and in either case, the conduit **93** will be automatically

moved away from its normal position, thus freeing the tumbler for turning movement on the trunnions 20. The movement of the conduit 93 to its inoperative position is effected automatically by the spring 122, and the cylinder and piston arrangement in Figure 9 acts as a shock absorber to cushion the turning movement of the conduit 93. The same means, if desired, may be employed to limit the turning movement of the conduit 93 to its inoperative position.

It is to be understood that the form of the invention herewith shown and described is to be taken as a preferred example of the same and that various changes in the shape, size and arrangement of parts may be made without departing from the spirit of the invention or the scope of the subjoined claims.

I claim:

1. An article conditioning apparatus for laundries, comprising a tumbler adapted to contain articles having a substantial water content, means for supporting said tumbler for axial rotation, said tumbler having an opening at one end, a circulatory system for supplying air to the said end of said tumbler and for withdrawing air from said tumbler at a point spaced from said end, said system comprising a conduit section connected to normally communicate with said opening and mounted to move therefrom, and means for supporting said tumbler for movement to an article dumping position when said conduit section is moved from said opening.

2. An article conditioning apparatus for laundries, comprising a tumbler adapted to contain articles having a substantial water content, means for supporting said tumbler for axial rotation, said tumbler having an opening at one end, a circulatory system for supplying air to the said end of said tumbler and for withdrawing air from said tumbler at a point spaced from said end, said system comprising a conduit section connected to normally communicate with said opening and mounted to move therefrom, means in said system for heating air supplied to said tumbler, and means for supporting said tumbler for movement to an article dumping position when said conduit section is moved from said opening.

3. An article conditioning apparatus for laundries, comprising a tumbler adapted to contain articles having a substantial water content, means for supporting said tumbler for axial rotation, said tumbler having an opening at one end, a circulatory system for supplying air to the said end of said tumbler and for withdrawing air from said tumbler at a point spaced from said end, said system comprising a conduit section connected to normally communicate with said opening and mounted to move therefrom, an outlet connected to said circulatory system, a damper for diverting to said outlet at least a portion of the air withdrawn from said tumbler, means operable for admitting outside air into said system when said last named means is in a position diverting at least a part of the air to said outlet, and means for supporting said tumbler for movement to an article dumping position when said conduit section is moved from said opening.

4. An article conditioning apparatus for laundries, comprising a tumbler adapted to contain articles having a substantial water content, means for supporting said tumbler for axial rotation, said tumbler having an opening at one end, a circulatory system for supplying air to the said end of said tumbler and for withdrawing air from said tumbler at a point spaced from said end, said system comprising a conduit section connected to normally communicate with said opening and mounted to move therefrom, means biasing said conduit section for movement away from said tumbler, and means normally latching said conduit section in operative position communicating with said opening.

5. An article conditioning apparatus for laundries, comprising a tumbler adapted to contain articles having a substantial water content, means for supporting said tumbler for axial rotation, said tumbler having an opening at one end, a circulatory system for supplying air to the said end of said tumbler and for withdrawing air from said tumbler at a point spaced from said end, said system comprising a conduit section connected to normally communicate with said opening and mounted to move therefrom, and a damper having mechanical connection with said conduit section to be operated upon movement of said conduit section away from said opening for stopping the passage of air from said conduit section.

6. An article conditioning apparatus for laundries, comprising a tumbler adapted to contain articles having a substantial water content, means for supporting said tumbler for axial rotation, said tumbler having an opening at one end, a circulatory system for supplying air to the said end of said tumbler and for withdrawing air from said tumbler at a point spaced from said end, said system comprising a conduit section connected to normally communicate with said opening and mounted to move therefrom, and means for supporting said tumbler for turning movement between normal and discharging positions on an axis perpendicular to the rotation of the axis of said tumbler, said conduit section being movable into communication with said opening when said tumbler is in normal position.

7. An article conditioning apparatus for laundries, comprising a tumbler adapted to contain articles having a substantial water content, means for supporting said tumbler for axial rotation, said tumbler having an opening at one end, a circulatory system for supplying air to the said end of said tumbler and for withdrawing air from said tumbler at a point spaced from said end, said system comprising a conduit section connected to normally communicate with said opening and mounted to move therefrom, means biasing said conduit section for movement away from said tumbler, means normally latching said conduit section in operative position communicating with said opening, means for supporting said tumbler for turning movement between normal and discharging positions on an axis perpendicular to the axis of rotation of said tumbler, said conduit section being movable into communicating engagement with said tumbler when the latter is in normal position, means for latching said tumbler in normal position, and means connected to simultaneously release both of said latching means.

8. An article conditioning apparatus for laundries, comprising a tumbler adapted to contain articles having a substantial water content, means for supporting said tumbler for axial rotation, said tumbler having an opening at one end, a circulatory system for supplying air to the said end of said tumbler and for withdrawing air from said tumbler at a point spaced from said end, said system comprising a conduit section connected to normally communicate with

said opening and mounted to move therefrom, means biasing said conduit section for movement away from said tumbler, means normally latching said conduit section in operative position communicating with said opening, means for supporting said tumbler for turning movement between normal and discharging positions on an axis perpendicular to the axis of rotation of said tumbler, said conduit section being movable into communicating engagement with said tumbler when the latter is in normal position, means for latching said tumbler in normal position, means connected to simultaneously release both of said latching means, and a damper in said circulatory system connected to be operated by said conduit section upon movement thereof away from said opening to stop the flow of air from said conduit section.

9. An article conditioning apparatus for laundries, comprising a tumbler having its axis normally substantially horizontal and mounted for rotation on such axis, one end of said tumbler having an axial opening, the other end having a manifold formed by a stationary wall and a perforated wall spaced therefrom and communicating with the interior of said tumbler, said stationary wall having an outlet opening below the axis of rotation of said tumbler, a circulatory system for said tumbler comprising an outlet conduit normally contacting said stationary wall and communicating with said outlet opening, said system further comprising an inlet conduit normally engaging the first named end of said tumbler and communicating with said axial opening, means for supporting said inlet conduit for movement away from said axial opening, and means for supporting said tumbler for turning movement between its normal position and a discharging position on an axis perpendicular to and arranged above the axis of rotation of said tumbler.

10. An article conditioning apparatus for laundries, comprising a tumbler having its axis normally substantially horizontal and mounted for rotation on such axis, one end of said tumbler having an axial opening, the other end having a manifold formed by a stationary wall and a perforated wall spaced therefrom and communicating with the interior of said tumbler, said stationary wall having an outlet opening below the axis of rotation of said tumbler, a circulatory system for said tumbler comprising an outlet conduit normally contacting said stationary wall and communicating with said outlet opening, said system further comprising an inlet conduit normally engaging the first named end of said tumbler and communicating with said axial opening, means for supporting said inlet conduit for movement away from said axial opening, means for supporting said tumbler for turning movement between its normal position and a discharging position on an axis perpendicular to and arranged above the axis of rotation of said tumbler, means for heating air passing through said circulatory system, and means for closing communication through said inlet conduit when the latter is moved away from said axial opening.

11. An article conditioning apparatus for laundries, comprising a tumbler adapted to contain articles having a substantial water content, means for supporting said tumbler for axial rotation, said tumbler having spaced openings, a circulatory system for supplying air to said tumbler through one of said openings and for withdrawing air from said tumbler through the other opening, said system comprising a conduit section connected to normally communicate with one of said openings and mounted to move therefrom, and means for supporting said tumbler for movement to a position for dumping articles from one of said openings when said conduit section is moved away from its associated opening.

12. An article conditioning apparatus for laundries, comprising a tumbler adapted to contain articles having a substantial water content, means for supporting said tumbler for axial rotation, said tumbler having spaced openings one of which is relatively large for the introduction of articles into said tumbler and arranged at one end of said tumbler, a circulatory system for supplying air to said tumbler through one of said openings and for withdrawing air from said tumbler through the other opening, said system comprising a conduit section connected to normally communicate with said relatively large opening and mounted to move therefrom, and means for supporting said tumbler for movement to a position for discharging articles through said relatively large opening when said conduit section is moved away from such opening.

13. An article conditioning apparatus for laundries, comprising a tumbler adapted to contain articles having a substantial water content, means for supporting said tumbler for axial rotation, said tumbler having spaced openings, a circulatory system for supplying air to said tumbler through one of said openings and for withdrawing air from said tumbler through the other opening, said system comprising a conduit section connected to normally communicate with one of said openings and mounted to move therefrom, means for heating air passing through said circulatory system, and means for supporting said tumbler for movement to a position for dumping articles from one of said openings when said conduit section is moved away from its associated opening.

14. An article conditioning apparatus for laundries, comprising a tumbler adapted to contain articles having a substantial water content, means for supporting said tumbler for axial rotation, said tumbler having spaced openings one of which is relatively large for the introduction of articles into said tumbler and arranged at one end of said tumbler, a circulatory system for supplying air to said tumbler through one of said openings and for withdrawing air from said tumbler through the other opening, said system comprising a conduit section connected to normally communicate with said relatively large opening and mounted to move therefrom, means for heating air passing through said circulatory system, and means for supporting said tumbler for movement to a position for discharging articles through said relatively large opening when said conduit section is moved away from such opening.

15. An article conditioning apparatus for laundries, comprising a tumbler adapted to contain articles having a substantial water content, means for supporting said tumbler for axial rotation, said tumbler having spaced openings, a circulatory system for supplying air to said tumbler through one of said openings and for withdrawing air from said tumbler through the other opening, said system comprising a conduit section connected to normally communicate with one of said openings and mounted to move therefrom, an exhaust connected to said circulatory

system, a damper controllable for discharging through said exhaust at least a portion of the air withdrawn from said tumbler, means operable for admitting outside air into said system when said damper is in a position diverting at least a part of the air to said outlet, and means for supporting said tumbler for movement to a position for dumping articles from one of said openings when said conduit section is moved away from its associated opening.

16. An article conditioning apparatus for laundries, comprising a tumbler adapted to contain articles having a substantial water content, means for supporting said tumbler for axial rotation, said tumbler having spaced openings one of which is relatively large for the introduction of articles into said tumbler and arranged at one end of said tumbler, and a circulatory system for supplying air to said tumbler through one of said openings and for withdrawing air from said tumbler through the other opening, said system comprising a conduit section connected to normally communicate with said relatively large opening and mounted to move therefrom, an exhaust connected to said circulatory system, a damper controllable for discharging through said exhaust at least a portion of the air withdrawn from said tumbler, means operable for admitting outside air into said system when said damper is in a position diverting at least a part of the air to said outlet, and means for supporting said tumbler for movement to a position for discharging articles through said relatively large opening when said conduit section is moved away from such opening.

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