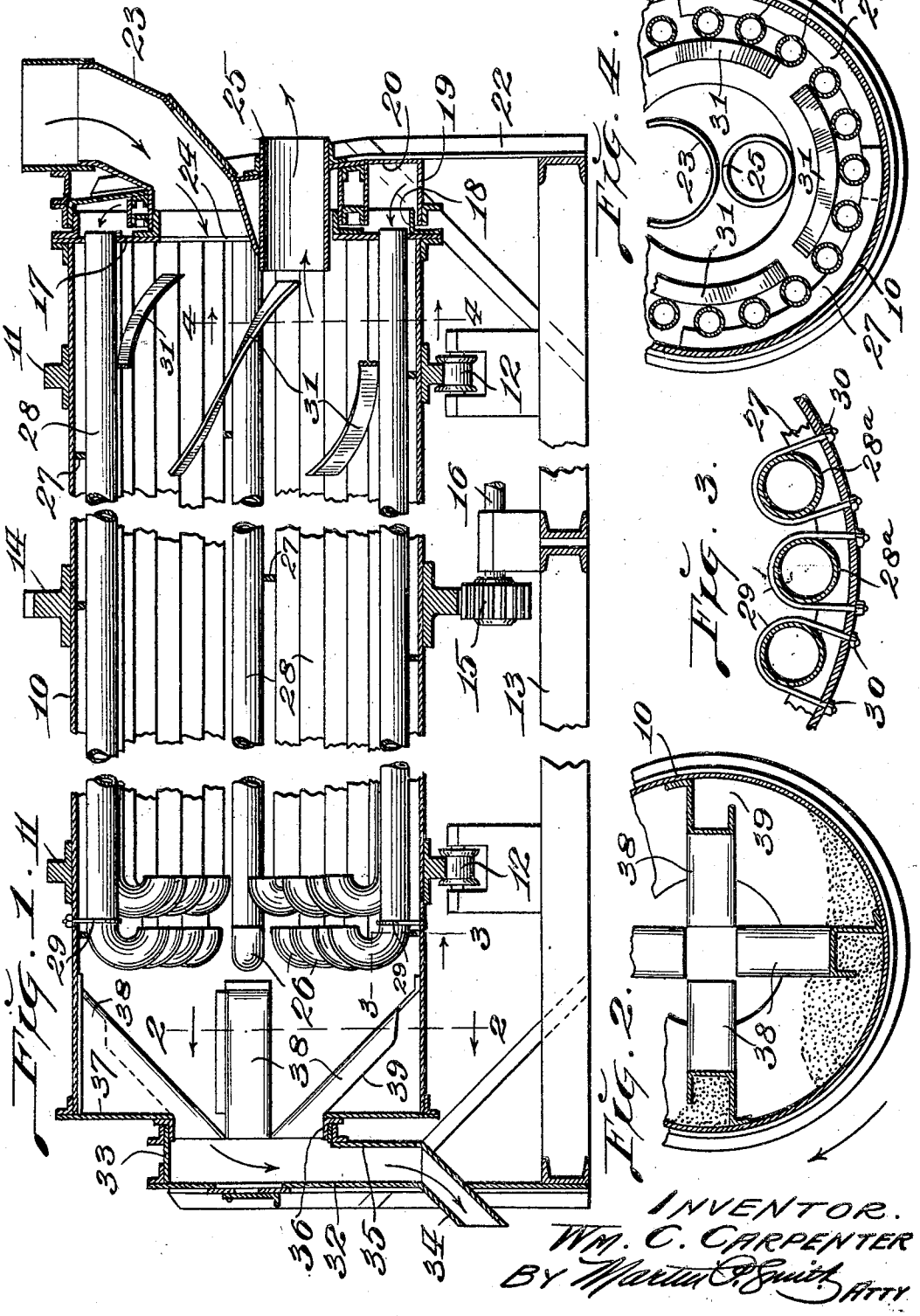
Sept. 15, 1931. W. C. CARPENTER 1,823,189

DRIER

Filed Oct. 9, 1929 2 Sheets-Sheet 1



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DRIER

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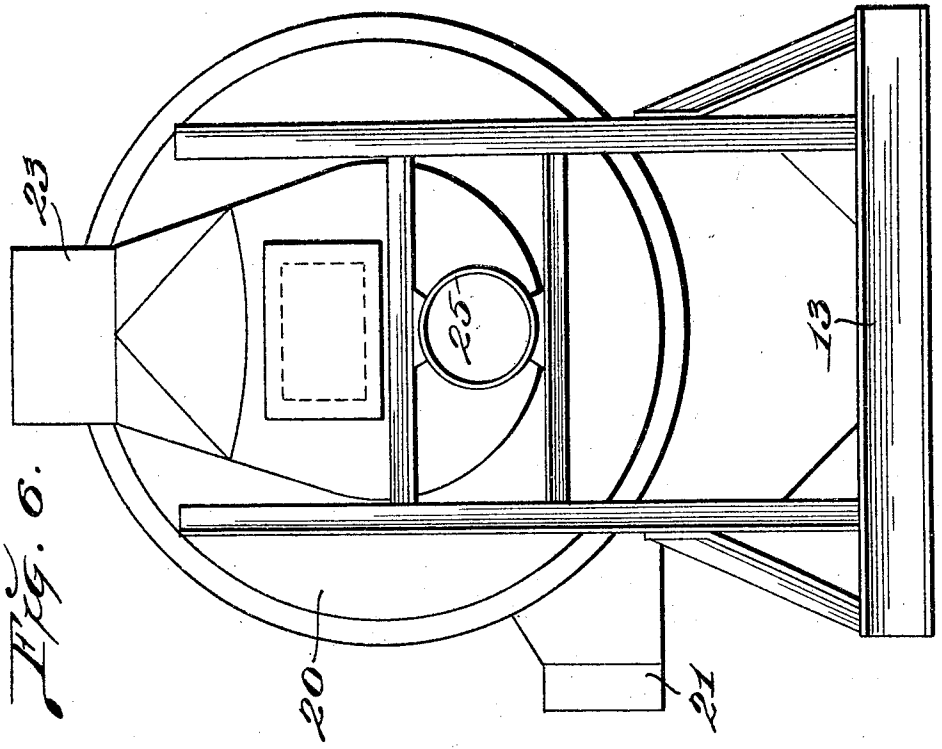


Fig. 6.

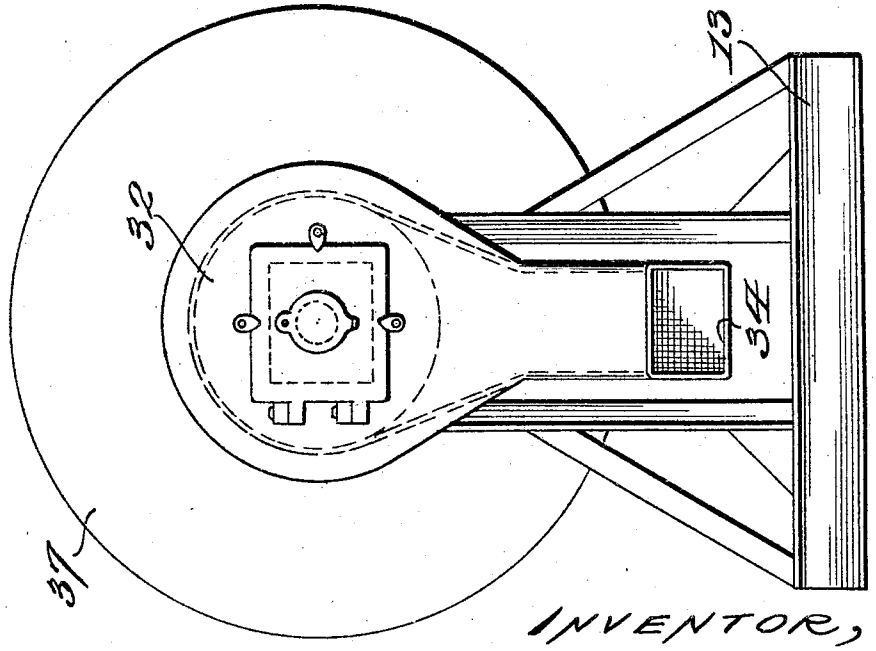


Fig. 5.

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Patented Sept. 15, 1931 1,823,189

UNITED STATES PATENT OFFICE

WILLIAM CLARENCE CARPENTER, OF SAN FRANCISCO, CALIFORNIA

DRIER

Application filed October 9, 1929. Serial No. 398,521.

My invention relates to a drier that is particularly designed for effecting a comparative rapid drying of comminuted substances such as sawdust, fine shavings or other pulverized vegetable material and my present invention is an improvement upon the drier for which U. S. Letters Patent No. 1,655,724 were issued to me January 10th, 1928.

The principal objects of my present invention are, to generally improve upon and simplify the construction of the drier disclosed in my aforesaid patent as well as other similar types of driers and further, to provide a drier of the rotary drum type so as to bring about the continuous drying of comminuted or pulverized material that is delivered into one end of the rotary drum and which discharges in a thoroughly dried condition at the other end of said drum.

Further objects of my invention are, to provide a drier having a pair of stationary heads between which is arranged a rotary drum, the latter having arranged on its interior, a series of heated air pipes or conduits that extend longitudinally through the drum adjacent to the wall thereof, and further, to provide improved means for effecting a delivery or feed of the material to be dried through one of the stationary heads of the drum and to provide simple and efficient means for effecting the discharge of the dried material through the stationary head at the opposite end of the drum.

Further objects of my invention are, to provide improved means for holding the heater air pipes firmly in position within the drum and in proper spaced relation thereto and further, to provide means arranged on the interior of the drum and the heating pipes extending therethrough for engaging and pulling the material away from the chute or opening through which said material is delivered into the drum.

With the foregoing and other objects in view, my invention consists in certain novel features of construction and arrangement of parts that will hereinafter be more fully described and claimed and illustrated in the accompanying drawings, in which:

Fig. 1 is a vertical section taken lengthwise through the center of a drier embodying the principles of my invention.

Fig. 2 is a cross section taken on the line 2—2 of Fig. 1.

Fig. 3 is an enlarged detail section taken on the line 3—3 of Fig. 1.

Fig. 4 is a cross section taken on the line 4—4 of Fig. 1.

Fig. 5 is an elevational view of the rear or discharge end of the drier.

Fig. 6 is an elevational view of the front or inlet end of the drier.

Referring by numerals to the accompanying drawings which illustrate a practical embodiment of my invention, 10 designates the elongated hollow cylindrical body of the drier which body is formed of suitable sheet metal and encircling said body and spaced at suitable distances apart are ring rails 11 that are mounted on suitable rolling supports 12.

These rolling supports are journaled in suitable bearings that are mounted on the base portion 13 of a frame, preferably formed of structural steel and arranged on the intermediate portion of the body of the drum is a circular rack 14, the teeth of which are engaged by a gear wheel 15 and the latter being mounted on a suitably driven shaft 16.

Secured to the forward end of the body 10 of the drum is a head or plate 17 of suitable sheet metal and secured to the outer face of this plate at the edge thereof is an outwardly projecting flange 18.

This flange projects into the circular outer wall 19 of a ring shaped housing 20 formed of sheet metal and which surrounds the outer portion of plate 17. Extending laterally from the lower portion of the housing 20 is a tubular member 21 that is connected in any suitable manner to a source of heated air supply, for instance, a furnace.

The ring shaped housing 20 is supported by an upright frame work 22, the lower portion of which is rigidly fixed to base 13 and supported by the upper portion of this frame work 22 is a relatively large material inlet tube or chute 23, the lower end of which communicates with an inlet opening 24 that is formed in plate 17 above the center thereof.

Suitably secured to the upright frame 22, just below the inlet chute 23, is a horizontally disposed tube 25 that projects through an opening in plate 17 and the tube 25 is for the purpose of permitting of the heated air to escape from the interior of the drum after it has passed therethrough and acted upon the material that passes through said drum.

Secured in any suitable manner in the head or plate 17 and spaced a short distance away from the wall of the drum 10 is a series of heated air conduits 28 in the form of sheet metal tubes. These heating tubes or conduits extend longitudinally through the body of the drum and at points a short distance inwardly from the rear end of the drum these tubes are rebent so as to form open ended gooseneck portions 26 that project toward the inlet end of the drier.

These heated air ducts are spaced apart from the wall of the drum by suitably located spacers 27 that are secured in any suitable manner to the wall of the drum and which spacing members are notched as designated by 28^a, thereby providing saddles in which the heating tubes rest. The tubes are firmly secured to the wall of the drum by straps or U-bolts 29 which pass around said tubes and the ends of said straps or bolts pass through the wall of the drum and receive nuts 30 on their outer threaded ends (see Fig. 3).

Secured in any suitable manner to the inner faces of the conduits or tubes 28, adjacent to the front plate or head 17 is a series of inclined or spirally disposed blades or flights 31 that serve to engage the pulverized material as it discharges into the drum from chute 23 as the drier is in operation and thus the incoming pulverized material is pulled away from the inlet opening so as to prevent undue accumulation of the material at the forward or inlet end of the drier. Thus the material delivered into the drier is prevented from clogging the vent or outlet 25 through which the heated air and gases discharge from the heating chamber within the drier.

Secured to the rear end of base 13 is an upright frame 32 and secured to the upper portion thereof is a circular housing 33, preferably formed of sheet metal and from the underside of which leads downwardly, a discharge chute 34.

The inner portion of the circular wall of housing 33 is surrounded by a flange 35 and projecting into this flange is a flange 36 that projects outwardly from a plate or head 37 and which latter is secured to the rear end of the wall of body 10.

Flange 36 surrounds an outlet opening that is formed in the center of plate 37.

Secured to the inner face of the wall of body 10 adjacent to plate 37 is a series of radially disposed inclined discharge chutes 38 formed of sheet metal and the open outer ends of these chutes extend through the opening in the center of plate 37 and which opening is encircled by flange 36. A portion of one side wall of each of these chutes 38 is cut away as designated by 39 in order to form an opening into the side of the chute and as a result when the drum is rotated dried material will enter the opening 39 as the chutes move through the lowermost portion of their travel and this material is carried upward until the chutes reach the upper portion of their travel, whereupon the material will discharge downwardly through the open outer ends of said chutes into the housing 33 and from thence the dried material will discharge through chute 34 into a bin receptacle or carrier.

In the operation of my improved drier drum 10 is rotated as a result of the engagement of gear wheel 15 with the circular rack 14 and the material to be dried discharges into the forward end of the drum through chute 23. Heated air from the furnace that is connected to the circular housing 18 by means of the inlet extension 21 will pass around the chamber within said circular housing 18 and pass into and through the ducts or tubes 28, thereby heating the same.

It will be understood that, in order to bring about a gradual movement of the material longitudinally through the body of the drier, the latter must be arranged so that it occupies a slightly inclined position with its rear end lower than the forward end. The heated air, after passing through the pipes or ducts 28 discharges from the rebent ends 26 thereof and passes through the chamber in the center of the drum to the forward end thereof and finally discharges from said drum through vent or outlet opening 25 and said air carries with it those gases that have been expelled from the material during the drying operation.

The material discharged into the drum is drawn away from the head end thereof by the spirally disposed flights 31 which act as screws to start the material rearwardly through the drum and thus said material is prevented from clogging the vent or outlet 25.

As the drum is rotated the material will be constantly agitated as it passes over the tubes 28 through which the heated air is passing and as the material comes in direct contact with the heated tubes the moisture will be expelled from said material and in a comparatively short period of time the material will pass lengthwise through the drum and upon reaching the rear end thereof it will be picked up by the discharge chutes 38 and finally discharged by said chute into the housing 33 and the outlet chute 34 leading therefrom.

By arranging the heated air ducts 28 adjacent to the circular wall of the heater a comparatively large heating area is provided

within the drum and as a result the material that passes through the drier will be thoroughly dried within a comparatively short period of time.

The flow of air from the rebent ends 26 of the heating tubes is insufficient to carry anything but the fine particles of dust forwardly through the drum to the vent or outlet 25.

Thus it will be seen that I have provided a drier of the rotary type which may be operated for the continuous drying of material such as sawdust, shavings, comminuted vegetable material or the like and which drier is relatively simple in construction, capable of being operated economically and which drier is very effective in performing the functions for which it is intended.

It will be understood that minor changes in the size, form and construction of the various parts of my improved drier may be made and substituted for those herein shown and described without departing from the spirit of my invention, the scope of which is set forth in the appended claims.

I claim as my invention:

1. In a drier, a rotary drum, a head on the end of said drum, said head being provided with a centrally arranged discharge opening, a series of radially disposed inclined chutes arranged on the interior of the drum adjacent to said head the open outer ends of which chutes terminate at said discharge opening, each chute being substantially U-shape in cross section and a portion of one of the side walls of each chute adjacent to the wall of the drum being cut away for the entrance of material into the chute.

2. In a drier, a rotary drum, a head on one end thereof, which head is provided with a dried material outlet spacing, a head on the opposite end of said drum, which last mentioned head is provided with a centrally arranged opening, a series of tubes extending lengthwise within the drum, said tubes at one end being seated in the outer portion of the head that is provided with the centrally arranged opening, a heated air housing arranged immediately adjacent to the head having the centrally arranged opening, overlapping flanges on said housing and head for preventing the inlet and outlet of air, a material inlet chute passing through the heated air housing and communicating with the opening in the adjacent head, an air outlet tube seated in the heated air housing below the material inlet chute and projecting through the centrally arranged opening in the adjacent head and a series of spirally disposed flights arranged on the tubes within the drum adjacent to the head having the centrally arranged opening.

In testimony whereof I affix my signature.

WILLIAM CLARENCE CARPENTER.