Feb. 9, 1926. 1,572,849

F. A. SECORD

DRYING APPARATUS

Filed April 25, 1922

Fig. 1.

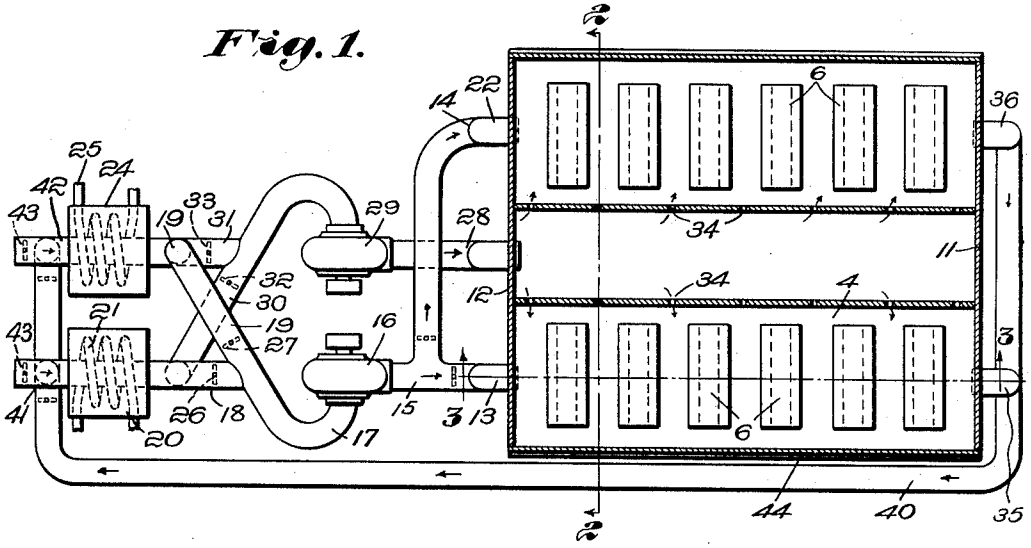


Fig. 2.

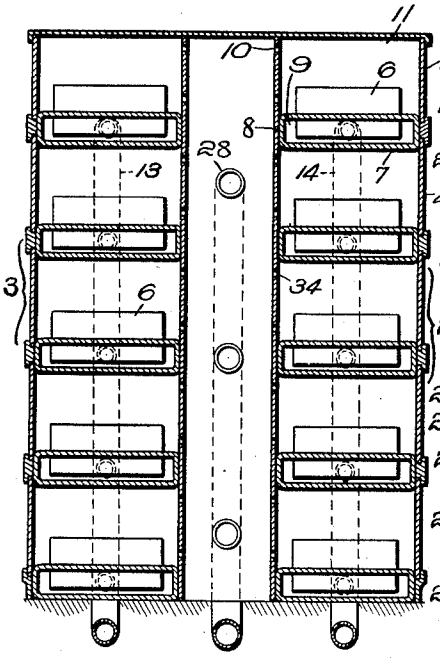
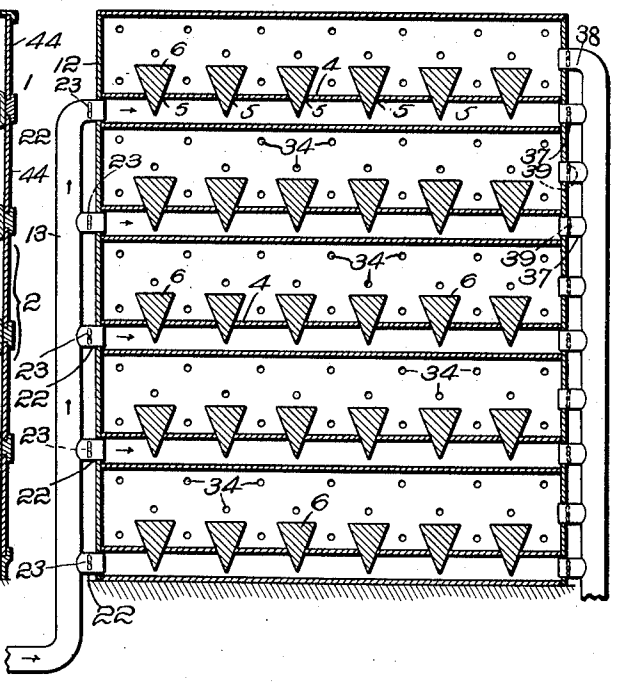


Fig. 3.



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UNITED STATES PATENT OFFICE.

FREDERICK A. SECORD, OF PORTLAND, MAINE, ASSIGNOR OF ONE-THIRD TO CHARLES HENRY PETERS AND ONE-THIRD TO ALEXANDER PIERCE PATTERSON, BOTH OF ST. JOHN, NEW BRUNSWICK, CANADA.

DRYING APPARATUS.

Application filed April 25, 1922. Serial No. 556,445.

To all whom it may concern:

Be it known that I, FREDERICK A. SECORD, a subject of King George V, and a resident of Portland, in the county of Cumberland and State of Maine, have invented an Improvement in Drying Apparatus, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to apparatus and process for drying articles but more particularly for drying last blocks, clay products and the like.

An object of the invention is to provide an apparatus and process for rapidly and uniformly drying articles which have a tendency to check without producing such checks therein. The invention will best be understood by referring to the accompanying drawings which disclose, merely for illustrative purposes, one embodiment of apparatus and the process for carrying out the invention wherein:

Fig. 1 is a sectional plan view of the apparatus;

Fig. 2 is a transverse section taken on the line 2—2 of Fig. 1; and

Fig. 3 is a longitudinal section taken on the line 3—3 of Fig. 1.

In the drawings I have illustrated the type of apparatus for carrying out the various steps and functions of the invention. This apparatus preferably includes a plurality of hollow supports 1, 1 herein arranged in two series 2 and 3, each series preferably including five shelves or supports as they will hereinafter be termed. The supports 1 may be of any desired form consistent with the article or articles that are to be supported thereby.

In the present example the supports are illustrated as of a construction adapted to support last blocks although the invention is not limited to this particular form, it being shown merely for convenience.

Preferably the supports 1 are of rectangular shape comprising an upper article-supporting wall 4 provided with a series of recesses 5 adapted to receive portions of the last blocks 6, said blocks being preferably formed in the rough and of triangular shape while said recesses 5 are shaped to receive the smaller portion of said blocks as clearly shown in Fig. 3. The said supports also have bottom and side walls 7 and 8 respectively which form, together with the wall 4, chambers 9. The recesses 5 are preferably just large enough to receive certain predetermined portions of the blocks and to be substantially closed thereby. The supports 1 may be mounted in any suitable manner but preferably they are mounted to extend laterally from a central hollow support 10, the ends of the spaces between the supports being enclosed by end walls 11 and 12 which walls also herein form the ends or closing walls for the ends of said hollow supports.

In effecting the drying of materials of the character set forth it is desirable to raise the temperature of the block or article that is being dried to a predetermined point and surround or, at least, to subject said block so heated to a lower temperature to draw the moisture from the interior of the block to the surface thereof for moisture travels from hot to cold. Therefore means are provided for supplying currents of fluid to the interior of the supporting members in contact with those portions of the block that are inserted through the recesses 5 into said support, which inserted portions may be any predetermined portion of the blocks. This fluid is preferably of relatively high temperature and as it comes in contact with the green, wet or frozen blocks, as the case may be, the heat from said fluid will permeate said blocks and raise the temperature thereof to the desired degree.

Means are also provided for supplying fluid of a predetermined temperature to that portion of the block or blocks which protrude from the supports 1 and this last mentioned fluid preferably has a temperature somewhat lower than that of the fluid supplied to the interior of the supports, thereby causing the moisture from the interior of the blocks to travel outwardly and upwardly to the surface of the blocks exposed to said relatively cooler fluid whence it is carried off by said fluid to the destination provided therefor.

To accomplish the best results the temperature of the block must be varied from time to time. For example if said blocks contain a great deal of moisture or ice a very high temperature may be required whereas if only a small amount of moisture remains

upon the interior of the block, the temperature must be reduced or a scale will be formed or what is sometimes called "case hardening" will result in certain articles which prevents the moisture from getting out to the surface of the blocks.

To supply tempered fluid to the interior of the supports 1, I have herein shown a conductor 13 at one end of one of said series of shelves and a conductor 14 at the like end of the other series of shelves, said conductors uniting at 15 in the delivery pipe from a blower 16. The blower 16 receives its supply of fluid through an intake pipe 17 herein arranged at one side of said blower and this intake pipe, in turn, is connected with two supply pipes 18 and 19, the supply pipe 18 extending to a chamber 20 within which are arranged coils of pipe 21 for conveying steam or other heating medium through said chamber so that as air or fluid is drawn through said chamber 20 by said blower it will be heated to the desired temperature and conveyed therefrom through pipes 15, 13 and 14 to the two series of hollow supports, each of which supports are connected by an independent connection 22 with the supply pipe adjacent thereto and the connections 22 are, in turn provided with dampers 23 which may be operated to regulate communication between said hollow supports and their fluid supply. The pipe 19 is connected with another chamber 24 preferably containing instrumentalities such, for example, as a brine pipe 25 for cooling the fluid or air that is drawn therethrough by said blower.

The pipes 18 and 19 are further provided respectively with dampers 26 and 27 which, by proper regulation, combine the desired degree of hot and cold fluid or air preparatory to its being conveyed by the blower 16 to the hollow supports.

To provide fluid of the desired temperature to the areas above the supports, which fluid is, as hereinbefore stated, of a lower temperature than that supplied to the interior of the hollow support, I preferably utilize the hollow central support 10 to which is preferably connected a supply pipe 28, the latter being connected to a second blower 29 adapted to receive its supply of fluid from the casing 20 and also the casing 24, herein through pipes 30 and 31 controlled by dampers 32 and 33 respectively. By providing the dampers 32 and 33 which are independent of the dampers 26 and 27 it will be possible to supply to the blower 29, a fluid of the desired temperature which temperature differs from that supplied to the blower 16. The blower 29 blows the fluid into the hollow support 10, which latter is provided with suitable perforations 34, 34 arranged in the side walls thereof to discharge over the tops of the hollow supports 1 and against the protruding portions of said blocks.

It may facilitate drying and reduce the expense of operation as well by utilizing the air that has passed over or in contact with one part or the other of said material over again and to this end means are provided for returning the air that has passed over said supports and also through said supports to the heating or cooling instrumentalities as the case may be for it may be desirable to cool air which contains an excess of moisture whereas air with a small percentage of moisture will not be required to be cooled but may pass through the heating instrumentalities only. The means herein shown for reconveying the used fluid or air back to the heating or cooling instrumentalities includes pipes 35 and 36 connected respectively with the two rows or series of supports 2 and 3. Each of the pipes 35 and 36 have connection 37 and 38 respectively with the interior of the supports and with the spaces above the supports and these connections are each provided with a damper 39 for use when it is desired to retard or shut off the supply of or circulation of fluid back to the chambers 20 and 24. The pipes 35 and 36 communicate with a pipe 40 which has connection with both of the chambers 20 and 25 respectively through pipes 41 and 42 within which are arranged dampers 43, the latter to permit the return of the used air or fluid to one or both of the chambers 20 and 24.

For the purpose of confining the flow or discharge of air from the various sections of the drier above the supports 1 to the desired channels, namely the pipes 35 and 36 and those connected therewith, the outer sides of said support may be and preferably are provided with appropriate closing devices such, for example, as slides 44, 44 which may be moved longitudinally of the shelves to open or close spaces therebetween so as to enable the operator to insert and remove the material or to inspect the same from time to time.

While I have herein shown and described one specific embodiment of my invention and have disclosed and discussed in detail the arrangement incidental to such disclosure it is distinctly to be understood that the invention is limited neither to the mere details or relative arrangement of parts nor to the specific application herein shown but that extensive variations may be made without departing from the principles thereof.

Claims.

1. A drying apparatus comprising a hollow support provided with an opening for the partial insertion of the work, means to supply a current of fluid to the interior of said support and means to enclose and sup-

ply a different fluid to the portion of the work protruding from said support.

2. A drying apparatus comprising a hollow support provided with an opening to receive a portion of the work, means to direct currents of fluid against that portion of the work that projects into said support, and means to enclose and direct currents of fluid of a different temperature against that portion of the work above said support.

3. A drying apparatus comprising a hollow support provided with an opening in its upper surface to receive a portion of the work, means to direct currents of tempering fluid against one portion of said work, and means to enclose and direct the drying fluid against another portion thereof.

4. A drying apparatus comprising a hollow support provided with openings in its upper surface to receive sections of the work, means to supply tempered fluid to the interior of said hollow support against the portion of the work inserted therein, and means to enclose and supply tempered fluid against the portions of the work protruding from said support.

5. A drying apparatus comprising a series of hollow supports each provided with openings in its upper surface to receive sections of the work, means to supply tempered fluid to the interior of each of said hollow supports and means to supply a fluid of cooler temperature against the portions of the work protruding from said support.

6. A drying apparatus comprising, in combination, a hollow support provided with an opening for the partial insertion of the work, means to supply a current of tempered fluid to the interior of said support in contact with the portion of the work projecting thereinto and means to supply a fluid of lower temperature to the portion of the work protruding from said support.

7. In a drying apparatus, a shelf for supporting the work, including means to cover a predetermined portion of the work and means respectively to supply currents of fluid of different temperature to the covered and the uncovered portions of said work.

8. An apparatus for drying last blocks comprising, in combination, a shelf having at least one recess to receive a portion of a last block and means to supply tempered fluid against the portions of the last block upon opposite sides of said shelf.

9. An apparatus for drying last blocks comprising, in combination, a shelf having a recess to receive a portion of the last block, means to supply tempered fluid to the portion of the last blocks upon one side of said shelf, and means to supply tempered fluid of a lower tempearture to the portion of said last block upon the opposite side of said shelf.

10. A drying apparatus comprising, in combination, two series of hollow supports, a fluid duct separating said two series of hollow supports, each of said supports having perforations in the upper surface thereof, means for supplying tempered fluid to the interior of said supports and means for supplying tempered fluid of different temperatures through said fluid duct and along the tops of each of said supports.

11. In combination, a shelf having a perforation of a size to receive a predetermined portion of the work, means to convey tempered fluid to the material at one side of said shelf and means to enclose and direct tempered fluid of the same or different temperature to the other side of said shelf.

12. In a drying apparatus, instrumentalities to supply fluids of different temperatures respectively to different isolated portions of the material to be dried.

13. In a drying apparatus for last blocks and the like, means for supplying drying fluid of a relatively high temperature to lower portions only of the material to effect the heating of the moisture contained within said material and means to supply fluid of a relatively lower temperature to the upper portion to cause said moisture from the interior of the material to travel outwardly to the outer and upper surface of the material.

14. In an apparatus for drying last blocks and the like, means respectively to enclose upper and lower portions of said blocks, means to supply tempered fluid to the lower enclosed portion of said block and to cause moisture in said block to form upon the upper surfaces thereof, and means to supply fluid of predetermined temperature to the upper enclosed portion of said block to remove the same moisture formed upon said upper surfaces of said block.

15. A process for drying articles which consists in enclosing different parts of an article to be dried in separate chambers and in subjecting such parts to the action of separate fluid currents.

16. A process for drying articles which consists in subjecting predetermined sections of an article to be dried to the action of separate fluids of predetermined temperatures.

17. A process for drying articles which consists in subjecting predetermined sections of an article to be dried to the action of separate fluids of different predetermined temperatures.

18. A process for drying articles which consists in subjecting predetermined sections of an article to be dried to the action of separate fluids of predetermined temperatures and in varying the temperatures of said fluids as the drying operations progress.

19. A process for drying articles which consists in separating by horizontal parti-

tions two portions of the article, then in supplying a tempered fluid of relatively high temperature to the portions of material below said partition to effect the raising of the temperature of the moisture throughout the article, in supplying a fluid of relatively lower temperature to the portion of the article above said partition to effect the condensation of moisture upon the upper surfaces of said article and the removal of said moisture therefrom.

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

FREDERICK A. SECORD.