

A. C. BUENSOD.
PROCESS FOR CURING TOBACCO.
APPLICATION FILED OCT. 26, 1915.

1,339,373.

Patented May 4, 1920.
2 SHEETS—SHEET 1.

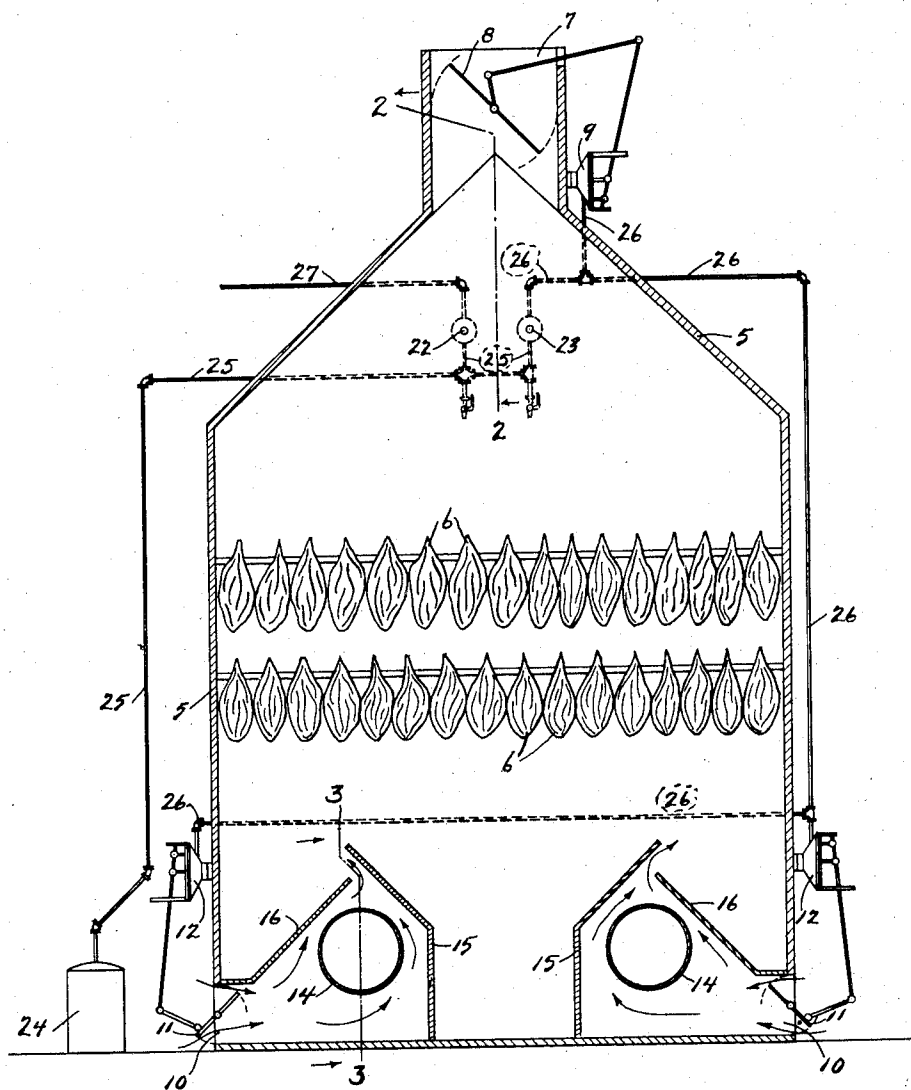


Fig. 1.

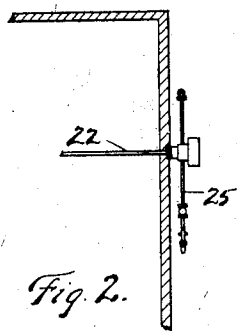


Fig. 2.

WITNESSES:

Walter H. Kelley
Clara Bowers

INVENTOR

Alfred Charles Buensod

BY

J. M. Ellis

ATTORNEY

A. C. BUENSOD.
PROCESS FOR CURING TOBACCO.
APPLICATION FILED OCT. 26, 1915.

Patented May 4, 1920.
2 SHEETS—SHEET 2.

1,339,373.

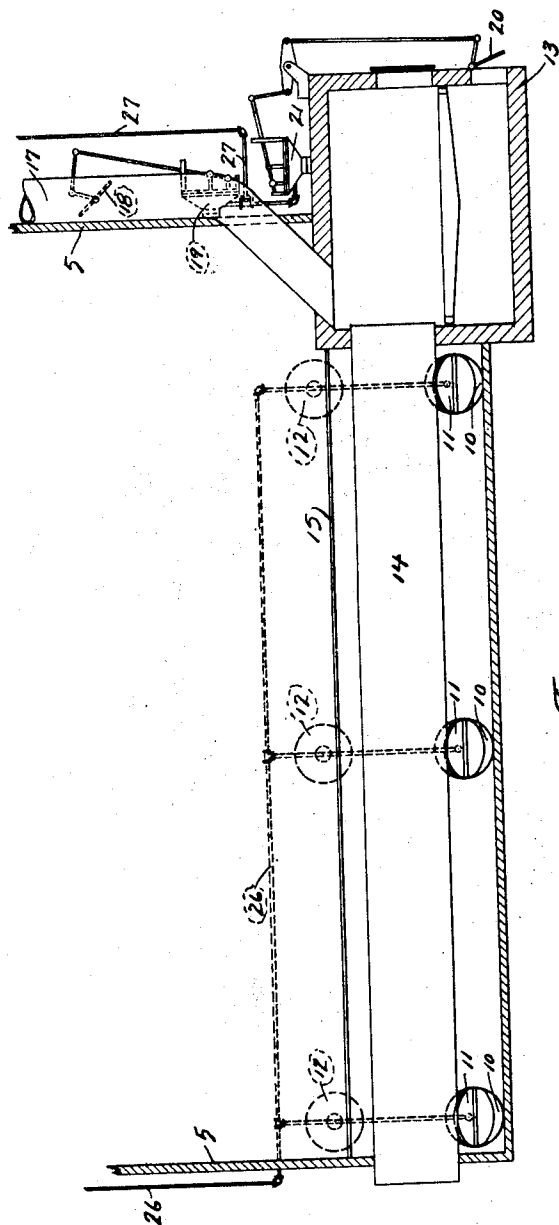


Fig. 3.

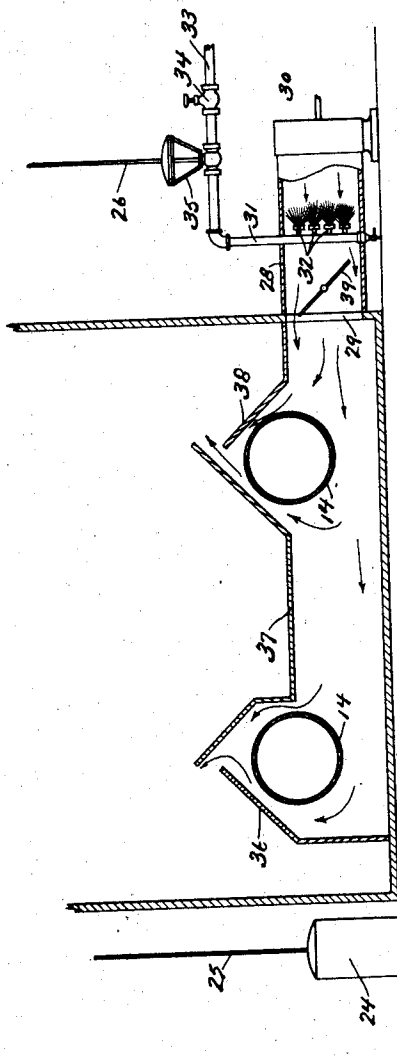


Fig. 4.

WITNESSES:

Walter H. Kelley
Clara Bowers

INVENTOR
Alfred Charles Buensod
BY J. W. Ellis

ATTORNEY

UNITED STATES PATENT OFFICE.

ALFRED CHARLES BUENSOD, OF NEW YORK, N. Y., ASSIGNOR TO THE TOBACCO
TREATING CO. INC., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

PROCESS FOR CURING TOBACCO.

1,339,373.

Specification of Letters Patent.

Patented May 4, 1920.

Application filed October 26, 1915. Serial No. 58,043.

To all whom it may concern:

Be it known that I, ALFRED CHARLES BUENSOD, a citizen of the United States of America, residing in the city of New York, county of New York, and State of New York, have invented certain new and useful Improvements in Processes for Curing Tobacco, of which the following is a full, clear and exact description.

10 My process is particularly concerned with the curing of green tobacco leaves, but for the sake of brevity and convenience of description I have referred to these green leaves in the specification as "tobacco."

15 It is well known to those skilled in the art that at present tobacco is cured in small barns which are tightly closed after the tobacco has been placed therein. The barn is made practically air tight, and fire-places
20 are provided along near the floor line of the barn. Metal flues connect with these fire-places and conduct the heat inside the barn for curing the tobacco. When the tobacco is placed in the barn, a thermometer is hung
25 beneath the tobacco, and the temperature of the barn is regulated by the amount of fuel burned in the fire-places. Some of the barns are provided with a ventilator in the top, which may be opened or closed, as de-
30 sired, and also with a number of openings made in the walls near the floor level to permit the entrance of air, thus making it possible to create a draft through the tobacco.

35 This arrangement of heating and ventilating requires constant attention on the part of the operator, and in many cases he is unable to properly control these conditions. Moreover, it is impossible, when
40 such a method of curing is used, to regulate the percentage of moisture or the evaporative temperature within the barn. The percentage of moisture in the tobacco, throughout the curing, governs the steps of the
45 process at every point, and the sensible temperature and evaporative temperature maintained during the curing determine the rate of curing the tobacco and the percentage of moisture in the tobacco. It will,
50 therefore, be seen that the process cannot be carried out with any degree of certainty without an evaporative temperature, as well as a sensible temperature, control. The process, as now practised, is entirely de-
55 pendent upon the outside weather condi-

tions, as the sensible temperature maintained inside the barn determines the evaporative temperature of the air within the same. It is, therefore, evident that no definite rule of raising the sensible tempera- 60
ture and maintaining the same at a predetermined point can be followed out in the present practice, and at the same time maintain the proper moisture conditions.

In my invention, I have sought to obviate 65
the disadvantages above enumerated by providing a process in which the sensible temperature, the evaporative temperature and consequently the rate of drying are under absolute control at all times, independent of outside weather conditions or the judgment and attention of an operator. I have further sought to provide a process in which the different batches of tobacco shall all have the same treatment, thus making 75
the finished product as uniform as possible.

By reason of the proper air control, the tobacco is supplied with air so conditioned as to allow the physical and chemical changes to take place in the tobacco and to so control them that the qualities of the tobacco are always brought as near ideal as is possible. This positive control makes it possible to meet the required conditions of any type of tobacco, or any changes in the composition of a leaf, due to different growing conditions. It also makes possible the attainment of a desired color by maintaining a delicate control of the conditions at a predetermined point. 90

Moreover, I have sought to provide a process, which, by reason of the control, shall materially shorten the length of time of curing the tobacco over present practice, and at the same time obtain with certainty, 95
a uniform, finished product. My process also makes unnecessary the employment of a skilled curer, who, in the present practice, must constantly watch the tobacco, day and night, to judge the amount of heat necessary to carry out the process successfully. 100
This process also avoids all danger of damage to the tobacco through any negligence or carelessness on the part of the curer.

My process is carried out by any suitable 105
apparatus, which may consist generally in a system of automatic control in its more simple form, consisting preferably of sensible temperature and evaporative temperature regulating devices. To regulate the 110

sensible temperature, I prefer to use, as a part of the apparatus, a thermostat, controlling the distribution of air under pressure to the damper operating motors. I use two of these thermostats: one controlled by the sensible temperature, and hereinafter referred to as the "dry thermostat", and the other controlled by the evaporative temperature, and hereinafter referred to as the "wet thermostat". The wet thermostat controlling the evaporative temperature is of the same construction as the dry thermostat, except that the expansive members thereof are covered with a film of water maintained by a wick dipped in water, by a spray or any other suitable means. These instruments, which are arranged in a suitable place in the treating chamber, measure the condition of the air at that point. The dry thermostat automatically regulates the sensible temperature in the chamber by controlling the amount of heat introduced into the flues. The wet thermostat automatically regulates the evaporative temperature by controlling, with suitable dampers, the amount of fresh air admitted at the floor line, and the amount of air exhausted through the ventilator at the top of the barn. By these means any desired sensible temperature or evaporative temperature may be maintained in the barn, and these temperatures can be varied either manually or automatically in any definite interval of time. In the drawings, forming part of this application, I have shown one form of apparatus for carrying out my process.

In the drawings:

Figure 1 shows a transverse section of a curing barn provided with suitable apparatus for carrying out my process.

Fig. 2 is a sectional view of the end of the barn, and is taken on line 2—2 of Fig. 1.

Fig. 3 is a longitudinal section of the barn, and is taken on line 3—3 of Fig. 1.

Fig. 4 is a transverse, sectional elevation of the barn showing a modified arrangement.

In the drawings, 5 represents the barn in which the tobacco leaves 6 are hung, after they are placed on supports, in the customary manner. The top of the barn is provided with a ventilator 7, having a suitable damper 8 controlled by an air motor 9. In the lower part of the barn is provided a plurality of openings 10 for the entrance of air from the outside. Each of these openings is provided with a damper 11 and each is controlled by means of an air motor 12. Obviously, if desired, several of these dampers may be controlled by a single motor.

In one end of the barn is arranged the usual fire-place 13, and one end of each of the metal flues 14 is connected with each fire-place. These flues extend longitudinally through the barn and preferably

emerge at the opposite end. If desired, one fire-place may be used for both flues. Extending around the flues 14 are partitions 15 and 16 which protect the flues and act as baffle plates for the incoming air. These partitions also act as a protection to the tobacco from the intense and direct radiation of heat from the flues. The partitions 16 are connected at their outer edges with the walls of the barn at a point just above the apertures 10, whereby all of the entering air is obliged to pass around the flues 14 in the direction indicated by the arrows. The fire-place 13 is provided with a stack 17, having a damper 18 controlled by the air motor 19. A damper 20 is preferably arranged in front of the fire pit of the furnace and is controlled by means of an air motor 21. This regulates the draft of air through the furnace and is located in the position shown, for convenience of illustration. It is obvious that this damper may be placed in such a position as to control the amount of heated air entering the flues after it has passed over the furnace fire.

22 and 23 are the dry and wet thermostats, respectively. These thermostats are located preferably in the upper part of the barn and may be adjusted or set from the exterior of the barn. 24 is an air tank for the storage of compressed air, which is supplied to the thermostats by means of the air pipe 25.

The air motors connected with the dampers regulating the draft of the air through the barn are controlled by means of the wet thermostat 23, and these motors 9 and 12 are connected with the wet thermostat by means of piping 26. The dampers controlling the furnace and the stack of the same, are regulated by the dry thermostat, and the air motors 19 and 21, respectively, are connected with the dry thermostat 22 by means of the piping 27.

In the modified form shown in Fig. 4, the air is admitted near the bottom of the barn by means of a forced draft created in a suitable way. I prefer to carry out this form by providing a duct 28, leading to an opening 29 near the bottom of the barn. At the outside end of this duct is preferably arranged a fan 30 for forcing air therethrough. This fan may be driven by any suitable motive power. In the duct 28 is provided suitable means for increasing the moisture content of the air as it passes through the duct. As shown, this comprises a pipe 31 passing down through the duct and provided with a plurality of spray nozzles 32. 33 is a water supply pipe, and 34 a manually operated valve for closing off the supply. In the pipe line, at some point between the valve 34 and the nozzles 32, is placed a diaphragm valve 35, which is operated by air pressure passing through

the pipe 26, controlled by the wet thermostat 23. In this form of the device, partitions 36, 37 and 38 are arranged so that the incoming air is obliged to pass over the two flues 14.

A damper 39 is preferably provided in the air duct 28 at its inner end for the control of the amount of air passing through this duct. This damper may be either manually or automatically controlled, as desired. If automatically controlled it will be regulated by means of an air motor connected with the wet thermostat. If desired, the fan 30 may be provided with variable speed means, and thus the flow of air controlled by this means instead of the damper 39.

When using the apparatus shown in Figs. 1 to 3, inclusive, the dry thermostat 22 is set for a definite temperature at each stage of the treating process. The damper 20 normally remains open and the damper 18 closed, thereby forcing the gases through the flues 14 and raising the temperature of the curing chamber until the predetermined temperature, at which the dry thermostat has been set, is reached. A further rise of temperature causes the dry thermostat to actuate the controlling air motors to close the damper 20 and open the damper 18, thereby shutting off the heat from the curing chamber and allowing it to pass up the stack 17. When the temperature falls below the predetermined point, it operates to move the dampers to their original positions. The wet thermostat 23, which is subjected to the temperature of evaporation in the treating chamber is set at a temperature lower than the dry thermostat 22 by a predetermined difference, which may be varied at will during the treating process. This offers a means for definitely controlling the rate at which evaporation occurs from the tobacco, and also of the degree of dryness to which the tobacco can ultimately be reduced. Normally the dampers 11 and 8, actuated by the wet thermostat 23, are closed and so remain until the air in the treating chamber has absorbed sufficient moisture from the tobacco to raise the wet thermostat in the compartment to the predetermined point. This thermostat then operates through the air motors to open the dampers 11, admitting fresh air into the chamber and also opens the damper 8 so as to allow the moisture laden air to pass out of the chamber. This causes a decrease of the moisture content in the air surrounding the wet thermostat 23, and a consequent drop in its temperature, whereupon it will again operate to restore the dampers to their normally closed positions.

In the modified form of the device, (see Fig. 4) when the moisture content of the air is insufficient, the diaphragm valve 35, controlled by the wet thermostat 23, will

be opened and water will pass through the pipe 31 and spray nozzles 32 and be atomized into the incoming air as it passes through the duct 28. When the moisture content has been raised to the predetermined point, the wet thermostat will act to close the diaphragm valve 35, and thus shut off the water supply from the spray nozzles.

It is well known that in the curing of tobacco, certain periods of the process require a different temperature and relative humidity, if the finished product is to be the best. My process provides a means for adjusting the wet and dry thermostats so that any of these conditions may be automatically maintained at any desired predetermined point for any desired length of time and be progressively changed at will. In this way the temperature and relative humidity of the air is controlled in accordance with the progressively changing conditions of the tobacco being cured during the progress of curing, and thus the percentage of moisture in the treated product is controlled. An increase of temperature and a decrease of relative humidity will hasten the curing process while a decrease of temperature and an increase of relative humidity will retard the curing process. In order to meet the varying conditions of the product, I have found it advantageous to progressively change the temperature and relative humidity, as above set forth.

While I have shown and described one type of apparatus for carrying out my process, it is obvious that other devices may be used for carrying out the same with equal efficiency without departing from the spirit of my invention or the scope of the appended claims, and I do not wish, therefore, to be limited to the exact apparatus herein shown and described.

Having thus described my invention, what I claim is:

1. A method of curing green tobacco which consists in confining the leaves in a substantially airtight chamber, then increasing the moisture content of the air by evaporation from the tobacco until the rate of evaporation from the tobacco is very slight, then opening an entrance into the chamber and therethrough admitting into the chamber air of lower moisture content than that in the chamber, and simultaneously opening an exit from the chamber, and then regulating the relative humidity of the air in the chamber by the condition of the air at the exit after it has passed through the tobacco.

2. A method of curing green tobacco which consists in confining the leaves in a substantially airtight chamber, then increasing the moisture content of the air by evaporation from the tobacco until the rate of evaporation from the tobacco is very slight, then opening an entrance into the chamber

and therethrough admitting into the chamber air of lower moisture content than that in the chamber, and simultaneously opening an exit from the chamber, then regulating the relative humidity of the air in the chamber by the condition of the air at the exit after it has passed through the tobacco, and then progressively decreasing the relative humidity of the air in the chamber.

3. A method of curing green tobacco which consists in confining the leaves in a substantially airtight chamber, then heating the air and tobacco leaves in such chamber, then increasing the moisture content of the air by evaporation from the tobacco until the rate of evaporation from the tobacco is very slight, then opening an entrance into the chamber below the tobacco and therethrough admitting into the chamber air of lower moisture content than that in the chamber, and simultaneously opening an exit from the chamber above the tobacco, and then regulating the temperature and relative humidity of the air in the chamber by the condition of the air at the exit after it has passed through the tobacco.

4. A method of curing green tobacco

which consists in confining the leaves in a substantially airtight chamber, then heating the air and tobacco leaves in such chamber, then increasing the moisture content of the air by evaporation from the tobacco until the rate of evaporation from the tobacco is very slight, then opening an entrance into the chamber below the tobacco and therethrough admitting into the chamber air of lower moisture content than that in the chamber, simultaneously opening an exit from the chamber above the tobacco, then regulating the temperature and relative humidity of the air in the chamber by the condition of the air at the exit after it has passed through the tobacco, and then progressively increasing the temperature of the air and the tobacco leaves in the chamber, and simultaneously progressively decreasing the relative humidity of the air in the chamber.

In testimony whereof I have hereunto signed my name in the presence of two subscribing witnesses.

ALFRED CHARLES BUENSOD.

Witnesses:

JAMES C. GRANT,
GEO. E. NACE.