

Patented Aug. 14, 1888.

A diagram of a lever system. A horizontal beam is pivoted on a vertical support. A force F is applied downwards at the left end of the beam. A force F^2 is applied upwards at the right end of the beam. The distance from the fulcrum to the point of application of F is labeled l_1 . The distance from the fulcrum to the point of application of F^2 is labeled l_2 . The text "16.5." is written above the fulcrum.

FIG. 6. and FIG. 7. show cross-sections of the device. FIG. 6 shows the device in a closed position, with the top plate 10 and the bottom plate 11. FIG. 7 shows the device in an open position, with the top plate 10 and the bottom plate 11. The device is shown in a cross-section view, with the top plate 10 and the bottom plate 11. The device is shown in a cross-section view, with the top plate 10 and the bottom plate 11. The device is shown in a cross-section view, with the top plate 10 and the bottom plate 11.

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UNITED STATES PATENT OFFICE.

WALLACE MCPHERSON, OF TEXARKANA, TEXAS.

DRIER.

SPECIFICATION forming part of Letters Patent No. 387,652, dated August 14, 1888.

Application filed April 2, 1888. Serial No. 269,293. (No model.)

To all whom it may concern:

Be it known that I, WALLACE MCPHERSON, a citizen of the United States of America, residing at Texarkana, in the county of Bowie and State of Texas, have invented certain new and useful Improvements in Driers, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to improvements in driers for lumber and other material, in which hot air mixed with smoke and other products of combustion are conducted and admitted into the drying-chamber to utilize the greatest proportion of heat given by burning fuel; and the objects of my improvement are to provide, with stackless arches having a closed top and openings in the side, another arch or arches alongside of the first with openings in its sides, and pendent deflecting-plates to arrest all sparks that may issue from a furnace also provided with deflecting walls or plates, and thereby secure perfect safety in the use of that class of driers. I attain these objects by the construction illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view of a lumber-drier provided with furnaces, and the latter provided with deflecting plates and flues having side openings and deflecting-plates constructed in accordance with my invention. Fig. 2 is a longitudinal vertical section on line $x x$ of Fig. 3. Fig. 3 is a horizontal section on line $y y$ of Fig. 2. Fig. 4 is a transverse vertical section of the flues on line $z z$ of Fig. 3. Fig. 5 is a top view of the damper and the thermostatic bar. Figs. 6 and 7 are modifications of the flues.

In said drawings, A represents a furnace having the grate-bars A^2 and a front opening closed by a door, A^3 . At the rear end of the grate-bars there is a bridge-wall, A^4 , to prevent the too rapid escape of the flame toward the rear flues, and about eighteen inches back of said bridge-wall stands the rear wall, A^5 , of the furnace, the whole being covered by the arch A^6 . Through the bottom portion of the wall A^5 there is an opening, a^5 , for the passage of the products of combustion from the furnace into the safety-flues, which will herein-
after be described. To prevent nearly all the sparks produced in the furnace from escaping

into said safety-flues, there is suspended from the under side of the arch of the furnace, a few inches in the rear of the bridge-wall, a plate, a , to deflect the current of heated gases and arrest a great portion of the sparks carried thereby, as the bottom edge of said plate is below the level of the top of the bridge-wall, and half-way between said plate a and the rear wall, A^5 , of the furnace there is a vertical plate, a^2 , that rests upon the floor, and has its upper edge on a level higher than the bottom edge of the plate a . Thus the bridge-wall, with the parallel plates $a a^2$, and the rear wall, A^5 , with its opening a^5 near its bottom, causes the sparks to follow a zigzag course, and to strike against so many obstructions to a direct course that they become extinguished and fall to the bottom of their leading passages, from which the majority can be occasionally removed by opening the door a^3 in the side wall of the furnace, leading from the passage between the rear of the bridge-wall and the plate a^2 .

The furnace above described is generally located on the outside of the drier, as shown in Fig. 1, and to prevent any escape of latent heat from the top of the arch A^6 the latter may be incased in earth or sand suitably retained, or a second arch may be placed above the arch A^6 , with a few inches of space intervening, through which space air may be allowed to circulate, and from its rear end enter the main chamber of the drier. After issuing from the opening a^5 , the hot air and products of combustion of the furnace are directed through passages B, that are preferably diverging, as shown in Fig. 3, to distribute the heat more uniformly at many points in the drying-chamber. To prevent any sparks that may yet be floating in the passages B from passing into the drying-chamber, these passages are arched over, and the smoke-escape openings b of said passages are below the base of the arch or the covering-plate of said passages, and in place of having said openings lead directly into the drying-chamber they lead into a flue, C, parallel with the passage or flue B, and the outer wall of the flue C is provided with escape-openings c , substantially on the same level as the openings b , but longitudinally in the middle of the flues C there is a pendent plate, d , the lower edge of which is

below the level of the escape-openings $b\ c$, and causes the current of hot air and gases to dip down under said lower edge and deposit upon the floor of the flue C any sparks or light body that may have been carried so far by the current of hot gases.

The flues C are closed and covered over by plates D, from which the plates d are suspended; but said division-plates may be made to rest upon bolts α' , inserted transversely and at short distances apart in the walls of the flues C, as shown in Figs. 6 and 7, and said bolts will also support the covering-plates D, in which case the latter are thus retained with their bottom surface a few inches above the walls of the flues C, so as to leave at these points long flat openings $b^2\ c^2$ for the passage of the products of combustion, and dispense with the separate openings $b\ c$, heretofore described. Said plates D may preferably be of such width as to extend over the passage B, as shown in Fig. 6; but they may also be united by a higher arch, as shown in Fig. 7. Although the flues B C have been described as made of suitable brick or clay, they may also be made of iron, if desired.

The plates D d are removable, so that the interior or floor of the flues C can occasionally be cleaned. The flues B may be provided either with one safety-flue, C, as shown in the upper part of Fig. 3, or with two safety-flues, viz: one on each side of the flue B, as shown in the lower part of said Fig. 3.

To automatically control the temperature in the drying-chamber, each furnace A is provided with a stack, E, set in the top of the arch, and the lower opening of said stack is controlled by a damper, F, pivoted at f to the under side of the arch, so that when in its normal horizontal position it will close the lower end of the stack; but when the temperature in the drying-chamber is over 200° , or whatever temperature it is desired to have therein, the lower end of the damper drops upon the upper edge of the bridge-wall and temporarily

prevents the heated gases from reaching the interior of the drier.

Many different means or thermostats can be used to control the damper. One of the simplest is illustrated in the drawings, as follows: The damper is slightly more than counterbalanced by a weight, F^2 , and upon its shaft is mounted a short crank-arm, f^2 , against the under side of which a long metal rod, G, is made to abut, and said rod extends across the drying-chamber over the flues B or C, and has its opposite end permanently secured, so that when the temperature becomes too high the rod G expands, and, pressing against the short arm, f , depresses the damper and allows the heat to escape up the stack E. As soon as the temperature is sufficiently lowered the rod G contracts and the weight F^2 closes the damper against the lower end of the stack. Electric thermostats may be used for the same purpose, or fusible chain-links may be used to control the damper.

Having now fully described my invention, I claim—

1. In a drier, the combination of a furnace having a bridge-wall in front of its rear wall, a pendent plate, a , between said bridge-wall and rear wall, and a standing partition, a^2 , between said pendent plates and rear walls, the latter having an opening, a^5 , therein, and passages provided with lateral openings, substantially as and for the purpose described.

2. In a drier, the combination of a furnace having a bridge-wall and an opening, a^3 , in its rear wall, and passages B, having lateral openings b below their arch or cover, and flues C, having lateral openings, and a pendent plate, d , substantially as and for the purpose described.

In testimony whereof I affix my signature in presence of two witnesses.

WALLACE McPHERSON.

Witnesses:

W. E. SNODGRASS,
JAMES ROBINSON.