No. 880,917. PATENTED MAR. 3, 1908.

H. W. RAYNER.

DRIER.

APPLICATION FILED MAY 29, 1907.

2 SHEETS—SHEET 1.

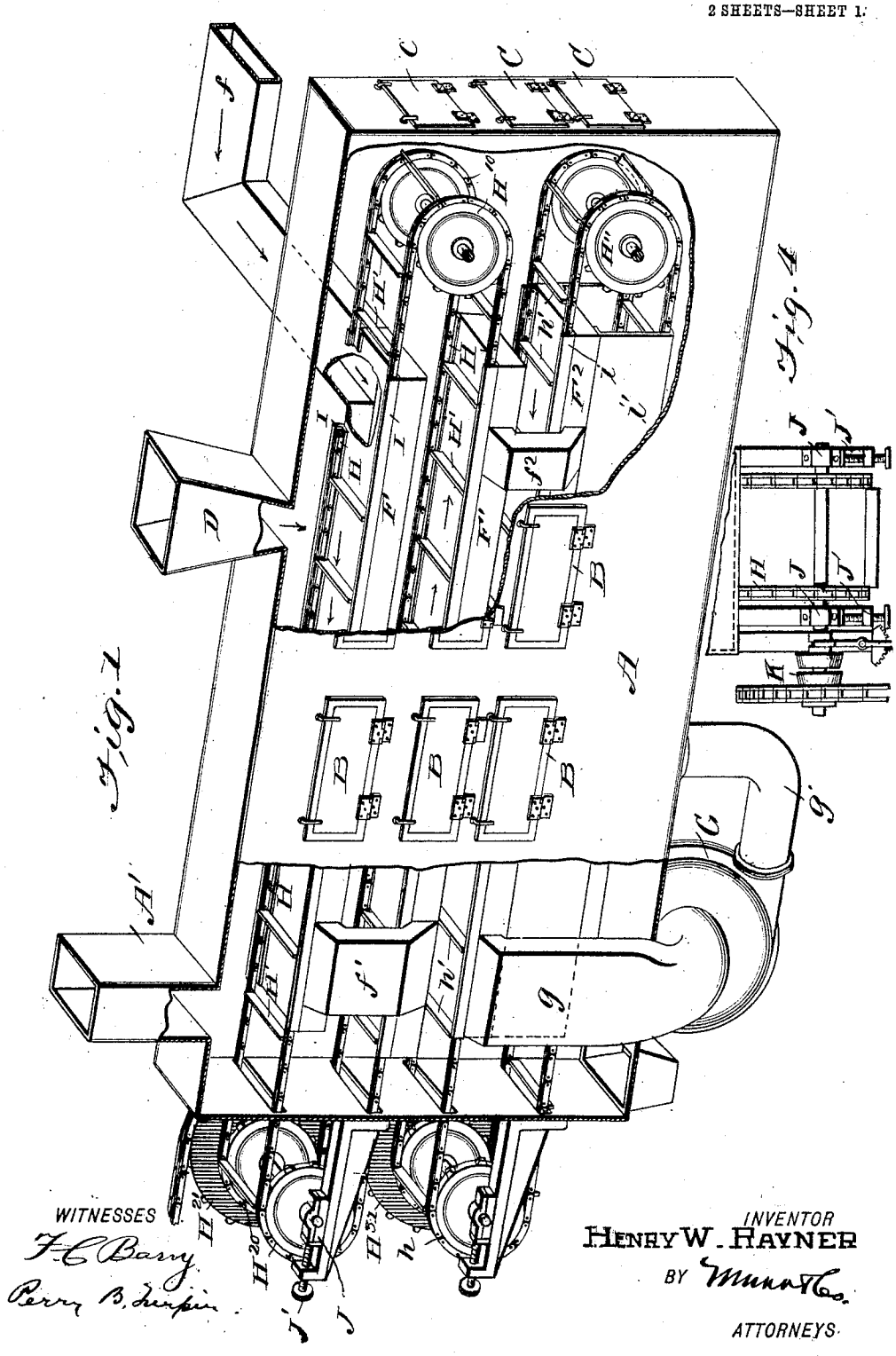


Fig. 1.

Fig. 4.

WITNESSES

F. C. Barry.

Perry B. Simpson.

INVENTOR

HENRY W. RAYNER

BY Munn & Co.

ATTORNEYS.

No. 880,917. PATENTED MAR. 3, 1908.

H. W. RAYNER.

DRIER.

APPLICATION FILED MAY 29, 1907.

2 SHEETS—SHEET 2.

Fig. 3.

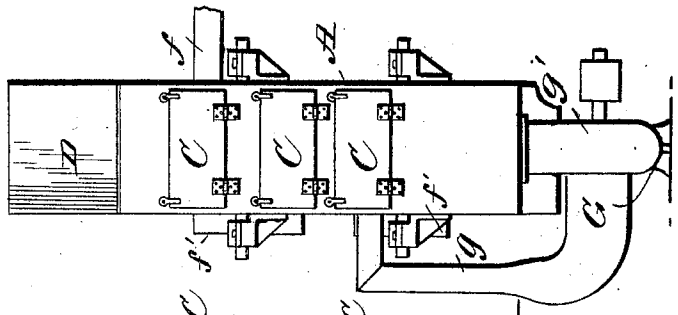
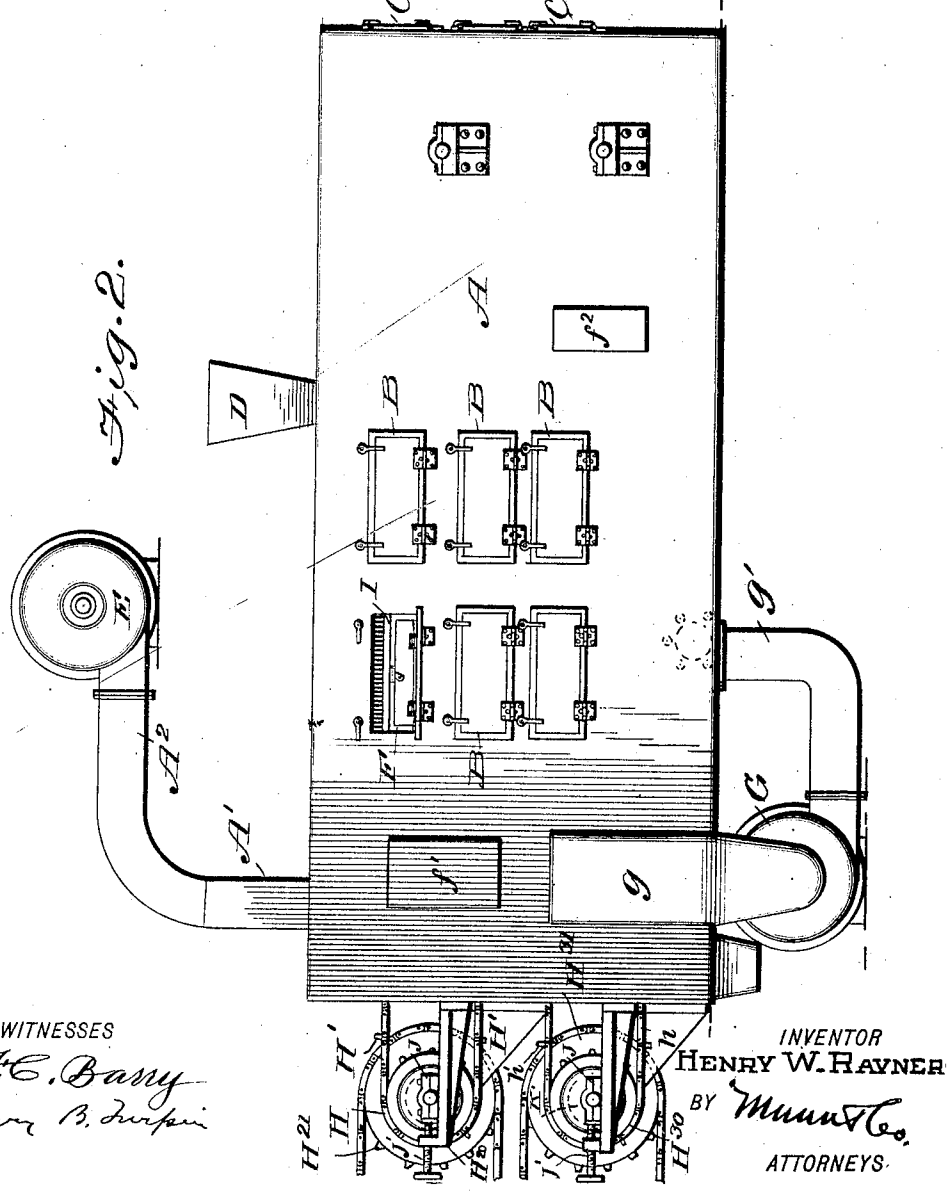


Fig. 2.



WITNESSES

F. C. Barry

Percy B. Turpin

INVENTOR

HENRY W. RAYNER

BY Munn & Co.

ATTORNEYS

UNITED STATES PATENT OFFICE.

HENRY WILLIAM RAYNER, OF EAGLE LAKE, TEXAS.

DRIER.

No. 880,917. Specification of Letters Patent. Patented March 3, 1908.

Application filed May 29, 1907. Serial No. 376,247.

To all whom it may concern:

Be it known that I, HENRY W. RAYNER, a citizen of the United States, and a resident of Eagle Lake, in the county of Colorado and State of Texas, have invented certain new and useful Improvements in Driers, of which the following is a specification.

My invention is an improvement in driers, and is especially designed for drying bagasse, or crushed cane, milled or diffused sugar cane from a sugar mill; and the invention consists in certain novel constructions and combinations of parts as will be hereinafter described and claimed.

In the drawings Figure 1 is a perspective view, parts being broken away and others shown in section of a drier embodying my invention. Fig. 2 is a side elevation of the drier. Fig. 3 is an end elevation of the drier. Fig. 4 is a detail view illustrating the bearings and friction clutch mechanism of the sprocket wheels.

Heretofore specially constructed furnaces have been employed for burning the bagasse on account of the large percentage of moisture which the solid or crushed cane and diffused sugar contains.

By my invention I seek to provide specially constructed driers and on account of the expense of heat for evaporating the moisture in the bagasse I utilize the waste heat of any character or any character of heat resulting from products of combustion used under a steam boiler, and the specified waste heat to be considered waste heat if used initially for steam raising purpose under a boiler and then sent into the open air either through breechings or stack. The waste heat as here indicated is the flue gases or the resultant of heat after it has been utilized as heat of direct combustion to raise steam under a boiler, in heating the drier for driving off the moisture.

In the construction shown, I employ a casing A having side doors B and end doors C and provided with a hopper D through which the bagasse may be supplied to the carrying mechanism by which it is shifted from the hollow heating boxes presently described. I also provide the casing A with an off-take A′ communicating through a pipe A^2 with any suitable form of suction fan E, by which the air within the casing may be turned off in the operation of the invention, as presently described. The suction fan E may deliver to any suitable stack if convenient, or may deliver to the air as preferred.

Within the casing A I provide a series of hollow boxes of which I have shown three, F, F′ and F^2, the several boxes overlying each other as shown in Fig. 1, and being arranged to extend longitudinally in the direction of length of the casing A and being spaced apart and also spaced apart from the body of the casing A so that air may circulate around the several heating boxes F, F′ and F^2 in the practice of the invention. Heat is delivered to one end of the upper box F by a flue *f* and circulates thence to the opposite end of the box F whence it is conducted by a flue *f′* to the adjacent end of the next lower box F′, circulates thence to the opposite end of the box F′ which is connected by the flue f^2 with the adjacent end of the next lower box F^2, and circulates thence in said box F^2 to the opposite end thereof, where it discharges through the flue *g* to a suction fan G which delivers the heated air, gases, etc. so received through the pipe *g′* back into the casing A within which it circulates around the heating boxes F, F′, and F^2 and is delivered through the off-take A′ by the operation of the suction fan E in the use of the invention as presently described.

As shown the boxes F, F′ and F^2 overlie and the delivery ends of the boxes F and F′ terminate short of the receiving ends of the next lower boxes F′ and F^2, respectively, so that the material delivered off the end of the box F will be received on the box F′ and discharged thence to the box F^2 in the use of the apparatus. The doors B and C permit convenient access to the interior of the casing for cleaning or repairing the interior parts of the apparatus, as will be readily understood from Fig. 1.

Heat is supplied through the flue *f* preferably by connecting said flue *f* with a smoke stack so the drier may be heated by the utilization of the exhaust, waste and surplus heat from such stack, the flue gas frequently reaching a very high temperature, and thus facilitating the drier's operation by rapidly driving off moisture, as will be understood from the drawings.

Chain carriers are employed for moving the bagasse over the upper surfaces of the boxes F, F′ and F^2. In the construction shown the upper run of the chain carrier H operates over the box F, and the lower run of

said carrier H operates over the box F', the slats H' of said carrier moving close to the upper surface of the boxes, and the chains at the edges of the carrier operating in angle iron tracks I, as shown in Fig. 1. The carrier for the lower box has its chains h and slats h' operating over the box F^2 with the chains h of the upper and lower runs of said carrier operating in angle iron tracks i and i', as shown in Fig. 1. At one end the chain carriers H and h operate over idle pulleys H^{10} and H^{11}, while at their other ends, the said carriers are suitably driven. The chain carrier H has its sprocket pulleys H^{20} connected with the drive pulley H^{21} which may be suitably driven from any source of power and the said sprockets H^{20} are mounted on a shaft journaled in boxes J which may be adjusted by screws J', as will be understood from the drawings. The journals of all the sprocket wheels, it will be noticed are arranged outside of the casing A so they may be lubricated and the lubrication will not be seriously affected by the heat within the casing.

The sprockets H^{20} of the upper carrier connect by friction clutches K with the drive sprocket H^{21} and the sprockets H^{30} of the lower carrier are mounted similarly to the sprockets H^{20} in adjustable boxes and connected by a friction clutch K' with their drive sprocket H^{31} which may be driven in any suitable manner.

In the operation of the described construction, it will be noticed the bagasse supplied through the hopper D is received upon the upper heat box F and moved thereabout by the upper run of the carrier H until it is discharged at the delivery end of the box F onto the receiving end of the box F' along which it is moved by the lower run of the carrier H and delivered onto the receiving end of the box F^2 along which it is carried to the delivery end of said box F^2 whence it may be discharged through a suitable outlet into any desired receptacle.

The heat maintained being supplied through the flue f is circulated through the boxes F, F' and F^2 and the flues f and f^2 and out of the box F^2 through the flue g whence it is returned by the fan G and delivered through the flue g' back into the casing through which it circulates around the bagasse in such manner as to operate thereon not only by the heat contained in the gases, etc. so circulated through the casing A, but also by reason of the draft aiding in the evaporation process, as will be understood by those skilled in the art.

I claim:

1. A drier substantially as herein described, comprising a casing, a series of heating boxes arranged therein one above the other, with the delivery end of each box terminating short of the receiving end of the next lower box, connecting flues between the delivery ends of each box and the receiving ends of the next lower box, a supply flue leading to the upper box, an outlet flue leading from the lower box, a suction fan connecting with said outlet flue and having a discharge flue leading to the casing, a suction fan connected with the offtake of the casing, chain carriers movable over their respective heating boxes, and angle iron tracks for the chains of the said carriers, substantially as set forth.

2. In a drier substantially as described, the combination of a casing, a series of drying boxes therein and arranged one above the other, with the delivery end of each box discharging to the receiving end of the next lower box, flues connecting the said boxes, a supply flue leading to the upper box, a discharge flue leading from the lower box, a fan in connection with said discharge flue, and a return flue from said fan to the casing, whereby heat may be circulated through the boxes and may thence be withdrawn and circulated through the casing surrounding the boxes, substantially as set forth.

3. The combination with a casing, and heating boxes therein, forming bases over which the material to be dried may be passed, means for supplying a heating medium to the heating boxes, and means for withdrawing the said medium from the boxes and circulating it through the case surrounding the boxes, substantially as set forth.

HENRY WILLIAM RAYNER.

Witnesses:
C. R. BARBE,
M. E. GUYNER,
J. E. ROBERTS.