April 19, 1955 E. EISENMAÑ 2,706,347

DEVICE FOR DRYING LOOSELY PILED GOODS, ESPECIALLY PILED WOOD

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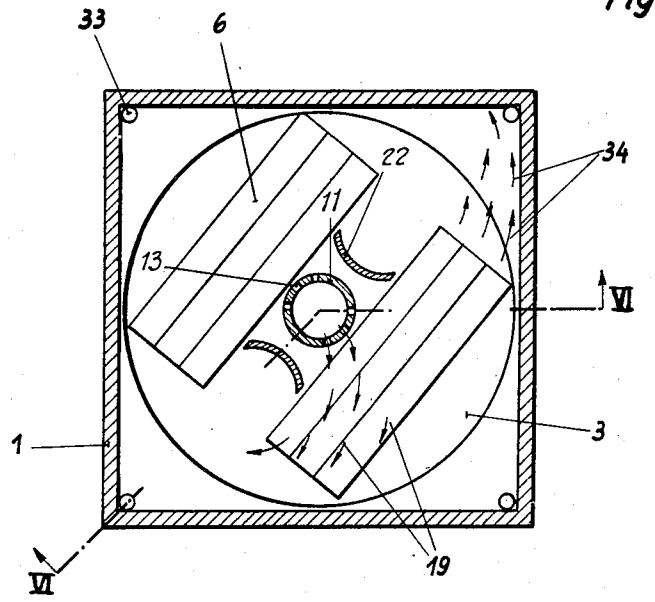
Fig. 1.



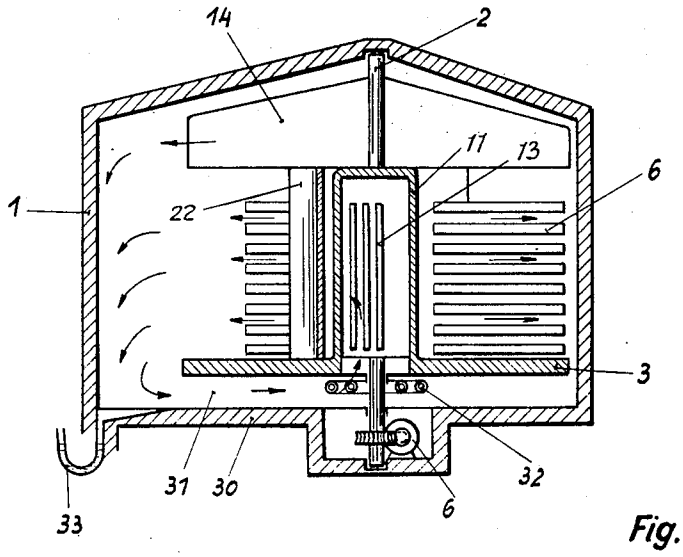


Fig. 2.

Inventor

EUGEN EISENMANN

by

Darby, Stephens & Hartig

Attorneys

April 19, 1955

E. EISENMAN

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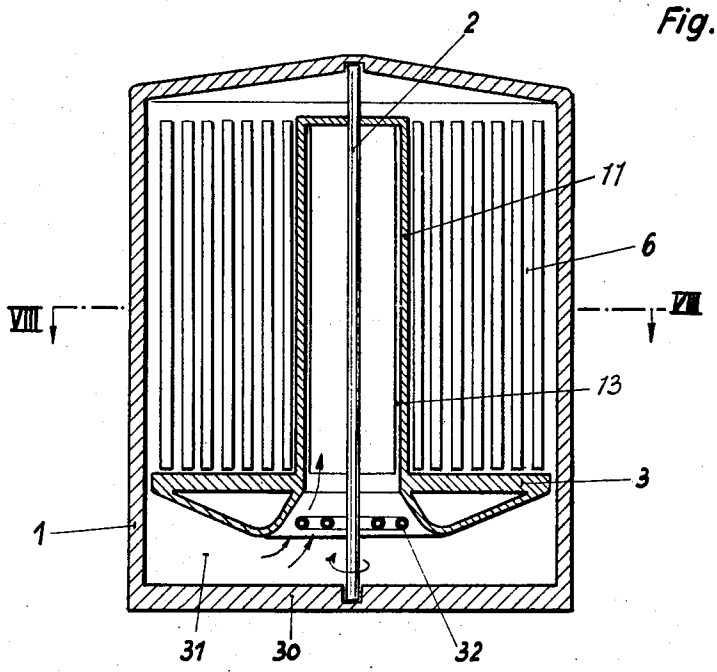
Fig. 3.



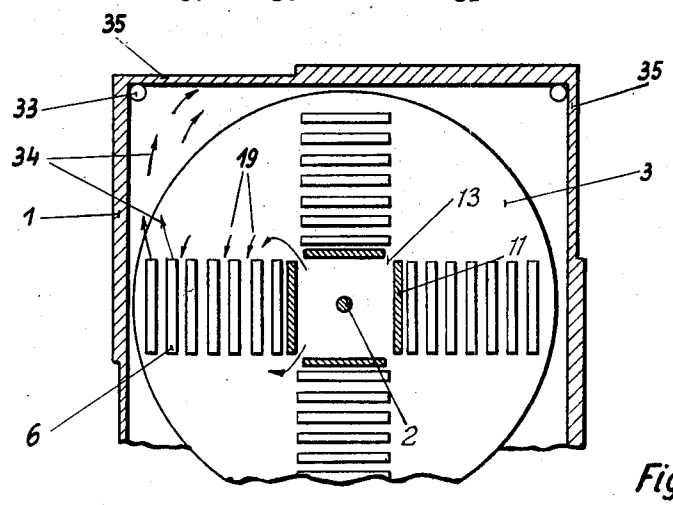


Fig. 4.

Inventor

EUGEN EISENMANN

by

Bailey, Stephens & Hartig

Attorneys

United States Patent Office 2,706,347 Patented Apr. 19, 1955

2,706,347

DEVICE FOR DRYING LOOSELY PILED GOODS, ESPECIALLY PILED WOOD

Eugen Eisenman, Stuttgart, Germany

Application February 28, 1951, Serial No. 213,070

3 Claims. (Cl. 34—77)

This invention relates to a process for drying loosely piled goods, especially piled wood, and to an apparatus for carrying out this process.

Artificial drying of wood usually is preceded by natural predrying by open air storage, thereby extracting from the wood the water content not bound in the grain. In such process the wood is dried down to about 20–30% of relative moisture of the wood (grain saturation point). This process is largely dependent upon the climate and requires much time. This fact involves the disadvantage that the plants working according to the said process are compelled to buy their supply many months, and even years, in advance of the definite processing, wherefore a considerable amount of "dead capital" is bound to be invested.

In order to reduce the time necessary for predrying, it was proposed to pass a current of air between the stacked lumber by, for instance, placing the lumber upon swings rocking to and fro or upon rotating carriers. Especially it was suggested to rotate the stacked lumber to be dried in a casing around a vertical axis running through the centre of gravity of the stack of lumber, in which operation not only air is forced through the gaps of the stack but also part of the water content of the wood is extracted by the centrifugal force. With apparatus of this type whose interior is heated to about 86° F. and in which the stack of lumber to be dried rotates at the rate of about 60 revolutions/min., a reduction by about as much as 5% per hour of the relative moisture content of the wood was achieved.

It is an object of this invention to lead the said process towards perfection in order to further accelerate the predrying and, in addition, to render the said process also suitable for drying wood down to a relative moisture content of below 20%. A further object of this invention is to provide an apparatus especially suitable for carrying out the said process.

The essential feature of the process improved according to the invention is primarily a revolving of the drying medium in the direction of rotation of the stack of goods, that operation being performed within a casing the horizontal cross section of which departs from the shape of circle inasmuch as at least one outwardly directed bulge is provided in which, by the centrifugal effect, a pressure comes into play which is higher than that in the central zone adjacent to the axis of rotation, and secondarily that the air current created by the said difference of pressure flowing radially from the outer zone to the central zone in the portions of the said casing not spread over by the rotating stack of goods is redirected in counterdirection from the central zone through the stack of goods. Thereby an intensification and an expedient distribution of the current of the drying medium is guaranteed without any perceptible increase of the amount of energy to be applied, this advantage resulting in a substantial reduction of the time necessary for drying. A further reduction of the time necessary for drying can be brought about by heating the drying medium, in contrast to the known processes above referred to, to a temperature considerably above 86° F. Furthermore, the process, especially after arriving below the grain saturation point, can be accelerated very considerably by employing as a drying medium, in addition to or instead of fresh air, other media such as superheated vapor generated outside or inside the casing or, conditions permitting, by evaporating the moisture contained in the particular material under treatment. In such process, operation within

the range below the grain saturation point is expediently done without any substantial supply of fresh medium.

Further characteristics of the process according to the invention as well as examples of embodiment of arrangements serving to carry out the said process are further illustrated in the following drawings.

In the drawings

Fig. 1 presents a cross section through an arrangement having a square transverse section and being charged with two stacks of horizontally stacked boards.

Fig. 2 shows a longitudinal section on the broken line VI—VI shown in Fig. 1.

Fig. 3 presents a longitudinal section through an arrangement having a square transverse section of the casing and being charged with four vertically stacked stacks of wood.

Fig. 4 shows a cross section on the line VIII—VIII shown in Fig. 3.

In the Figs. 1 and 2 the casing **1** has a square transverse section, the sides of the square nearly touching the outline of the pile carrier **3** rotatable around the vertical axis **2**. Said carrier is, at a distance from the bottom **30** of the casing, placed in such a manner that, between it and the bottom, passages **31** are formed through which the corner zones of the casing not spread over by the pile carrier **3** are connected with the central zone. In this latter zone the axis **2** is widened to form a suction tube **11** downwardly open which has openings **13** facing the piles **6**. Besides, guiding surfaces **22** are provided between the piles. Furthermore, vanes **14** are placed above the two piles and in fixed connection with the axis **2**. Heating means **32** are installed in front of the mouth of the suction pipe **11**. Drains **33** for condensed water are provided in the bottom corners of the casing. Other openings may be employed but are not shown in the present drawing.

The mode of operation of the arrangement is as follows:

When the pile carrier **3** is given counter-clockwise rotation by means of the motor **6** the drying medium contained in the casing will be urged by centrifugal effect into the corner zones of the casing in the direction of the arrows **34**, in as far as said drying medium hits the front faces of the boards forming the two piles **6** as well as the vanes **14**. Simultaneously in the central zone and especially inside the tube **11** a low pressure is created thereby, and the result of this pressure difference is a current of drying medium which passes from the corners through the passages **31** to the suction tube **11**. The drying medium again emerges from the tube **11** through the openings **13**, flowing through the interstices **18** of the pile in the direction of the arrows **19** in as far as said drying medium does not again hit the front faces of the said boards.

In the embodiment according to Figs. 3 and 4, heating means **32** are provided in front of the mouth of the suction tube **11**. Thereby an increase in the velocity of the current of drying medium is achieved by a chimney-like effect of the heating means. Besides that, in the proximity of the corners of the casing, the portion of the walls marked **35** is less perfectly insulated against loss of heat than the other walls. Thereby a cooling down is effected and consequently a downward-going stream of the drying medium. Simultaneously the cooling surfaces can be used, in a known way, for the separation of the absorbed moisture by causing condensation, the condensed water being removed through the drains **33**.

Drying arrangements of the character described are, of course, not restricted to drying by a closed circuit of the drying medium. The current sealable inlets and outlets are omitted in the drawing only for the sake of clarity.

It may be added that the process according to the invention can also be employed for goods other than those described here, i. e. other than those capable of being evenly stacked. Uneven, loosely piled objects can also be treated by the process described if they are placed in wing-like arrangement, for instance between perforated walls.

I claim:

1. In an apparatus for drying loosely stacked material, a stationary outer casing, a rotatable supporting member

within said casing adapted to have material to be dried loosely stacked thereon, said casing comprising at least one wall section immediately adjacent to said supporting member and at least one other wall section more remote from said supporting member, said supporting member being spaced from the bottom of said outer casing and having an aperture substantially concentric with its axis of rotation, a hollow tube mounted on said supporting member communicating with said aperture and having its longitudinal axis parallel with the axis of rotation of said supporting member, said hollow tube having apertures therein, said outer casing comprising at least one sealable aperture in the bottom thereof for the removal of condensed moisture, a shaft concentric with the axis of rotation of the supporting member and in fixed relation with said supporting member, and radially disposed vertical fins fixed on said shaft.

2. In an apparatus according to claim 1, said fins being attached to said shalf at a point above the stack of loosely stacked material.

3. In an apparatus for drying loosely stacked material, a stationary outer casing, a rotatable supporting member within said casing adapted to have material to be dried loosely stacked thereon, said casing comprising at least one wall section immediately adjacent to said supporting member and at least one other wall section more remote from said supporting member, said supporting member

being spaced from the bottom of said outer casing and having an aperture substantially concentric with its axis of rotation, a hollow tube mounted on said supporting member communicating with said aperture and having its longitudinal axis parallel with the axis of rotation of said supporting member, said hollow tube having apertures therein, said outer casing comprising at least one sealable aperture in the bottom thereof for the removal of condensed moisture, said wall sections comprising insulating material which covers the wall section from the most remote point relative to the supporting member in the direction opposite to the rotation of the supporting member in a substantial amount, while the wall section from the most remote point to the point most adjacent in the direction of rotation of the supporting member are less perfectly insulated.

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