This invention relates generally to spray units and more particularly to an improved time controlled spray unit for use in dry cleaning of clothes and the like to diminish the effects of static electricity.

In dry cleaning operations, clothes and the like are placed in a tumbling enclosure through an access door and after the door has been closed, the tumbler is rotated and suitable heat and controlled air flow passed through the enclosure to effect drying of the clothes. This tumbling action results in the generation of large amounts of static electricity which tends to create lint and the like and cause it to bunch adhering to the clothes in question.

In view of the foregoing, it is common practice to inject for a given period of time a fine spray of a given chemical which will serve to diminish the effects of the static electricity by neutralizing the static charges to the extent that lint and the like will be minimized and will not adhere to the drying garments.

With the above in mind, it is a primary object of this invention to provide an improved spray unit for dry cleaning use comprising a semi-automatic type spray unit wherein in a pre-selected period of time may be set into the unit during which the spray will operate and after which the spray will automatically be terminated.

Other objects are to provide a timed control spray unit of the foregoing type which is relatively economical to manufacture, easy to mount to any existing tumbling enclosures and which is extremely reliable in operation to provide a timed spray to the end that the undesirable effects of static electricity in dry cleaning operations are enormously reduced.

Briefly, these and other objects and advantages of this invention are attained by providing a spraying unit having a nose portion and an outlet tube portion. From the nose portion, there extends an outlet spray tube which is exteriorly threaded and serves the dual function of passing spray into an enclosure and also mounting the spray unit itself to the door of the tumbling enclosure. The nose portion has a compressed air inlet passage and a chemical inlet passage. Also included is a suitable valve means for placing the compressed air inlet passage in communication with a spray passage in the spray outlet tube. The assembly is completed by a timing means within the casing interconnected with the valve means in such a manner that the valve will be held open for a pre-set length of time as determined by the timing means. Thus, a controlled amount of spray may be ejected into the enclosure.

A better understanding of the preferred embodiment of the invention will be had by now referring to the accompanying drawings, in which:

FIGURE 1 is a schematic perspective view partly broken away illustrating the improved spray unit of this invention;

FIGURE 2 is a partial cross section taken in the direction of the arrows 2-2 of FIGURE 1 with some of the interior portions shown in full lines and;

FIGURE 3 is a cross section taken generally in the direction of the arrows 3-3 of FIGURE 2.

Referring first to FIGURE 1, the spray unit comprises a casing 10 having a nose portion 11 at one end. Extending from the end of the nose portion 11 is a spray outlet tube 13 which is exteriorly threaded as shown. Also associated with the nose portion 11 is a laterally extending compressed air inlet passage 15. This tube is adapted to be connected through a hose, schematically indicated by the dash-dot line 14, to a source of compressed air or heated steam 15.

The nose portion 11 also includes a chemical inlet tube 16 connected as indicated by the dash-dot line 17 to a chemical tank source 18.

The opposite end of the casing 10 is closed by a cover 19 secured in place by rivets 20. On the exterior side of the cover, there is provided a timing scale 21 and a timing control knob 22 which may be rotated to any one of the various index marks on the scale to provide a pre-selected period of time of operation of the unit.

In FIGURE 1, the unit is shown mounted in a door 23 which is broken away to reveal the mounting. This door would form part of a tumbling enclosure for drying clothes, the area to the left of the door constituting the tumbling chamber. As shown, the threaded spray outlet tube 12 extends through the door and is secured to the surface thereof by a nut 24. Thus, the spray outlet tube portion 12 serves to support the entire unit to the door. The connections schematically represented by the numerals 14 and 17 may constitute plastic type tubes or equivalent conduits so that the compressed air source 15 and chemical tank 18 may be disposed at remote locations.

Referring now to the detailed cross-section of FIGURE 2, it will be noted that the spray outlet tube 12 includes an inner co-axial spray outlet passage structure 25 having an input end defining a valve seat 26 in communication with the compressed air inlet passage shown at 15. It will also be evident from FIGURE 2 that the chemical inlet passage designated 16 communicates with the annular space defined between the exterior of the outlet spray passage 25 and the interior wall of the spray outlet tube 12.

A valve means is provided between the compressed air inlet passage 15 and the spray outlet passage 25, and this means preferably includes a valve head 27 on the end of a valve stem 28 extending from the casing 10 into the nose portion 11. The right hand end of the valve stem 28 is pivoted at 29 to one arm 30 of a bell crank lever 30. The bell crank lever 30 in turn is pivoted at 31 to a suitable mounting 32 secured to the inside of the casing 10. The other arm 30" of the bell crank terminates in a cam engaging surface portion 33. A biasing spring 34 is connected between the arm 30" and the interior of the casing 10 to bias the arm upwardly.

Cooperating with the cam engaging portion 33 of the bell crank lever is a cam follower pin 35 mounted on a swingable bar 36. The cam follower pin 35 is engaged by a cam wheel 37 provided with an indent 38 and driven by a timing mechanism 39. The knob 22 serves to wind up the timing mechanism 39 so that the cam wheel 37, depending upon its circumferential displacement, will return to a position in which the indent 38 is juxtaposed the cam follower pin 35, thereby permitting the spring 34 to raise the arm 30" and rock the bell crank lever 30 in a direction to seat the valve head 27.

FIGURE 3 illustrates more clearly the intercoupling arrangement between the cam engaging portion 33, the cam follower pin 35 and the cam wheel 37. It will be noted that the pin supporting bar 36 is pivoted at 40 to the front of the timer mechanism 39 for small arcuate swinging movement when the pin 35 falls into the indent 38.

The mechanism within the enclosure 59 for providing a timed period depending upon the setting of the knob 22 may take any conventional form.

The overall operation of the spray unit will be evident from the foregoing. The unit itself as stated may be mounted to the door of a tumbling enclosure so that only the threaded tube portion 12 extends into the interior of the enclosure in which the clothes and the like
are being tumbled. The chemical inlet tube 16 and compressed air inlet tube 13 are exterior of the tumbling enclosure as is clear from FIGURE 1. With suitable hose connections as indicated by the schematic lines 14 and 17 connected to the compressed air inlet 13 and the chemical inlet tube 16, and with the timer knob 22 in its zero or upward position with the timer off, the cam follower pin 35 of FIGURE 2 will be received within the indent 38 so that the bell crank may pivot about the pivot point 31 to the left and seat the valve head 27 on the valve seat 26. In this position, the compressed air applied to the inlet passage 13 is blocked from passing out of the spray outlet passage 25. Thus, there is no spray ejected into the enclosure.

If now the operator wishes to spray for a given period of time, he simply rotates the knob 22 to the desired division mark on the scale 21 shown in FIGURE 1 designating a given period; for example, 35 seconds. Rotation of the knob 22 will rotate the cam wheel 37 to remove the indent 38 and cam the cam follower pin downward. This action will cause the bell crank 30 to rotate about the pivot 31 in a clockwise direction thereby moving the valve stem 28 to the right as viewed in FIGURE 2 and thus seating the valve head 27 from the seat 26. Compressed air or heated steam, as the case may be, will then pass through the outlet spray passage 25 forming a high velocity stream. This action in turn will draw in chemical through the inlet passage 16', the restricted area of the passage 25 opening out into the wider area defined by the outlet tube 12 functioning similarly to a venturi section to provide a reduced pressure area which serves to draw in the chemical. The result will be a fine chemical spray into the enclosure which will tend to neutralize the deleterious effects of static electricity.

When the given time period at which the knob 22 was originally set is completed, the cam wheel 37 as viewed in FIGURE 3 will have rotated such that the indent 38 will receive the cam follower pin 35 and the spring 34 shown in FIGURE 2 will then rotate the bell crank lever 30 in a counter-clockwise direction to seat the valve head 27 on the valve seat 26. Thus, the valve is closed and compressed air can no longer pass through the spray outlet passage 25 and the spray action ceases.

From the foregoing description, it will thus be evident that the present invention has provided a greatly improved time and spray unit. While the only particular embodiment of the invention has been set forth and described, it should be understood by those skilled in the art that various changes and substitutions of equivalent elements can be effected without departing from the scope and spirit of the invention. The timed spray unit is therefore not to be thought of as limited to the exact embodiments set forth merely for illustrative purposes.

What is claimed is:

1. A spray unit for attachment to the door of a tumbling enclosure to diminish the effects of static electricity generated during the drying of clothes in said tumbling enclosure comprising, in combination: a cylindrically shaped casing having a reduced diameter nose portion at one end and a timing scale at its other end; a threaded spray outlet tube having an internal co-axial outlet passage and extending from the end of said nose portion to pass through an opening in said door; a nut receivable on said threaded tube on the other side of said door to secure said unit to said door; a compressed air inlet tube extending laterally into said nose portion to communicate with said outlet passage in said spray outlet tube; a chemical inlet tube extending laterally into said nose portion and opening into the annular area defined between the outlet passage and the inner wall of said outlet tube so that compressed air passing through said outlet passage will draw a chemical through said chemical inlet tube and eject it from the end of said outlet tube in the form of a fine spray; a valve means positioned between said outlet passage and said compressed air inlet tube to enable closing off of said air from said outlet passage; a timer means within said casing; and interconnecting means for coupling said timer means to said valve means whereby said valve means may be held open for a given period of time as read on said timing scale by said timer means to thereby provide said spray for said given period.

2. A spray unit according to claim 1, in which the inner end of said outlet passage defines a valve seat, said valve means comprising a valve stem having one end extending into said nose portion from said casing and terminating in a valve head adapted to seat on said valve seat, said interconnecting means including a bell crank lever pivotally mounted to the interior of said casing with one arm pivotally connected to the other of said valve stem and its other arm terminating in a cam engaging portion; a biasing spring connected between said other arm and said body of said bell crank lever in a direction to move said valve stem further into said nose portion to seat said valve; and a cam means operable by said timing means holding said cam engaging portion so that said valve is held open until said cam engaging portion is permitted to move by said cam means at the end of said given period.

3. A spray device for diminishing the effects of static electricity generated during the drying of clothes and the like in a tumbling enclosure, comprising, in combination: a source of compressed air and a line connected thereto a casing; a nozzle means, said nozzle means including a spray passage, a compressed air inlet, and a chemical inlet, said compressed air inlet communicating with said compressed air source and line; mounting means for connecting said nozzle means to said tumbling enclosure; a valve means connecting said compressed air inlet to the input end of said spray passage when in a first position and blocking said compressed air from said input end when in a second closed position, said chemical inlet being in communication with the outlet end of said spray passage; timing means in said casing; and, interconnecting means coupling said timing means to said valve means to operate said spray device for a given period of time.

4. A spray device, according to claim 3 in which said spray passage functions as a venturi section when said compressed air is passed therethrough to draw a chemical through said chemical inlet.

5. A spray device, according to claim 3, including a threaded tube surrounding said spray passage extending from the end of said nozzle means; and a nut receivable on said tube to provide a mounting means for said spray device.

References Cited by the Examiner

UNITED STATES PATENTS

1,664,803 4/28 Agassiz -------------- 222—193
1,551,445 5/51 Lindsay et al. ------ 251—74 X
2,689,006 9/54 Lindsay ------------ 251—74 X
2,889,856 6/59 Magnuson ---------- 222—193 X
2,995,150 8/61 Engholt ----------- 251—74 X

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