June 4, 1968 J. TIEFENBACH 3,386,186

APPARATUS FOR CONDUCTING A GASEOUS DRYING MEDIUM

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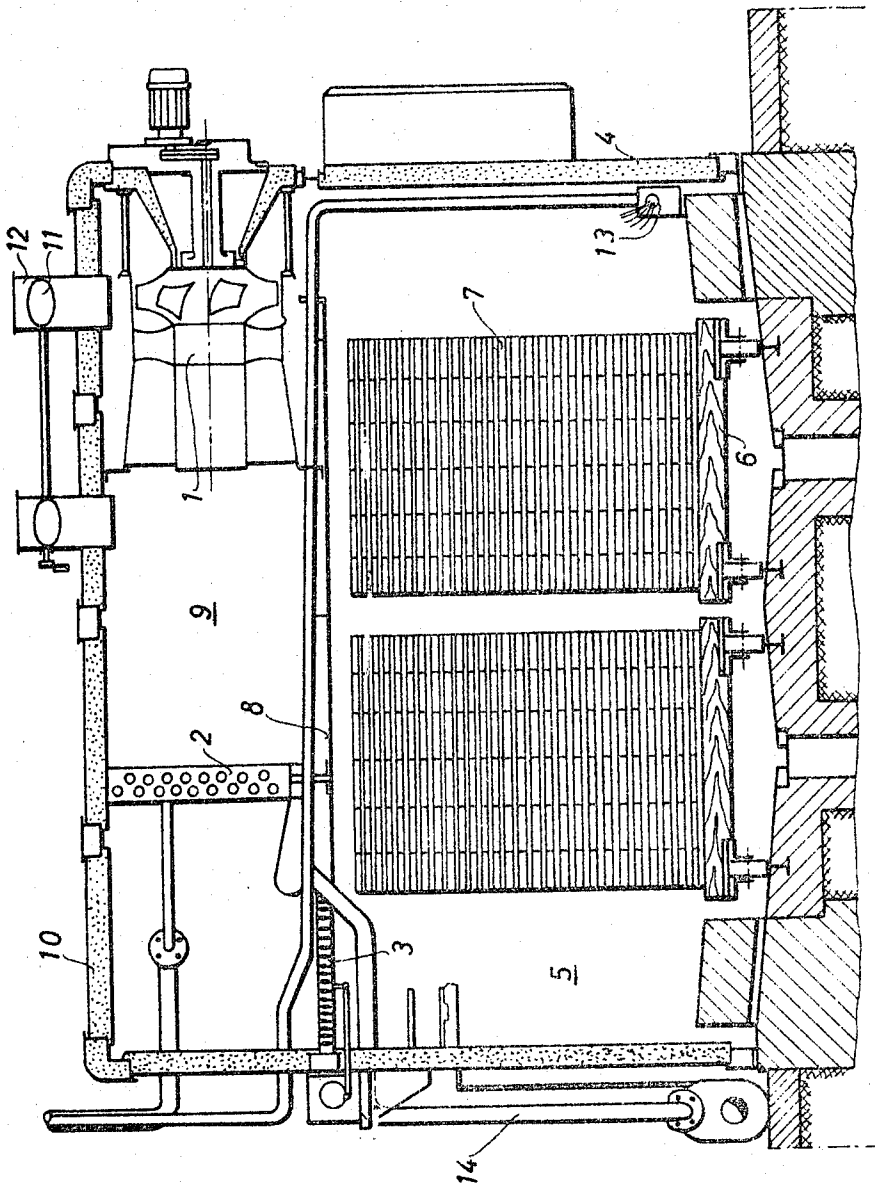


Fig. 1

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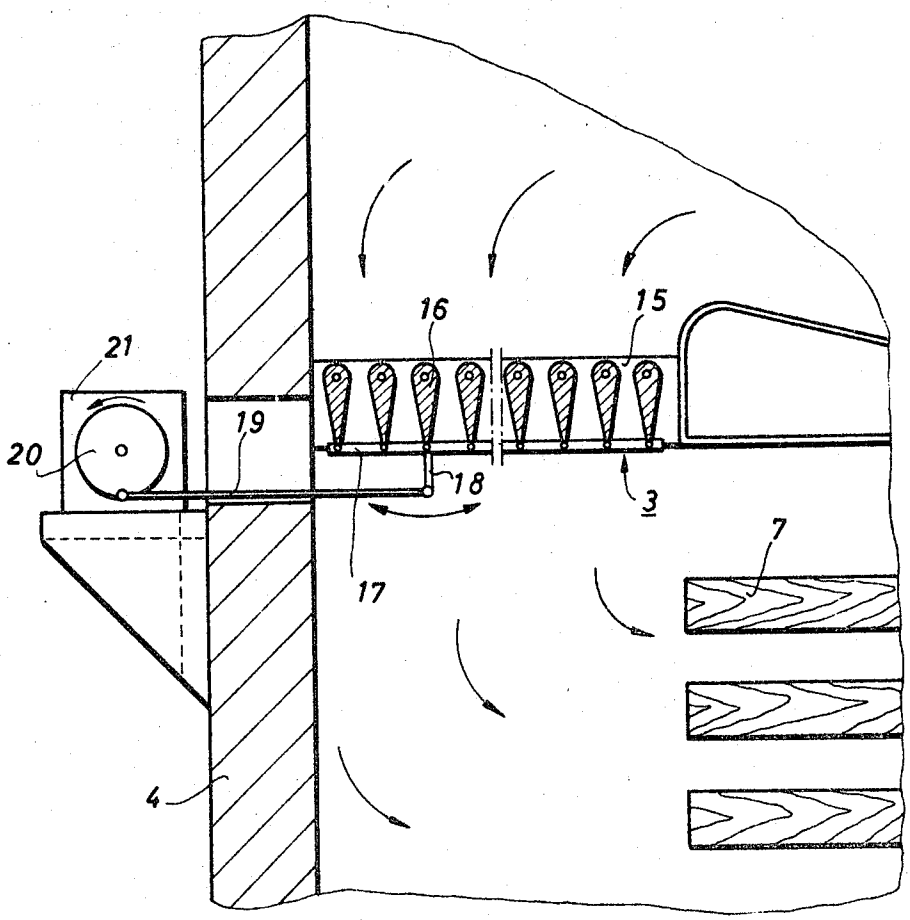


Fig. 2

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APPARATUS FOR CONDUCTING A GASEOUS DRYING MEDIUM

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5 Claims. (Cl. 34—191)

ABSTRACT OF THE DISCLOSURE

A dryer for use in connection with cut wood and in which the drying medium is circulated by means of a blower through guide baffles and through the material to be dried. The dryer also includes various elements connecting the drive means to the baffle elements to oscillate the same and means for varying the oscillating movements.

The present invention relates to an apparatus for conducting a gaseous drying medium within a drier, especially a drier for cut wood, in which the drying medium is circulated by means of a blower through guide baffles and through the material to be dried.

Whereas driers as well as air heaters are usually designed so as to produce a uniform flow of the drying or heating medium by means of guide baffles the individual elements of which are either secured in fixed positions so as to guide the flow in a particular direction or are pivotable so as to permit the flow to be changed in another fixed direction, it is an object of the present invention to vary the direction of flow of the drying medium continuously and to pivot the plurality of baffle elements of the drier at any desired angle and at any time or cycle as may be desired so as to vary the course of flow of the drying medium at least around the material to be dried. By varying the flow of the drying medium around the material, this material will be dried more quickly than by a uniform flow.

It is another object of the invention to pivot the baffle elements so as to vary the flow of the drying medium in a manner so as to prevent or destroy a boundary layer which at a continuous flow might be formed adjacent to the material to be dried. Since such a boundary layer delays the drying process because it separates the material to be dried from the remainder of the current of drying medium so that practically only the drying medium which is saturated with moisture will be conducted over the material to be dried, the prevention or destruction of this boundary layer will accelerate the drying process. If the boundary layer is eliminated, the moisture which should be withdrawn and conducted away from the material will be passed to areas of flow of the drying medium which are more remote from the material.

A further object of the invention consists in providing a drier which is designed so as to carry out the inventive method by pivotably mounting its individual baffle elements which are connected to each other and by providing suitable driving means for pivoting at least some of these baffle elements. These driving means preferably consist of a crank gear the crank arm of which is adjustable to different lengths and/or the driving motor of which is adjustable so as to run at different speeds.

The features and advantages of the present invention will become more clearly apparent from the following detailed description thereof which is to be read with reference to the accompanying diagrammatic drawings, in which:

FIGURE 1 shows a cross section of a drier especially for lumber; while

FIGURE 2 shows an enlarged view of a part of FIGURE 1.

Although the particular drier according to the invention as illustrated in the drawings is especially intended for drying lumber, for example, boards, planks or panels, it may, of course, also be employed for drying other materials. This drier is provided with an axial-flow blower 1, an air heater 2, and a guide baffle 3. The drying chamber 5 of the drier is enclosed by lateral walls 4 of insulating material and contains rail-mounted cars 6 on which the lumber 7 to be dried is stacked. The drying chamber 5 is separated by a top wall 8 from a return channel 9 which is defined by insulating walls including a top wall 10. This top wall 10 contains a pair of vents 12 which are provided with pivotable flap valves 11. The drying chamber 5 further contains a spray pipe 13 from which steam may be sprayed into this chamber. The air heater 2 may be operated, for example, by a steam generator, not shown, to which it is connected. The condensate may be removed from the drier through a discharge line 14.

As particularly shown in FIGURE 2, the guide baffle 3 comprises a plurality of wedge-shaped baffle elements 16 which are pivotably mounted at their upper ends between a pair of supporting members 15, while their lower ends are pivotably connected to each other by a connecting rod 17. One of the baffle elements 16 or the connecting rod 19 is connected by a link 18 to one end of a further connecting rod 19 the other end of which is adapted to be pivotably connected to a crank wheel 20 at different radial distances from the axis of this wheel. Either in addition or in place of this adjustability, the connecting rod 19 may also be designed so as to be adjustable to different lengths. Crank wheel 20 is connected to and driven by a motor 21 which may be adjusted so as to run at different speeds. The adjustability of the radius of the point of connection of the connecting rod 19 on crank wheel 20 and/or the adjustability of the length of the connecting rod 19 permit the angle to be varied to which the baffle elements 16 may be pivoted at each stroke of this connecting rod, while the adjustability of the speed of motor 21 permits the frequency of the oscillations of the baffle elements 16 to be varied. For absolutely preventing the formation of a boundary layer adjacent to the material to be dried which would occur if the flow of air proceeds continuously in the same direction or varies only very slightly, it has been found advisable to oscillate the pivotable baffle at a frequency of at least fifty oscillations per minute. In this manner it is possible to accelerate the drying process considerably. If it is desirable to produce a pulsating flow of the drying medium through the drier, this may be attained by pivoting the baffle elements at least in one direction so far that they will substantially engage with each other at one reversal point of the oscillating movements. In order to facilitate the operation of the drier and the adjustments of the driving means of the baffle elements 16, the motor 21 and the crank wheel 20, as well as the adjustable part of the connecting rod 19 are preferably located on the outside of the drier and the connecting rod 19 extends into the drier through an aperture in a wall thereof.

Although my invention has been illustrated and described with reference to the preferred embodiment thereof, I wish to have it understood that it is in no way limited to the details of such embodiment but is capable of numerous modifications within the scope of the appended claims.

Having thus fully disclosed my invention, what I claim is:

1. A drier comprising a drying chamber adapted to contain a material to be dried, means for producing a flow of a gaseous drying medium and for conducting the same into and through said chamber means for repeatedly varying at least the direction of said flow within said chamber during each drying operation, said means for varying the direction of said flow comprises a plurality of adjacent baffle elements spaced from and connected to each other, means for pivotably mounting each of said baffle elements, means for repeatedly pivoting said baffle elements back and forth so as to vary the direction of said flow within said chamber, and means for varying the speed of oscillation of said baffle elements.

2. A drier comprising a drying chamber adapted to contain a material to be dried, means for producing a flow of a gaseous drying medium and for conducting the same into and through said chamber means for repeatedly varying at least the direction of said flow within said chamber during each drying operation, said means for varying the direction of said flow comprises a plurality of adjacent baffle elements spaced from and connected to each other, means for pivotably mounting each of said baffle elements, means for repeatedly pivoting said baffle elements back and forth so as to vary the direction of said flow within said chamber, said means for pivoting said baffle elements comprises rotary driving means, a crank gear connected to and adapted to be driven by said driving means, and connecting means pivotably connected near one end to said crank gear and at the other end to said baffle elements so as to oscillate the same, and means for varying the oscillating movements of said baffle elements.

3. A drier comprising a drying chamber adapted to contain a material to be dried, means for producing a flow of a gaseous drying medium and for conducting the same into and through said chamber means for repeatedly varying at least the direction of said flow within said chamber during each drying operation, said means for varying the direction of said flow comprises a plurality of adjacent baffle elements spaced from and connected to each other, means for pivotably mounting each of said baffle elements, means for repeatedly pivoting said baffle elements back and forth so as to vary the direction of said flow within said chamber, said means for pivoting said baffle elements comprises rotary driving means, a crank gear connected near one end to said driving means and adapted to be driven thereby and connected at the other end to said baffle elements, and means for varying the active length of said crank gear.

4. A drier comprising a drying chamber adapted to contain a material to be dried, means for producing a flow of a gaseous drying medium and for conducting the same into and through said chamber means for repeatedly varying at least the direction of said flow within said chamber during each drying operation, said means for varying the direction of said flow comprises a plurality of adjacent baffle elements spaced from and connected to each other, means for pivotably mounting each of said baffle elements, means for repeatedly pivoting said baffle elements back and forth so as to vary the direction of said flow within said chamber, said means for pivoting said baffle elements comprises rotary driving means, a crank gear connected near one end to said driving means and adapted to be driven thereby and connected at the other end to said baffle elements, and means for varying the speed of said driving means.

5. A drier comprising a drying chamber adapted to contain a material to be dried, means for producing a flow of a gaseous drying medium and for conducting the same into and through said chamber means for repeatedly varying at least the direction of said flow within said chamber during each drying operation, said means for varying the direction of said flow comprises a plurality of adjacent baffle elements spaced from and connected to each other, means for pivotably mounting each of said baffle elements, means for repeatedly pivoting said baffle elements back and forth so as to vary the direction of said flow within said chamber, said means for pivoting said baffle elements comprises rotary driving means, a crank gear connected to and adapted to be driven by said driving means, and connecting means pivotably connected near one end to said crank gear and at the other end to said baffle elements so as to oscillate the same, and means for varying the oscillating movements of said baffle elements, said rotary driving means, said crank gear, and said means for varying said oscillating movements being located on the outside of said drier and are connected by said connecting means with said baffle elements at the inside of said drier.

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