

May 16, 1933.

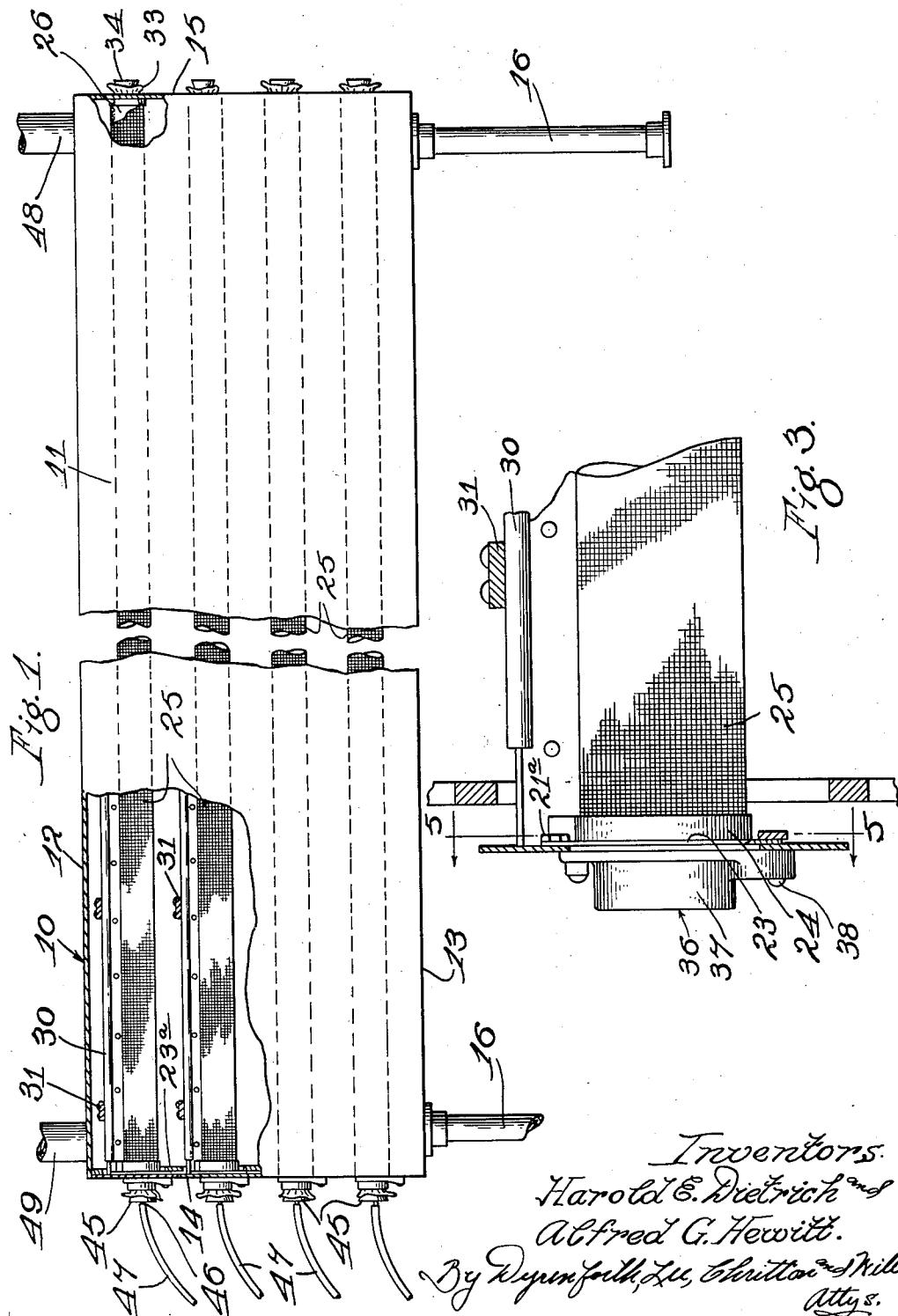
H. E. DIETRICH ET AL

1,908,892

DRYING APPARATUS

Filed Aug. 23, 1930

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Fig. 2.

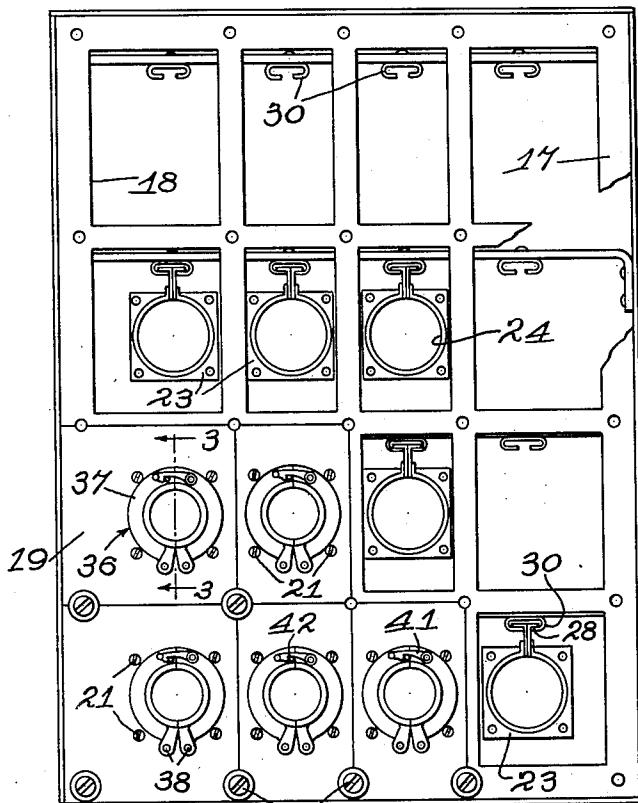


Fig. 5.

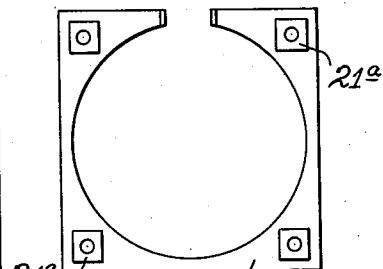


Fig. 6.

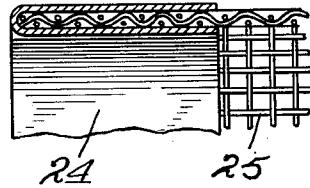


Fig. 4.

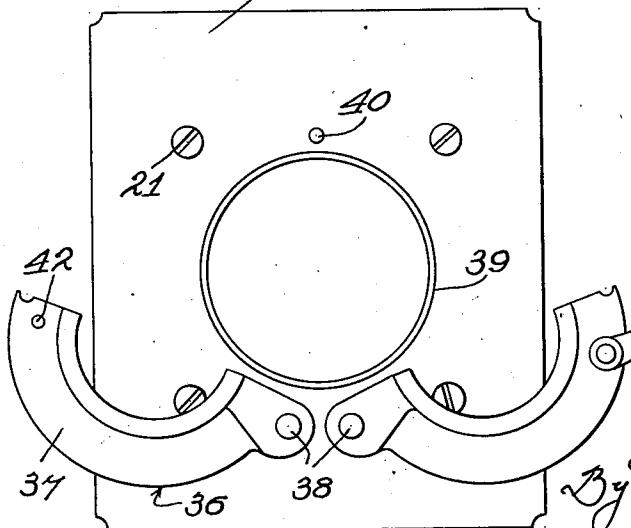
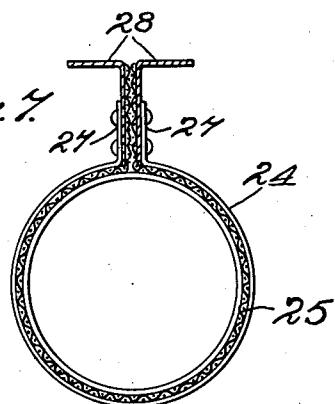


Fig. 7.



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## UNITED STATES PATENT OFFICE

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## DRYING APPARATUS

Application filed August 23, 1930. Serial No. 477,358.

The invention relates to drying apparatus, and particularly to apparatus for drying sausage casings or tubes formed from cellulose.

5 Cellulose sausage casings or tubes are formed from a viscose which is obtained by practicing the method described in United States Letters Patent 1,612,508 granted to William F. Henderson and Harold E. Dietrich, December 28, 1926. The viscose is extruded through an annular orifice to form the tubing and the tubing is then subjected to coagulating and regenerating baths, the excess coagulating and regenerating liquids 10 being washed from the tubing in a bath of water. The washed tube is passed through a bath of some hygroscopic agent, preferably glycerine, and is then dried in such manner that it will not become brittle and, yet, will 15 not be so wet that it will not slip readily on the stuffer horn of a stuffing machine.

The present invention relates particularly to the drying apparatus. In practice, the tubing is stored in sliver cans when it passes 20 from the glycerine bath, and these cans with their contents are transferred to a humidifier placed at one end of the drying apparatus. A plurality of lengths of the tubing are pulled through the drier and are subjected to 25 the drying process, after which the succeeding lengths of the tubes are subjected to the same treatment. In other words, the drying of the tubes is a step by step process and as the tubes are inflated during the drying operation the sections in the drier are severed 30 from the tubing in the humidifier. To inflate the sections, compressed air is introduced in one end of each section, the other end of the section being closed by a stopper.

35 Apparatus embodying the present invention preferably comprises foraminous confining tubes for the casing sections, the confining tubes extending the entire length of the drier and being slidably mounted therein so that they may be removed for repairs, etc. At the discharge ends of the tubes, improved means is provided for securing the forward ends of the casing sections to the means whereby compressed air is introduced into 40 the sections. The construction is such that

the casing sections will not be injured during the drying process, nor will they be injured when they are withdrawn through the discharge openings of the tubes.

Many other objects and advantages of the 55 invention will become apparent as the following detailed description progresses, reference being had to the accompanying drawings, wherein:

Figure 1 is a side elevation, partly in section, of a drier which embodies the invention; Fig. 2 is an elevation of the discharge end of the drier, certain parts thereof being omitted to illustrate the details of construction; Fig. 3 is an enlarged section taken 60 substantially on line 3-3 of Fig. 2; Fig. 4 is a front elevation of one of a plurality of end plates which form the end wall at the discharge end of the drier; Fig. 5 is a section taken on line 5-5 of Fig. 3; Fig. 6 is 70 a fragmentary enlarged longitudinal section through one end of one of a plurality of casing confining tubes provided in the drier, and Fig. 7 is a transverse section taken 75 through one of the confining tubes.

Referring to the drawings wherein a preferred embodiment of the invention is illustrated, the reference character 10 designates generally the housing of a drier which comprises side walls 11, a top wall 12, a bottom 80 wall 13 and end walls 14 and 15, the end walls 14 and 15 being at the discharge and loading ends of the drier, respectively. For convenience, the housing 10 is mounted on standards 16.

The end wall 14 comprises a plate 17 provided with rectangular apertures 18. These apertures are normally closed by rectangular plates 19 which are secured to the plate 17 by screws 20. Detachably secured by bolts 85 or screws 21 to the back surface of each of the plates 19 is a rectangular plate 23 which is soldered to a ferrule 24 fixed to the end of a foraminous tube 25 which extends from the wall 14 into one of a plurality of apertures 26 provided in the wall 15. The screws 21 pass through the plates 19 and 23 and are screw-threaded into nuts 21a which are soldered or brazed to the back surfaces of the plates 23.

Each of the tubes 25 is provided with ferrules 24 at each end thereof (see Fig. 1). As illustrated in Figs. 6 and 7, the walls of the ferrules are U-shape in cross-section and are clamped upon the ends of the tubes 25. Each ferrule is provided with outwardly projecting lugs 27 which are riveted to angle members 28, which angle members extend substantially the entire length of the tube. 10 The tubes may be made from any suitable material, but are preferably constructed of a wire mesh, the wire mesh being folded to provide an annular tube having a longitudinal seam which comprises flanges of the mesh projecting up between the angle irons 28 (see Fig. 7). The flanges and the lugs are preferably riveted to the angle irons 28.

The angle irons 28 are slidably mounted in guides or rails 30 which are secured to the bars 31 extending transversely in the housing 10. The construction is such that if one of the rectangular plates 19 is withdrawn from the wall 14 the entire assembly, including the associated rectangular plate 23 and the associated tube 25, may be withdrawn as a unit from the housing 10. To withdraw the unit from the housing in this manner, it is only necessary to unscrew the screws 20 securing the rectangular plate 19 to the apertured plate 17. Obviously, the tubes 25 may be withdrawn quickly and easily from the housing when it is necessary to clean, repair or replace them.

The ferrules 24 adjacent the wall 15 are aligned with the apertures 26 therein and the arrangement is such that when a section 33 of tubing or sausage casing has been drawn into one of the tubes, a stopper 34 may be inserted in the tube to cooperate with the associated ferrule adjacent the wall 15 in such manner that the wall of the tube is clamped between the ferrule and the stopper and that end of the tube is sealed.

Each of the plates 19 carries an improved collet device 36 comprising a pair of semi-circular members 37 which are pivoted by pins 38 to the front surface of the plate. The pins 38 project through plates 19 and 23 and into a re-enforcing bar 23a secured to the back surface of each plate 23. The members 37 may be swung towards each other to form an annulus, as illustrated in Fig. 2, or they may be swung away from each other to clear an opening 39 provided in the plate 19 (see Fig. 4). When the members 37 are swung into their closed positions they engage a stop pin 40 projecting from the plate 19. A latch member 41 pivoted to one of the members 37 is engageable with a pin 42 projecting from the other so that the collet members may be locked in their closed position.

In the operation of the apparatus, when a section of sausage casing is drawn through one of the tubes 25 from the wall 15 to the wall 14, the forward end of the tube is drawn

through the associated plate 19, as indicated in Fig. 1, and the collet members associated with that plate are then brought into their closed positions. A stopper 45 is then inserted in that end of the sausage casing and clamps the wall of the casing between itself and the collet members. The stoppers 45 have tubes 46 projecting therethrough, which tubes 46 are connected by flexible tubes 47, or the equivalent, to a source of fluid pressure, preferably compressed air, which has been heated. 70

The compressed air inflates the casing section as the other end thereof is closed by a stopper 34. The pressure to which the casing is subjected will not cause it to burst, unless it is imperfect. In practice, a pressure of one pound to one and a half pounds is preferably employed. The tubes 25 are preferably of a larger diameter than the diameters of the uninflated casings, but the casing is preferably inflated to the diameter of the tube. They function as confining tubes and expose the outer surfaces of the casing to the drying action of the air in the drier. 80

Air that has been heated is supplied to the housing 10 through a pipe 48 and is discharged therefrom through a pipe 49. The air is preferably circulated by means of a fan (not shown) and any suitable means (not shown) may be employed for heating it before it is delivered to the housing 10. 90

As set forth above, the improved drier is particularly adapted for use in the production of sausage casings from cellulose. When the apparatus is so used, the sequence of the steps of the drying operation is substantially as follows: After the casings have been withdrawn from the glycerine bath and have been placed in the sliver cans, the sliver cans are positioned adjacent the drier. Lengths of the casing are drawn through the confining tubes 25 and are severed from the lengths remaining in the cans. The casing ends protruding from the wall 15 are sealed by the stoppers 34, and the stoppers 45 are inserted into the casing ends protruding through the split collets 36. Thus, the compressed air is admitted into the casing sections to inflate them. After the casings have been subjected to the drying treatment for a predetermined period of time, the stoppers 45 and 34 are withdrawn therefrom and the collet members 36 are swung to their open positions. The ends of the casings remaining in the sliver cans are then tied to the ends protruding from the wall 15 so that when the dried sections are drawn out of the housing 10 through the open collet members 36, other sections of casing will be pulled into the housing. The 100 drying operation is then repeated. 110

The diameters of the openings in the split collets are smaller than the internal diameters of the confining tubes 25 and are also preferably smaller than the normal diameters 120 130

of the inflated sausage casings. However, as the collet members can be swung into open position when the casings are to be withdrawn, it is obvious that the withdrawal of 5 the casings from the confining tubes will not result in injury thereto as they pass freely through the openings provided in the plates 19 and 23.

10 The foregoing detailed description has been given for clearness of understanding only and no unnecessary limitations should be understood therefrom, but the appended claims should be construed as broadly as permissible, in view of the prior art.

15 What we claim as new, and desire to secure by Letters Patent, is:

1. A drier comprising a housing having an aperture therein, a foraminous tube alined with said aperture and removable from said 20 housing through said aperture, said tube being adapted to expose the contents thereof to the air in the housing, rigid means secured to said foraminous tube and extending substantially the entire length thereof, and 25 means in said housing for slidably mounting said rigid means.

2. A drier comprising a housing having alined apertures in opposed walls thereof, a foraminous tube mounted in said housing in alinement with said apertures and removable from said housing through one of them, ferrules fixed to the ends of the tube, and a plate fixed to one of said ferrules and secured to an outer surface of the housing.

3. A drier comprising a housing having alined apertures in opposed walls thereof, a foraminous tube extending through said housing and alined with said apertures, said tube being adapted to expose the contents 40 thereof to the air in the housing, a split collet mounted on an outer surface of said housing in alinement with said tube, and means co-operating with said collet for inflating a cellulose casing in said tube.

4. A drier comprising a housing having apertures in alined walls thereof, a foraminous tube extending through said housing and alined with said apertures, said tube being adapted to expose the contents thereof 50 to the air in the housing, co-operating pivoted collet members mounted on the outer surface of one of said apertured walls in alinement with said tube, a stopper insertable in said collet to secure one end of a cellulose casing thereto, and means extending through said stopper for inflating said cellulose casing.

5. A drier comprising a housing having an aperture therein, a foraminous tube extending through said housing and alined with said aperture, said tube being adapted to expose the contents thereof to the air in the housing, a pair of collet members pivoted to said housing alined with said tube and forming a collet of less diameter than the tube,

and means for holding said collet members in positions wherein they form a continuation of the passage through the tube.

6. A drier comprising a housing having an aperture therein, a foraminous tube extending through said aperture into said housing, said tube being adapted to expose the contents thereof to the air in the housing, a pair of co-operating semi-circular collet members pivoted to an outer surface of said housing, and means for locking said collet members in positions wherein they form a continuation of said tube, the opening through said collet members being smaller in diameter than the passage through said tube. 70

7. A drier comprising a housing having front and back walls, said front wall being provided with a plurality of apertures therein, individual plates detachably secured to said front wall for closing said apertures, a foraminous tube associated with each of said plates and secured thereto, each foraminous tube being normally disposed between the front and back walls of said housing and being removable from said housing with its associated plate, each of said plates having an aperture alined with the opening through the tube, said back wall having openings registering with the openings in the tubes, detachable closure members for closing the ends of the tubes, each of said tubes being adapted to expose its contents to the air in said housing, and a pair of co-operating semi-circular collet members pivoted to the outer surface of each of said plates and alined with the opening in the associated foraminous tube. 80

8. A drier of the character set forth comprising: a housing having an aperture therein; a foraminous tube extending into said housing and alined with said aperture, said tube being adapted to contain a cellulose casing; a pair of cooperating collet members pivotally mounted adjacent one end of said tube and adapted to form a seat for a plug-member; and a plug-member adapted to be inserted in an end of said casing and to hold the same against the seat thus formed. 90

9. A device as specified in claim 8, in which the collet, in operative position, is of less diameter than the tube, and said collet-members are adapted to be swung clear of an outward extension of said tube. 100

In testimony whereof, we have hereunto set our signatures, this 8th day of August, 1930. 110

HAROLD E. DIETRICH.  
ALFRED G. HEWITT. 120