April 28, 1942. T. J. COSTELLO 2,281,269

CORN DRIER

Filed Dec. 18, 1939 2 Sheets-Sheet 1

Fig. 1

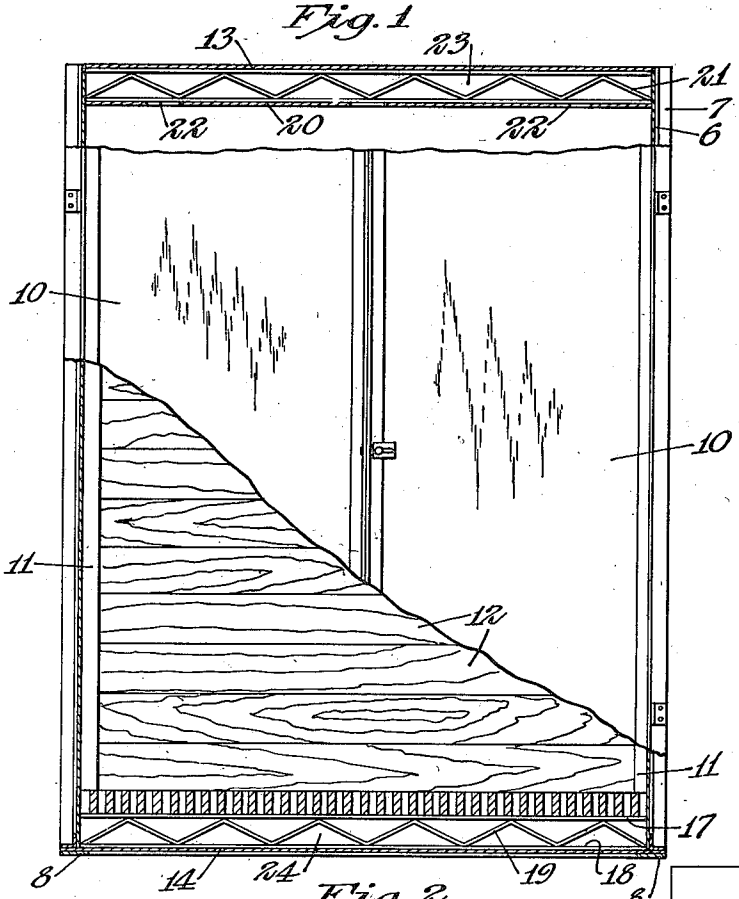
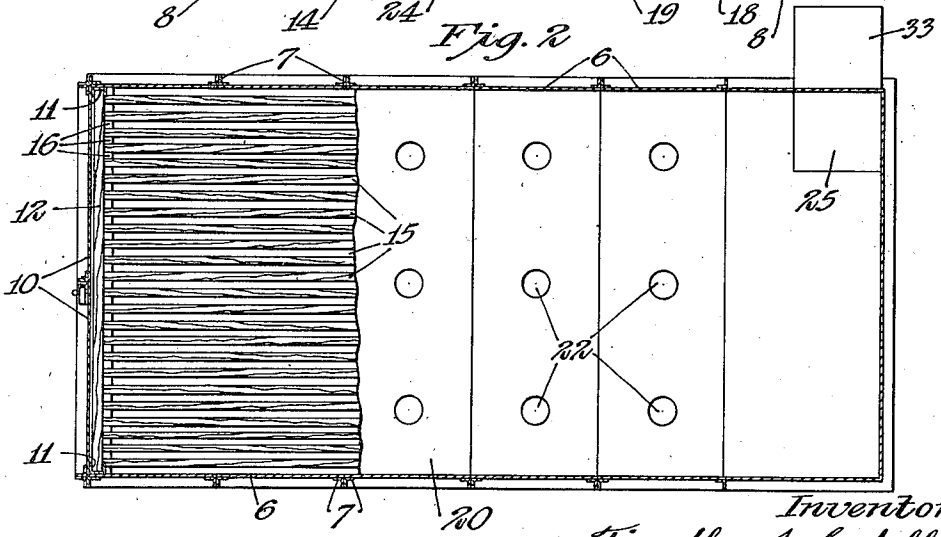


Fig. 2



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Filed Dec. 18, 1939 2 Sheets-Sheet 2

Fig. 3

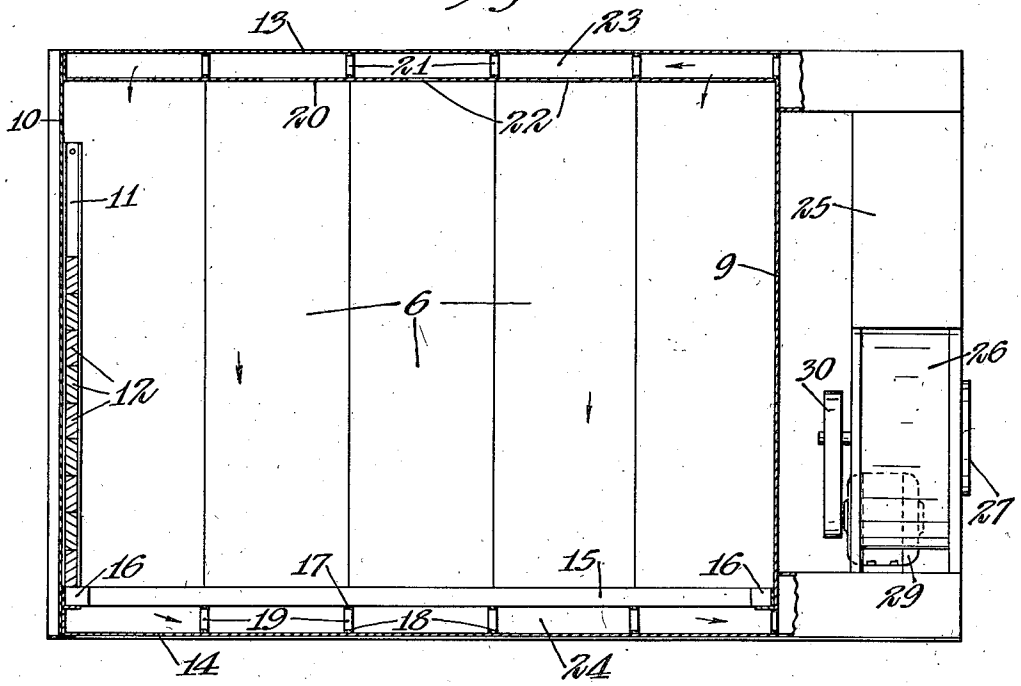


Fig. 4

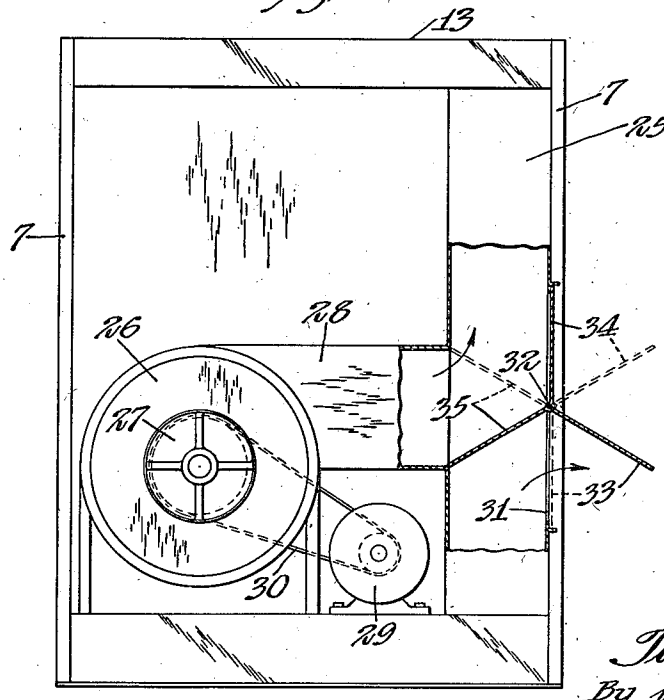
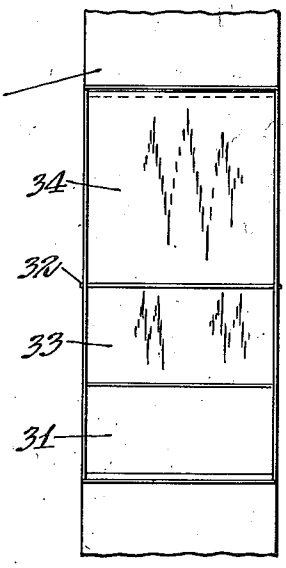


Fig. 5



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CORN DRIER

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Application December 18, 1939, Serial No. 309,844

1 Claim. (Cl. 98—54)

This invention relates to drying apparatus and more particularly to apparatus for drying corn on the cob. It is of particular importance in connection with the rapid drying of seed corn.

One of the objects of my invention is to provide a drier which can accommodate a considerable quantity of corn and in which a flow of heated air is circulated through a mass of ears to remove the moisture therefrom.

Another object of the invention is to provide drying apparatus in which a blast of heated air can be circulated through the mass of corn first in one direction and then in a reverse direction, the reversal of flow providing for more even drying of the corn.

Another object of the invention is the provision of means for setting up a flow of heated air with a blower and means for reversing the flow of air without disturbing the action of the blower in any manner.

These and other objects and advantages of the invention will more fully appear from the following description made in connection with the accompanying drawings, wherein like reference characters refer to the same parts throughout the views, and, in which:

Fig. 1 is an end elevation of a drier with portions of the door broken away and interior parts in section;

Fig. 2 is a horizontal section through the upper portion of the drier with a portion of the drying chamber wall and a portion of the floor shown in plan view;

Fig. 3 is a longitudinal vertical section;

Fig. 4 is a rear elevation with portions of the air conduit broken away and the flow control valve in dotted and full lines in two positions; and

Fig. 5 is an enlarged fragmentary detail of the air control valve taken at right-angles to the showing in Fig. 4.

The device includes a sheet metal outer casing having side wall panels 6 and vertical ribs 7. Suitable longitudinal bottom frame members 8 are preferably provided to strengthen the structure. The casing has a rear end wall 9 and a front provided with hinged door sections 10. Just inside the door sections are a pair of oppositely disposed vertical panels 11 which are adapted to slidably receive a plurality of boards 12 which are adapted to support the corn within the chamber and relieve the doors of the pressure of said corn.

The interior of the main casing which also has a closed top 13 and a closed bottom 14 is provided with a floor made up of a number of longitudinally disposed spaced slats 15. The slats are preferably composed of elongated wooden strips which are spaced apart by suitable end blocks 16, and said floor is supported above the main casing bottom 14 by means of transversely disposed metallic cross members which are made up of relatively flat top and bottom strips 17 and 18 and a zigzag web 19. This web is open so that air can flow between the slats which comprise the floor and the sheet metal casing bottom 14. The upper partition 20 is suspended from open work metallic cross members indicated generally at 21 which are of the same type of construction as the lower cross members just described. The partition 20 is made up of a plurality of panels of metal or from one piece if desired, and said partition has a number of openings 22 therethrough, and, as shown in the drawings, the partition is spaced downwardly from the casing top 13.

The spaced partition 20 and the casing top 13 provide an upper air passage 23 and the raised floor in cooperation with the casing bottom 14 provide a lower air passage 24. At the rear end of the main casing these upper and lower air passages communicate with a vertical conduit 25 which forms an air flow connection between said upper and lower passages 24 and 25.

A rotary blower 26 is positioned at the rear of the main casing and has an inlet 27 adjacent the horizontal axis thereof, said inlet being adapted for connection with a source of heated air of any suitable type. The heater is not shown but is preferably a stove having a hot air outlet pipe connected to said blower inlet. The outlet of the blower comprises a horizontal conduit section 28 which communicates with the vertical conduit 25 intermediate the ends thereof as best illustrated in Fig. 4. The blower can be driven by any suitable means such as a motor 29 geared to said blower by a belt 30.

The vertical conduit 25 is shown rectangular in cross section and on the side opposite the blower outlet connection said conduit has a relatively large rectangular opening 41 formed therein. Positioned horizontally and centrally of the opening 31 in the conduit 25 is a shaft 32 which is rotatably supported by said conduit. Radiating from said shaft at three points approximately 120° apart are vanes 33, 34 and 35. In their full line position in Fig. 4 vane 34 is shown closing the upper half of the opening 31 in the side of the vertical conduit 25 and the vane 35 is shown extending from the shaft 32 to the lower portion of the blower outlet conduit 28. In this position heated air is directed from

the blower upwardly through the upper half of the vertical conduit **25** and into the air passage **23** at the top of the drier chamber. From the passage **23** air is directed through the openings **22** in the upper partition **20**, thence down through the corn in the chamber through the slatted floor, the lower air passage **24**, and thence out of the lower portion of the vertical conduit **25** to the atmosphere. It is desirable, however, to reverse the air flow so that the freshly admitted dry heated air will be directed against the corn in the bottom of the chamber and will flow upwardly so that both the bottom and top of the mass of corn will receive the same type of drying treatment. In order to reverse the air flow it is necessary only to pivot the vanes **33**, **34**, and **35** to the dotted position shown in Fig. 4 and then air from the blower will be directed downwardly from the lower portion of the conduit **25**, upwardly through the corn in the drier chamber, out of the chamber through the top passage **23**, and thence to the atmosphere through the open upper half of the opening **31** in the vertical conduit section **25**. This makes it unnecessary to reverse the blower or to disturb it in any manner whatsoever. The simple manipulation of the valve made up of the three above identified vanes is all that is required to produce this reversal of flow.

While the particular location and total size of the openings **22** in the top partition is not to be exactly prescribed, it is greatly preferred that these openings have a total area which is less or no greater than the cross sectional area of the blower outlet **28** and vertical conduit section **25**. This being true, there will be a backing up of pressure due to the restricted air flow openings in the partition **20** and the speed and capacity of the blower **26** so that air will be evenly distributed over the horizontal area of the chamber and the air flow will not be short-circuited through the rear end of said chamber. This particular relationship of the area of the openings **22** to the flow capacity of the conduit **25** is effective to distribute the air properly whether the flow in the drying chamber is downward or upward. Consequently the corn or other substances being dried will be uniformly treated simply by maintaining a relatively constant air temperature and by directing the flow in the two directions alternately for equal lengths of time.

From the foregoing description it will be seen that I have provided an efficient drying apparatus particularly for the drying of seed corn which is of comparatively simple construction, but which guarantees uniform drying due to the distribution and size of the air openings and also to the manipulation of the valve comprising the radial vanes **33**, **34**, **35** which produces the reversal of hot air flow. The walls of the casing are shown in panelled sections, but, of course, it is contemplated that the walls may be made of single large sheets if desired. The valve mechanism may under some conditions of construction require the use of catches to maintain the vanes in desired positions, but it is considered that these details need not be brought out in the present disclosure.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the various parts without departing from the scope of my invention.

What is claimed is:

Drying apparatus of the class described comprising, a drying chamber having openings in the top and bottom portions thereof, a conduit connected at its ends with the interior of said casing at said openings, means for setting up a flow of relatively dry air in said conduit including a blower having a dry air intake and having an outlet connected to said conduit intermediate its ends, said conduit having an opening opposite to the point of connection of said blower and leading to the outer atmosphere, and a flow control valve comprising a pivoted element having three radially disposed and equally spaced vanes and having its pivotal axis extending horizontally across the center of said conduit opening, said conduit opening and the length of said vanes being such as to close off one-half of said conduit opening and simultaneously to direct airflow from said blower into one end of said conduit only when said vanes are in one position, and said vanes being shiftable on their pivotal axis to open the closed half of said conduit opening and close the other half thereof and simultaneously to direct the flow of air from said blower only into the other end of said conduit.

TIMOTHY J. COSTELLO.