

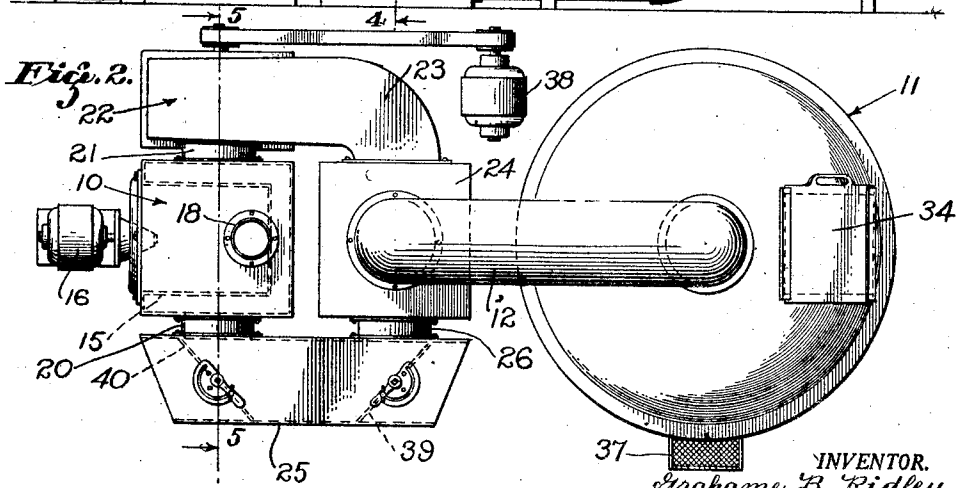
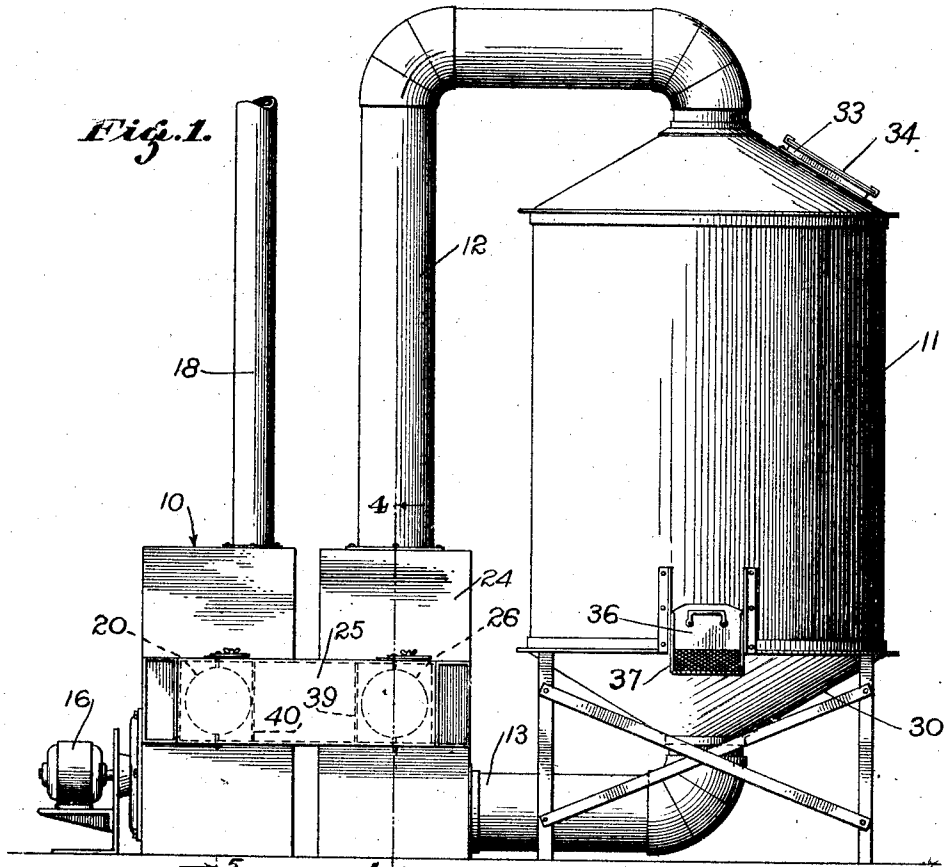
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1,620,289

G. B. RIDLEY

DESICCATOR

Original Filed Oct. 22, 1924 2 Sheets-Sheet 1



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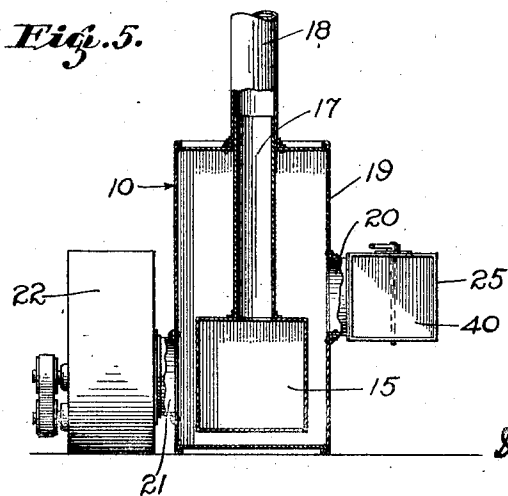
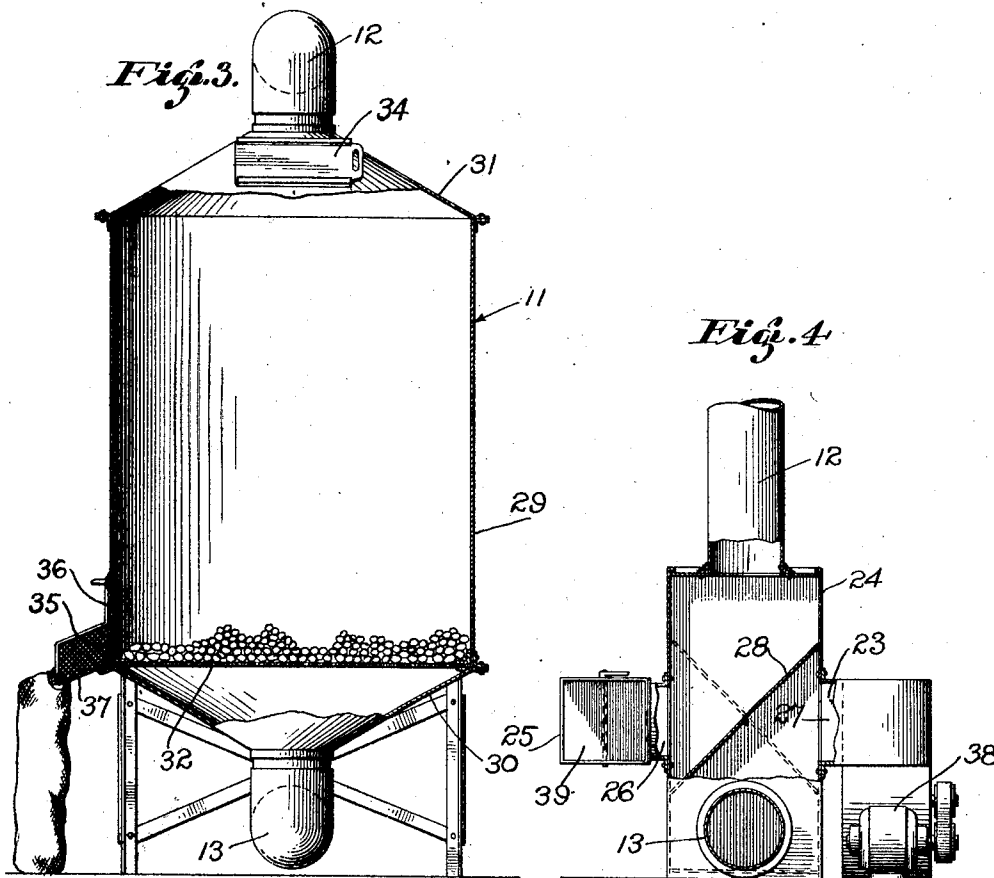
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DESICCATOR

Original Filed Oct. 22, 1924 2 Sheets-Sheet 2



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# UNITED STATES PATENT OFFICE.

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## DESICCATOR.

Original application filed October 22, 1924, Serial No. 745,103. Divided and this application filed July 13, 1925. Serial No. 43,197.

This invention relates to a desiccator and a method of operating the same, and particularly pertains to means for dehydrating material in bulk as disclosed in my application entitled "Method of dehydration and apparatus therefor", filed October 22, 1924, Serial No. 745,103, and of which the present application is a division.

It is the principal object of the present invention to provide a desiccator of the bin type within which material may be placed in bulk and by which the material may be rapidly and thoroughly dehydrated, the invention being particularly applicable to fruits, nuts and vegetables.

The present invention contemplates the use of a bin or a plurality of bins within which bulk material may be placed, and through which said material has a gravity flow, the bin structure being in communication with an air heating structure, whereby a current of air may be passed through the bulk material in either a direction with or countercurrent to the path of travel of the material being dried.

The invention is illustrated by way of example in the accompanying drawings in which:

Fig. 1 is a view in side elevation showing the complete desiccating apparatus.

Fig. 2 is a view in plan showing the device disclosed in Fig. 1.

Fig. 3 is a view in side elevation showing the bin with parts broken away for the sake of clearness.

Fig. 4 is a view in vertical section through the control chamber of the heater as seen on the line 4—4 of Fig. 1.

Fig. 5 is a view in vertical section through the heater as seen on the line 5—5 of Fig. 2.

Referring more particularly to the drawings, 10 indicates a furnace structure and 11 indicates a drying bin in communication therewith and through which bin heated air may be circulated in alternate directions, the communication being established between the furnace structure and the bin by an upper air pipe 12 and a lower air pipe 13.

The furnace as more clearly shown in Fig. 5 of the drawings, comprises a firebox 15 supplied with a suitable heating medium such as the oil burner 16 by which a flame is projected into the firebox. The firebox is in communication with a flue 17 leading

to the stack 18. An air jacket 19 encloses the firebox 15. An inlet port 20 is formed in one side wall of the air jacket and an outlet port 21 is formed in another side wall of this jacket.

The outlet port is in communication with a rotary blower structure 22 by which air will be drawn from the air jacket and delivered to a hot air duct 23 to a control chamber 24. As shown in Fig. 1 of the drawing, it will be seen that the control chamber 24 and the furnace structure are disposed alongside of each other, and it will be seen that all air being delivered to or from the furnace must of necessity pass through the control chamber 24 before reaching the air pipes 12 or 13.

Disposed on the opposite side of the control chamber 24 from the inlet duct 23 is an air duct 25 which establishes communication between an opening 26 in the side of the control chamber and port 20 in the side wall of the air chamber of the furnace. By reference to Fig. 4 of the drawings, it will be seen that the opening 26 in the side wall of the control chamber is substantially diametrically opposite to the opening 27 in the opposite side wall of the control chamber and which opening is in communication with the hot air duct 23.

The pipe 12 is shown in Fig. 4 as being in communication with the top of the control chamber 24, while the pipe 13 is shown as being in communication with the control chamber at a point near its bottom or at least at a point below the plane of the side openings 26 and 27. The control chamber is equipped with a damper 28 pivotally mounted within the chamber substantially midway between the openings 26 and 27, the dimensions of said damper being such as to cause the damper to extend diagonally of the chamber when striking the opposite side walls thereof at points above and below the openings 26 and 27, as the case may be, so that the control chamber 24 will be divided into two compartments between which an inclined partition wall is formed by the damper, and which damper is thus disposed in the paths of travel of the incoming and outgoing air passing through openings 26 and 27 to divert the air along its desired course. By this arrangement the control chamber with its damper alter-

nately establishes communications between the openings 26 and 27 and the air pipes 12 and 13, thereby making it possible to conveniently change the direction of flow of heated air through the drying bin 11.

The drying bin 11 as particularly shown in Figs. 1 and 3 of the drawings, comprises a cylindrical shell 29 having a frusto-conical bottom 30 and a frusto-conical top 31. The apex of the bottom 30 is formed with an opening in direct communication with the air pipe 13, while the apex of the top 31 is formed with an opening in direct communication with the air pipe 12.

Extending across the bottom of the cylindrical shell portion and thus separating the cylindrical body of the drying bin from the frusto-conical bottom member 30 is a false floor 32 formed of foraminous or reticulated material, upon which articles to be dried may be supported. The cover 31 is formed with a feed opening 33 through which the articles to be dried may be delivered to the bin 11, this opening being normally closed by a sliding door 34. Near the bottom of the cylindrical shell and in the wall thereof is formed an outlet opening 35 controlled by a sliding door 36. This opening permits the contents of the bin to be delivered into a chute 37.

In operation of the present invention, a suitable temperature is established within the firebox of the furnace 10 and the air within the chamber 19 will thus be heated to a desired degree. This air is caused to circulate through this chamber from inlet opening 20 around the chamber and the firebox to outlet opening 21, by means of fans 22 being driven by a suitable drive mechanism, such as the motor 38.

The heated air drawn from the furnace will then be delivered through the hot air duct 23 to the control chamber 24. Assuming that the control valve 27 is in the position shown in solid lines on Fig. 4, this air will pass into the chamber 24 through the duct 23 and the opening 27. It will then strike the inclined damper 38 and will be diverted downwardly to flow through the pipe 13. This pipe will conduct the air to the bottom of the desiccator, allowing it to pass upwardly through the foraminous false floor 32 and then around the articles within the bin while drying the same. The moisture laden air will then be drawn off through the pipe 12 to the control chamber 24 and will then be diverted from the chamber by the damper 28 to the cool air conduit 25.

Attention is particularly directed to Fig. 2 of the drawing in which details of construction of the cool air duct 25 are disclosed. It will be here seen that the opposite ends of this duct are open and that dampers 39 and 40 are pivotally mounted

within the duct to make it possible to divert the entire volume of air directly from the control chamber 24 through the duct 25 and to the hot air chamber 19 of the furnace 10, or to divert the moisture laden air from the duct 25 by manipulation of the damper 39, or permit an added volume of fresh air to be mixed with the moisture laden air passing through the duct 25 to the hot air chamber 19 of the furnace by manipulation of the damper 40.

It has been found in practice that if the air is too hot or if it is continued at a high temperature for too long a period of time, or if the moisture laden air is reused through too many cycles of operation without changing or replenishing, the material being dried will deteriorate. This deterioration may result in immediate damage to the products or may so affect the products, such for example, as nuts, that they will readily rot.

It will also be apparent that if heated air is caused to blow through the bin continuously in a single direction for a considerable period of time, the material in the bin with which the heated air first comes into contact will be more fully dried, and the material farthest from the point of entry of the heated air will only be affected by the air which is partially cooled and has also become moisture laden.

In order to insure that the entire contents of the bin will be thoroughly and uniformly dehydrated, it is desirable to reverse the direction of the flow of the heated air at suitable intervals. This is done by turning the control damper 28 to the dotted line position indicated in Fig. 4, so that the heated air coming into the control compartment 24 will be diverted to the pipe 12 instead of pipe 13, and the pipe 13 will be used to carry away the moisture laden air from the bottom of the bin.

After the nuts have been thoroughly dehydrated, the sliding door 36 may be raised to allow the nuts to roll out onto the chute 37 and be thereafter caught in a suitable container.

It will thus be seen that the apparatus here disclosed provides simple means for dehydrating material while in bulk and for insuring that the bulk contents of the dehydrating bin may be thoroughly dehydrated without deleterious results.

While I have shown the preferred form of my invention as now known to me, it is to be understood that various changes may be made in its construction without departing from the spirit of the invention as defined in the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A desiccator comprising a bin within

which bulk materials may be placed, induction and eduction ports in the top and bottom of said bin, a foraminous floor within the bin to support bulk material above the  
5 bottom of the bin, an air heater, means for creating a circulation of said heated air through the bin from an induction port to an eduction port, control means for permitting a mixing and replenishing of the air  
10 drawn from the bin by fresh air, and means interposed between the bin and the air heater for optionally reversing the direction of flow of the air circulating through the bin.

2. A desiccator comprising a bin within  
15 which bulk material may be placed, a hot air furnace by which air may be heated for circulation through the bin, a control chamber interposed between the air furnace and the bin and in communication with the furnace, pipes connected with the control chamber,  
20 one of said pipes communicating with the upper end of the bin and the pipe communicating with the lower end thereof, and

means within the control chamber whereby a circulation of air may be set up through the bin, the control chamber and the furnace. 25

3. A desiccator comprising a bin within which bulk material may be placed, a hot air furnace by which air may be heated for circulation through the bin, a control chamber interposed between the air furnace and the bin and in communication with the furnace, pipes connected with the control chamber, one of said pipes communicating with the upper end of the bin and the pipe communicating with the lower end thereof.  
35 means within the control chamber whereby a circulation of air may be set up through the bin, the control chamber and the furnace, and means whereby the direction of  
40 flow of the circulating air may be changed in the control chamber to cause a corresponding change of direction of flow through the bin.

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