June 24, 1924. 1,498,774

L. C. BALDWIN

DRYING MACHINE

Filed Feb. 9, 1922 3 Sheets-Sheet 1

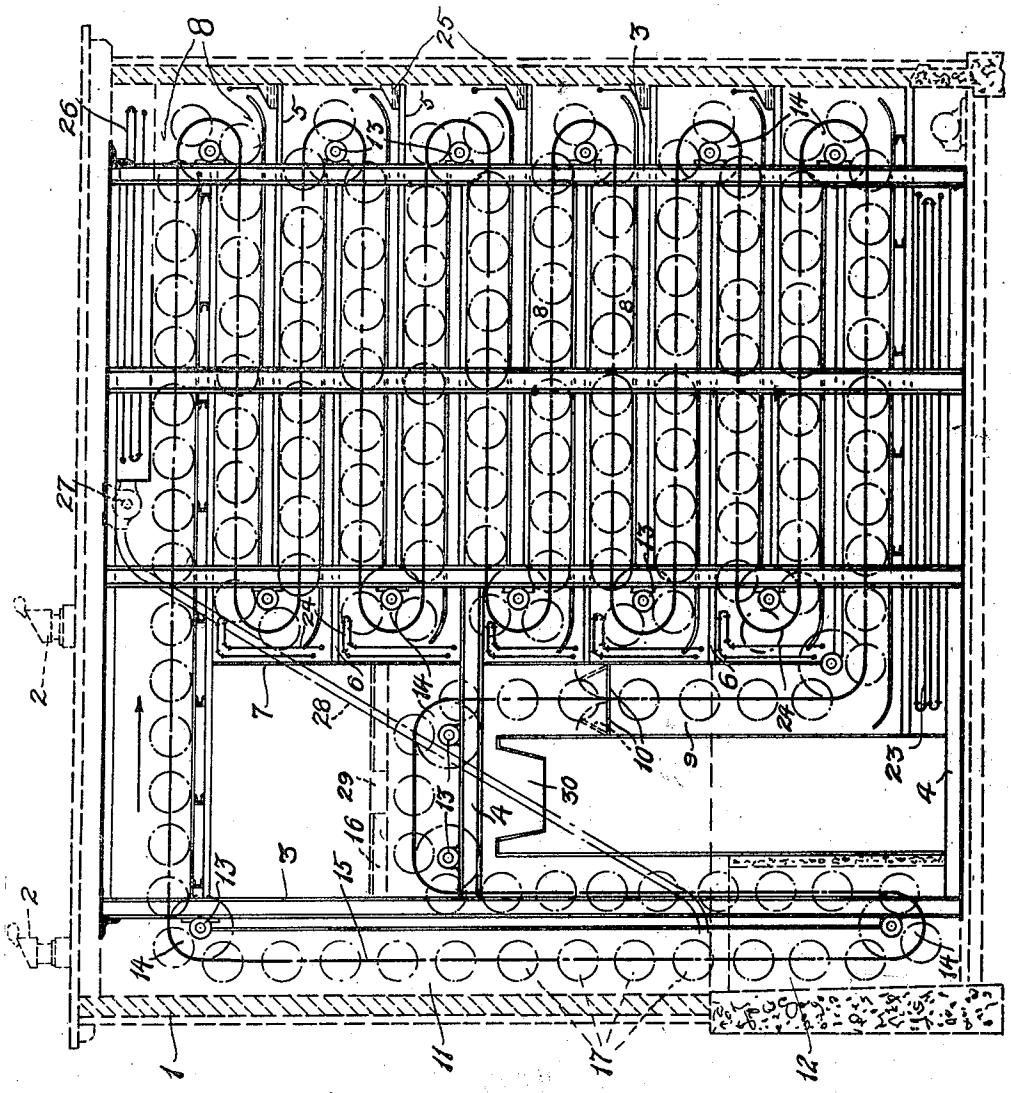


FIG 1

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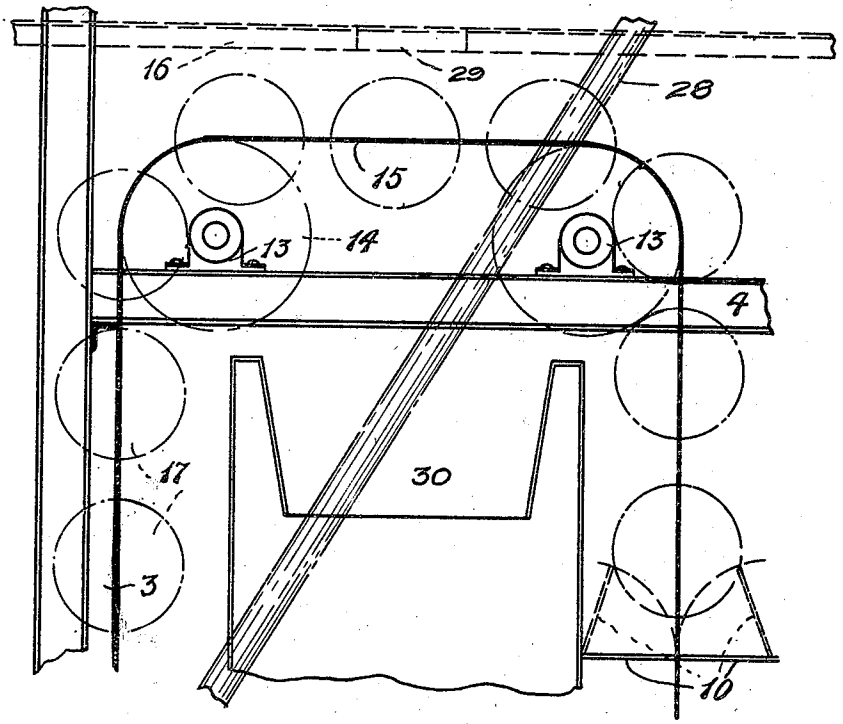


FIG 2

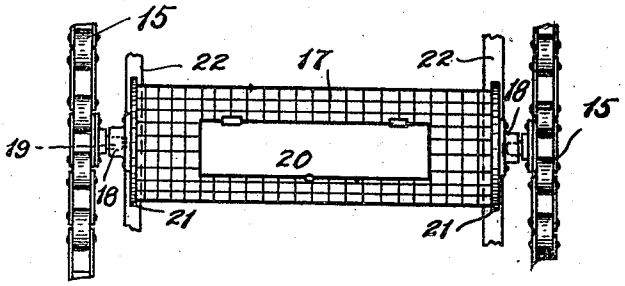


FIG 3

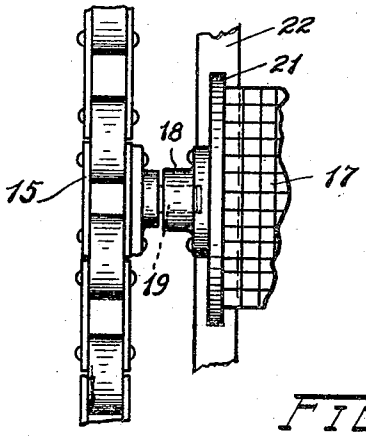


FIG 4

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1,498,774

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DRYING MACHINE

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3 Sheets-Sheet 3

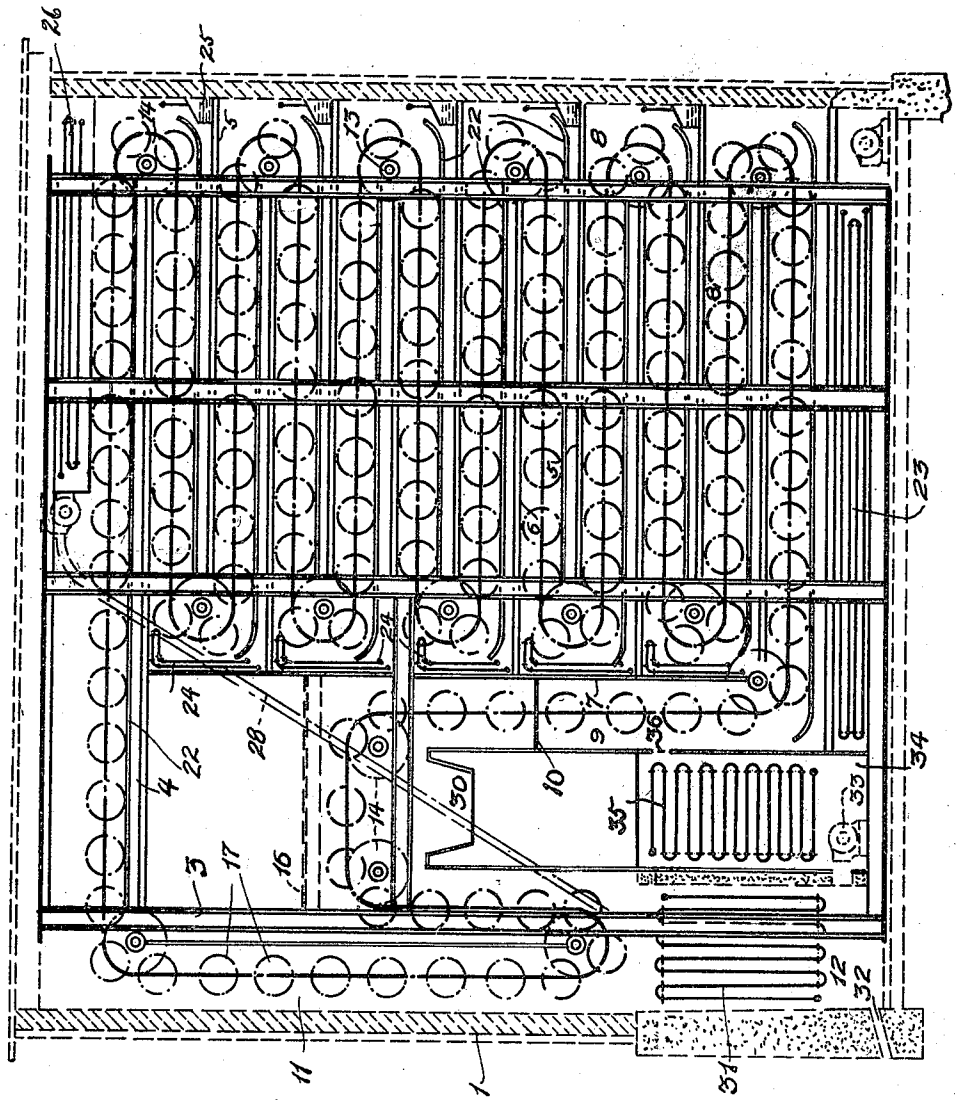


FIG 5

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UNITED STATES PATENT OFFICE.

LUTHER C. BALDWIN, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO U. S. BOBBIN & SHUTTLE COMPANY, OF PROVIDENCE, RHODE ISLAND.

DRYING MACHINE.

Application filed February 9, 1922. Serial No. 535,155.

To all whom it may concern:

Be it known that I, LUTHER C. BALDWIN, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented new and useful Improvements in a Drying Machine, of which the following is a specification.

This invention relates to certain new and useful improvements in a drying machine and one especially adapted for curing or drying blanks for use in the manufacture of spools, bobbins and similar wooden structures.

The invention has for its primary object to provide a machine of such a character wherein the blanks are gradually cured and dried by being submitted to an ever increasing degree of heat.

In one aspect, the invention may be said to consist of a series of run-ways traversed by an endless carrier and being heated to a higher temperature toward the delivery end whereby as the goods are carried through the succeeding run-ways they will gradually be subjected to the highest temperature.

The invention further resides in the features of construction and the arrangements and combinations of parts hereinafter described and claimed, reference being had to the accompanying drawings wherein:

Figure 1 is a vertical section through a structure embodying the present invention, the endless carrier and its containers being shown diagrammatically;

Figure 2 is an enlarged fragmentary view thereof showing more clearly the supply and delivery station;

Figure 3 is a detailed elevation of one of the containers or baskets supported by the endless carrier;

Figure 4 is a fragmental showing of the particular mounting of a container on a side chain; and

Figure 5 is a view similar to Figure 1 depicting a modified form of the invention.

The building 1 which houses the drier mechanism is shown in Figure 1 as being equipped with or without roof ventilators 2. The frame work of the drier embodies a plurality of upright members 3 and horizontal members 4 which support a staggered arrangement of partitions 5 and 6, the former extending from a wall of the building and the latter having their outer ends spaced from said wall and connected with each other beyond the opposite ends of the partitions 5 by a wall 7 thus providing a series of run-ways 8 extending back and forth over horizontal courses, the opposite ends of the runways being connected respectively with the adjacent runways by short vertical passages, as shown. The lowermost run-way has its inner end extended upwardly along the wall 7 in the form of a shaft 9 which is closed by a trap door 10, while the uppermost runway extends across the building and opens into the upper end of a shaft 11 that leads to a well 12.

Journaled in bearings 13 mounted on the adjacent frame members, is a plurality of sprockets 14 which sprockets are arranged to guide a pair of endless chains 15 through the horizontal runways 8 and shaft 9, beneath a platform 16 down into the well 12 and up shaft 11 back to the runways. The endless chains constitute a carrier for a series of open mesh containers or baskets 17 which have end bearings 18 for journaling on the inwardly extending trunnions 19 with which the chains are equipped. Each container is provided with a door or closure 20 through which the blanks or articles may be inserted and removed. During their travel through the runways the enlarged rims 21, on the opposite heads of the containers, are caused to have rolling contact with supporting tracks 22 whereby the containers will continuously revolve during their passage through the runways and thereby effect a uniform heating and drying of their contents.

A drying heat is supplied the runways by heating coil 23 and where additional heat is required the same is supplied by individual coils 24 disposed in their respective runways. Moisture-supply units 25 may be arranged at the outer ends of partitions 5 to furnish any additional and necessary moisture. The heated air which accumulates in the upper runway, and as intensified by heating coils 26, is driven by a fan 27 down into the well 12 by means of a pipe 28.

In operation, power is applied to one or more of the sprockets 14 to impart an in-

termittent travel to the endless carrier. Through an opening 29 in platform 16 the containers are supplied with the green stock, each container receiving its supply during the interval of rest and as the carrier moves intermittently said containers are caused to pass downwardly into the well 12 where they are supplied with heated air from pipe 28. By this means only a moderate amount of heat is first applied to the green stock and as the containers ascend and move over into and through the runways the stock will gradually approach the main force of heat in the lowermost runway. Should additional heat be required the same will be supplied by the coils 24. As the containers leave the lowermost runway they pass upwardly through the trap door 10 which immediately closes thereafter to retain the heat in the runways and when the containers reach the opening 29 the same are opened and the contents discharged into the chute 30 for removal. The container is then refilled with green stock and proceeds on its step-by-step travel through the system.

In the modification depicted in Figure 5 the drier system is entirely self-contained by eliminating the roof ventilators 2. For this reason, as the containers move through the well 12 more or less moist steam will be precipitated and condensed by the cooling coils 31, the water of condensation draining through an opening 32 or it may be retained in a suitable well (not shown). A suction fan 33 is provided in a heating compartment 34 and acts to draw the cool air from the well thereinto for being heated by heating coils 35 whence it will escape through an opening 36 into the upper portion of the compartment 34 for passage through the several runways. The air will then be further heated by the main coils 23, and the auxiliary heating units 24, and finally by heating coils 26 following which it will be delivered through the pipe 28 back to the well.

It will thus be evident that the blanks will expeditiously be dried or cured and that after all the containers have been once filled each interval of rest of the intermittently moving carrier will permit the emptying of a container and the immediate refiling of the same. In their movement through the system of runways the containers will continuously revolve and thereby subject the contents to a thorough drying action of the heat. It will be noted that the direction of rotation of the containers is reversed in the next succeeding runway and thus as the containers roll to the right through the uppermost runway they will roll to the left in a reversed direction of revolution in the next runway, and so on throughout their travel in the underlying runways. The drying heat may be varied by bringing into action more or less of the heating coils and the humidity controlled by the insertion of a greater or lesser number of the liquid-containing vessels 25.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. A drying machine comprising a housing, upright frame members therein, a vertical series of horizontal runways communicating at their opposite ends respectively with the adjacent runways, the uppermost runway extending at one end beyond the underlying runways, a vertical shaft communicating with the projecting end of the uppermost runway, a well from which said shaft rises, a loading platform between the shaft and said series of runways, a discharge chute underlying the platform, an endless carrier operable through the runways and shaft, down into the well and between the platform and discharge chute, wheels supporting and guiding the endless carrier along its path of movement, a series of containers rotatably mounted on the carrier, means for revolving the containers during the movement of the carrier, and means for supplying a drying heat in the runways.

2. A drying machine comprising a housing, upright frame members therein, a vertical series of horizontal runways communicating at their opposite ends respectively with the adjacent runways, the uppermost runway extending at one end beyond the underlying runways, a vertical shaft communicating with the projecting end of the uppermost runway, a well from which said shaft rises, a loading platform between the shaft and said series of runways, an endless carrier mounted for movement through the well and runways and past the loading platform, means for supplying heat to the lowermost runway, and means for transferring the heated air which accumulates in the uppermost runway down into the well.

3. A drying machine comprising a housing, a vertical series of horizontal runways connected at their ends to provide a zig-zag passage, an endless carrier mounted for movement through the runways, a loading platform arranged above the lowermost runway, a well arranged beneath the platform and spaced from the runways and through which the endless carrier moves, said endless carrier passing from the lowermost runway upwardly by the platform and thence downwardly into the well, a discharge receptacle disposed between the runways and well and beneath the loading platform to receive the contents of the carrier, and means for driving the carrier.

4. A drying machine comprising a housing, a vertical series of horizontal runways

connected at their ends to provide a zig-zag passage, an endless carrier mounted for movement through the runways, a shaft through which the carrier passes preliminary to entering the runways, the movement of the endless carrier through the runways being downward, means for supplying heat to a point adjacent the lowermost runway, and means for transferring the heated air from a point adjacent the uppermost runway into said shaft.

5. A drying machine comprising a housing, a vertical series of horizontal runways connected at their ends to provide a zig-zag passage, an endless carrier mounted for movement through the runways, a shaft through which the carrier passes preliminary to entering the runways, the movement of the endless carrier through the runways being downward, means for supplying heat to a point adjacent the lowermost runway, a self closing door for the lowermost runway acting to prevent the escape of heat as the carrier moves therefrom and means for driving the carrier.

6. A drying machine comprising a housing, a vertical series of horizontal runways connected at their ends to provide a zig-zag passage, an endless carrier mounted for movement through the runways, a shaft through which the carrier passes preliminary to entering the runways, the movement of the endless carrier through the runways being downward, means for supplying heat to a point adjacent the lowermost runway, means for supplying heat to each runway individually, and means for driving the carrier.

7. In a drier, a plurality of runways, an endless carrier movable through the runways, a pair of spaced shafts adjacent one end of the runways, means to cause the carrier to move vertically in one shaft, then across the space between the shafts, then vertically through the other shaft and then again across the space between the shafts, and loading means for the containers arranged above the first named flight of the carrier which crosses the space between the shafts.

8. A drying machine comprising a housing, a vertical series of horizontal runways connected at their ends to provide a zig-zag passage, an endless carrier mounted for movement through the runways, a shaft through which the carrier passes preliminary to entering the runways, the movement of the endless carrier through the runways being downward, means for supplying heat to a point adjacent the lowermost runway, means for conducting the heated air from the upper portion of the housing into the shaft, and means for reheating the conducted air after it leaves the runways and before it is delivered to the shaft.

9. In a drier, a plurality of runways, an endless carrier movable through the runways, a pair of spaced shafts adjacent one end of the runways, means to cause the carrier to move vertically in one shaft, then across the space between the shafts, then vertically through the other shaft and then again across the space between the shafts, and loading means for the containers arranged adjacent to one of the flights of the carrier which crosses the space between the shafts.

10. A drying machine including a housing, means in the housing for carrying the material to be dried therethrough, means for supplying heat to the housing, means at the upper part of the housing for reheating the air, means for conducting the reheated air to the lower portion of the housing, and means for forcing the reheated air through said conducting means.

11. A drying machine including a housing, a series of runways in the housing extending from top to bottom thereof, means for carrying the material to be dried through the runways, means in the runway at the top of the housing for reheating the air, means for conducting the air reheated in said runway to the lower portion of the housing, and means for forcing the reheated air through said conducting means.

12. In drying machine, a plurality of runways, an endless carrier operating through the runways, a plurality of containers mounted on the carrier, a shaft through which the carrier passes preliminary to entering the runways, means for conducting heated air from the upper portion of the machine into the shaft, and means for driving the carrier.

13. A drying machine including a housing, means in the housing for carrying the material to be dried therethrough, means at the upper part of the housing for reheating the air, a shaft in the housing into which the carrying means passes before entering the housing, and means for conducting the reheated air into the shaft.

14. In a drier, a series of runways, a carrier movable through the runways, a shaft adjacent one end of the runways, means to effect movement of the carrier through the shaft and laterally thereof, loading means disposed adjacent said lateral flight of the carrier, and self-closing means in the shaft below said lateral flight of the carrier and openable by the latter.

15. In a drier, a closed housing, a cooling shaft therein, a series of runways, a heating chamber interposed between the cooling shaft and the runways, means for transferring the air from the cooling shaft through the heating chamber into the runways, means for carrying material to be dried through the cooling shaft and runways,

means for heating the air in the runways, and means for conducting the heated air from the runways into the cooling shaft.

16. In a drier, a casing, heating means therein, an endless carrier in the casing, means to mount the carrier for zig-zag movement, loading means, means spaced beneath the loading means to receive the dried articles after removal of the latter from the carrier, and means to cause a single flight of the carrier to move through the space between the loading means and the receiving means, whereby to allow of successive unloading and loading of said flight of the carrier from said loading means.

17. In a drier, a housing, a series of runways therein, a cooling shaft in the housing, means for carrying material to be dried through the shaft and runways, means for heating the air in the runways, means for conducting the heated air from the runways into the cooling shaft, and means for reheating the air after cooling and for returning same to the runways.

In testimony whereof I have signed my name to this specification in the presence of a subscribing witness.

LUTHER C. BALDWIN.

Witness:
J. A. MILLER.