Sept. 7, 1954 JOAO DE OLIVEIRA TORRES 2,688,196

DRYING OR DESICCATING DEVICE FOR GRANULAR MATERIAL

Filed Oct. 29, 1951 3 Sheets-Sheet 1

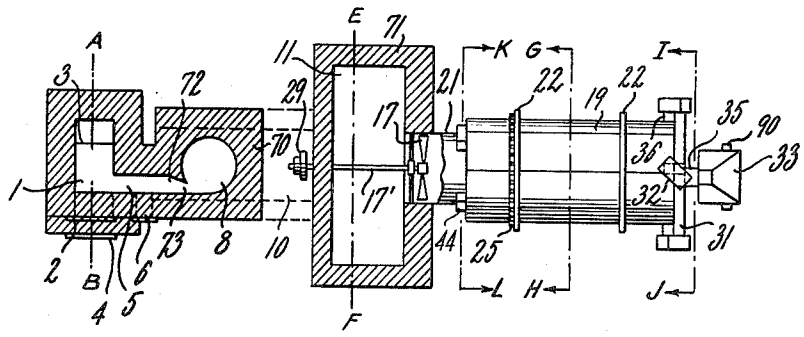

Fig. 1

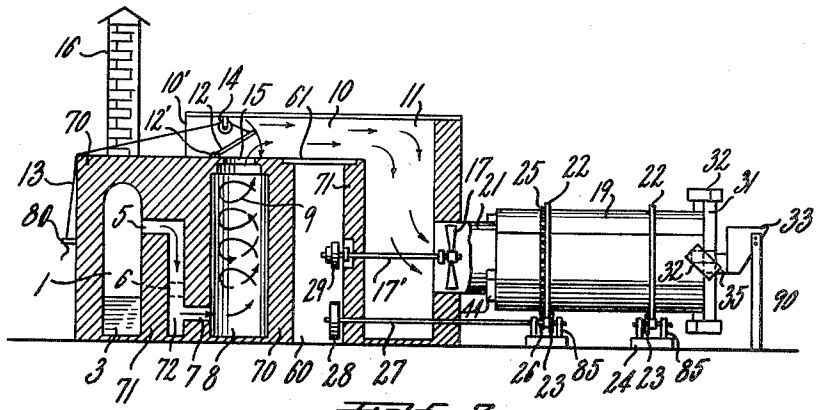

Fig. 3

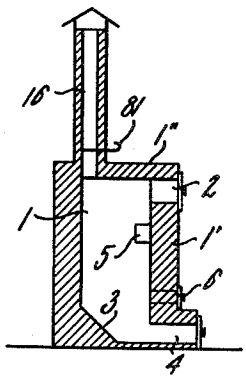

Fig. 2

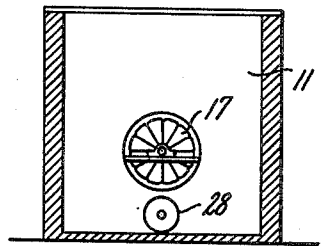

Fig. 4

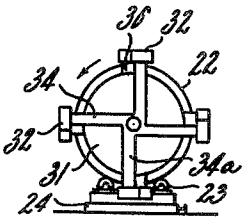

Fig. 6

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DRYING OR DESICCATING DEVICE FOR GRANULAR MATERIAL

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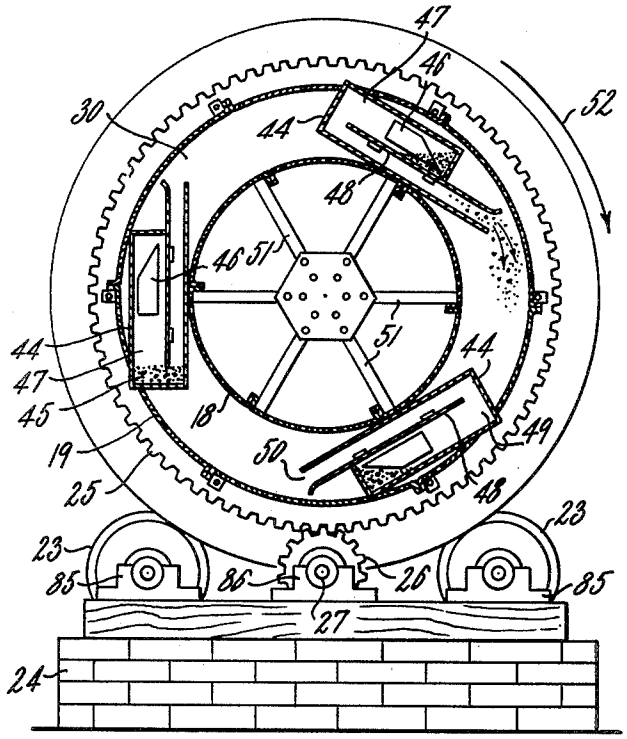

Fig. 10

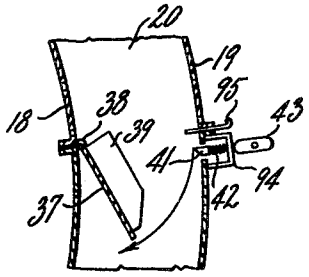

Fig. 8

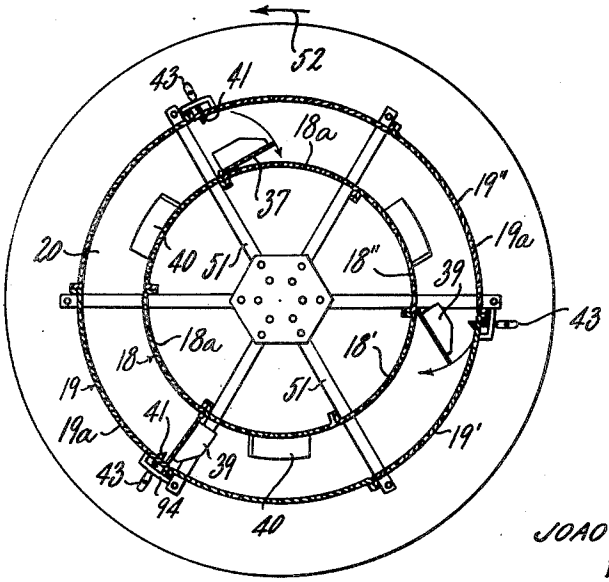

Fig. 5

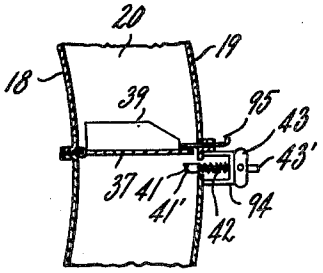

Fig. 9

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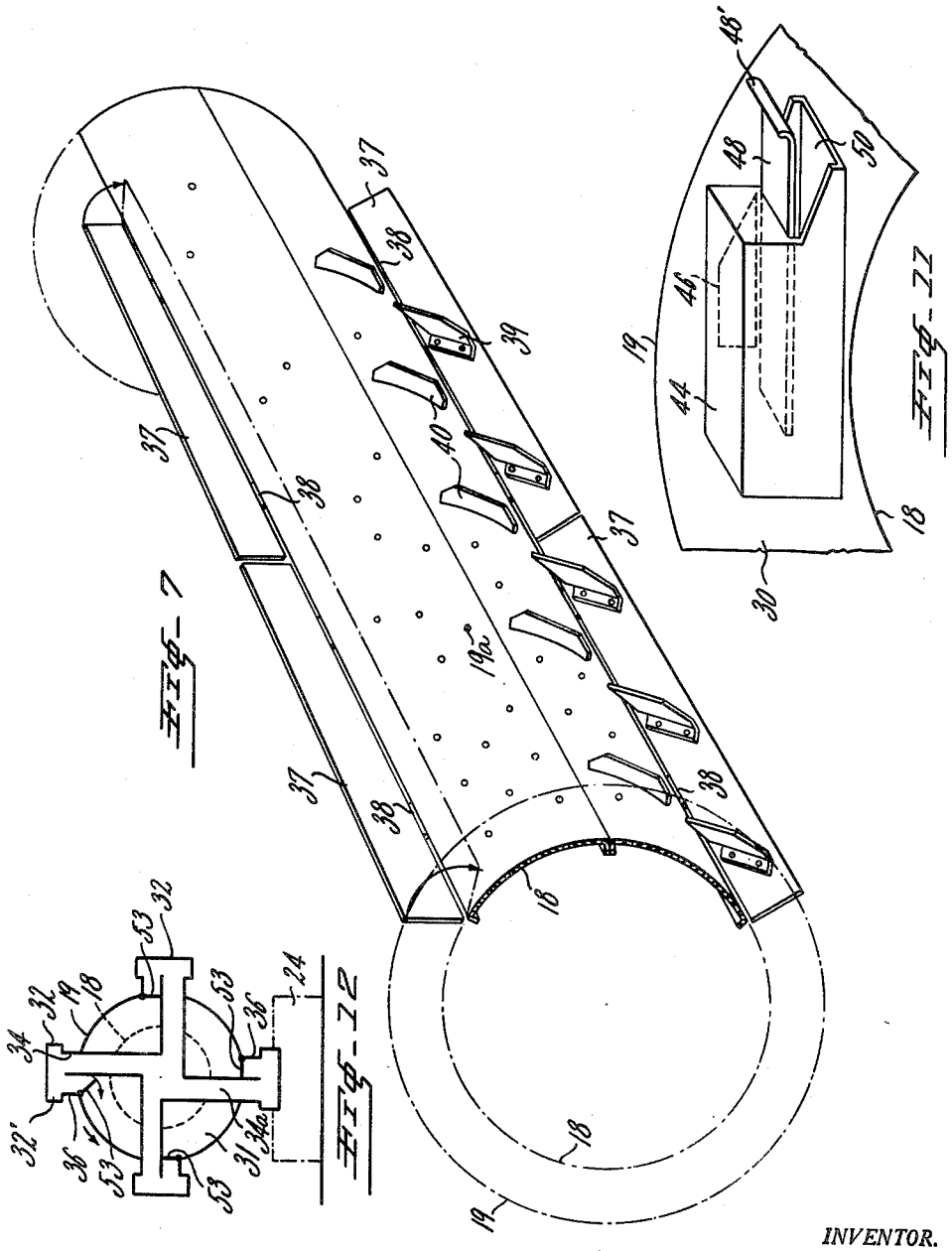
DRYING OR DESICCATING DEVICE FOR GRANULAR MATERIAL

Filed Oct. 29, 1951 3 Sheets-Sheet 3



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Patented Sept. 7, 1954

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UNITED STATES PATENT OFFICE

2,688,196

DRYING OR DESICCATING DEVICE FOR GRANULAR MATERIAL

João de Oliveira Torres, Sao Paulo, Brazil

Application October 29, 1951, Serial No. 253,742

Claims priority, application Brazil
October 30, 1950

8 Claims. (Cl. 34—109)

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The present invention relates to a drying or desiccating device for drying coffee, grains, or other agricultural materials or products.

It is an object of the present invention to provide a new furnace for burning wood which supplies the combustion gases used for desiccation or drying of the products.

It is another object of the present invention to provide a novel drying device proper.

It is a further object of the present invention to provide a drying or desiccating device which is sturdy and reliable in operation.

It is still another object of the present invention to provide a drying or desiccating device having automatic means for supplying and discharging the material to be dried.

Other objects of the present invention will become apparent from the following detailed description of an embodiment of the present invention in connection with the accompanying drawings showing an embodiment of the drying device or desiccator according to the invention by way of example.

In the drawings

Fig. 1 shows a plan view of a drying or desiccating device according to the present invention;

Fig. 2 is a cross-section along the line A—B of Fig. 1;

Fig. 3 shows a slide elevation, partly in section, of the device shown in Fig. 1;

Fig. 4 is a cross-section along the line E—F of Fig. 1;

Fig. 5 is a cross-section along the line G—H of Fig. 1 at an enlarged scale;

Fig. 6 is a cross-section along the line I—J of Fig. 1;

Fig. 7 is a perspective view of part of the device shown in Figs. 1 and 3 at an enlarged scale;

Figs. 8 and 9 show at an enlarged scale a detail of Fig. 5;

Fig. 10 is a cross section along the line K—L of Fig. 1 at an enlarged scale;

Fig. 11 shows a detail of Fig. 10 at an enlarged scale; and

Fig. 12 is an end view at a slightly enlarged scale of the device shown in Fig. 3 from the right hand side thereof, some parts being omitted for the sake of clearness.

Referring now to the drawings and first to Figs. 1 to 3, the drying or desiccating device according to the present invention comprises a furnace the brickwork of which is denoted by 70. The furnace has a combustion chamber 1 provided with a front wall 1' and a roof 1''

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shown in Fig. 2. The lower part of the combustion chamber 1 is provided with an inclined bottom 3 which leads to a horizontal discharge opening 4 arranged at the lowest level of the chamber 1. The discharge opening 4 is provided for discharging ashes from the combustion chamber 1. The combustion chamber 1 has a wall 71 (Fig. 3) arranged at right angles to the front wall 1' which is provided in the upper part thereof with a horizontal duct 5 communicating with the interior of the chamber 1. The horizontal duct 5 leads to a vertical duct 72 leading to a horizontal duct 7 arranged near the lower level of the brickwork 70 and provided with a tapering outlet 73 leading into a vertical cylindrical compartment 8 which acts as a cyclone for the combustion gases, as more fully described hereinafter.

A chimney 16 is connected to the combustion chamber 1 through the roof 1'' thereof and provided with a valve 81 which can be put into and out of operation from the outside. Above the brickwork 70 is arranged a horizontal passage 10 having an open rear end 10' and leading to a compartment 11 more fully to be described hereinafter. The horizontal passage 10 communicates with the cylindrical compartment 8 at the top thereof through an opening 15 preferably comprising a plurality of parts of gradually diminishing diameter.

The opening 15 is covered by a flap 12 which is hinged to the brickwork 70 and adjustable in position by means of a rope or cable 13 attached to the edge of the flap 12 opposite the hinge 12'. The rope or cable 13 is lead over the pulley 14 arranged at the roof of the passage 10 and can be secured in any position by the hook 80 arranged outside the brickwork 70. By pulling the rope 13 the flap 12 can be adjusted so that it gives free the opening 15 and at the same time allows air to enter the passage 10 from the open end 10' thereof. In consequence thereof the combustion gases which travel along a helical path 9 through the cylindrical compartment 8 are mixed with an adjustable amount of air and enter in this condition the compartment 11. The compartment 11 is arranged in the brickwork 71 which is arranged a distance from the brickwork 70 so as to leave a space 60 between them which is covered by a roof 61. The compartments or chambers 1, 8 and 11 and the ducts 5, 72, and 7 are defined by inner walls covered with plates or tiles consisting of a fire-proof material.

The operation of the device so far described is as follows:

Wood logs are brought into the combustion chamber 1 through the feed opening 2 thereof and fire is set to the wood. The valve 81 of the chimney 16 is opened in order to aid the initial stages of the combustion. After the wood in the combustion chamber 1 is fully afire, the valve 81 is closed and the exhaust of the combustion gases is started by means of a fan 17 more fully to be described hereinafter.

The combination gases escape from the combustion chamber 1 through the duct 5 into which an air inlet 6 leads, and enter the cylindrical compartment 8 through the narrow opening 73 of the horizontal duct 7 communicating with the horizontal duct 5 through the vertical duct 72. It should be noted that the horizontal duct 7 has a narrowed opening 73 arranged so that the combustion gases enter the cylindrical compartment 8 in a substantially tangential direction as clearly shown in Fig. 1. In consequence thereof the combustion gases travel along helical paths such as 9 toward the top of the cylindrical compartment 8. The flap 12 is adjusted so that the combustion gases may leave the cylindrical compartment 8 through the opening 15 at a certain rate and are mixed with fresh air entering through the open rear end 10' of the horizontal passage 10. By a suitable adjustment of the flap 12 by means of the rope or cable 13 any ratio of combustion gases and air can be obtained. The mixture of air and combustion gases is carried in the direction of the arrows in Fig. 3 through the horizontal passage 10 and enters the compartment 11 at the top thereof.

The cylindrical compartment 8 serves as a cyclone for the combustion gases separating ashes and other undesirable solid particles therefrom. This effect is aided by the exit opening 15 of the cylindrical compartment 8. Then the mixture of combustion gases and air is exhausted from the compartment 11 by means of a fan 17.

Referring now to Figs. 1 and 3 to 7, the drying device proper comprises two horizontally arranged coaxial cylindrical drums 18 and 19 having a common axis. The inner drum 18 protrudes beyond the rear end of the outer drum 19 into the brickwork 71 of the compartment 11. The drums 18 and 19 consist of perforated walls of a mesh size sufficiently fine to prevent the material to be dried from passing through the meshes whereas the extension 21 of the inner drum 18 has a non-perforated wall.

The fan 17 is arranged inside the entrance opening of the extension 21 and connected to one end of a shaft 17' extending transversally through the compartment 11 and carrying at its other end a pulley 29 arranged in the space 60. The pulley 29 is driven by a belt (not shown) or the like.

Furthermore the compartment 11 is traversed by a shaft 27 to be more fully described hereinafter which carries at one end thereof a pulley 28 also arranged in the space 60 and driven by a belt (not shown) or the like.

The outer drum 19 and the inner drum 18 are separated from each other by an annular space 20. Rings 22 are rigidly secured to the outer drum 19 at a distance apart from each other and supported by supporting discs 23 which can freely rotate in bearings 85 secured to a base plate 24. Furthermore, a toothed wheel 25 is rigidly secured to the outside of the drum 19 close to one of the rings 22 and is engaged by a pinion

26 secured to the other end of the shaft 27 and being rotatable in bearings 86 (Fig. 10) rigidly secured to the base plate 24.

The space 20 is closed at the end thereof opposite to the compartment 11 (termed hereinafter the second end) by an annular plate 30 (Figs. 11 and 10) rigidly connected to the drums 18 and 19. At the opposite end (termed hereinafter the first end) the drums 18 and 19 are closed by a circular plate 31 rigidly connected therewith (Fig. 3). If the shaft 27 is driven from the pulley 28 thereof the pinion 26 is rotated and therefore the outer drum 19 is rotated in the direction of the arrow 52 shown in Fig. 10. The rotation is transferred to the inner drum 18 by means of the annular plate 30 and the circular plate 31 so that both drums 18 and 19 rotate about the common axis thereof.

The plate 31 carries the feeding device comprising four box-like compartments 32 (Fig. 6) arranged at the end of four ducts 34 extending substantially parallel respectively to four radii, thus forming right angles with one another. The ducts 34 are arranged excentrically with respect to the common axis of rotation of the drums 18 and 19 and are longer than the radius of the drum 19 so that the box-like compartments 32 are arranged outside the perimeter of the drum 19 (Figs. 6 and 12). A hopper 33 supported by rods or bars 90 (Figs. 1 and 3) communicates with a stationary circular inlet 35 (Figs. 1, 3 and 6) arranged at the center of the circular plate 31 from which material to be dried is delivered to the duct 34*a* when same assumes a vertical position and is downwardly directed. The box-like compartments 32 are arranged, as shown in Figs. 1 and 3, at an angle to the cross-sectional planes of the drum 19 and have extensions 32' (Fig. 12) in the direction of the rotation thereof which extensions are connected to ducts 36 opening into the space 20 defined by the circular plate 31.

The ducts 36 are as a rule closed by hinged flaps 53 except in the uppermost position thereof as will be seen from Fig. 12. Therefore the product or material to be dried which is delivered through the hopper 33 enters the central inlet 35 and from there the duct 34*a* which has at the time a position extending vertically downwardly. From the duct 34*a* it enters the box-like compartment 32 and is guided eventually into the extension 32' thereof. When the box-like compartment 32 reaches the uppermost position thereof the material is at least partly transferred to the duct 36 connected to the extension 32' from whence it is transferred to the space 20 between the drums 18 and 19 through the flap 53 which is at that moment under the influence of gravity in the open position. If the annular space or chamber 20 is filled with material any further material is returned to the inlet 35 of the mill hopper 33 so that the feeding is done in an automatic way and adjusted in relatively small portions for continuous feeding. The material cannot return from the chamber or space 20 to the box-like compartments 32 because the opening of each duct 36 except that one being in the uppermost position is closed by the respective flaps 53, thus preventing the material to be dried from flowing back from the annular space 20 to the box-like compartments 32.

Referring now to Figs. 5 and 7 to 9 it will be seen that the inner space 20 between the two cylindrical drums 18 and 19 can be subdivided

in longitudinal direction into three parts by movable walls 37 hinged at 38 to the outer surface of the inner drum 18. Preferably the walls 37 comprise several, for instance two sections as shown in Fig. 7.

At one side the movable flap walls 37 are provided with baffles 39 which are rigidly connected thereto and set at an angle so as to be part of helicoidal surfaces surrounding the inner drum 18 when the flap walls 37 are in an erected position in which they extend substantially through the whole distance or width between the drums 18 and 19 as shown in Fig. 9. Furthermore the drum 18 is provided with stationary baffles 40 which are rigidly connected thereto and also provided with helicoidal surfaces. As will be seen from Fig. 5, each of the drums 18 and 19 comprises six sections, such as 18', 18'' and 19', 19'', each occupying one sixth of the perimeter of the drums 18 and 19, respectively. The hinges 38 of the movable walls 37 are arranged at the junction of two consecutive sections such as 18' and 18'' of the inner drum 18 and the baffles 40 approximately at the center of the sections such as seen at section 18'', preceding the hinges 38 in the direction of rotation of the drums indicated by the arrow 52 in Fig. 5. If the flap walls 37 are brought to non-erected position, the baffles 39 arrange themselves in a row adjacent to the sectors such as 18'.

It is to be mentioned that annular chamber or space 20 is subdivided by flap plates 30 in order that granular material located on the left hand side of Fig. 5 will be divided and then lifted by means of plates 37 while the material on top of space 20 falls on the right hand side of Fig. 5 to the bottom portion of space 20. Therefore flap means 37 cooperate with baffles 40 to advance the granular material gradually towards the outlet at plate 30. When all the flap plates 37 are locked in a position shown in Fig. 9 advance of the granular material towards the discharge outlet of the drum is prevented. Therefore, it is obvious that flap means 37 have a dual function and extreme utility. In the first place, the flap means 37 prevent concentration of the granular and like material on the bottom of the drums and in the second place the flap means 37 when locked in a position shown in Fig. 9, control the advancing or feed of the granular material and the like towards the discharge outlet of the drums 18, 19. The continuous discharge of the dried material and rotation of drums 18, 19 produce a relatively small empty space in the upper part of the annular chamber 20 (not shown), where the material slides by gravity downward.

When starting the drier or desiccator the walls 37 are raised but later on they are turned about the hinges 38 in the manner described more fully hereinafter. The baffles 39 and 40 move the material to be dried and convey the same continuously from the plate 31 at the charging end of the annular space 20 toward the plate 30 where the material is discharged by a discharging device to be more fully described hereinafter.

The walls 37 are temporarily brought into the erected position and locked therein.

In order to accomplish this the outer drum 19 is provided with latches 41 shiftably arranged in radial direction in external housings 94, respectively, having stems 43', on which are wound springs 42 which act upon the latches 41 and urge the same into a position in which they protrude beyond the inner surface of the outer drum 19 (Fig. 9). The latches 41 are provided with an inclined surface 41' enabling the flap walls 37 to pass by the latches 41 against the force of the springs 42. An oblong handle 43 is pivoted to the stem 43' of the latches 41 and can be brought into a position in which it abuts with one end thereof against the housing 94 and locks the latch 41 in the retracted position thereof (Fig. 8). Furthermore a stop 95 is shiftably arranged on the side of the housing 94 which leads in the direction of rotation of the drum 19. The stops 95 can be operated so as to protrude beyond the inner surface of the outer drum 19 (Fig. 9) or to be withdrawn into an inoperative position as shown in Fig. 8.

The operation of this device is as follows:

The drums 18 and 19 rotate in the direction of the arrow 52 so that the left hand side of the drums seen in Fig. 5 is descending whereas the right hand side thereof is ascending. At the start of the rotation of the drums 18 and 19 before the space 20 has been filled with material, the latches 41 and the stops 95 are brought into the position in which they extend beyond the inner surface of the outer drum 19 (Fig. 9) and therefore the flap walls 37 in the descending part of the drums 18 and 19 shown in the left half of Fig. 5 are swung by gravity about the hinges 38 and strike against the protruding ends 41' of the latches 41, thus pressing the same back against the force of the springs 42.

After a wall 37 has passed a latch 41 it is held in an erected position by the stop 95 and the associated latch 41 (Fig. 9). When the parts of the space 20 are filled with material the latches 41 and the stops 95 are pulled back into the position shown in Fig. 8, the latches 41 being secured in retracted position by the handles 43 which are turned about the pivots thereof so that in the ascending part of the drums 18 and 19 the walls 37 are swung by gravity about the hinges 38 from the erected position shown in Fig. 9 into the position shown in Fig. 8 and rest eventually against the surface of the inner drum 18.

It should be noted that any number of flap walls 37 and baffles 39 and 40 may be provided, the number shown in the drawings being only an example.

On the other side of the drums 18 and 19 fixed to the annular plate 30 is the discharging device. The latter comprises a plurality of boxes 44 the shape of which will become clear from Figs. 10 and 11. The boxes 44 are arranged around the extension 21 of the inner drum 18 as shown in Figs. 1 and 3. Each of the boxes 44 is in communication with the annular space 20 by an opening 46 through which the dried material enters the boxes 44, if the latter are in the lower part of the annular space 20. The boxes 44 have each an internal baffle or partition 48 which is arranged at a distance from the bottom wall of the associated box 44 so as to leave an undivided part 49 of the same. The baffles or partitions 48 define with one of the side walls of the boxes 44, respectively, outlets 50 for the discharge of the material which are arranged opposite to the parts 47 into which the openings 46 open.

The operation of this device is as follows:

If one of the boxes 44 is situated in the lower part of the drums 18 and 19, the material 45 enters through the opening 46 the zone 47 of the box 44 and during the upward movement thereof the material slides to the undivided part 49 of the box 44 which it fills when the same is

in the position shown to the left in Fig. 10. The box 44 continues its movement and reaches the top of the drums 18 and 19, so that the material slides to the other side of the partition or baffle 48 and leaves the box 44 through the discharge outlet 50 and is collected by a collecting device (not shown). The partition or baffle 48 is preferably provided with a handle 48' so as to be adjustable as shown in Fig. 11 so that the boxes 44 can be prevented from discharging any material by pushing the partition or baffle 48 to its innermost position in which it is in contact with the small side of the box 44.

The interior of the drum 18 is provided with radial spikes 51 in order to strengthen the inner drum 18.

The operation of the parts of the device has been described hereinabove. However, it should be noted that the material is supplied through the hopper 33 and is conveyed through the annular space 20 in opposition to the hot gases admitted to the annular space 20. The hot gases are delivered by the fan 17 and pass through the interior of the inner drum 18 and enter the space 20 by the perforated wall at 18a of the inner drum 18 so as to come into intimate contact with the material to be dried which is permanently traveling from the delivery end of the space 20 to the discharge end thereof. The gases leave the material after having removed the moisture thereof through the perforations 19a of the outer drum 19. The material which has traveled from the charging side of the space 20 near the circular plate 31 to the discharge side of the space 20 near the annular plate 30 is discharged there in a dried condition as described hereinabove.

While I have illustrated and described the invention as embodied in a drying device for drying coffee, grains, or like material or products, I do not intend to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of my invention.

What I claim as new and desire to secure by Letters Patent is:

1. A device for drying a material such as coffee, grains, or the like, comprising in combination: a first cylindrical drum arranged horizontally; a second cylindrical drum arranged coaxially to said first drum so as to surround the same and to define an annular space therewith, said annular space having a first end and a second end, said first drum and said second drum having perforated walls; means for delivering the material to be dried to said first end of said annular space; means for discharging the dried material from said second end of said annular space; means for introducing a flow of hot gases to the interior of said first drum at said second end of said annular space, whereby the hot gases penetrate into said annular space filled with the material to be dried through the perforated wall of said first drum and leave said annular space after having dried the material through the perforated wall of said second drum; means for rigidly connecting said first drum and said second drum; means for rotating said second drum about the common axis of said first drum and said second drum whereby both said first drum and said second drum are rotated about the common axis thereof; and walls hinged to the outer surface of said first drum in the longitudinal direction thereof, said walls subdividing in the erect position thereof said annular position space into a plurality of parts extending in the longitudinal direction thereof.

2. A device for drying a material such as coffee, grains, or the like, comprising in combination: a first cylindrical drum arranged horizontally; a second cylindrical drum arranged coaxially to said first drum so as to surround the same and to define an annular space therewith, said annular space having a first end and a second end, said first drum and said second drum having perforated walls; means for delivering the material to be dried to said first end of said annular space; means for discharging the dried material from said second end of said annular space; means for introducing a flow of hot gases to the interior of said first drum at said second end of said annular space, whereby the hot gases penetrate into said annular space filled with the material to be dried through the perforated wall of said first drum and leave said annular space after having dried the material through the perforated wall of said second drum; means for rigidly connecting said first drum and said second drum; means for rotating said second drum about the common axis of said first drum and said second drum whereby both said first drum and said second drum are rotated about the common axis thereof; walls hinged to the outer surface of said first drum in the longitudinal direction thereof, said walls subdividing in the erect position thereof said annular position space into a plurality of parts extending in the longitudinal direction thereof; and baffles rigidly connected to said hinged walls, said baffles lying in helicoidal surfaces surrounding said first drum in the erect position of said walls.

3. A device for drying a material such as coffee, grains, or the like, comprising in combination: a first cylindrical drum arranged horizontally; a second cylindrical drum arranged coaxially to said first drum so as to surround the same and to define an annular space therewith, said annular space having a first end and a second end, said first drum and said second drum having perforated walls; means for delivering the material to be dried to said first end of said annular space; means for discharging the dried material from said second end of said annular space; means for introducing a flow of hot gases to the interior of said first drum at said second end of said annular space, whereby the hot gases penetrate into said annular space filled with the material to be dried through the perforated wall of said first drum and leave said annular space after having dried the material through the perforated wall of said second drum; means for rigidly connecting said first drum and said second drum; means for rotating said second drum about the common axis of said first drum and said second drum whereby both said first drum and said second drum are rotated about the common axis thereof; walls hinged to the outer surface of said first drum in the longitudinal direction thereof, said walls subdividing in the erect position thereof said annular position space into a plurality of parts extending in the longitudinal direction thereof; baffles rigidly connected to said hinged walls, said baffles lying in helicoidal surfaces surrounding said first drum in the erect position of said walls; and baffles rigidly connected to the outer surface of said first drum.

4. A device for drying a material such as coffee, grains, or the like, comprising in combination: a first cylindrical drum arranged horizontally; a second cylindrical drum arranged coaxially to said first drum so as to surround the same and to define an annular space therewith, said annular space having a first end and a second end, said first drum and said second drum having perforated walls; means for delivering the material to be dried to said first end of said annular space; means for discharging the dried material from said second end of said annular space; means for introducing a flow of hot gases to the interior of said first drum at said second end of said annular space, whereby the hot gases penetrate into said annular space filled with the material to be dried through the perforated wall of said first drum and leave said annular space after having dried the material through the perforated wall of said second drum; means for rigidly connecting said first drum and said second drum; means for rotating said second drum about the common axis of said first drum and said second drum whereby both said first drum and said second drum are rotated about the common axis thereof; walls hinged to the outer surface of said first drum in the longitudinal direction thereof, said walls subdividing in the erect position thereof said annular position space into a plurality of parts extending in the longitudinal direction thereof; and means connected to said second drum for temporarily locking said walls in the erected positions thereof.

5. A device for drying a material such as coffee, grains, or the like, comprising in combination: a first cylindrical drum arranged horizontally; a second cylindrical drum arranged coaxially to said first drum so as to surround the same and to define an annular space therewith, said annular space having a first end and a second end, said first drum and said second drum having perforated walls; means for delivering the material to be dried to said first end of said annular space; means for discharging the dried material from said second end of said annular space; means for introducing a flow of hot gases to the interior of said first drum at said second end of said annular space, whereby the hot gases penetrate into said annular space filled with the material to be dried through the perforated wall of said first drum and leave said annular space after having dried the material through the perforated wall of said second drum; means for rigidly connecting said first drum and said second drum; means for rotating said second drum about the common axis of said first drum and said second drum whereby both said first drum and said second drum are rotated about the common axis thereof; walls hinged to the outer surface of said first drum in the longitudinal direction thereof, said walls subdividing in the erect position thereof said annular position space into a plurality of parts extending in the longitudinal direction thereof; baffles rigidly connected to said hinged walls, said baffles lying in helicoidal surfaces surrounding said first drum in the erect position of said walls; baffles rigidly connected to the outer surface of said first drum; and means connected to said second drum for temporarily locking said walls in the erected positions thereof.

6. A device for drying a material such as coffee, grains, or the like, comprising in combination: a first cylindrical drum arranged horizontally; a second cylindrical drum arranged coaxially to said first drum so as to surround the same and to define an annular space therewith, said annular space having a first end and a second end, said first drum and said second drum having perforated walls; a plurality of ducts arranged substantially radially outside said first end of said annular space; means for feeding the material to be dried to said ducts at the ends thereof near the axis of said drums; box-like compartments arranged, respectively, at the other ends of said ducts and communicating with the same, said box-like compartments communicating, respectively, through openings with said annular space; means for preventing the material to be dried from flowing back from said annular space to said box-like compartments; means for discharging the dried material from said second end of said annular space; and means for introducing a flow of hot gases to the interior of said first drum at said second end of said annular space, whereby the hot gases penetrate into said annular space filled with the material to be dried through the perforated wall of said first drum and leave said annular space after having dried the material through the perforated wall of said second drum.

7. A device for drying a material such as coffee, grains, or the like, comprising in combination: a first cylindrical drum arranged horizontally; a second cylindrical drum arranged coaxially to said first drum so as to surround the same and to define an annular space therewith, said annular space having a first end and a second end, said first drum and said second drum having perforated walls; a plurality of ducts arranged substantially radially outside said first end of said annular space; means for feeding the material to be dried to said ducts at the ends thereof near the axis of said drums; box-like compartments arranged, respectively, at the other ends of said ducts and communicating with the same, said box-like compartments communicating, respectively, through openings with said annular space; means for preventing the material to be dried from flowing back from said annular space to said box-like compartments; means for discharging the dried material from said second end of said annular space; and means for introducing a flow of hot gases to the interior of said first drum at said second end of said annular space, whereby the hot gases penetrate into said annular space filled with the material to be dried through the perforated wall of said first drum and leave said annular space after having dried the material through the perforated wall of said second drum.

8. A device for drying a material such as coffee, grains, or the like, comprising in combination: a first cylindrical drum arranged horizontally; a second cylindrical drum arranged coaxially to said first drum so as to surround the same and to define an annular space therewith, said annular space having a first end and a second end, said first drum and said second drum having perforated walls; a plurality of ducts arranged substantially radially outside said first end of said annular space; means for feeding the material to be dried to said ducts at the ends thereof near the axis of said drums; box-like compartments arranged, respectively, at the other ends of said ducts and communicating with the same, said box-like compartments communicating, respectively, through openings with said annular space; means for preventing the material to be dried from flowing back from said

annular space to said box-like compartments; means for delivering the material to be dried to said first end of the said annular space; means for discharging the dried material from said second end of said annular space; means for introducing a flow of hot gases to the interior of said first drum at said second end of said annular space, whereby the hot gases penetrate into said annular space filled with the material to be dried through the perforated wall of said first drum and leave said annular space after having dried the material through the perforated wall of said second drum; means for rigidly connecting said first drum and said second drum; means for rotating said second drum about the common axis of said first drum and said second drum whereby both said first drum and said second drum are rotated about the common axis thereof; walls hinged to the outer surface of

said first drum in the longitudinal direction thereof, said walls subdividing in the erect position thereof said annular position space into a plurality of parts extending in the longitudinal direction thereof; and means connected to said second drum for temporarily locking said walls in the erected positions thereof.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
231,384	Wiesebrock	Aug. 17, 1880
644,057	Carmen	Feb. 27, 1900
889,560	Thull	June 2, 1908
1,415,990	Carstens	May 16, 1922
1,518,966	Damon	Dec. 9, 1924
1,792,935	Schweiter	Feb. 17, 1931
2,007,298	Fasting	July 9, 1935