

June 8, 1943.

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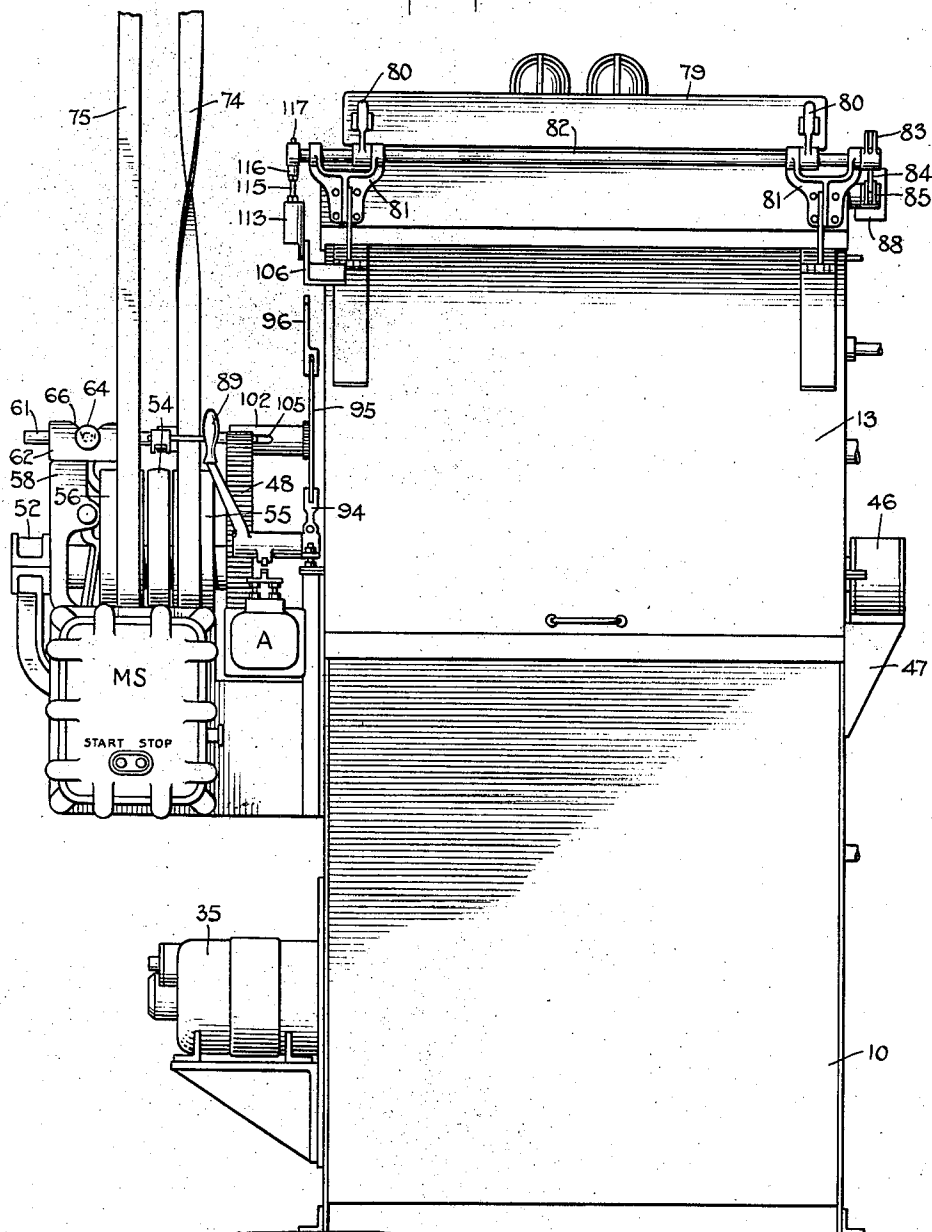
2,321,124

APPARATUS FOR DRYING

Original Filed Oct. 12, 1935

8 Sheets-Sheet 1

Fig. 1.



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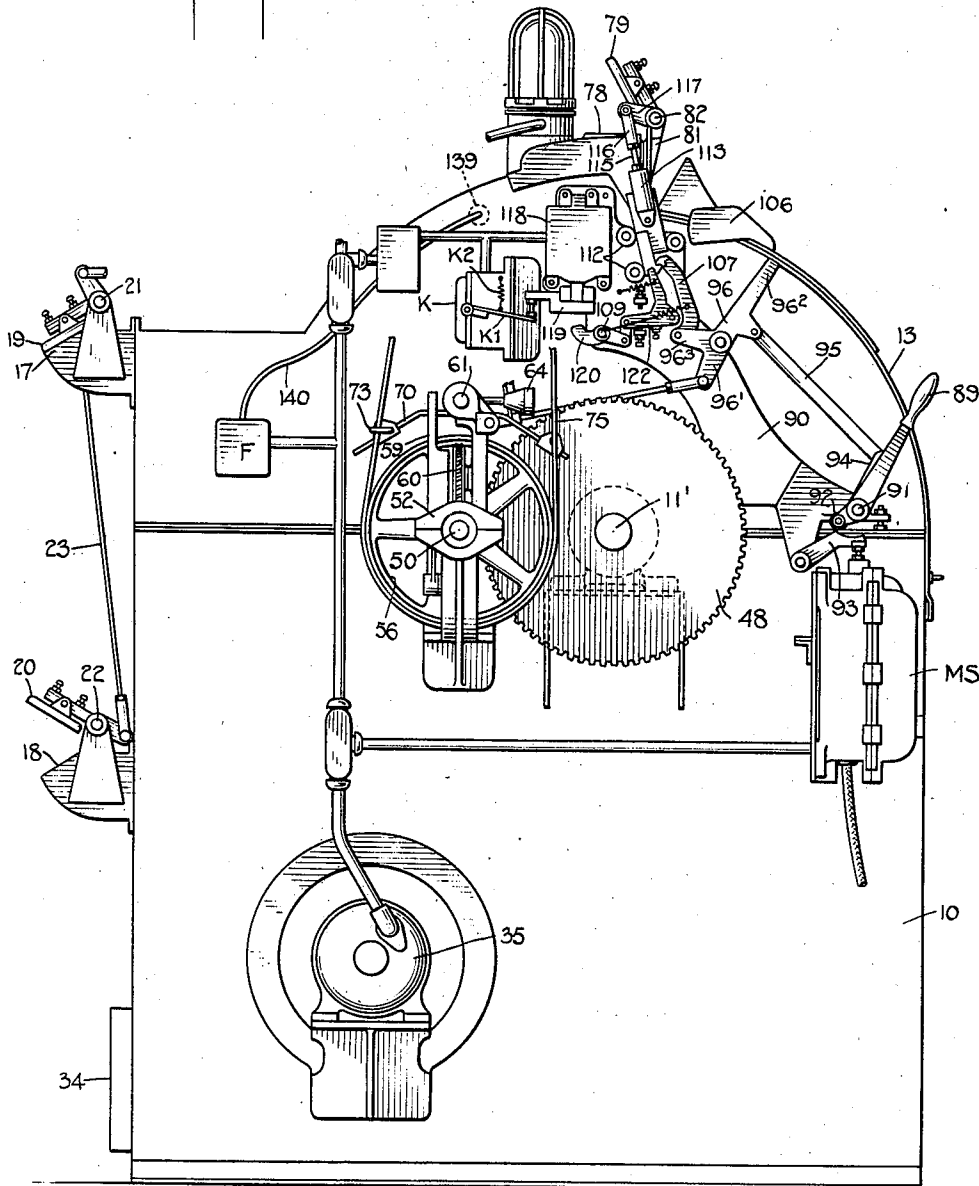
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8 Sheets-Sheet 2

Fig. 2.



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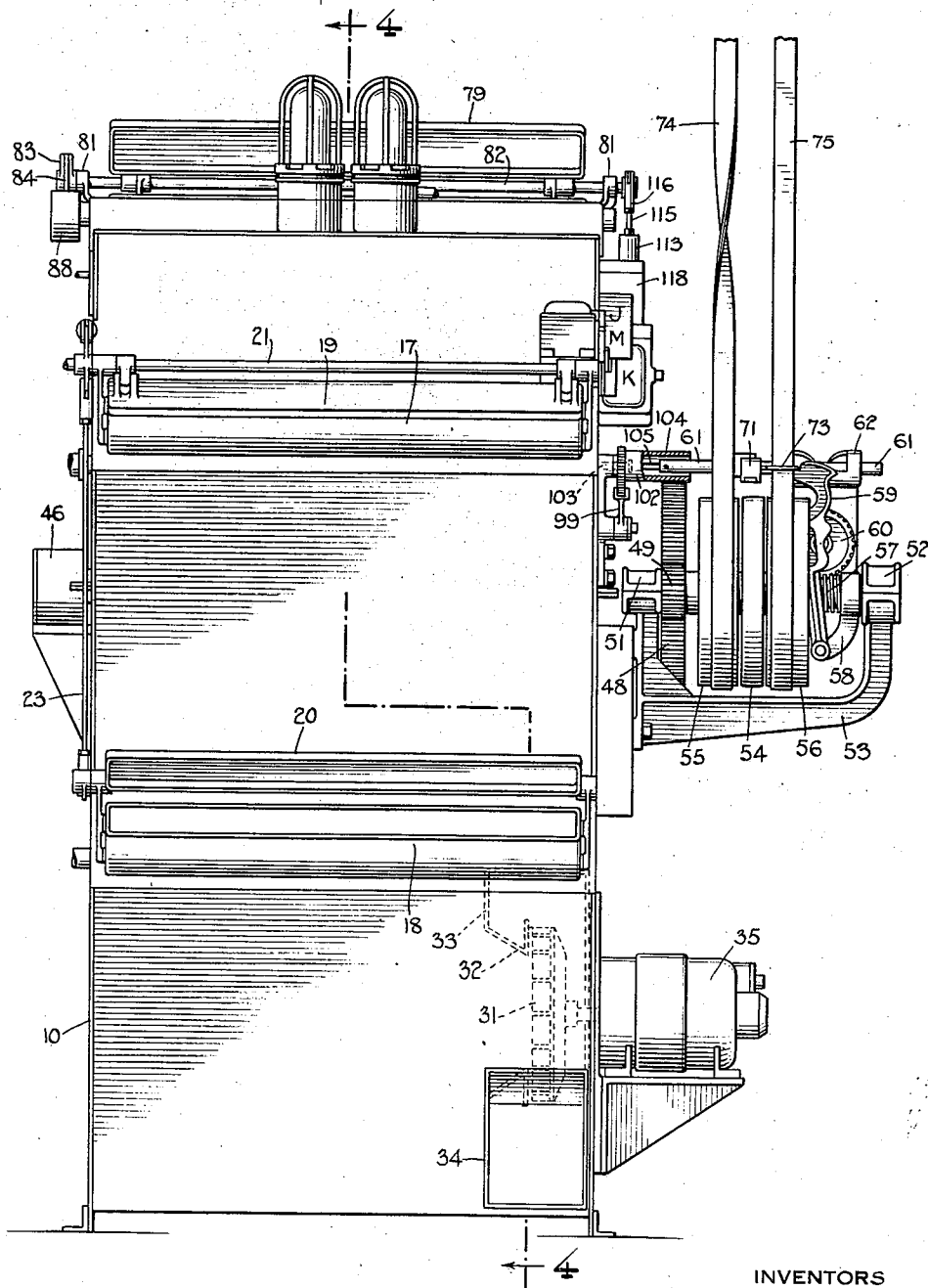
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8 Sheets-Sheet 3

Fig. 3.



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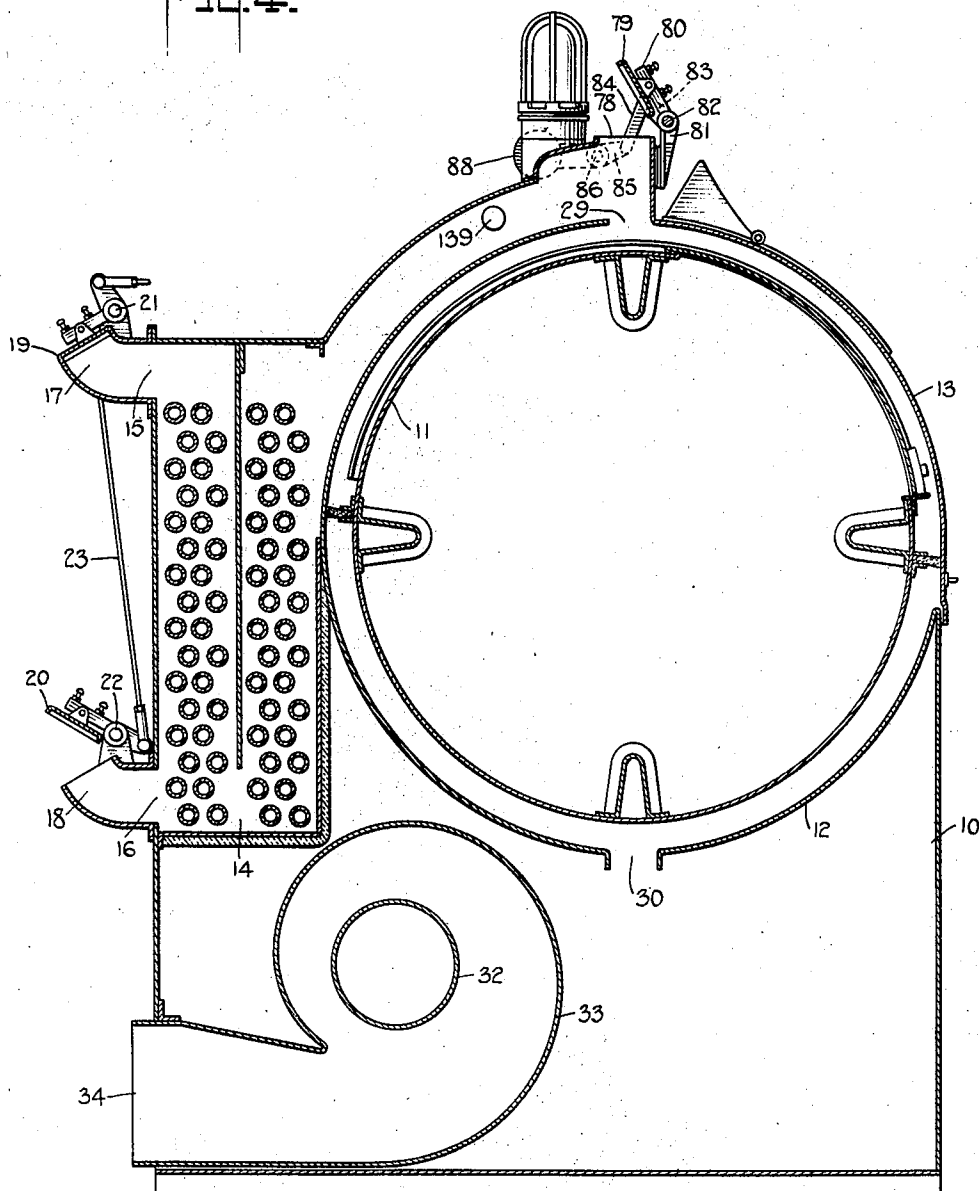
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APPARATUS FOR DRYING

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8 Sheets-Sheet 4

Fig. 4.



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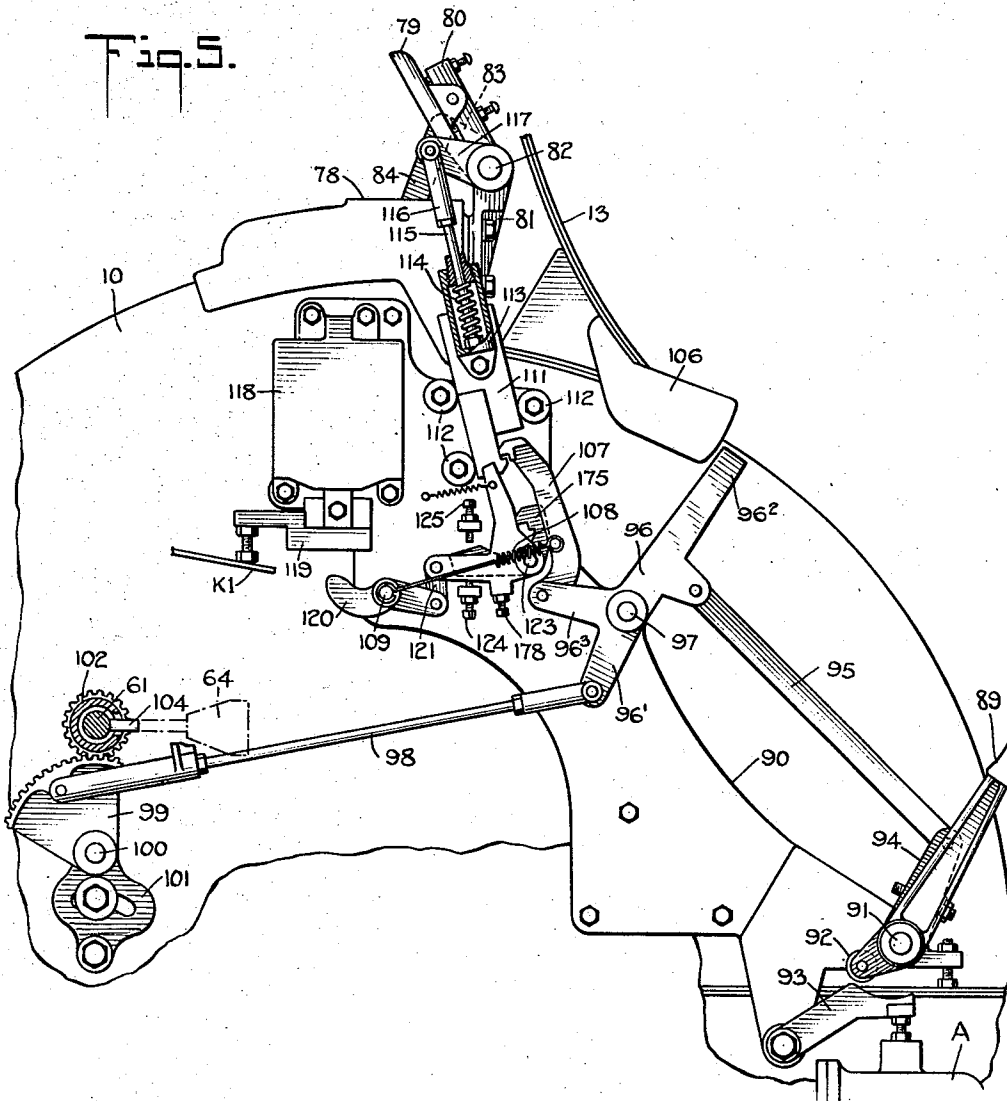
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Original Filed Oct. 12, 1935

8 Sheets-Sheet 5



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G. E. BOWDOIN ET AL

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APPARATUS FOR DRYING

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8 Sheets-Sheet 6

Fig. 6.

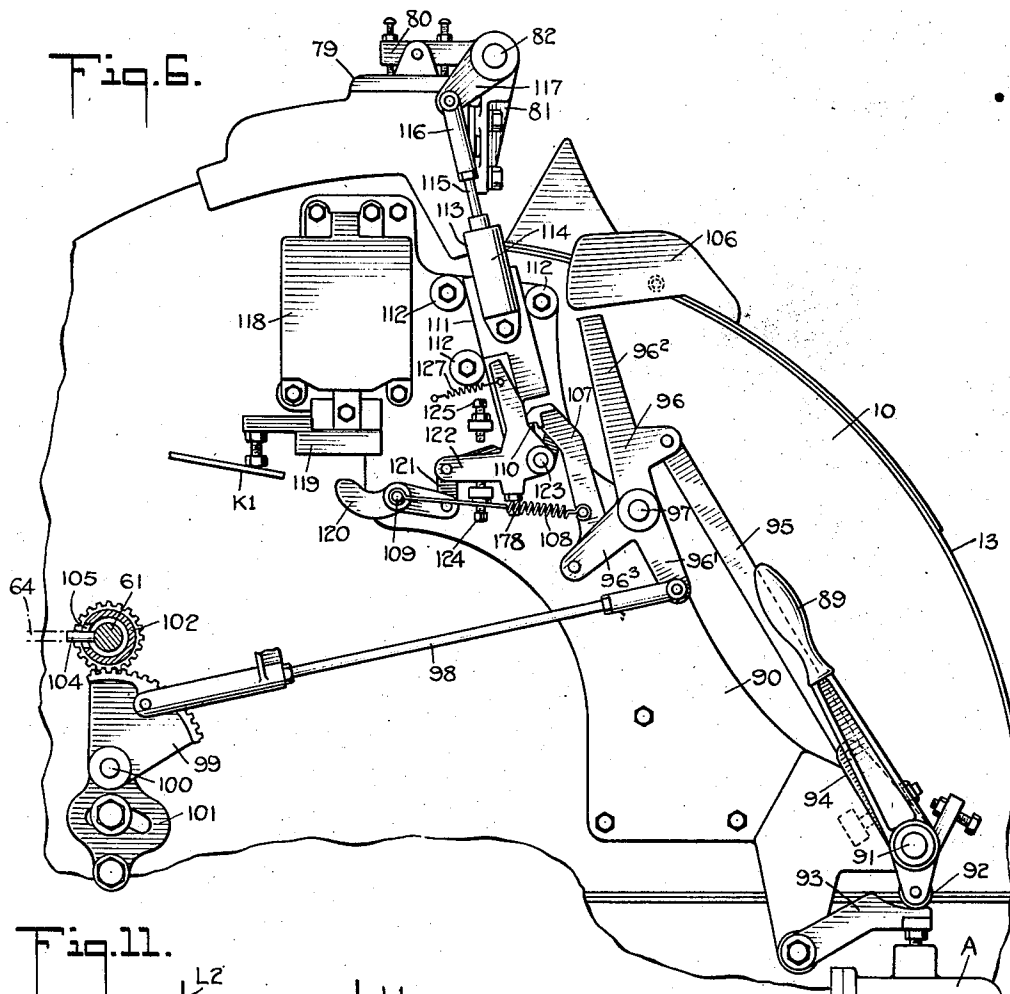
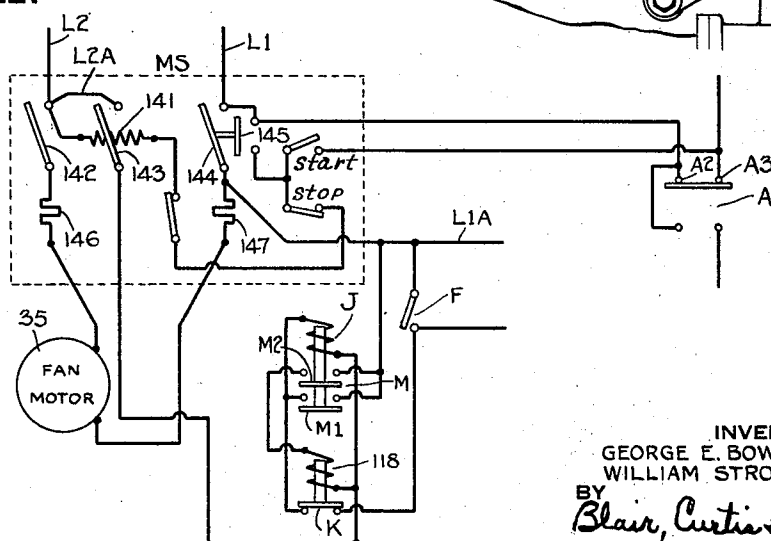


Fig. 11.



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2,321,124

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Original Filed Oct. 12, 1935

8 Sheets-Sheet 7

Fig. 7.

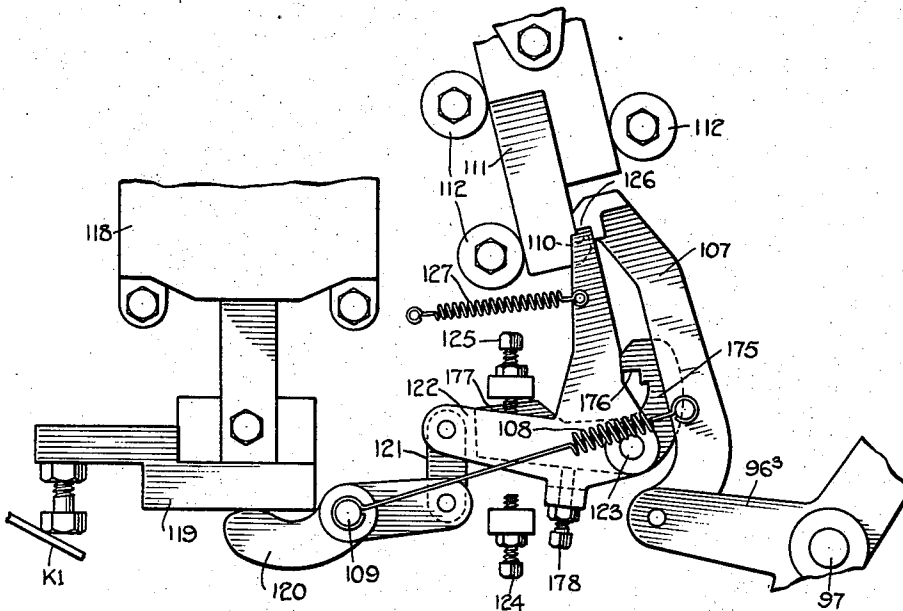
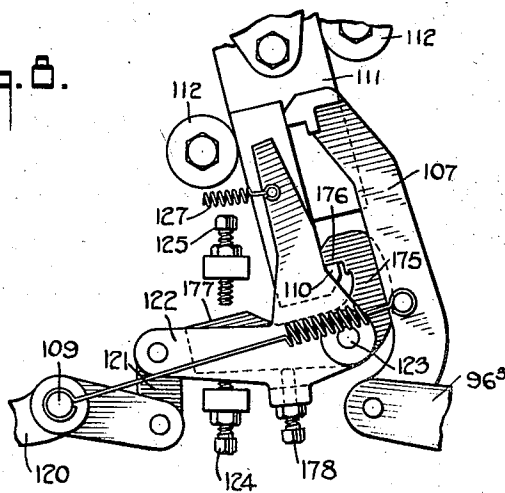


Fig. 8.



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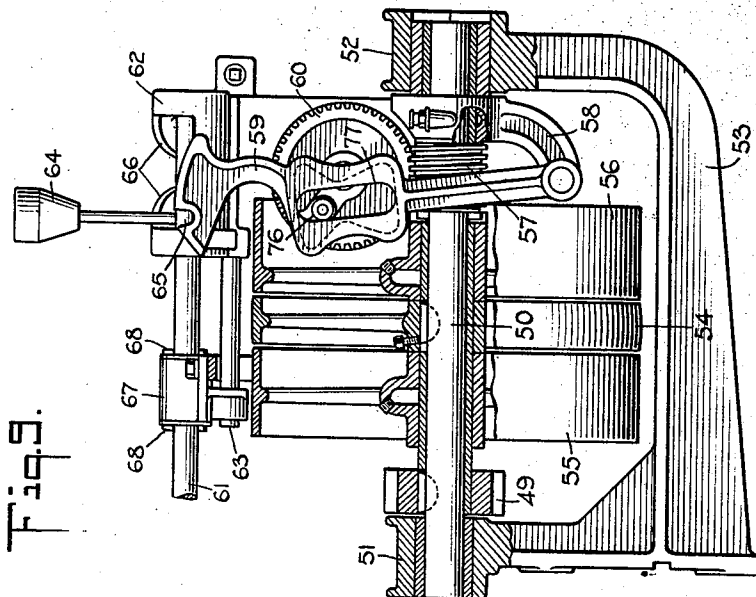
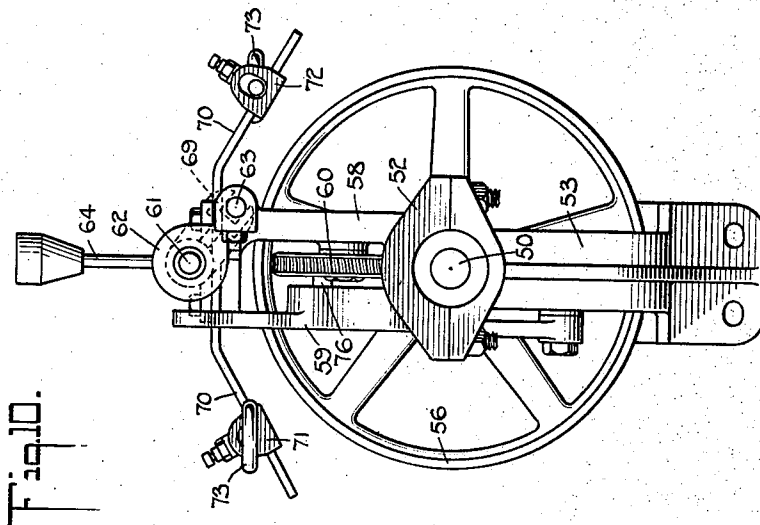
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8 Sheets-Sheet 8



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UNITED STATES PATENT OFFICE

2,321,124

APPARATUS FOR DRYING

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Application October 12, 1935, Serial No. 44,724, now Patent No. 2,142,042, dated December 27, 1938, which is a division of application Serial No. 133,344, March 27, 1937, now Patent No. 2,217,153, dated October 8, 1940. Divided and this application September 7, 1940, Serial No. 355,726

2 Claims. (Cl. 34—87)

This invention relates to apparatus employed in dry cleaning, and more particularly to apparatus for drying materials which have previously been treated with an inflammable cleaning solvent.

This application is a division of application Serial No. 133,344, patented October 8, 1940, No. 2,217,153, filed in the United States Patent Office March 27, 1937, the latter being a division of application Serial No. 44,724, filed October 12, 1935, now Patent No. 2,142,042 issued December 27, 1938.

An object of the invention is to provide simple and trustworthy means, interlocked with certain of the manually operated parts of the apparatus, for preventing operation of such parts unless predetermined safe operating conditions obtain.

Further objects of the invention are in part obvious and in part will be pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements, and arrangement of parts, as will be hereinafter described, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings, in which is shown a preferred embodiment of the invention capable of use in carrying out the purposes above mentioned:

Fig. 1 is a front elevation of a drying tumbler embodying features of the present invention;

Fig. 2 is a left side elevation thereof;

Fig. 3 is a back elevation of the tumbler;

Fig. 4 is a cross-section taken on line 4—4 of Fig. 3;

Fig. 5 shows on a larger scale the upper portion of the tumbler, and the control mechanism in the same position it occupies in Fig. 2, the shell door being in open position;

Fig. 6 is a view similar to Fig. 5 showing the control mechanism in a different position and the shell door closed;

Fig. 7 is a view of certain elements of the control mechanism in positions different from those occupied by the same elements in Figs. 2, 5 and 6;

Fig. 8 is a view showing the control elements of Fig. 7 in still different positions;

Figs. 9 and 10 are respectively back and side elevations, on an enlarged scale, of the belt pulley and belt shifting header assembly; and

Fig. 11 is a wiring diagram pertaining to the apparatus and devices shown in the preceding figures.

Similar reference characters refer to similar

parts throughout the various views of the drawings.

The safe operating conditions referred to above are predicated upon the fact that the treatment of the materials in the drying tumbler comprises a preliminary drying stage during which the temperature within the tumbler is not permitted to rise above a predetermined safe temperature related to the flash point of the dry cleaning solvent with which the clothes have been previously treated. For a fuller understanding reference may be had to the copending applications referred to above.

Description of apparatus

Referring to the drawings, there is disclosed a tumbler comprising an outer shell or casing 10 having rotatably mounted therein a foraminous drum 11. The drum 11 is surrounded by an internal cylindrical shell 12 which encloses the drum for approximately three-quarters of the periphery thereof, the hinged outer shell door 13 at the front of the tumbler housing completing the enclosure. To the rear of the drum chamber is formed a rectangular coil box 14, connected with the atmosphere through the rear plate of the housing by means of two air inlets 15 and 16, the inlet 15 giving access of air to the upper portion of the coil box and the inlet 16 at a point near the bottom of the coil box. These two inlets are equipped respectively with rectangular air intake nozzles 17 and 18 adapted to be opened or closed to the atmosphere by means of dampers 19 and 20. The damper 19 is rotatably mounted upon a shaft 21 and similarly the damper 20 is rotatably mounted upon a shaft 22. These dampers are connected in predetermined relationship by means of an adjustable rod 23, the length of the rod and its mode of attachment to the two dampers being such that whenever one of said dampers is open the other will be closed.

The heater

Air for solvent removal is admitted through one or the other of the air inlets 15—16 to the coil box 14 and after being heated by passing over steam coils, is led to the top of the tumbler and admitted to the tumbler drum through an opening 29 in the inner shell 12. Admission of steam for heating the steam coils is controlled automatically to insure that at the beginning of a drying operation the heated air entering the tumbler drum does not exceed a predetermined temperature. The outlet from the cylin-

drical drum chamber is through an opening 30 at the bottom of the shell 12, opposite the opening 29. This outlet 30 forms a passage for the air into the lower part of the tumbler housing beneath the drum chamber, where there is located a rotary fan 31 to which air is admitted from the lower part of the housing through an inlet 32 formed in the fan housing 33. The outlet of the fan housing 33 is at 34 projecting through the rear wall of the tumbler housing near the bottom thereof.

The fan 31 is driven by a direct connected motor 35 and serves to draw air through the air inlet 15 or 16 over the steam coils, thence by way of the air inlet 29, down through the drum chamber, and by way of outlet 30 into the lower part of the tumbler housing, whence the air is exhausted to the atmosphere, preferably outside of the building in which the tumbler is installed.

Cylinder drive

The tumbler drum 11 is journaled in bearings 46 mounted on brackets 47 secured to the side plates of the tumbler housing.

Upon the drum shaft 11¹ is mounted a spur gear 48 driven by a pinion 49 mounted upon a jack shaft 50 forming part of a pulley and belt shifting header assembly, for a better understanding of which reference is made to Figs. 9 and 10 in which the jack shaft 50 is shown to be rotatably mounted in a pair of bearings 51, 52 carried by a header bracket or arm 53. This bracket is bolted to the side of the tumbler housing. The jack shaft 50 carries a tight pulley 54 and a pair of loose pulleys 55, 56. Also loosely mounted upon the shaft 50 is the header worm 57 which has a pin-and-slot connection with the hub of the loose pulley 56 so as to be driven thereby. Mounted upon the header bracket 53 in coaxial relation to the shaft 50 is a header arm assembly comprising the support 58, to which is pivotally connected the belt shifter fork 59.

The header arm assembly includes a worm gear 60 on support 58 meshing with the worm 57, and a reciprocating slide shaft 61 slidably and rotatably mounted at the upper end of the support 58 in a block 62. Projecting from the block 62 parallel to the shaft 61 is a guide rod 63. A weighted pin or header fall 64 secured to and extending at right angles to the slide shaft 61 shifts with the slide shaft about its axis so that the pin 64 may engage the upper end of the shifter fork 59 when the pin 64 is swung in one direction to a horizontal position, eventually settling in the notch 65 formed in said upper end, and when swung in the opposite direction to a horizontal position will be free of the shifter fork 59, but will engage one or the other of the beveled surfaces 66 formed on the block 62 and ride down to a neutral position. Near the end of the slide shaft 61 which is nearest the tumbler housing is a shifter sleeve 67 loosely mounted upon the said slide shaft, but held against endwise movement by means of cotter pins 68. This shifter sleeve carries a forked arm 69 cooperating with the guide rod 63 to prevent the shifter sleeve 67 from rocking about the axis of the shaft 61. This shifter sleeve carries a shifter arm 70 extending in opposite directions above the belt pulleys and provided with belt guide blocks 71, 72, each equipped with a belt guide 73. The belt guides are so disposed that when the shifter pin 64 occupies its center or neutral position the two drive belts 74, 75 (see Fig. 3) will be positioned upon the loose pulleys so that under these conditions no power

will be transmitted to the tumbler drum. It will be noted that the belt 75 is direct and the belt 74 crossed whereby the shifting of one belt off and the other belt on to the tight pulley will effect a reversal of the rotation of the tumbler drum. It will be understood that belts 74 and 75 connect with a suitable line shaft (not shown) and are of a width to enable them to drive the tight pulley without disengaging their respective loose pulleys.

The operation of the header assembly will now be briefly described. It will be noted that since the worm 57 is driven by the loose pulley 56 it will always rotate in the same direction irrespective of the location of the belts with respect to the tight pulley. Thus, also, the worm wheel 60 will rotate constantly in one direction. This wheel drives a crank pin 76 slidable up and down in a slot 77 provided for that purpose in the shifter fork 59. Thus rotation of the loose pulley produces constant oscillation of the shifter fork at a slow rate of speed. When the pin 64 does not engage the notch 65 in the upper end of the shifter fork no motion will be transmitted to the belt guides, but when the pin 64 engages the notch 65, it will cause the slide shaft 61 to reciprocate slowly. This action will periodically shift the driving belts and reverse operation of the tumbler drum. No claim is made to this header construction per se, but, as will be seen hereinafter, it is associated with other control mechanism to insure safe operation of the apparatus.

Safety air inlet

At the top of the tumbler housing there is provided an auxiliary air inlet 78 communicating directly with the air outside the tumbler housing and serving as a vent when the fan is not running. This air inlet 78 may be closed by means of a vent damper 79 pivotally mounted upon arms 80 which themselves are rotatably mounted upon brackets 81 secured to the housing. The rock shaft 82 which supports the arm 80 carries a crank arm 83 connected by means of a link 84 to one end of a counterbalanced lever 85 pivotally supported at 86 upon the tumbler housing. The weight lever 85 has mounted at its free end a counterweight 88, the tendency of which is to maintain the vent damper 79 always in an open position. The operation of this damper, as will be hereinafter disclosed, is associated with other automatic control mechanism.

Mechanical control mechanism

Referring again to the drawings, mechanical means for setting the tumbler in operation to begin the drying cycle will now be described. It will be noted that in Fig. 5 the vent damper 79 is open, the tumbler shell door 13 is also open, and that the belt-shifting header-fall 64 occupies its disengaged position as in Fig. 2, so that the drum is at rest. The means for shifting the header-fall into or out of engagement to cause belt drive of the tight pulley on the jack shaft comprises an operating lever 89 which, with other operating parts, is mounted upon a cast bed-plate 90 bolted to the side sheet of the tumbler housing. The operating lever 89 is pinned to a shaft 91 rotatable in a bearing-forming part of the said bed-plate casting. Attached to one end of the operating lever is a roller 92 adapted, when the lever 89 is thrown to engage the belt-shifting header-fall in operating position, to come in contact with an arm 93, moving said arm to shift an electric switch A to initiate the operation of certain auto-

matic controls, not included in the present specification.

Pinned to the shaft 91 in proper angular relation to the lever 89 is an arm 94, connected by a link 95 to a crank arm 96 which is free to turn about a shaft 97 mounted in bed-plate casting 90. A branch arm 96¹ of crank arm 96 is connected by an adjustable link 98 to a gear segment 99 rotatably mounted on a pin 100 fixed to a casting 101 which is adjustably mounted on the side of the tumbler housing toward the rear of said housing relative to the position of the bed-plate 90. The gear segment 99 meshes with teeth cut on a rotating sleeve 102 rotatably mounted on a pin 103 carried by the bed-plate 101 (see Fig. 3). The rotatable sleeve 102 surrounds an extension of the reciprocating slide shaft 61 of the header assembly hereinbefore described. This extended shaft 61 is provided at the end nearest the tumbler with a pin 104 which projects through a longitudinal slot 105 in the sleeve 102. It is obvious, therefore, that when the operating lever 89 is thrown toward the center of the tumbler to the position shown in Fig. 6, the toggle composed of the members 94, 95 straightens out and causes rotation of the crank arm 96 about its axis of rotation, causing the branch arm 96¹ to assume the position shown in Fig. 6, thus rocking the gear segment 99 toward the front of the tumbler.

This motion of the gear segment causes rotation of the sleeve 102 and because of the engagement of the pin 104 with a side of the slot 105 produces rotation of the shaft 61 in a counterclockwise direction, as looked at in Figs. 5 and 6, throwing the weighted header pin or fall 64 from the position shown in Fig. 5 to that shown in Fig. 6, where it will engage the slot 65 in the header fork 59, thus, by reason of the slow reciprocation of the shaft 61, shifting one or the other of the driving belts on to the tight pulley 54 and causing rotation of the tumbler drum through pinion 49 and gear 43. It should be noted at this point that straightening the toggle 94, 95 locks the operating lever in the engaged position of the belt-shifting header, thus insuring that the tumbler drum drive will continue until the starting lever 89 is returned to its forward or disengaged position.

Safety devices associated with mechanical control mechanism

There will now be described means connected with this operating mechanism for preventing the opening of the shell door 13 when the belt-shifting header is engaged and also for preventing any actuation of the operating mechanism to start rotation of the drum when the shell door is open. There will also be described means associated with this operating mechanism for controlling the operation of the vent damper 79 in association with magnetic means adapted to open the vent damper 79 in case of failure of current to the fan motor 35.

Referring to the drawings, it will be seen that the crank arm 96 is provided with another branch arm 96² which serves to form an interlock between the operating lever 89 and the shell door 13. The latter is equipped with an abutment casting 106 so shaped and disposed that the shell door can be opened only when the operating lever 89 is in its forward or header-disengaging position, as will be clearly understood by comparing the positions of the parts in Figs. 5 and 6. It will be seen that the abutment 106 prevents rearward movement of the branch arm 96²; and thus

rearward movement of operating lever 89, when the tumbler door stands in open position and, reversely, the said arm 96² opposes movement of the abutment member 106 should an attempt be made to open the door 13 while the operating lever 89 stands in its rearward position, as shown in Fig. 6. Now since, as will be shown hereinafter, it is impossible that the starting lever 89 be put in engagement position unless current is being supplied to the fan motor, it follows that the dryer cylinder can not be set in operation until after the fan is started. The crank arm 96 is also provided with a third branch arm 96³ which carries pivotally mounted thereon a latch member 107, the movement of which is restrained in one direction by means of a spring 108 attached at one end to the latch member 107 and at the other end to a fixed pin 109. This latch member 107 normally stands in interlocking engagement (see Figs. 5 and 6) with a coacting projection 110 formed upon a slide block 111, which is constrained to a straightline motion by three rollers 112 mounted upon the bed-plate 90. Attached to the slide block 111 is a spring housing 113 which by means of a spring 114, a bolt 115, and a link 116 connects the slide block 111 with a crank arm 117, pinned to the vent damper shaft 82.

Obviously, then, when the operating lever 89 is thrown to the header-engaged position, as in Fig. 6, it causes a rotation of branch arm 96³ of crank arm 96, thus moving the latch member 107 from the position shown in Fig. 5 to that shown in Fig. 6. Thus, the slide block 111 is drawn down and through its spring connection with the crank 117, the vent damper 79 is drawn down to cover the vent opening 73, the extra travel of the parts needed to insure proper seating of this damper being taken up through the spring 114.

Safety device operable upon failure of electric energy

Also supported upon the bed-plate 90 is a solenoid 118 to the core of which is attached a weight 119 of sufficient mass to cause the immediate descent of the solenoid core whenever excitation ceases. As will be more fully explained in connection with the wiring diagram shown in Fig. 11, this solenoid is energized under normal working conditions immediately after the closing of a magnetic starter, indicated in the drawings by the letters MS, whose position on the tumbler housing is substantially as disclosed in Figs. 1 and 2. It should be explained at this time that operation of the magnetic starter, among other things, starts the tumbler fan rotating; and that the solenoid 118 remains energized as long as the main switch in the magnetic starter remains closed or so long as failure of current in the fan circuit does not occur. Below the weight 119 is a lever 120 pivoted on the pin 109 hereinbefore mentioned. One end of this lever is connected by means of a link 121 to a bell crank lever 122 turning freely about a pin 123. The throw of the bell crank lever 122 is limited by the adjustment screws 124 and 125. In Figs. 5 and 6, the solenoid core and parts coacting therewith are shown in the normal position they would occupy during the operating cycle while the solenoid is energized. Should current fail at any time during the operating cycle the solenoid 118 will become de-energized, dropping its core and permitting the weight 119 to fall upon the free end of the lever 120, turning the lever 120 to the position shown in Fig. 7, in moving to which posi-

tion movement of the bell crank 122 is effected to the position also shown in Fig. 7. Referring to Figs. 5, 6, 7 and 8, it will be noticed that also pivoted on pin 123 there is provided a trigger 175 lying in back of the bell crank 122. At one end this trigger is provided with a detent hook 176 adapted to engage the projection 110 on slide 111 when the slide is drawn down to the position shown in Fig. 6 by the latch member 107, as above described. The slide will thus be held in its lower position by the trigger even though the operating lever 89 be thrown to its header disengaged position, as is clearly shown in Fig. 8, which shows the latch member 107 in its raised position and the trigger 175 interlocked with the slide projection 110. Trigger 175 tends always to follow up any movement of the bell crank 122 in a counterclockwise direction by reason of its weighted end 177. However, when the bell crank 122 is moved in a clockwise direction by the dropping of the solenoid core, the trigger is also swung in the same direction under the compulsion of an adjustable abutment bolt 178 carried by the bell crank.

If failure of current occurs when the operating lever 89 occupies its header-engaged position, as in Fig. 6, the upper arm of the bell crank lever 122 will strike the latch member 107, driving it and consequently trigger 175 out of engagement with the slide block projection 110, thus permitting the slide block to move upward under the reaction of the spring 114 and the effect of the counterweight 88. Therefore, if the tumbler has been in operating condition when failure of current occurs the vent damper on top of the tumbler will be automatically opened. Should the failure of current occur when the operating lever 89 is in the header-disengaged position and slide 111 in its upper position, as in Fig. 7, the movement of the bell crank 122 in response to the dropping of the solenoid weight is to the position shown in Fig. 7 where the upper arm of the bell crank moves under the projecting surface 126 of the latch member 107 and so serves as a strut to prevent the operating lever 89 from being moved to its header-engaged position until current has been restored and the solenoid re-energized. Again, should current failure occur when the operating lever 89 is in header-disengaged position and slide 111 in its lower position (damper 79 closed and held in place by trigger 175 as in Fig. 6), the movement of the bell crank 122 in response to the dropping of the solenoid weight will swing the bell crank in a clockwise direction and cause the trigger 175 to release the slide projection. The slide will now assume its upper position, as in Fig. 7, opening the damper, and the upper arm of the bell crank will pass under the latch 126 to serve as a strut to prevent downward movement of latch member 107 and hence the manipulation of lever 89 to header-engaged position until current to the fan has again been restored. Thus, irrespective of the period in the drying cycle that such current failure may occur, the drying tumbler will be put out of operation and/or held out of operation until after current is once more made to flow in the fan circuit. The bell crank lever 122 is held in its normal rearward position by means of a spring 127. It will be seen as we proceed with the description of the wiring diagram in what manner the fan is energized concurrently with excitation of the solenoid and so becomes operative before operating lever 89 can be moved away from its header-disengaged position.

Wiring diagram

So much of the original wiring diagram as is pertinent to the present application is shown in Fig. 11 including the magnetic starter MS, the fan motor 35, the solenoid 118 and magnetic contactor J with its switch M. A switch K is also shown which under certain conditions serves to operate the magnetic contactor JM. F is a thermostatic control switch, the bulb for operating which is indicated at 139 in Figs. 2 and 4 where it is shown disposed in the air passage leading to the top of the tumbler cylinder in a position to measure the temperature of the air entering the tumbler drum. Bulb 139 is connected to switch F by means of flexible tubing 140. The thermostatic control of the switch F should be such that the switch will close when the temperature in the air passage falls to or below the predetermined temperature desired for the preliminary low heat stage of dryer operation.

Referring to the wiring diagram, L1 and L2 indicate respectively the two sides of a power line entering the magnetic starter MS. When the starting lever 89 is in its disengaged position, line L1 connects with the start switch of the magnetic starter MS by means of the switch A, mentioned above. This connection only obtains when the machine starting lever 89 stands in its forward or disengaged position. The momentary closing of the starting switch, indicated on the drawings by word "Start," completes a circuit through the normally closed stop switch, indicated by the word "Stop," through the magnet coil 141 of the magnetic starter. The energizing of this coil closes the main circuit contactors 142, 143 and 144, and as soon as these main circuit contactors come to closed-circuit position the circuit through the magnet coil 141 is maintained by means of a bridge member 145 which completes a circuit shunting the contacts A2, A3 of which A and the "Start" switch, the maintaining circuit then being made from L1 through the bridge member 145, the "Stop" switch and the magnet coil 141 back to line L2.

The closing of contacts 142 and 144 completes a circuit through the fan motor which immediately starts the tumbler fan in operation, and since at this time the tumbler vent damper 79 is open, atmospheric air is drawn in at the top of the tumbler through the tumbler cylinder and discharged out-of-doors. Should, for any reason, the fan motor not start, thermal elements in the magnetic starter, indicated at 146 and 147, will heat up and, after a few seconds of this abnormal condition, throw the main switch to open position. It will be noted that the line L2 has a branch L2A which is closed by the switch contact 143, and also that a branch line L1A takes off from line L1 at a point beyond switch contact 144. Thus, we have a circuit L1, L2 through the fan motor and a circuit L1A, L2A in shunt therewith, adapted to supply current to various control devices (not shown). It will be understood that as soon as the main switch of the magnetic starter closes, the line L1A becomes alive as far as the thermostatic switch F.

The switch F is normally held in open position at temperatures above the selected temperature at which the apparatus is to operate during the low heat period, as, for instance, 140° F. If, at the beginning of a cycle, the temperature stands below or at 140° F., the switch F will be closed and a circuit will be completed from L1A through switch contact K, through the coil of the magnetic contactor J and back to the line

L2A. Thus, the magnetic contactor will be energized and drawing up its core will complete circuits respectively by means of switch contacts M1 and M2 from line L1A through magnetic contactor J and solenoid 118. Thus, the solenoid will become energized and by the raising of its core open the circuit through the switch K, the magnetic switch J, M thereafter being maintained by current flowing through the switch contact M and its connections. Switch K (see Fig. 3) is mounted upon the tumbler housing adjacent the solenoid 118. Its interior contact member, not shown, is operably associated with an exterior arm K1, normally biased, by any suitable means, to hold the switch K in open position whenever permitted to act through the energization of the solenoid 118. Upon de-energization of the solenoid, the dropping of the weight 119 produces movement of the arm K1 to close the switch K.

It will be remembered that with the solenoid 118 de-energized the vent damper 79 stands in open position and an interlock is maintained between the bell crank 122 and latch member 107, preventing operation of the belt-shifter operating lever 89. However, upon energization of solenoid coil 118, the weight 119 is removed from engagement with the lever 120 releasing the belt-shifter mechanism for hand actuation.

Now, upon the operator throwing the hand lever 89 to its rearward or header-engaging position, as shown in Fig. 6, one of the driving belts is shifted to the tight pulley on the jack shaft and the tumbler drum rotates. At the same time the vent damper at the top of the tumbler is closed. Also, the throw of operating lever 89 breaks the connection between line L1 and the "Start" switch of the magnetic starter.

It will be understood from the foregoing that when the machine is prepared for operation by closing the "Start" switch, the fan is immediately set in operation and, at the same time, the solenoid 118 is energized and opens the switch K. Now when the starting lever 89 is thrown to the position shown in Fig. 6, the damper 79 is closed by the movement of the hook 107 which engages the corresponding hook element 110 on the damper slide 111. It will be understood also that when there is no interlocking of these hooks, the damper will close automatically by spring action, but, after the parts have been moved to the position shown in Fig. 6, the damper may not be released simply by moving the starting lever from the position of Fig. 6 to the position of Fig. 5, because the energized solenoid 118 has brought the bell crank lever 122 to the position shown in either Figs. 5 or 6, in which position the gravity actuated hook 176 engages the hook 110 and holds the damper closed. Thus it is impossible to open the damper without failure of current in the fan and solenoid circuits, due either to opening the stop switch or to accident or other cause of general power failure. If the parts are in the position shown in Fig. 6 and momentary current failure occurs, the vertical arm of bell crank lever 122 moves to the right and shoves both of the hooks 107 and 176 out of engagement with 110. The damper 79 immediately opens and the machine may not again be put in operation until the starting lever has been moved to its idle position, as shown in Fig. 5, and the temperature

within the tumbler has fallen to its required setting so as to permit closing of the switch F. During the movement of the starting lever 89 to its idle position, the hook 107, which has been pushed backwards by the upstanding portion of the bell crank lever 122, merely slides up along the back of that upstanding portion until it reaches the position shown in Fig. 7 when its hook engages with the hook 110 of the slide, at which time the hook 126 at the upper end of 107 overlies the upper end of the said upstanding arm of the bell crank lever so that thereafter the starting lever 89 may not be moved back to operating position until the solenoid has again been energized by starting the fan, by which means the bell crank lever 122 is permitted to return to the position shown in Figs. 6 and 8.

As many possible embodiments may be made in the above invention and as many changes might be made in the embodiments above set forth, it is to be understood that all matter hereinbefore set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

We claim:

1. In apparatus of the character described, in combination, a drying chamber, a rotatably mounted cylinder in said chamber, a heater chamber, a fan for drawing heated air through said drying chamber from said heater chamber, driving means for said cylinder, driving means for said fan, control means for engaging or disengaging said driving means with said cylinder, means for supplying energy to said fan driving means, a damper biased to stand in open position for admitting cold air directly to said cylinder chamber, means operated by said control means for closing said damper when said control means is moved to engaging position, means including an electrical circuit for driving said fan, means for releasing said damper from said closing means, and means in said electrical circuit for operating said damper releasing means upon failure of said fan energy supply.

2. In apparatus of the character described, in combination, a drying chamber, a rotatably mounted cylinder in said chamber, a heater chamber, a fan for drawing heated air through said drying chamber from said heater chamber, driving means for said cylinder, driving means for said fan, control means for engaging or disengaging said driving means with said cylinder, means for supplying energy to said fan driving means, a damper biased to stand in open position for admitting cold air directly to said cylinder chamber, means operated by said control means for closing said damper when said control means is moved to engaging position, means including an electrical circuit for driving said fan, means for releasing said damper from said closing means, means in said electrical circuit for operating said damper releasing means upon failure of said fan energy supply, and means cooperatively associated with said releasing means and said damper closing means and operated by said releasing means to prevent movement of said cylinder control means to engaging position should failure of said energy supply occur while said control means stands in its disengaging position.

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