

Sept. 1, 1942.

B. WIESE  
DEHYDRATION APPARATUS

2,294,530

Filed July 15, 1941

2 Sheets-Sheet 1

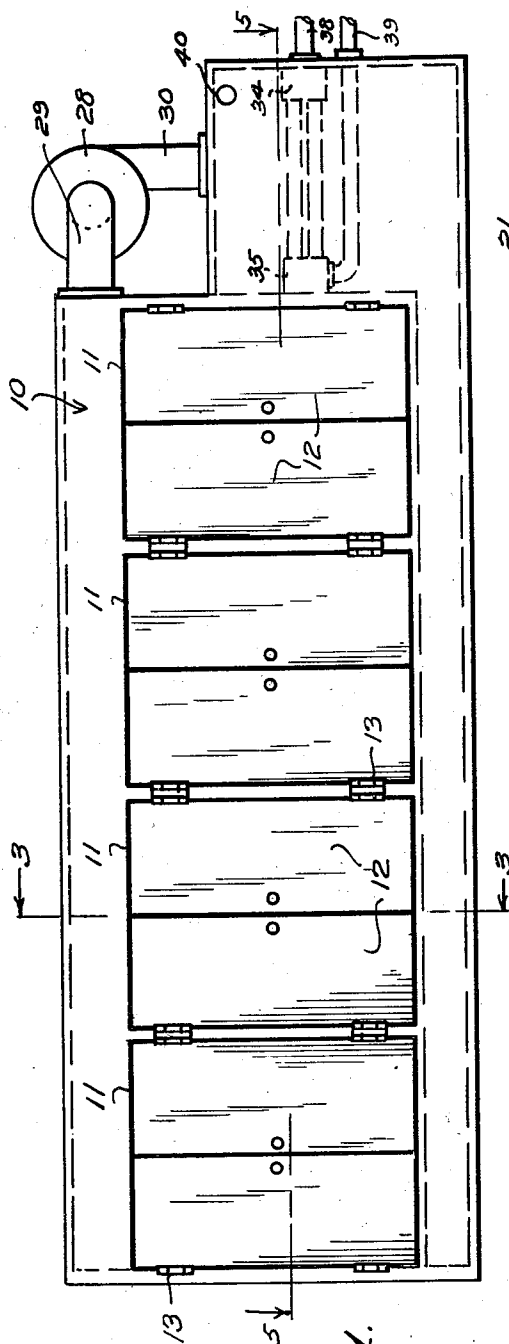


Fig. 1.

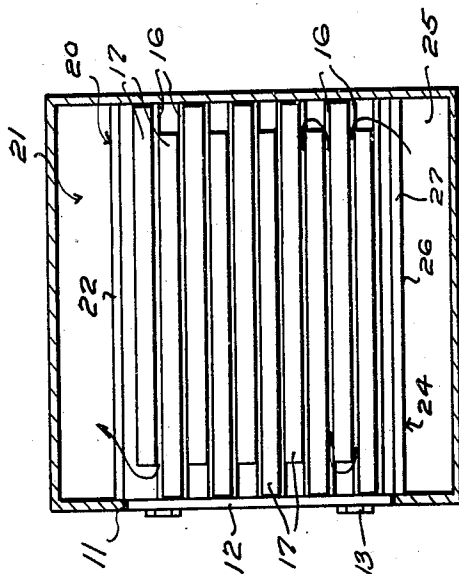


Fig. 3.

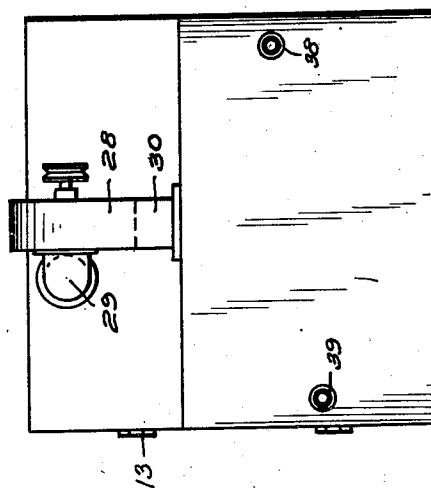


Fig. 2.

INVENTOR.  
BEN WIESE,  
BY *B. W. Wiese*

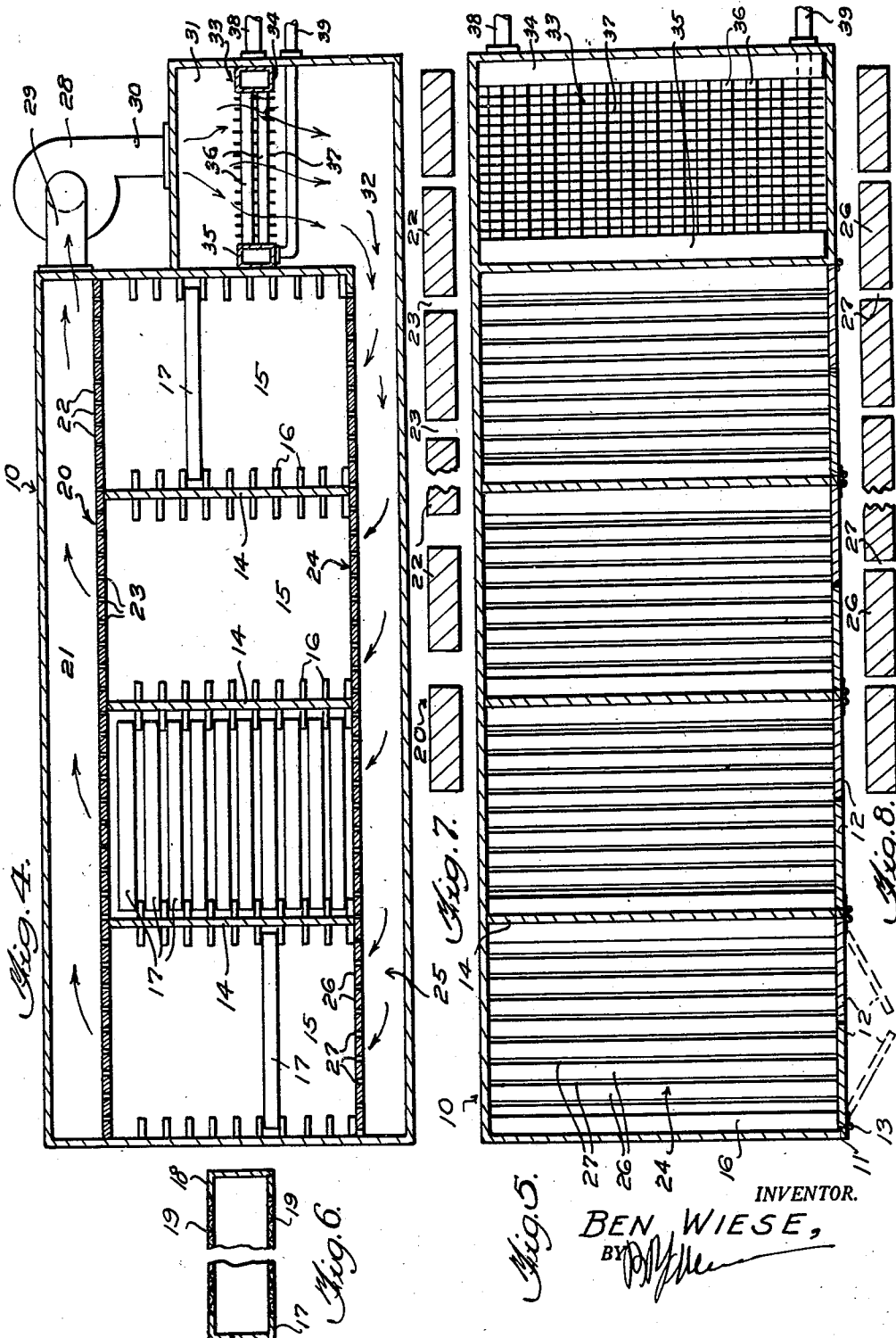
Sept. 1, 1942.

B. WIESE  
DEHYDRATION APPARATUS

2,294,530

Filed July 15, 1941

2 Sheets-Sheet 2



INVENTOR.  
BEN WIESE,  
BY *[Signature]*

# UNITED STATES PATENT OFFICE

2,294,530

## DEHYDRATION APPARATUS

Benjamin Wiese, Chehalis, Wash.

Application July 15, 1941, Serial No. 402,551

7 Claims. (Cl. 34—92)

My invention relates to dehydration apparatus. An important object of the invention is to provide apparatus of the above-mentioned character which may be used to dehydrate various materials, such as leaves, herbs, fruits, vegetables, and the like.

A further object of the invention is to provide apparatus of the above-mentioned character which will subject the material being dried to a vacuum action.

A further object of the invention is to provide apparatus of the above-mentioned character for circulating heated air in contact with the material being dehydrated and returning the air into contact with a heating unit arranged exteriorly of the casing holding the material being treated.

A further object of the invention is to provide apparatus of the above-mentioned character so constructed that the air is passed through the trays or supports holding the material being treated and also about the trays or supports for effecting a uniform drying of the material.

A further object of the invention is to provide apparatus of the above-mentioned character which is relatively simple in construction and may be manufactured cheaply and operated economically.

Other objects and advantages of the invention will be apparent during the course of the following description.

In the accompanying drawings forming a part of this application and in which like numerals are employed to designate like parts throughout the same,

Figure 1 is a front elevation of apparatus embodying my invention,

Figure 2 is an end elevation of the same,

Figure 3 is a transverse section taken on line 3—3 of Figure 1,

Figure 4 is a central vertical longitudinal section through the apparatus,

Figure 5 is a horizontal section taken on line 5—5 of Figure 1,

Figure 6 is an enlarged transverse section through a tray unit, parts broken away,

Figure 7 is an enlarged vertical longitudinal section through the upper slat-unit, parts broken away, and,

Figure 8 is a similar view through the lower slat-unit, parts broken away.

In the drawings, wherein for the purpose of illustration is shown a preferred embodiment of my invention, the numeral 10 designates a preferably horizontally arranged elongated casing, which is closed, except upon the front side. The

front side is provided with openings 11. Each opening 11 is covered by a pair of horizontally swinging doors 12, hinged at 13. The doors may be held close by any suitable means. The casing 10 has transverse vertical partitions 14, forming separate compartments or chambers 15. Each compartment or chamber has the opening 11 at its front end. Each compartment 15 is equipped with stationary supports or guides 16, which are horizontal and arranged in spaced superposed relation. These guides serve to support sliding tray units 17. Each tray unit comprises a stiff rectangular frame 18, carrying sections of screening or foraminous elements 19, secured to its top and bottom. These trays are slidable into the compartment 15 through the opening 11 and the material to be dried, such as leaves, is suitably spread upon the foraminous elements 19. The tray units have a length shorter than the width of their compartment 15 and the tray units are longitudinally staggered, as shown in Figure 3, so that the heated air passes longitudinally about the trays as well as through the foraminous elements 19. This effects a more even distribution of the heated air with the various materials being dried, and held at different elevations, so that the material at the lower elevation will not dry too rapidly with respect to the material at the upper elevation. The supports or guides 16 retain the tray units vertically spaced affording horizontal air circulating passages between them. The lowermost tray unit may have its front end contacting with the doors 12 and its rear end spaced from the back of the casing, while the next upper tray unit will have its front end spaced from the doors and its back end contacting with the back of the casing, this alternate arrangement continuing throughout the series of tray units.

Arranged above the compartments 15 is a horizontal slat-unit 20, forming with the top of the casing an elongated suction passage 21. The slat-unit or partition comprises transverse spaced slats 22. The slats are of uniform dimensions and the spaces 23 between the slats gradually and uniformly increase from the outlet end of the passage 21, that is toward the left end of the casing 10, Figure 4. I have found that satisfactory results are had by spacing the first two slats to the right, Figure 4, for a distance of one-fourth of an inch, and uniformly increasing the distance between each succeeding pair of slats until the last slat to the left is reached and having the space between the last pair of slats to the left three-eighths of an inch. If a

hundred slats were used then the space between each succeeding pair of slats would be increased for substantially one eight-hundredth ( $\frac{1}{800}$ ) of an inch. The invention is in no sense restricted to the use of a particular number of slats nor to the precise spacing of the slats. Any number of slats may be used but the spaces between each succeeding pair of slats should be uniformly increased. At the bottom of the compartments 15 is a lower slat-unit or partition 24, providing an elongated air inlet passage 25, at the bottom of the casing 10. The slat-unit or partition 24 includes spaced transverse slats 26, having passages 27 therebetween. The slats 26 are of uniform dimensions, and the spaces 27 are all of the same dimension or width. If the space between the first pair of slats 22 in the partition 20 is two-eighths of an inch then all of the spaces 27 would be two-eighths of an inch. The increasing of the width of the spaces 23, of slat-unit 20, causes the combined cross-sectional area of the spaces 23 to be about thirty per cent (30%) more than the combined cross-sectional area of the spaces 27. As a result of this, a substantial vacuum is maintained within each compartment 15, as the air is drawn out of it through openings having a greater combined cross-sectional area of the openings through which the air enters the compartment at its bottom. Further, by having the spaces 26 progressively increase in width in one direction, the circulation of air and degree of vacuum is maintained substantially constant in each succeeding compartment.

The numeral 28 designates a rotary fan, of any well-known or preferred type, having its intake end 29 leading into the outlet end of the suction passage 21. This fan has an outlet end 30.

The numeral 31 designates an air heating chamber arranged exteriorly of the casing 10 and this air heating chamber has communication at its top with the fan outlet 30 and is provided at its bottom with an outlet opening 32 leading into the air inlet passage 25. Arranged within the air heating chamber 31 is an air heating device 33, in the form of a steam heater. This steam heater includes shells 34 and 35, connected by tubes 36, carrying radiating fins 37. The air is forced about and between the tubes 36. Steam is supplied to the shell 33 through an inlet pipe 38 and discharges from the shell 35 through a pipe 39.

The air heating chamber 31 has openings 40 upon its opposite sides and near its top, for the escape of a portion of the moisture laden air. A sufficient amount of fresh air enters the casing 10 about the doors, but additional openings may be provided for this, if desired.

The operation of the apparatus is as follows:

The material to be dried, such leaves, is suitably spread upon the foraminous elements 19 of the tray units 17 and these tray units are arranged within the compartments 15 and are longitudinally staggered, as explained. Steam is supplied to the heating device 33 and the rotary fan 28 set into action. This fan exhausts air from the suction passage 21 and discharges it into the air heating chamber 31 and the air then passes into the air inlet passage 27. The air enters the bottom of the compartments 15 through the spaces 27 and discharges from the top of the compartments through the spaces 23. The heated air enters the bottom of each compartment, a portion of the same traveling upwardly through the foraminous elements 19 and

about and in contact with the leaves or the like thereon, and a portion of this heated air also traveling longitudinally over and about the successive superposed tray units in a tortuous path.

5 This effects a more even distribution of the heat in an upward direction throughout the compartment whereby the leaves or the like being held at different elevations will be dehydrated at about the same time. Since the air is drawn more freely through the spaces 23 than through the spaces 27, a substantial degree of suction is maintained within each compartment, which is noted by the force necessary to open the doors 12. By having the spaces 23 uniformly increase in width from the rotary fan and heating chamber 31, the uniform circulation of air is effected through the succeeding compartments 15.

10 It is to be understood that the form of my invention herewith shown and described is to be taken as a preferred example of the same and that various changes in the shape, size, and arrangement of parts may be resorted to without departing from the spirit of my invention or the scope of the subjoined claims.

15 Having thus described my invention, what I claim is:

1. In dehydration apparatus, a casing, means dividing the casing into a plurality of separate compartments, a slat unit within the casing at the top of the separate compartments for providing a suction passage, the slats in the unit being spaced and the spaces uniformly increasing in width toward one end of the passage, a slat unit arranged within the casing at the bottom of the compartments and forming an inlet passage, the slats in the lower slat unit being spaced and the spaces between the slats being of the same width and as narrow as the narrowest space between the slats of the first slat unit, trays arranged within each compartment in spaced superposed relation, a rotary fan having its suction end leading into the suction passage adjacent to the end of the slat unit having the smaller spaces, and means to collect and heat the air from the outlet of the fan and introduce the same into the inlet passage.

2. In dehydration apparatus, a casing, means dividing the casing into a plurality of separate compartments, a slat unit within the casing and forming a longitudinal suction passage, the slats in the unit being spaced and the spaces uniformly increasing in width from the outlet end of the suction passage, a slat unit arranged within the casing and extending longitudinally thereof and forming an inlet passage, the slats in the second slat unit being spaced and the spaces between the slats being of the same width and as narrow as the narrowest space between the slats of the first slat unit, trays arranged within each compartment in spaced relation, a rotary fan having an inlet in communication with the outlet end of the suction passage, air heating means arranged exteriorly of the casing and connected with the outlet of the fan and discharging into the inlet end of the inlet passage.

3. In dehydration apparatus, a casing, means dividing the casing into separate vertical compartments, spaced superposed supports arranged within each compartment, tray units arranged within each compartment upon the supports, the tray units having a length shorter than the width of the compartment, the tray units being adapted to be arranged in a staggered relation within the compartment with one tray having its end adjacent to one side of the compartment and

the next tray having its end adjacent to the opposite side of the compartment, means forming a suction passage at the top of the compartments and having communication therewith, means forming an inlet passage at the bottom of the compartments and having communication therewith, a heating chamber exteriorly of the casing and discharging into the inlet passage, a rotary fan having its intake leading into the suction passage and its outlet discharging into the chamber, and a heating unit arranged within the heating chamber.

4. In dehydration apparatus, a casing, means forming a suction passage adjacent to the top of the casing and including a slat unit, the slats in the unit being spaced and the spaces uniformly increasing in width toward one end of the passage, means forming an inlet passage adjacent to the bottom of the casing and including a slat unit, the slats in the lower slat unit being spaced and the spaces between the slats being of the same width and as narrow as the narrowest space between the slats of the upper slat unit, means arranged within the casing between the suction passage and the inlet passage for holding the material to be dehydrated, and a rotary fan having its suction end leading into the suction passage adjacent to the end of the slat unit having the smaller spaces and its outlet end leading into the inlet passage.

5. In dehydration apparatus, a generally horizontal casing, means forming a suction passage adjacent to the top of the casing and including a slat unit, the slats in the unit being spaced and the spaces increasing in width from the outlet end of the suction passage, means forming an inlet passage adjacent to the bottom of the casing and including a slat unit, the slats in the lower slat unit being spaced and the spaces between the slats being of substantially the same width, the combined area of the spaces between the slats in the upper slat unit being greater than the combined area of the spaces between the slats in the second slat unit, means arranged within the casing between the suction passage and the inlet passage for holding the material to be dehydrated, and a rotary fan having its intake end in communication with the outlet end of the suction passage and its outlet end in communication with the inlet passage.

6. In dehydration apparatus, a generally horizontal casing, means forming an upper suction passage, the suction passage including a slat unit constituting the top of the casing, the slats in the slat unit being spaced and the spaces increasing in width from the outlet end of the suction passage, means forming a lower inlet passage including a slat unit, the lower slat unit constituting the bottom of the casing, the slats in the lower slat unit being spaced, the combined area of the spaces between the slats in the upper slat unit being greater than the combined area of the spaces between the slats in the lower slat unit, means arranged within the casing between the suction passage and the inlet passage for supporting the material to be dehydrated, and dehydrating means including a rotary fan having its intake end in communication with the outlet end of the suction passage and its outlet end in communication with the inlet passage.

7. In dehydration apparatus, a substantially horizontal casing having sides, one side being provided with openings, means dividing the casing into spaces arranged in end-to-end relation, vertically spaced tray supporting means arranged within each space, one opening leading into each space, doors to cover the openings, means forming a suction passage having spaced openings leading into the upper portion of the spaces, means forming an inlet passage having spaced openings leading into the lower portions of the spaces, spaced superposed tray units arranged within each space and mounted upon the supporting means, the tray units including foraminous supporting elements, the tray units having a length shorter than the width of the casing, the tray units being arranged in staggered relation within the casing with one tray unit having its end adjacent to one side of the casing and the next tray unit having its end adjacent to the opposite side of the casing, the arrangement being such that a tortuous passage is formed about the tray units, a heating chamber discharging into the inlet passage, a heating unit arranged within the heating chamber, a rotary fan having its inlet end leading into the suction passage and its outlet end into the heating chamber.

BENJAMIN WIESE.