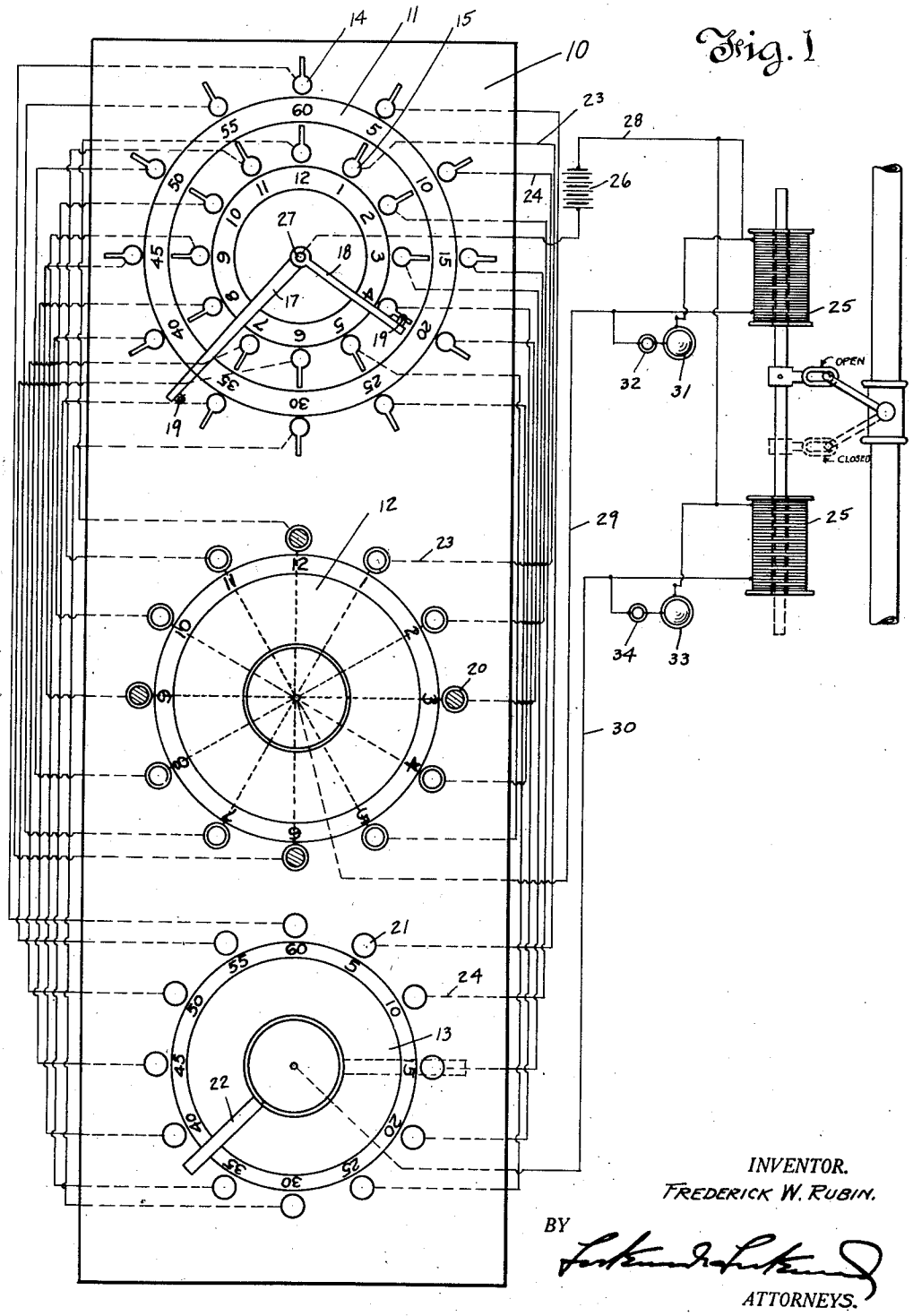
March 2, 1926. 1,575,008

F. W. RUBIN

PROCESS OF STEAMING DRY KILNS AND TIME CONTROL THEREFOR

Filed May 15, 1924 2 Sheets-Sheet 1

Fig. 1



INVENTOR.
FREDERICK W. RUBIN.

BY

ATTORNEYS.

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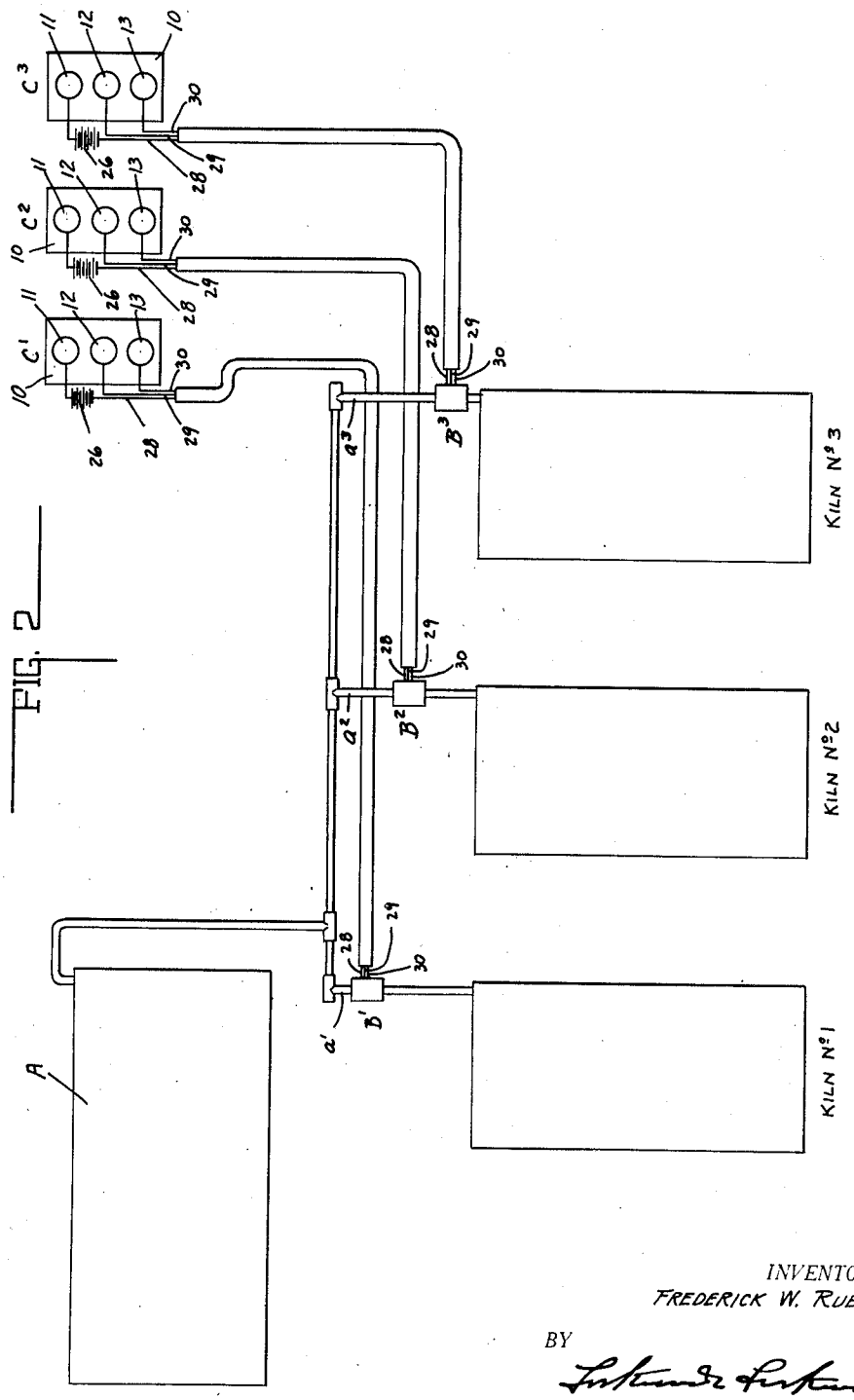

FIG. 2

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Patented Mar. 2, 1926. 1,575,008

UNITED STATES PATENT OFFICE.

FREDERICK W. RUBIN, OF INDIANAPOLIS, INDIANA.

PROCESS OF STEAMING DRY KILNS AND TIME CONTROL THEREFOR.

Application filed May 15, 1924. Serial No. 713,601.

To all whom it may concern:

Be it known that I, FREDERICK W. RUBIN, a citizen of the United States, and a resident of Indianapolis, county of Marion, and State of Indiana, have invented certain new and useful Processes of Steaming Dry Kilns and Time Control Therefor; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which like numerals refer to like parts.

The full nature of the invention will be understood from the accompanying drawings and the following description and claims.

Fig. 1 is a diagrammatic illustration of the steam valve and time control mechnaism therefor. Fig. 2 is a diagrammatical illustration of the arrangement of the steam valves with their respective time control mechanisms in connection with the respective kilns and the source of steam supply.

In the drawings there is shown a steam control device comprising what may be termed a switch board 10 having thereon a clock or timing device 11, an hour contact dial 12 and a minute contact dial 13. The clock or timing dial 11 is provided with twelve contact posts 14 arranged in an outer circle and spaced apart equidistant, the same being numbered from 5 to 60, inclusive, in units of 5. There are also twelve contact posts 15 arranged in an inner circle spaced equidistant and indicated by the numerals 1 to 12, inclusive. There is provided the ordinary and usual clock mechanism, not shown herein, which is wound by a key-receiving post and is provided with a minute hand 17 and an hour hand 18. Said hands are provided with contact brushes 19 near their ends adapted to ride over and make contact with their respective posts 14 and 15. The hour hand dial is provided with twelve sockets adapted to receive switch buttons or contact screws 20, and arranged in a circle, spaced from each other and designated by the numerals 1 to 12, inclusive. The minute contact dial is provided with contact posts 21 arranged in a circle and spaced equidistant from each other, the same being indicated by the numerals 5 to 60, inclusive, in units of 5. Pivotally mounted on said dial there is a movable contact arm 22 which may be rotated in such manner as to engage and make contact with any one of the posts 21.

In the wiring, the contact hour posts 15 on the clock dial are connected with their numerically corresponding switches or screw contacts 20 on the hour contact dial by the electric conducting wires 23. Each of the minute posts 14 on the clock dial is connected with its numerically corresponding contact post 21 on the minute contact dial by the electric conducting wires 24.

There is provided in the steam system of each of the kilns, a steam valve operating solenoid 25, said solenoid being constructed in any suitable manner to control the opening and closing of the steam valve. There is further provided a battery 26 having one terminal connected with the mounting 27 of the hour and minute hands 17 and 18 and the other terminal connected by a wire 28 with the solenoid. The solenoid may be so arranged that when electrical energy is imparted to the end marked "open," it will act to open the steam valve and when energy is imparted to the other end marked "closed," it will close the steam valve. The hour contact dial 12 is connected by a wire 29 to that end of the solenoid marked "open" and the mounting of the arm 22 on the minute contact dial is connected by a wire 30 to that end of the solenoid marked "closed." Connected in parallel with the wire 29 there is a lamp 31 and push button 32, which will throw a light indicating that the valve has been turned on upon pressing the button 32, if there is a current passing through the wire 29. There is likewise connected in parallel with the wire 30 a lamp 33 and button 34 for acting in the same manner if the valve is turned off by the current passing through the wire 30. The lamps 31 and 33 are for the purposes of checking the system and assuring the operator whether the valve is opened or closed.

In operation, assuming that the particular lumber to be dried should be sprayed for 15 minutes every 3 hours, it is obvious that the valve should be turned on for 15 minutes and should be turned off for 2 hours and 45 minutes. Since the cycle is every 3 hours, the hour contact switches or screws 20 may be set at 12 and 3, 6 and 9, and since the spraying interval is for the duration of 15 minutes, the minute contact posts 21 located

at 15 should be engaged by placing the adjustable contact arm 22 on the post so located as shown by the dotted arm 22 in the drawing. When the clock movement causes the hour hand 18 to reach the post 12, it closes the circuit with the open end of the solenoid, through the wire 28, the battery 26, the mounting 27, hour hand 18, post 15 located at 12 and switch 20 indicated by 12 and wire 29. The closing of this circuit, therefore, actuates the solenoid for opening the valve and the steam will be sprayed. If the operator desires, he may verify this by pressing the button 32, which will cause the lamp 31 to flash on.

Assuming at the beginning of this operation that the minute hand 17 had been set with the hour hand, at a lapse of 15 minutes, it will have moved into contact with the post 14, located at 15 on the clock dial. In the meantime, the hour hand 18 will have moved from contacting position with the post 15 indicated by 60 and the circuit through the "Open" end of the solenoid will be broken, but the steam valve will remain on. At the lapse of 15 minutes, the circuit will be closed through the minute hand 17, contact post 21 located at 15, arm 22, wire 30 and the closed end of the solenoid as well as through the battery 26 and wire 28. The closing of this circuit will actuate the solenoid to move the valve to "Closed" position and may be verified by the operator upon pressing the button 34 and flashing the lamp 33, if he so desires. After such actuation, this circuit will be opened again upon the minute hand 17 passing over the post 14 indicated at 15, but the valve will remain closed until the first-described circuit is again closed for opening the valve. This cannot occur until the hour hand reaches the post 15 located at 3, or 2 hours and 45 minutes from the closing of the valve.

By different relative arrangements of the hour and minute hands, the arm 22 and the switches 20, various combinations can be obtained for timing the duration of the spraying and the intermediate time between sprayings. The spray may be arranged to operate during 5, 10 or 15 minutes, etc., every 1, 2, 3 or 4 hours, etc. By means of tests and experience, charts may be made up indicating the duration of the spray and the interval of time between sprays for each kind of wood and the respective conditions thereof, as well as the temperature to be maintained in the kiln independently of the spraying system. For example, air dried ash 4/4ths should be sprayed 10 minutes every 2 hours and 50 minutes, at 170 degrees. On the other hand, air dried yellow pine 4/4ths should be steamed 15 minutes every 5 hours and 45 minutes at 200 degrees.

The same process may be employed for each kiln and in order that the steam supply for all the kilns may be operated with the greatest efficiency, the timing may be arranged so that there would be no conflict between the kilns, or, in other words, so that the steam will not be employed for more than one kiln at a time. As an example, we may assume that four kilns are being operated. The first kiln may be started with the hour hand 18 at 12, the actual daily time being 7 a. m. The kiln No. 2 may be started in the same manner at 7:15 a.m., the time when the first kiln stops spraying. Kiln No. 3 may be started at 7:30 a.m. with the hour hand 18 at 12 on the clock dial, at which time the second kiln has stopped spraying. Kiln No. 4 may be started at 7:45 a.m., the time the third kiln has stopped at 8 a.m., and there will be 2 hours during which time there will be no steam used in the kilns, and the boiler room will know in advance that between the hours of 8 a.m. and 10 a.m., there will be no use of drying steam. This is assumed, of course, that the drying period for each of the kilns is 15 minutes. It will further be understood that the clock dial is to be used in no sense for indicating the time of day, but only for steam timing purposes. If it is desired that the steam be off continuously, after the valve has been once closed the clock hands may be moved to a neutral position between their respective posts. On the other hand, if it is desired that the steam be continuously sprayed without the use of this system, it may be started as above described and the arm 22 may be positioned neutral out of contact with any of the posts 21 as shown in the drawing.

As shown in Fig. 2, there is illustrated a plurality of kilns numbered 1, 2 and 3 respectively. There is also shown a central source of steam supply A which is connected with the respective kilns through the branch steam pipes a^1, a^2, and a^3 respectively. In each of said branch pipes there is a valve and valve control housing B^1. In this housing there may be included the valve 14 and the solenoids 13 and 25 for operating said valve as shown in Fig. 1. Electrically connected with the respective valve control housings as illustrated in Fig. 1, there are a plurality of electric time control devices C^1, C^2, and C^3, one for each kiln, said devices comprising the timing device 11, hour contact dial 12 and minute contact dial 13. Each dial is electrically connected by the wires 28, 29 and 30 with their respective valve control mechanism. In this diagrammatic illustration, the time control mechanisms are shown as being remotely positioned from the steam control valves of the respective kilns. However in actual practice, it is some times desirable that the time control devices be associated with the valve control mechanism or positioned on or in close proximity to their respective kilns.

Whereas solenoids are herein shown as controlling the steam valve, it is often desirable by reason of the nature of the current to provide as standard equipment an electric motor for controlling the valve in place of the solenoids, all of which is well known in the art and does not form a part of this invention.

The invention claimed is:

1. The process of steaming a plurality of dry kilns in the drying treatment of lumber from a single source of steam supply, consisting of timing the discharge of steam into the individual kilns at predetermined intervals independently of the relative humidity thereof, whereby said kilns will receive steam from a single source of supply during different periods of time and prevent the overloading thereof.

2. The process of steaming dry kilns in the drying treatment of lumber, from a source of steam supply, consisting in providing a remotely positioned time control for the discharge of steam and thereby remotely controlling the steam discharge into said kilns at predetermined intervals irrespective of the relative humidity, whereby the steam from the source of supply may be distributed for avoiding overloading.

3. The process of steaming dry kilns in the drying treatment of lumber from a source of steam supply consisting of electrically controlling the discharge of steam from said supply by turning it on or shutting it off, providing a remotely positioned electric time controlled switch and manually setting said switch so as to actuate the discharge of steam from said source of supply for turning the same on for given periods of time and turning it off for intermediate periods of time determined by the manual positioning of the switch irrespective of the relative humidity of the kiln.

4. A control mechanism for the steaming of dry kilns independently of the relative humidity thereof in the drying treatment of lumber, comprising a steam supply pipe, a valve, electrically actuated means for controlling said valve, a time controlled switch having hour and minute hands adapted to respectively engage during their rotation a plurality of hour and minute contacts, a manually actuated switch board having a plurality of switch members, each of which is electrically connected with each of said hour contacts, a second switch board having a plurality of switch members, each electrically connected with each minute contact, a source of current, and an electric circuit including said source of current, electric valve controlled means, time controlled switch and switch boards, whereby said valve will be opened for permitting the discharge of steam into the kilns at a given time upon the hour hand engaging the contact on the time switch which is electrically connected with the manually closed circuit through the first switch board, and thereafter closing said valve upon the minute hand engaging a minute contact on the time switch connected with the manually closed circuit on the second switch board, whereby said switch boards may be set to open said valve over a given period of time at predetermined intervals.

In witness whereof I have hereunto affixed my signature.

FREDERICK W. RUBIN.