Dec. 27, 1932. E. ROTH 1,892,319

DEVICE FOR THE CONDITIONING AND DRYING OF CEREALS

Filed April 29, 1931

Fig. 1

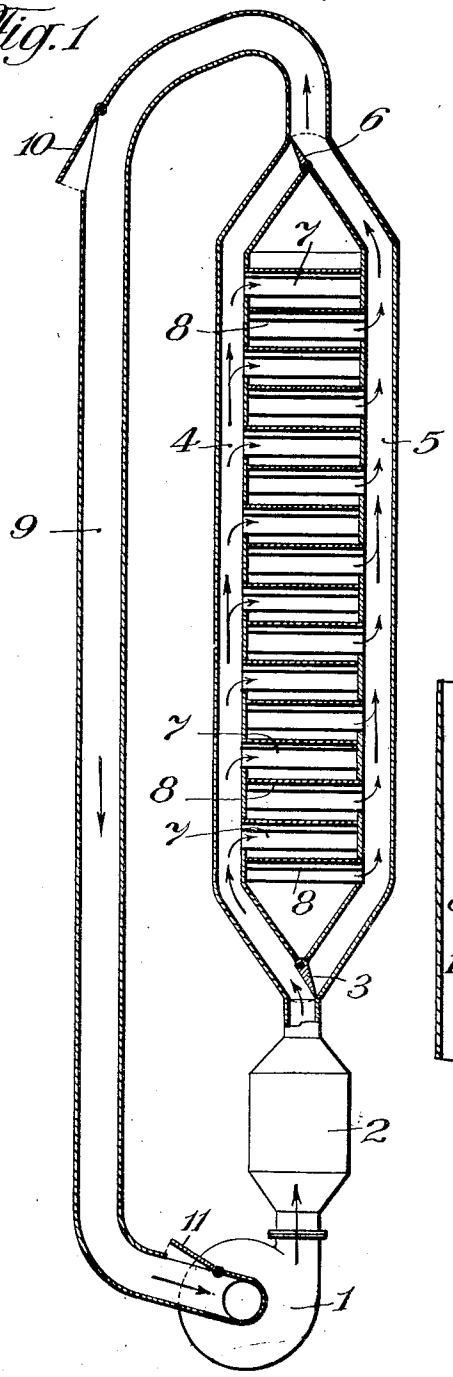


Fig. 2

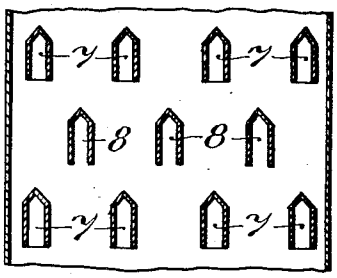
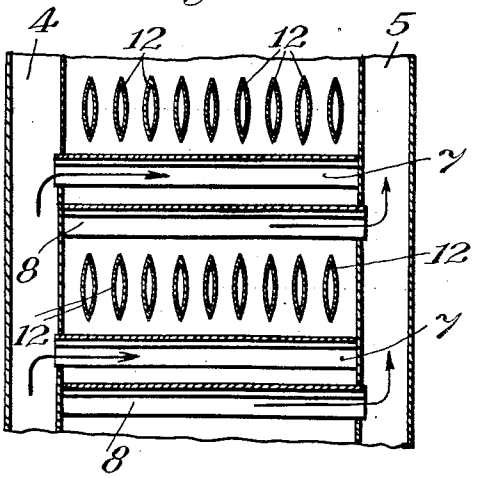


Fig. 3



Inventor:

Ernst Roth

By B. Dommers

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UNITED STATES PATENT OFFICE

ERNST ROTH, OF NIEDERUZWIL, SWITZERLAND, ASSIGNOR TO THE FIRM GEBRUDER BUHLER, OF UZWIL, SWITZERLAND

DEVICE FOR THE CONDITIONING AND DRYING OF CEREALS

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Conditioning machines for cereals are either constructed as columns to which the goods are fed from the top and withdrawn at the bottom, whereby the goods are moved through the column by virtue of the pressure arising from the weight of the goods, or as drums through which the goods are conveyed by mechanical means.

In another known construction of a drying machine for any dry goods that are adapted to be poured out each of the two sides of the horizontal drying chamber are provided with an air chamber which is associated with a perforated pocket for the dried goods and between said pockets air conduits extending through the drying chamber are arranged which are alternately connected with the air chamber on one side and shut to the one on the other side and conversely, shut to the first mentioned air chamber and communicating with the latter. These air chambers are commonly connected to a blower and to an outlet duct respectively and the air which is discharged from the blower is adapted to be changed over so as to enable the air to pass through the goods deposited in the pockets alternately in the one or other direction.

The present invention relates to the first mentioned type of devices comprising a vertical column. This type includes two classes, the devices of the one class being provided with heating means distributed along the height of the column and acting on the slowly downwardly moving goods in conjunction with the air which is induced to pass through the same. With the columns of the other class hot air alone is passed through the goods once or several times either in dry or wet condition. In connection with the devices of either class air is induced to pass through the goods for the purpose of entraining the vapors caused by the introduced heat. With this procedure the heated air encounters the goods to be treated in more or less dry condition and entrains the moisture contained in the same whereby the air is cooled down and subsequently passes out of contact with the goods. Several known devices are constructed to this end in such manner that the air is led through conduits which are open at the bottom and at one end and extend across the column, from where the air is forced upwardly to be withdrawn by way of another series of similar conduits. The air when passing through the first series of these cross conduits, by way of which it enters the column, remains dry because condensation of its residual humidity is not yet apt to arise, but when the air reaches the outlet conduits after having traversed the cereals and consequently was cooled down the water and dust content is precipitated, so that these conduits become soiled and finally clogged. In order to avoid this drawback it has already been proposed to admit hot air to the exit conduits, i. e. additional but false air, with a view to render the outgoing air more capable of absorbing humidity, so as to reduce the amount of condensation of the moisture content of the air in the exit conduits.

The present invention provides for keeping the exit conduits clean in the most simple manner and so that the introduction of additional air which would increase the total amount of heat required for the operation of the device is dispensed with. For this purpose the device according to the invention comprising an air entrance passage and an air exit passage and an intermediate treatment chamber through which extend branch conduits for admission and education of treatment air which alternately communicate with either passage is characterized by the passages adjoining the treatment chamber being commonly connected to a supply duct for hot air and an air discharge duct, the said passages being provided, for example at their junction with the respective duct with shut-off means adapted to be selectively adjusted for connecting either passage to the air supply duct while the other is connected to the air discharge duct.

In the drawing an embodiment of the device according to the invention is illustrated, by way of example only, in which

Fig. 1 shows a sectional elevation of the device in connection with a blower,

Fig. 2 is a fragmentary longitudinal section through the column of Fig. 1, on a larger scale, and

Fig. 3 is a view similar to Fig. 2 of a modification of the column.

The air which is discharged from the blower 1 (Fig. 1) passes through the air heating device 2 and enters corresponding to the adjustment of the flap 3 the one or other of the two air passages 4, 5 of the conditioning column, in the position illustrated the passage 4. The flap 6 at the upper end of this passage is closed thus preventing the air from passing on and causing it to find its way across the treatment chamber of the conditioning column via the entrance conduits 7 which are open at the bottom. As, however, these conduits are closed at their other end, the air passes through the goods to be treated to the exit conduits 8 and as the latter are shut to the air passage 4 it flows to the air passage 5 to subsequently leave the column at the top. Afterwards the air is led through the return duct 9 back to the blower.

The flaps 3 and 6 are reversed in certain intervals, so that the air current passes from the heating device 2 to the passage 5 on the right hand side of the column and from thence to the passage 4 on the left hand side across the cereals, whereafter it is withdrawn from the upper end of the column. The flap 10 inserted in the return duct 9 is opened more or less for removing the saturated air from the circulation. The flap 11 serves for controlling the fresh air admission to the blower 1.

By changing over the air current from the left hand passage 4 to the right hand passage 5 the direction of flux in the branch conduits 7 and 8 is alternately changed, so that these conduits are at one time acting as entrance conduits and at the other as exit conduits. The air arrives at the exit conduit in cooled and highly saturated condition thus causing its humidity content to condense on the inner wall of the exit conduit and inducing dust and branny material to stick to the wall. When afterwards the exit conduit is used as admission conduit the condensate is assimilated by the fresh air entering the conduit and the dried dust and bran particles drop off the wall of the conduit so that the soiled exit conduit is automatically cleaned when it is used as an entrance conduit.

In Fig. 2 the cross-section of the air conduits open at the bottom is illustrated and the arrangement is such that adjacent conduits 7 and 8 are alternately connected with the one or other wall of the treatment chamber or closed by the same respectively.

Fig. 3 shows a cross-section of a conditioning column wherein the air conduits 7, 8 are arranged in groups and between adjacent groups of conduits heating means 12 for heat transmission to the goods to be treated are provided.

I claim:

1. In a device for the conditioning and drying of an uninterrupted stream of cereals, the combination with a treatment chamber for the goods, of an air entrance passage and an air exit passage adjoining said treatment chamber, branch conduits open at the bottom extending through said chamber and alternately communicating at one end with either of said passages for admission or eduction of air respectively, an air heating device connected with both of said passages at one end of said chamber, a blower preceding said air heating device, an air return connected with both of said passages at the other end of said chamber and extending to the intake end of said blower, and air control means at each end of said chamber for selectively connecting one of said passages with the air supply and simultaneously the other passage with the air return for preventing precipitation of moisture and impurities in the air circulation means.

2. In a device for the conditioning and drying of an uninterrupted stream of cereals, the combination with a treatment chamber for the goods, of an air entrance passage and an air exit passage adjoining said treatment chamber, branch conduits open at the bottom extending through said chamber and alternately communicating at one end with either of said passages for admission or eduction of air respectively, an air heating device connected with both of said passages at one end of said chamber, a blower preceding said air heating device, an air return connected with both of said passages at the other end of said chamber and extending to the intake end of said blower, a control means included in said air return in the vicinity of said blower for the admission of fresh air to the latter, a control means included in said air return in the vicinity of the connection of the latter with said chamber for the removal of saturated air, and air control means at each end of said chamber for selectively connecting one of said passages with the air supply and simultaneously the other passage with the air return for preventing precipitation of moisture and impurities in the air circulation means.

In testimony whereof I have signed my name to this specification.

ERNST ROTH.