Dec. 4, 1928.

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W. MILLIGAN ET AL

METHOD OF AND APPARATUS FOR TREATING TOBACCO

Filed July 25, 1925 2 Sheets-Sheet 1

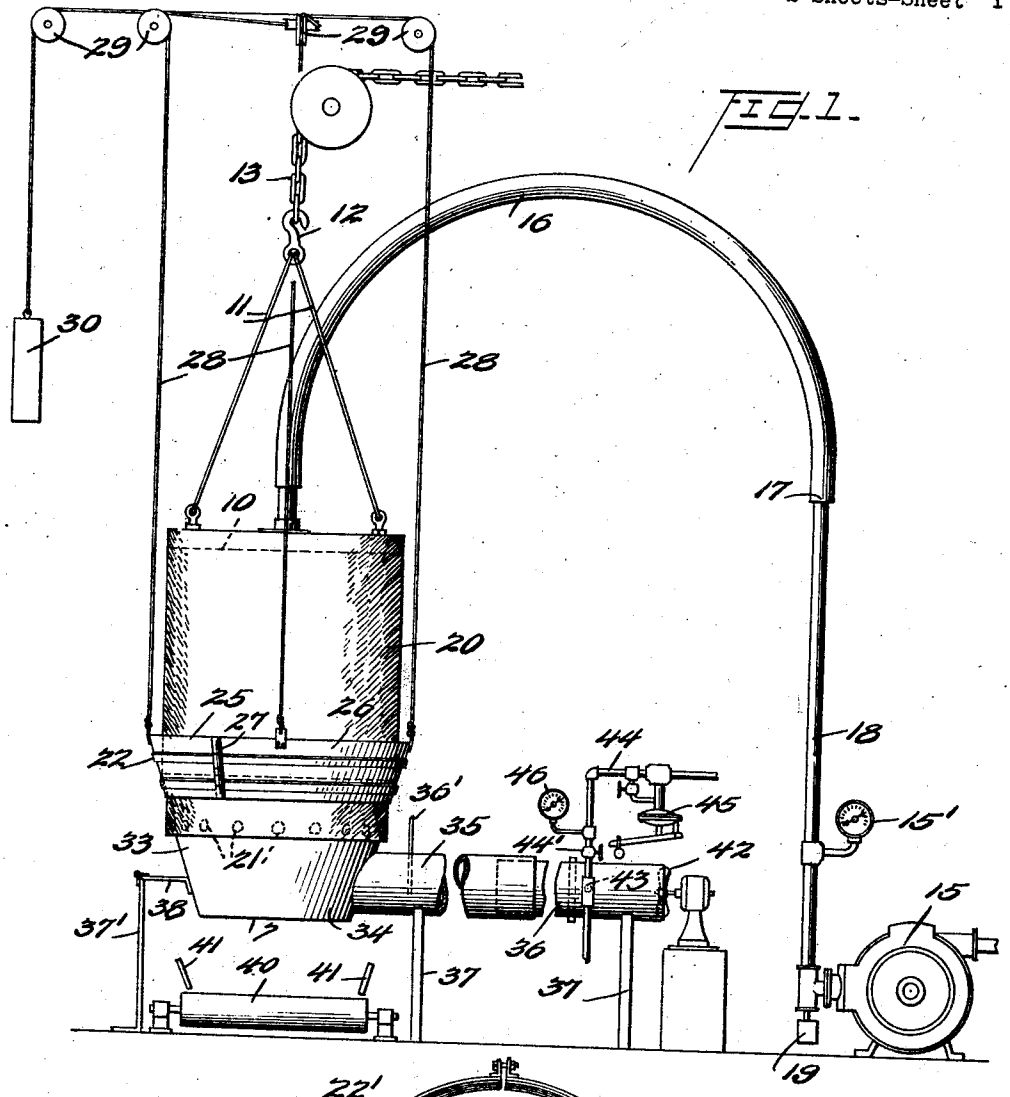


FIG. 1.

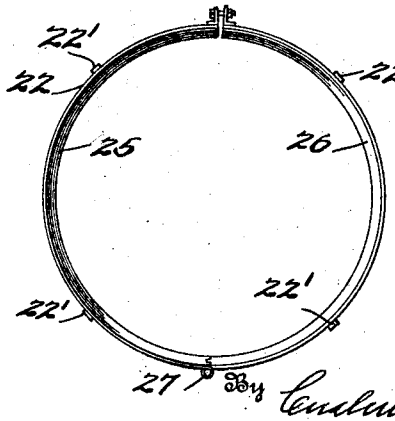


FIG. 3.

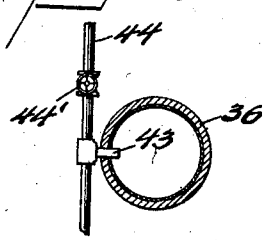


FIG. 4.

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FIG. 4.

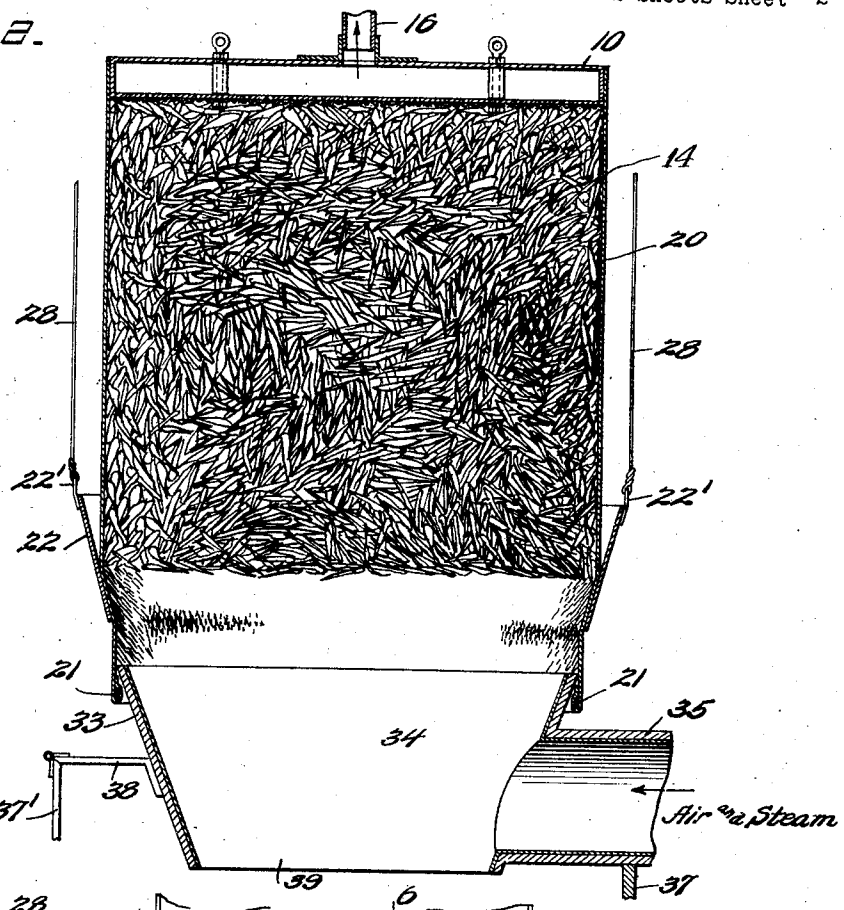


FIG. 5.

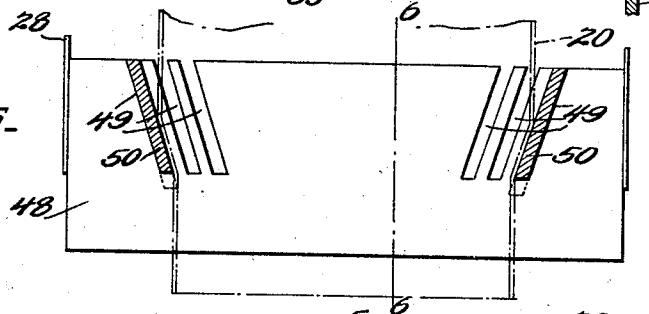
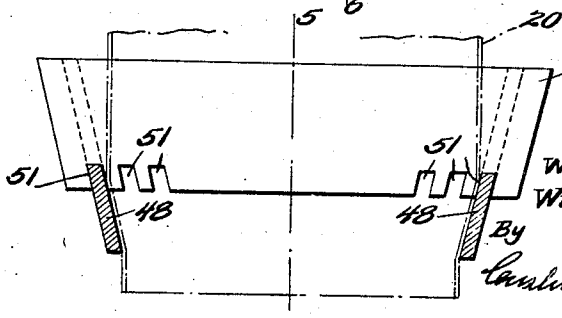


FIG. 6.



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UNITED STATES PATENT OFFICE.

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METHOD OF AND APPARATUS FOR TREATING TOBACCO.

Application filed July 25, 1925. Serial No. 46,056.

The present invention relates to new and useful improvements in the treatment of tobacco, and has as an object the provision of an improved method of and apparatus for such treatment.

As is well known, it is customary for the manufacturer to receive his tobacco packed in hogshead, tierces, cases or bales, which must be broken down, and subsequently the individual bundles and leaves which are very dry and brittle must be re-ordered or reconditioned so that the tobacco may be worked.

There is a very substantial loss of valuable tobacco in breaking down the hogsheads or bales, due to the fact that the tobacco is exceedingly dry and brittle, and is packed in a very compact mass. Moreover, the labor required for this operation is a very considerable item of expense.

An object of the present invention is to provide a method and apparatus which will render unnecessary such handling of the tobacco while dry, and to enable the manufacturer to re-condition or re-order the tobacco in bulk, i. e., while arranged in a compact mass, either as a whole hogshead, tierce, or bundle, or as any section of the same. In other words, the present invention seeks to provide a practicable and efficient method and apparatus for re-ordering or re-conditioning tobacco before the entire hogshead or case is broken down, thereby eliminating the necessity for handling the dry tobacco, and avoiding the consequent destruction of a substantial portion of the tobacco.

The method and apparatus is useful for the treatment of whole cases or hogsheads or one or more sections of a hogshead or case, it being understood that each individual section will constitute a compact or packed mass of dried tobacco, which must be re-ordered or reconditioned, and for this purpose, is thus treated in bulk, or in other words, as a packed mass.

A further object of the invention is to accomplish the re-ordering of the tobacco without the use of excessive heat or pressure, which will darken and destroy certain grades of tobacco.

Our method comprises, broadly, the arranging of a packed mass of tobacco, which may be either the contents of an entire hogshead or case, or an entire bundle, or one or more sections of the same, and the subjection of the packed mass for a suitable period, to the action of a conditioning agent, such as warm vapor. This is accomplished without the use of high heat and pressure, by passing the agent through the mass by means of a positive draught, induced preferably by suction. During the passage of the agent through the mass, portions of the mass will be progressively conditioned, and it is a further, although not essential, feature of the method that the mass is supported so that the portions of the mass as they become conditioned may be separated from the mass, preferably by gravity.

Another feature of the invention is that we employ a common means to support the mass of tobacco, and to conduct the vapor therethrough, this means being a suitable suction, which is directed through the mass by means of a suction head positioned thereover. The lower side of the mass is preferably free and unobstructed, so that the vapor or other treating agent may be drawn upwardly through the mass and bundles and leaves at the bottom of the mass fall freely therefrom as they are suitably moistened.

The conditioning agent, preferably a mixture of steam and air, may be supplied to a suitable mixing chamber beneath the mass, and by means of the suction drawn upwardly therethrough. It will be understood that any suitable form of apparatus may be employed for carrying out this method, and in order to make the method entirely clear, and also to illustrate a preferred form of apparatus, there is illustrated in the accompanying drawings, an apparatus embodying the invention.

In the drawings:

Figure 1 is a side elevational view.

Figure 2 is a vertical section taken through the closure for the tobacco mass.

Figure 3 is a top plan view of the follower cone 22.

Figure 4 is a vertical section taken through the air and vapor conveying pipe 35, 36.

Figure 5 is a vertical sectional view of a modified form of follower taken on substantially the line 5—5 of Figure 6, looking in the direction of the arrows.

Figure 6 is a vertical sectional view taken on substantially the line 5—5 of Figure 6, looking in the direction of the arrows.

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Referring to the drawings for a more detailed description, 10 indicates a suction head or chamber supported by means adapted to adjust the head vertically, such as cables 11, connected to a hook 12, carried by a suitable hoisting chain 13, the latter being operated from any suitable hoisting means (not shown). The head 10 is adapted to serve as a lifting cap and partial closure for a packed mass 14 (Figure 2) of tobacco. This mass, in the present instance, is illustrated as the entire bulk removed from a hogshead, but it will be understood that such showing is merely illustrative, and the invention contemplates the treatment of any packed mass, whether it be one section or several independent sections of a hogshead, tierce, case or bale of tobacco.

The tobacco is removed from the container, preferably entirely, and, by any suitable means, such as a truck, conveyed to the suction head 10, which is lowered to cover the top of the mass. The suction head 10 is in communication with a vacuum pump 15, through a flexible pipe 16, which connects at 17 with a vertical pipe 18, leading to the pump, the pipe 18 having a relief valve 19 and a vacuum gage 15' therein. The pump should be of sufficient power to create a suction capable of raising the tobacco mass when the suction head is lifted to hoist the chain 13.

In order to direct the suction through the mass, a wall 20, in the form of a flexible curtain, extends from the head downwardly around the mass, and its lower end may be weighted as at 21, to cause the same to fit within a follower 22, which, when the mass is round, may be in the form of a truncated cone, serving to receive the bottom of the mass and the curtain 21. The cone is formed of two substantially semi-circular sections 25, 26, (Fig. 3), hingedly connected at 27 and having their other ends detachably fastened together by securing bolts extending through juxtaposed end flanges 27'. The entire follower is supported by means of cables 28 connected to lugs 22', and the cables extend upwardly over pulleys 29, and carry a counterweight 30, which automatically maintains the cone in sealing engagement with the bottom of the tobacco mass and the wall 20 at the bottom of the mass. Since this wall is of flexible material, it conforms readily to the transverse dimensions of the mass and should the mass constitute separate sections of a bale or case, it will seal the joint between the sections, thus causing the suction to be exerted entirely through the body of the entire mass.

The curtain 20 extends through the follower, and its lower end fits around an upwardly flaring extension 33 of a mixing chamber 34, which is in the form of a substantially circular and trunco-conical box communicating with a laterally disposed pipe formed of two telescoping sections 35, 36, the former section being united and movable with the distributing box and the latter being rigidly mounted. The distributing box and pipe are supported by legs 37, one leg 37' having a horizontal hinged portion 38, which may be raised out of interfering position when the box is removed laterally to permit a fresh mass to be placed in position for conditioning. The bottom of the distributing box is open as at 39, and below the same is positioned a suitable conveyor 40, having side guards 41 serving to direct portions of the mass to the conveyor, as they drop downwardly, and such portions are automatically removed by the conveyor.

The conditioning agent is admitted through the pipe section 36, which has positioned at one open end a blower fan 42, arranged behind a steam inlet 43, the steam being conducted through a pipe 44, provided with an automatic pressure regulating valve 45, and a gage 46 in communication therewith. The air and steam travel through the pipe to the box 34 and in the latter are suitably mixed. It should be understood that the steam and air will be under comparatively low pressure, and the vapor mixture, which is a suitable conditioning agent, is drawn upwardly through the suspended mass. After such treatment for a comparatively short period, portions of the mass will begin to be suitably moistened or reconditioned, and, the mass supported as described will separate from the bottom of the mass, gravitating to the conveyor 40 through the follower 22, distributing box 34, and the open bottom 39 of the latter. It will be understood, of course, that the invention is not limited to this specific manner of progressively removing the conditioned portions of the mass therefrom. Preferably, the action of gravity is employed to permit the conditioned leaves to drop freely, and it may be found in the practice of the method with the apparatus disclosed, that it will be some times desirable to loosen the conditioned leaves manually or otherwise. As the mass begins to decrease in size, the seal at the lower end of the latter will be maintained, since the counter-weight 30 will draw the follower cone 22 upwardly against the curtain wall 20, and bottom of the mass.

By treating the tobacco in this manner, it may be re-ordered in bulk, or, in other words, as a compact mass without breaking down the mass and separating the individual bundles or "hands" for such re-ordering while the tobacco is dry, and this is accomplished without the use of high pressure or heat which will darken and injure some grades of tobacco. In other words, the tobacco is treated as a dense, or closely packed, mass which is the condition in which it is received from the usual hogshead, case, tierce, or the like. It will be understood, of course, that when we state in the specification and claims that the

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tobacco is treated in the closely packed condition it is received from the usual hogshead, we mean that so far as the density of substantial portions of the mass is concerned, it is closely packed. That is to say, the individual leaves are not separated and loosely laid upon one another as in the prior art, nor are spacer elements inserted by special packing methods in forming the hogshead mass. This definition of the invention, however, is not to be understood as negativing any preliminary steps, such as the forming of minor holes or the like in the mass to facilitate passage of the conditioning agent therethrough, providing such expedients do not destroy the substantial integrity and density of major portions of the hogshead mass.

In the operation of the apparatus, it will be understood that the mass, whether it be an entire hogshead, or one or more sections of the same, is placed under the suction head 10, and the latter is lowered upon the mass. The curtain or wall 20 is then dropped over the mass, and the cone follower 22 closed and fastened around the base of the mass outside the curtain. The vacuum pump 15 is started, and as soon as an appreciable vacuum is created, the curtain 20 is drawn tight against the tobacco. As the diameter of the cone follower 22 is substantially less than the diameter of the tobacco at the base of the same there is formed a tight joint between the follower, curtain 20, and the base of the tobacco, and the only channel through which the pump can receive its supply is through the head 10, the tobacco mass and the cone 22. In other words, the tobacco is, in effect, positioned within a conduit, through which a suction is created, and effectively closes this conduit so that any suction will be exerted through the tobacco mass. As soon as the required vacuum is indicated at the vacuum gage 15', the tobacco mass may be raised by means of a hoist chain 13, and the cone 22 will follow the mass upwardly by reason of the automatic action of the counter-weights connected to the suspending cables 28. The vapor distributing box 33 may then be moved to position beneath the cone 22 by means of the telescoping pipe 35, 36. The blower 42 may then be operated, and steam introduced through the inlet 43, the pressure of the steam being regulated by means of the valve 45. In order to guard against excessive heat or pressure, a thermometer 36' may be positioned within the pipe 35, 36, and any undesirable rise in the temperature may be regulated by modifying the speed of the fan or the manual control valve 44' in the steam pipe 44.

As illustrative of the very low temperature at which the tobacco may be conditioned, it has been found that a vapor temperature as low as 90° F. is satisfactory when continuously drawn upwardly through the tobacco by means of the suction pump. As the tobacco becomes ordered, the leaves or bundles will detach themselves from the mass at the bottom of the latter, and fall upon the conveyor, and although the size of the mass will progressively decrease, the same relation of the follower cone 22 to the tobacco mass will be maintained by means of the counter-weights which will maintain the follower against the curtain at the bottom of the mass, and the tobacco falling upon the conveyor will be automatically carried off.

The operation above described is the same if a portion of a tierce or hogshead instead of the entire bulk is to be re-ordered, and, of course, several sections of the same or different hogsheads or tierces may be simultaneously treated by simply positioning the sections one upon the other in alignment, since the flexible curtain or wall 20 will effectively close the spaces between the sections, and direct the suction through the body of the entire mass being treated.

In Figures 5 and 6 there is illustrated a modified form of follower which may be substituted for the cone 22, when the contents of a case instead of a hogshead are being treated, since a case is ordinarily rectangular. This follower comprises two vertically inclined wall strips 48, having adjacent its opposite ends, parallel slots 49 which are inclined to the vertical to receive wall strips 50, disposed at right angles to the walls 48. As will be understood, the walls 50 may be disposed in any one of the slots 49, and carry at their lower edges vertically inclined parallel slots 51 arranged adjacent the opposite ends and into which may fit the bottom ends of the slots 49. As thus constructed, the transverse dimensions of the follower may be varied as desired within reasonable limits, depending upon the number of slots provided in each side strip, and thus the follower will conform to a mass which is rectangular in cross section, irrespective of the transverse dimensions of the mass. Such a follower may be supported by cables 28, which are secured to the ends of the walls 48.

It will be understood that the entire structure may be supported in any suitable manner, and preferably the conveyor 40 and vapor distributing box 34, will be positioned below the level of the floor or support for the tobacco mass when the same is arranged in position beneath the suction head 10. With this arrangement, it will not be necessary to move the vapor box into and out of position by telescoping the pipe sections 35, 36, since, as will be understood, the tobacco mass will simply be moved to position above the vapor box and below the suction head, whereupon the follower may be arranged in position about the bottom of the same, and the mass slightly raised by the suction head 10. Or, if desired, the entire structure including the vapor box may be supported above the floor

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level as illustrated in Figure 1, in which event it is desirable to construct and position the vapor box so that it may be moved from beneath the follower cone and suction head to enable the mass to be properly positioned preliminary to carrying out the method and operating the apparatus.

Obviously, the detailed method herein described, as well as the apparatus set forth herein, and illustrated in the accompanying drawings, may be modified materially without departing from the invention, and it is to be understood that the terms used throughout this description have been selected solely for the purpose of explanation, and not to define the invention. It will be understood that an essential feature of the invention is the positive passing of a current of conditioning agent through a mass of substantially the density received from the usual hogshead, irrespective of whether the current is directed vertically or horizontally, or created by pressure or suction. When it is stated in the claims that a positive draft is created, it is intended to cover this border aspect of the invention.

We claim:

1. The method of treating a prized mass of tobacco in the closely packed condition it is received from the usual hogshead, which consists in subjecting the closely packed mass for a suitable period to the action of a conditioning agent under positive draft through the mass, whereby the mass is ordered to permit free handling without breakage.

2. The method of treating a prized mass of tobacco in the closely packed condition it is received from the usual hogshead, which consists in supporting the closely packed mass within a conduit so that the mass serves substantially to close said conduit and passing a conditioning agent through said conduit and the entire mass under positive draft whereby the mass is ordered to permit free handling without breakage.

3. The method of treating a prized mass of tobacco in the closely packed condition it is received from the usual hogshead, which consists in suspending the closely packed mass by the application of suction, closing the sides of the mass, admitting a conditioning agent to the mass and permitting the same to pass through the mass by the action of said suspending suction.

4. The method of treating a prized mass of tobacco in the closely packed condition it is received from the usual hogshead which consists in subjecting the packed mass to the action of a conditioning agent for a predetermined period by passing the agent under positive draft through the mass and progressively removing portions of the mass as it is subjected to said conditioning agent.

5. The method of treating a prized mass of tobacco in the closely packed condition it is received from the usual hogshead which consists in subjecting the closely packed mass for a predetermined period to the action of a conditioning agent by passing the agent through the mass under positive draft, and progressively removing portions of the mass by gravity, while it is subjected to the conditioning agent.

6. The method of treating prized tobacco in the closely packed condition in which it is received from the usual hogshead, which consists in supporting the closely packed mass with an area exposed, subjecting the mass to the action of a conditioning agent by passing the agent through the mass under a positive draft for a suitable period, and separating by gravity progressively conditions portions of the mass from said exposed area.

7. An apparatus of the class described comprising means for enclosing a closely packed mass of tobacco in the condition it is received from the usual hogshead, and a common means for supporting said mass and for passing a conditioning agent therethrough under positive draft.

8. An apparatus of the class described comprising means for enclosing a closely packed mass of tobacco in the condition it is received from the usual hogshead, and means for passing a conditioning agent therethrough under positive draft, said enclosing means being formed to permit the progressive removal of conditioned portions of the mass, and means for adjusting the enclosing means to conform to the size of the mass as portions are separated therefrom.

9. An apparatus of the class described comprising means for enclosing a closely packed mass of tobacco in the condition it is received from the usual hogshead, common suction means for suspending said mass, and for positively drawing a conditioning agent therethrough, said enclosing means being formed to permit the progressive removal of conditioned portions of the mass, and means for adjusting the enclosing means to conform to the size of the mass as portions are separated therefrom.

10. An apparatus of the class described comprising means for enclosing a closely packed mass of tobacco in the condition it is received from the usual hogshead, and means for suspending the mass and for passing a conditioning agent therethrough under positive draft, said enclosing means being formed to permit progressive gravitational removal of conditioned portions from the mass.

11. An apparatus of the class described comprising means for enclosing a closely packed mass of tobacco in the condition it is received from the usual hogshead, and means for suspending the mass and for passing a conditioning agent therethrough under posi-

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tive draft, said enclosing means being formed to permit progressive gravitational removal of conditioned portions from the mass, and means adapted to conform the enclosing means to the size of the mass as portions are progressively separated therefrom.

12. An apparatus of the class described comprising means for enclosing a closely packed mass of tobacco in the condition it is received from the usual hogshead, means for suspending the mass and for passing a conditioning agent therethrough under positive draft, said enclosing means being formed to permit progressive gravitational movement of conditioned portions of the mass, and means adapted automatically to conform the enclosing means to the size of the mass as portions are progressively separated therefrom.

13. In an apparatus of the class described, the combination of means for supporting a closely packed mass of tobacco, means to enclose the sides of the mass leaving its bottom exposed, means for delivering a conditioning agent to said enclosing means and against the exposed bottom of the mass whereby conditioned leaves may fall from the bottom of the mass by gravity, and means to conform said enclosing means closely about the mass at its exposed bottom as the mass disintegrates under the action of the conditioning agent and gravity.

14. In an apparatus of the class described, the combination of means for supporting a closely packed mass of tobacco, flexible means to enclose the sides of the mass leaving its bottom area exposed, means for delivering a conditioning agent to said flexible enclosing means and against the exposed bottom of the mass whereby conditioned leaves may fall from the bottom of the mass by gravity, and means to conform said flexible enclosing means closely about the mass at its exposed bottom as the mass disintegrates under the action of the conditioning agent and gravity.

15. In an apparatus of the class described, the combination of suction means for supporting from the top a closely packed mass of tobacco, flexible means enclosing the sides of the mass leaving its bottom area exposed, means for delivering a conditioning agent to said enclosing means against the exposed bottom of the mass and passing it by suction through the mass whereby conditioned leaves may fall from the bottom of the mass by gravity, conforming means engaging said flexible enclosing means closely about the mass at its exposed bottom, and means for adjusting said conforming means longitudinally of the mass as the mass disintegrates under the action of the conditioning agent and gravity.

16. In an apparatus of the class described, a suction head for supporting from the top a closely packed mass of tobacco, a flexible envelope enclosing said mass longitudinally leaving the bottom area of the mass exposed, means for delivering a conditioning agent to said flexible envelope and against the exposed bottom of the mass and passing it by suction through the mass whereby conditioned leaves may fall from the bottom of the mass by gravity, a conforming frame closely engaging the flexible envelope to conform the envelope to the mass of tobacco at its bottom, and means automatically to move said frame longitudinally of the mass as the mass disintegrates under the action of the conditioning agent and gravity.

17. In an apparatus of the class described, a suction head for supporting from the top a closely packed mass of tobacco, a flexible envelope enclosing said mass longitudinally leaving the bottom area of the mass exposed, means for delivering a conditioning agent to said flexible envelope and against the exposed bottom of the mass and passing it by suction through the mass whereby conditioned leaves may fall from the bottom of the mass by gravity, a conforming frame having inclined walls closely engaging the flexible envelope to conform the envelope to the mass of tobacco at its bottom, and means automatically to move said frame longitudinally of the mass as the mass disintegrates under the action of the conditioning agent and gravity.

18. In an apparatus of the class described, a suction head for supporting from the top a closely packed mass of tobacco, a flexible envelope enclosing said mass longitudinally leaving the bottom area of the mass exposed, means for delivering a conditioning agent to said flexible envelope and against the exposed bottom of the mass and passing it by suction through the mass, whereby conditioned leaves may fall from the bottom of the mass by gravity, a conforming frame closely engaging the flexible envelope to conform the envelope to the mass of tobacco at its bottom, means automatically to move said frame longitudinally of the mass as the mass disintegrates under the action of the conditioning agent and gravity, and means for adjusting said conforming ring to the transverse area of the mass.

19. In an apparatus of the class described, the combination of a suction head to support from the top a closely packed mass of tobacco, a flexible envelope having an open bottom depending from said head and enclosing the mass of tobacco, means for delivering a conditioning agent to the open bottom of said flexible envelope against the exposed bottom of the mass and passing it by suction through the mass whereby the conditioned leaves may fall from the bottom of the mass by gravity, and means for conforming said flexible envelope closely about the wall of the mass at its bottom.

20. In an apparatus of the class described, the combination of a suction head to support from the top a closely packed mass of tobacco,

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a flexible envelope having an open bottom depending from said head and enclosing the mass of tobacco, means for delivering a conditioning agent to the open bottom of said flexible envelope against the exposed bottom of the mass and passing it by suction through the mass whereby the conditioned leaves may fall from the bottom of the mass by gravity, means for conforming said flexible envelope closely about the wall of the mass at its bottom, and means automatically to move said conforming means longitudinally of the mass as the mass disintegrates under the action of the conditioning agent and gravity.

In testimony whereof we have hereunto set our hands.

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WILEY E. PALMER.