

Oct. 21, 1958

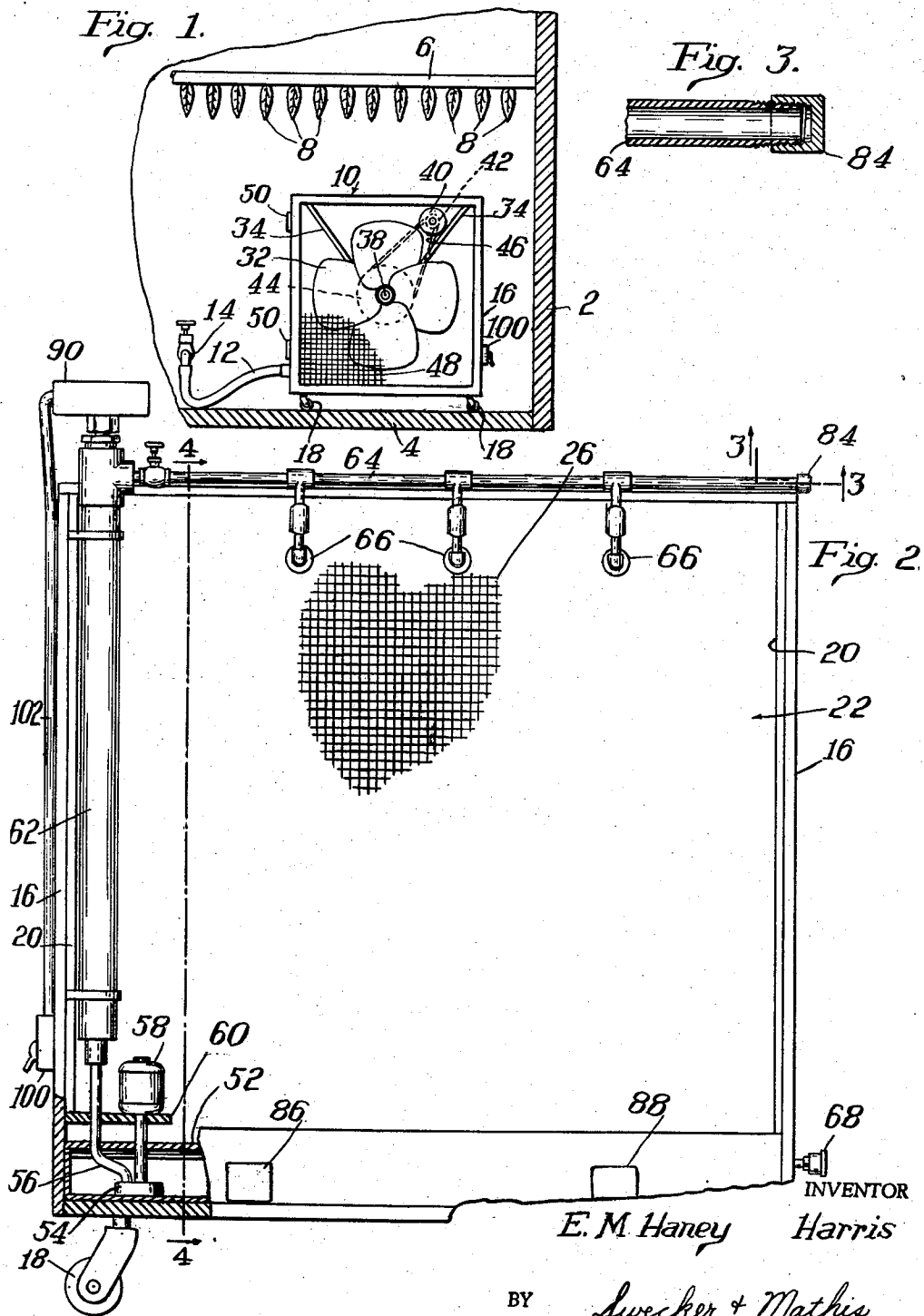
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APPARATUS FOR TREATING TOBACCO

Filed Jan. 6, 1955

2 Sheets-Sheet 1



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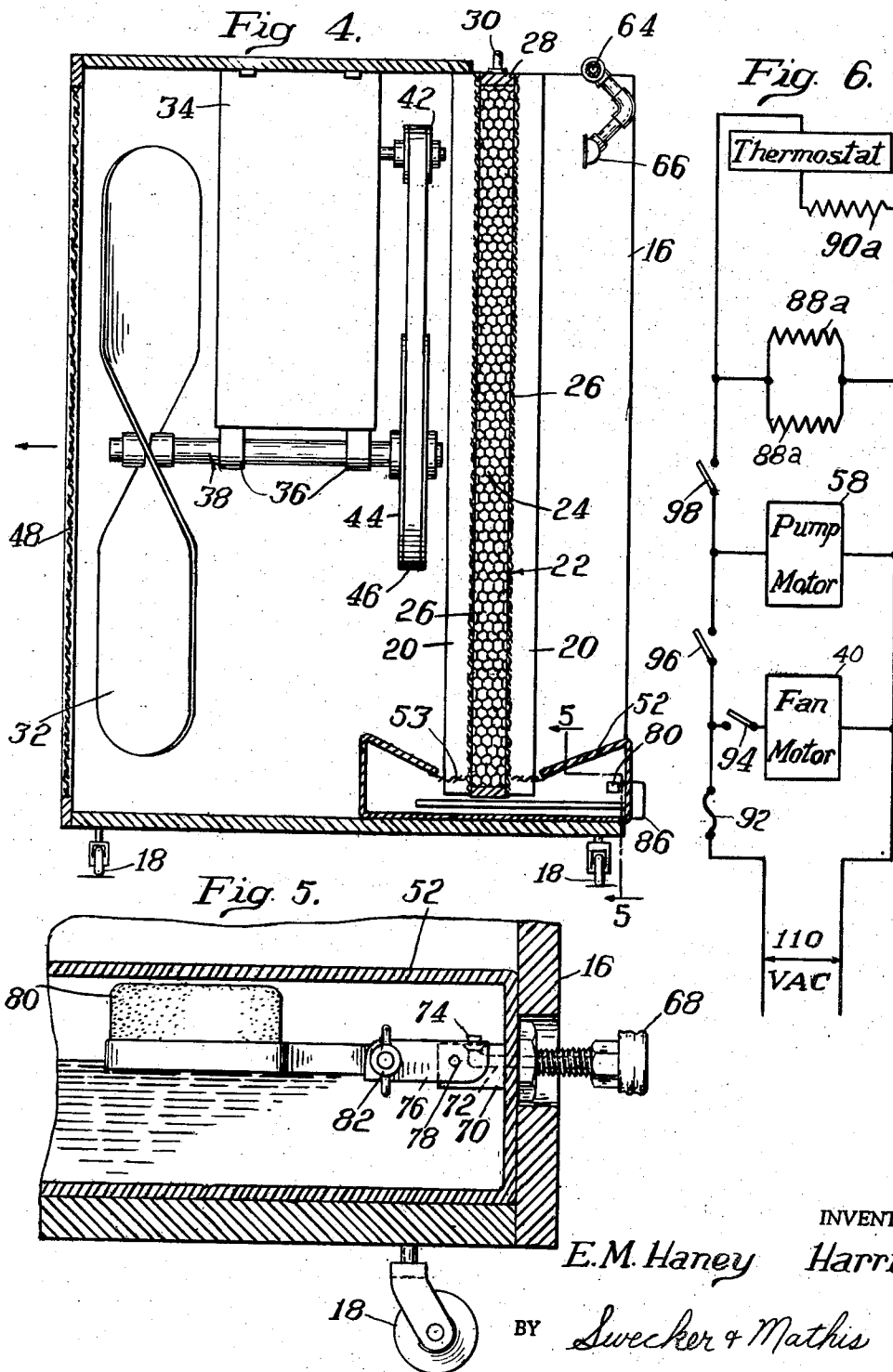
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APPARATUS FOR TREATING TOBACCO

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8 Claims. (Cl. 131—134)

This invention relates to the treating of tobacco, and more particularly to the ordering or casing of tobacco.

In the processing of tobacco after it has been harvested, there are times when the leaves dry out to such an extent that they cannot be handled without breaking them into small particles of little commercial value. As such times it is necessary to increase the moisture content of the leaves to make them pliable again so that they can be packed, graded, or manipulated in some other desired manner. The process of restoring moisture to the tobacco leaves is called ordering or casing.

The best method known heretofore for ordering tobacco was a natural method. The tobacco was simply stored in an atmosphere having a naturally high relative humidity. For example, the farmer, after curing his tobacco by the usual heat treatment in a tobacco barn, would place the tobacco in order to permit its removal from the barn by spraying water onto the barn floor and leaving the barn open overnight. This particular process usually consumed about twenty-four hours.

A similar method, called the pit method, was employed by the farmer in preparing cured tobacco for the grading and marketing process. The dried, brittle tobacco was placed in a pit and water was sprayed upon the walls of the pit. This method also consumed a great deal of time.

The delays involved in these natural ordering methods resulted in large monetary losses to the farmer. The inability to remove a barn of tobacco from the curing barn for a long period of time after the completion of the heat treatment was particularly expensive. As those concerned with tobacco know, the tobacco leaves must be removed from the plants at the precise time they reach the desired color. If it is necessary to delay the harvest of ripe leaves for a day or two after they have reached the desired color, the quality suffers severely. Furthermore, it is not advisable to harvest leaves and then store them outside the tobacco barn for any significant period of time. As a result, it has been necessary for the farmer either to provide a sufficient number of tobacco barns to handle all of the tobacco that might conceivably ripen at a particular time, or to suffer a loss in the quality of his tobacco as a result of the delays which inevitably result from leaving the tobacco in the curing barns for a long period of time after the curing process has been completed.

The tobacco warehouseman also is concerned with the ordering of tobacco. In some cases, buyers may not appear at his warehouse for several days after the date on which he expected them and, of course, unless the tobacco is kept in order, it cannot be handled by the buyers.

In order to meet this problem, several proposals have been made heretofore. According to one method of artificially ordering tobacco, wet steam is introduced into a tobacco containing compartment to increase the humidity to a value far above normal. This method makes the tobacco leaves more pliable, but in doing so, it

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ruins them. It is often found that water can be squeezed out of leaves ordered in this way. Spotting and changes of color occur, and these reduce the value of the tobacco severely. Also, the very wet tobacco leaves cannot be packed in hogsheads after sale, as is customary, because they will rot.

Another artificial method of ordering tobacco that has been tried but found to be unsatisfactory involves the use of a whirling device for throwing particles of water into the tobacco containing compartment. The objections to this method are similar to those outlined above in connection with the steaming method. It also puts too much water in the air.

This invention overcomes the objections heretofore associated with the artificial ordering of tobacco. The moisture content of the tobacco is increased in a manner closely approaching the natural way. The result is that experienced buyers and other tobacco experts cannot tell the difference between tobacco placed in order by the pit method, for example, and tobacco placed in order according to this invention.

According to applicant's invention, air is drawn from the tobacco containing compartment through a honey-combed paper filter and returned to the tobacco containing compartment. Simultaneously with this air movement, water heated to about 140° F. is sprayed upon the intake side of the filter. Experience has shown that this method increases the moisture content of the tobacco containing compartment enough to speed up the ordering process without in any way damaging the tobacco. The ordering process, which if carried out by the natural method would require approximately twenty-four hours, can be carried out in approximately two and one-half hours.

The equipment employed by applicant in carrying out this invention has many advantageous features. Rollers are provided on the bottom of the ordering machine so that it may be moved about as desired. For instance, it may be moved from one barn to another without difficulty.

An electric heating system for the water is carefully tailored to function efficiently on the low voltage lighting circuits normally available in rural areas. Preheaters located in a small water storage container function to raise the temperature of the water somewhat before it is pumped to the spray nozzles which direct it against the filter element. Then a heater, which may be controlled thermostatically, raises the temperature of the water to the desired value as it moves along toward the spray nozzles. With this system, the load that must be carried by any given one of the heaters is kept at a minimum.

The small water storage container is a big advantage in minimizing the heater loads. The small capacity of the pan would be a disadvantage, however, if some means were not provided for automatically replenishing the supply. The machine of this invention utilizes a float-operated valve mechanism for this purpose.

If it is desired to empty the water from the water container so that the machine may be moved about more easily, this can be done by removing a cap element from the water distribution line and then operating the water pump so as to force the water from the container and discharge it through the open line.

Another advantageous feature of the tobacco ordering machine of this invention is that separate motors are provided for driving the air circulating fan and the water pump. This increases the flexibility of the machine by permitting use of the air circulating system and the water circulating system separately or simultaneously.

Other features and advantages of this invention will become apparent from the following detailed description of one embodiment thereof, taken in connection with the accompanying drawings in which:

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Fig. 1 is a partial, vertical cross-sectional view of a tobacco barn, with a portable tobacco ordering machine shown in front elevation therein;

Fig. 2 is a rear elevational view, partly broken away, of a portable ordering machine according to this invention;

Fig. 3 is an enlarged cross-sectional view, along the line 3—3 in Fig. 2, showing a detail of the invention;

Fig. 4 is a vertical cross-sectional view along the line 4—4 in Fig. 2;

Fig. 5 is an enlarged vertical cross-sectional view, along the line 5—5 in Fig. 4; and

Fig. 6 is a wiring diagram showing an electric circuit which may be used with the illustrated machine.

Referring to Fig. 1, the numerals 2 and 4 refer, respectively, to a wall and the floor of a tobacco barn or some other tobacco containing compartment. Supported within the tobacco containing compartment by any usual means, such as tobacco sticks 6, are tobacco leaves 8. The details of the construction of the tobacco containing compartment, the state of the leaves, and the means for supporting them may all be conventional.

The portable ordering machine is indicated by the numeral 10 in Fig. 1. This machine will be described in greater detail below. A hose 12 is shown connecting the machine 10 to a spigot 14 in the tobacco containing compartment. This, of course, is for supplying water to the machine. It will be understood that means are also provided for connecting the machine to a source of electricity.

The tobacco ordering machine 10 includes a housing 16 supported on casters 18. The housing may be constructed of any suitable material, the important considerations being that the resulting structure be light in weight and sufficiently durable to withstand the abuses to which farm machinery is frequently subjected.

Removably positioned between vertically extending guides 20, on opposite side walls of the housing 16, is a filter unit 22. This unit includes a porous filter element 24 in the form of a honeycombed mass of paper. Such a filter element is available commercially under the name "P & R Cooling Pad." The filter element 24 is covered by facing elements 26 of hardware cloth or screening material and supported in a frame 28. The frame 28 is preferably provided with one or more handles 30 along its upper edge, by which the filter unit may be grasped to remove it from the housing 16. The handles 30 also may serve conveniently as means by which one may grasp the machine to roll it from one place to another on the casters 18.

A fan 32 is mounted in the housing 16 by means of hanger members 34 bolted to the top wall of the housing. The lower ends of the hanger members 34 support bearings 36 in which the fan shaft 38 rotates. Also carried by one of the hangers 34 is an electric motor 40 for driving the fan 32 through pulleys 42 and 44 and a belt 46. A fan guard 48 of hardware cloth or screening material is positioned in front of the fan 32 in the interest of safety. Hinges 50 permit the fan guard to be swung out of position when desired, so that the fan 32 and its motor 40 may be serviced.

At the rear portion of the housing 16, a water container 52 extends laterally across the bottom of the housing. This container is a relatively small one when the amount of water needed for ordering a barn or other quantity of tobacco is considered. Its capacity may be in the order of 20 gallons.

The central part of the container 52 is open at its top as shown in Fig. 4. The filter unit 22 extends downwardly through the center of this opening so that water may flow from the filter unit into the container 52. Screening material 53 is disposed over the opening in the container 52 to prevent tobacco particles and other trash from entering the water system.

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At one end of the water container there is provided a centrifugal pump 54 having an axial water inlet located close to the bottom of the container 52, and a peripheral outlet communicating with a conduit 56. The pump 54 is driven by an electric motor 58 mounted on a laterally extending frame member 60.

The conduit 56 communicates at its upper end with a larger conduit 62 which extends upwardly along one side of the housing 16. The upper end of the conduit 62 in turn communicates with a laterally extending conduit 64 for delivering water to a plurality of spray nozzles 66, arranged to spray water upon the rear face of the filter unit 22 near its upper end.

The small capacity of the water container 52 makes it desirable that some means be provided for automatically replenishing the supply of water. Such means are shown in Fig. 5. A hose connection 68, of any convenient construction, is attached to one end of the container 52 by a valve member 70. The member 70 has an internal water passage 72 shown in dotted lines in Fig. 5. This passage 72 opens upwardly and is normally closed by a nob 74 on a cooperating valve member 76, pivotally secured at 78 to the valve member 70. A float 80 is clamped to the valve member 76 by a screw and wing nut connection 82, so that it may be positioned at various angles with respect to the axis of the valve member 76. With this construction, the nob 74 will close the water inlet passage 72 as long as the water level does not fall below the desired value. When, however, the water supply has been depleted, the float 80 will move downwardly to swing the nob 74 away from the mouth of the water passage 72. This allows water to flow into the container 52 to bring the water level back up to a value which will be effective to close the passageway 72 again.

When it is desired to empty the water from the machine of this invention after the hose 12 has been disconnected from the spigot 14, a cap 84, threaded onto the outer end of the horizontal conduit 64 is removed. The pump 54 is then operated to force the water from the container 52 out through the open end of the conduit 64. Thus, there is little recirculation of the water, and after a short time nearly all of the water may be removed from the machine. The speed of the flow of the water through the conduit 64 is such that most of the water will rush past the depending nozzles 66 and very little water will drop down therethrough.

Electric heaters 86 and 88 are provided to preheat the water in the container 52. These heaters are preferably 750 watt heaters, operating on 110 volts. In this connection, it must be remembered that the electric power available in rural areas is almost always limited to 110 volt circuits. Consequently, if any sort of economy in operation is to be achieved, each of the several heaters must be relatively small.

Another electric heater 90 is positioned to heat the water flowing in the vertical conduit 62. This heater is preferably a 1500 watt, 110 volt heater, and since it must bring the water to the temperature at which it is to be sprayed from the nozzles 66, its operation may be thermostatically controlled. The heat responsive element of the thermostat, of course, would be located in the flowing water stream or sufficiently close to it to give an accurate indication of the temperature of the flowing water.

An electric circuit which may be used with the illustrated machine is diagrammatically shown in Fig. 6. A fuse 92 protects the circuit in the usual manner. In order to start the fan motor 40, one must close a switch 94. The pump motor 58 is controlled by another switch 96. It should be noted that closure of the pump motor circuit is not dependent in any way upon the closure of the fan motor circuit, and vice versa. This arrangement

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permits the fan and the pump to be used separately when desired.

The heater elements are indicated by the numerals 88a and 90a. In order to energize them, the pump motor switch 96 and a separate heater switch 98 must be closed. Overheating of the heating elements is prevented by permitting them to operate only when the pump 54 is circulating the water.

The switches 94, 96 and 98 and the fuse 92 are positioned together in a control box 100 on a side of the machine to facilitate access to them. Suitable shielding means, such as that indicated by the numeral 102 in Fig. 2, may be provided for the wiring where this is found to be desirable.

The operation of the portable ordering machine of this invention will now be summarized. When the fan 32 is in operation, air is drawn from the tobacco treating compartment, through the filter unit 22, and then exhausted back into the tobacco treating compartment. Since warm water at about 140° F. is being continuously sprayed on the intake face of the filter unit 22, the air picks up some moisture in its passage through the filter unit.

A better understanding of the specific effects produced by operating this machine can be gained by considering the results of a specific test. One such test was made on a day when the outside temperature was 51° F. A machine according to this invention was positioned in a compartment measuring 16 feet by 16 feet by 12 feet and operated for a period of five hours, during which time seven gallons of water were used. At the beginning of the test period, the following conditions prevailed in the compartment: Dry-bulb temperature, 52° F.; wet-bulb temperature, 45° F.; and relative humidity, 78%. At the end of the test period, the following conditions prevailed in the compartment: Dry-bulb temperature, 68° F.; wet-bulb temperature, 64° F.; and relative humidity, 90%.

By increasing the relative humidity in this way, the tobacco becomes moist or in order in a minimum amount of time without becoming too wet or spotted.

While I have described a single embodiment of the invention in considerable detail, it will be apparent to persons skilled in the art that various modifications may be made without departing from the spirit of the invention. It is intended, therefore, that the foregoing description should be considered as exemplary only, and that the scope of the invention be determined from the claims which follow.

I claim:

1. Apparatus for treating tobacco comprising a substantially closed compartment, means within said compartment for supporting tobacco to be treated, and a portable ordering machine resting upon the floor of said compartment, said ordering machine including a housing, casters on the bottom of said housing for supporting said housing in such a way that it may be moved easily, an upright filter element carried by said housing, a water container below said filter element, a water nozzle in position to spray water onto one face of said filter element near the top thereof, conduit means connecting said nozzle to said water container, a pump for forcing water through said conduit means from said container through said nozzle, heater means for heating the water to be sprayed from said nozzle onto said filter element, and a fan in said housing on the side of said filter element opposite said nozzle for drawing air through said filter element and exhausting it into said compartment.

2. Apparatus for treating tobacco comprising a substantially closed compartment, means within said compartment for supporting tobacco to be treated, a source of water in said compartment, and a portable ordering machine resting upon the floor of said compartment, said ordering machine including a housing, casters on the bottom of said housing for supporting said housing in such a way that it may be moved easily, an upright filter element carried by said housing, a water container below

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said filter element, a hose connecting said container to said water source, means for controlling the flow of water from said source to said container so as to maintain a predetermined water level in said container, a water nozzle in position to spray water onto one face of said filter element near the top thereof, conduit means connecting said nozzle to said water container, a pump for forcing water through said conduit means from said container through said nozzle, heater means for heating the water to be sprayed from said nozzle onto said filter element, and a fan in said housing on the side of said filter element opposite said nozzle for drawing air through said filter element and exhausting it into said compartment.

3. Apparatus for treating tobacco comprising a substantially closed compartment, means within said compartment for supporting tobacco to be treated, a source of water in said compartment, and a portable ordering machine resting upon the floor of said compartment, said ordering machine including a housing, casters on the bottom of said housing for supporting said housing in such a way that it may be moved easily, an upright filter element carried by said housing, a small water container below said filter element, a hose connecting said container to said water source, means for controlling the flow of water from said source to said container so as to maintain a predetermined water level in said container, a water nozzle in position to spray water onto one face of said filter element near the top thereof, conduit means connecting said nozzle to said water container, a pump for forcing water through said conduit means from said container to said nozzle, a first electric heater for heating water as it passes through said conduit means, a second electric heater for preheating the water in said container, circuit means operable on relatively low, lighting-circuit potentials for energizing said heaters to economically heat the water being delivered to said nozzle, and a fan in said housing on the side of said filter element opposite said nozzle for drawing air through said filter element and exhausting it into said compartment.

4. In a substantially closed, tobacco-containing compartment, an ordering machine comprising a housing adapted to be supported upon the floor of said compartment, a filter element carried by said housing and including a porous mass of cellulosic material, means for supplying water to one face of said filter element near its upper end, a water container below said filter element disposed to receive water from the lower end of said one face, conduit means connecting said container to said means for supplying water, a pump for moving water from said container through said conduit means, drive means for said pump, heater means for heating the water delivered to said water supplying means, a fan in said housing on the side of said filter element opposite to said one face for drawing air through said filter element and exhausting it into said compartment, and drive means for said fan, and drive means for the pump, each operable independently of the other so that the water circulating and air circulating operations of the machine may be carried on separately or simultaneously, as desired.

5. A tobacco ordering machine comprising a housing having aligned openings providing a straight air passage, a filter element carried by said housing adjacent one of said openings, means for spraying water to one face of said filter element near its upper end, a water container below said filter element disposed to receive water from the lower end of said filter element, screening covering the open upper end of said container to prevent the entry of tobacco particles and other trash along with the water from the filter element, conduit means connecting said container to said means for spraying water, a pump for moving water from said container through said conduit means, an electric motor for driving said pump, electric heater means disposed adjacent said conduit means so

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as to heat the water as it is delivered by said pump from said container to said water supplying means, an electric circuit for energizing said heater means only when said electric motor is energized, and a fan in said housing on the side of the filter element opposite to said one face for drawing air through said filter element and discharging it from said housing.

6. A portable tobacco ordering machine adapted for use by farmers in the treating of their tobacco crops comprising a housing having aligned openings providing a straight passage, rollers on the bottom of said housing for facilitating movement of the housing from one tobacco treating compartment to another, an upright filter element carried by said housing adjacent one of said openings, a water container below said filter element, means for spraying water to one face of said filter element near its upper end, conduit means connecting said container to said means for spraying water, a pump for moving water from said container through said conduit means, a first electric heater for heating water as it passes through the conduit means, a second electric heater for preheating the water in said container, circuit means operable on relatively low voltages for energizing said heaters to economically heat the water being delivered to said water supplying means, and a fan in said housing on the side of the filter element opposite to said one face for drawing air through said filter element and discharging it from said housing.

7. A tobacco ordering machine comprising a housing having aligned openings providing a straight air passage, a pair of opposed guide means attached to the side walls of said housing, an upright filter element adjacent one of said openings removably mounted in said guide means and including a honeycombed mass of paper, a water container below said filter element, water conduit means extending upwardly from said water container near one side of said housing and then laterally across the top of said housing to the other side thereof, a plurality of spray nozzles connected to the laterally extending portion of said conduit means directed toward and arranged to spray water against the upper end of one face of said filter element, a pump having an inlet opening near the bottom of said container and an outlet opening communicating with said conduit means, means to heat said water, means for driving said pump to force water from said container through said conduit means and through said nozzles, and a fan in said housing on the side of said filter element opposite said nozzles for drawing air through the filter element over which warm water is moving to increase the moisture content of the air.

8. A portable tobacco ordering machine comprising a

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housing having aligned openings providing a straight passage, a roller on the bottom of said housing for facilitating movement of the housing from one tobacco treating compartment to another, an upright filter element carried by said housing adjacent one of said openings and including a honeycombed mass of paper, a water container below said filter element, water conduit means extending upwardly from said water container near one side of said housing and then laterally across the top of said housing to the other side thereof, a cap removably positioned on the end of said conduit means remote from said container so that water may be discharged from said machine when desired, a plurality of spray nozzles connected to the laterally extending portion of said conduit means and directed toward, and arranged to spray water against, the upper end of one face of said filter element, a pump having an inlet opening near the bottom of said container and an outlet opening communicating with said conduit means, means for driving said pump to force water from said container through said conduit means, means to heat said water, and a fan in said housing on the side of said filter element opposite said nozzles for drawing air through the filter element over which warm water is moving to increase the moisture content of the air.

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