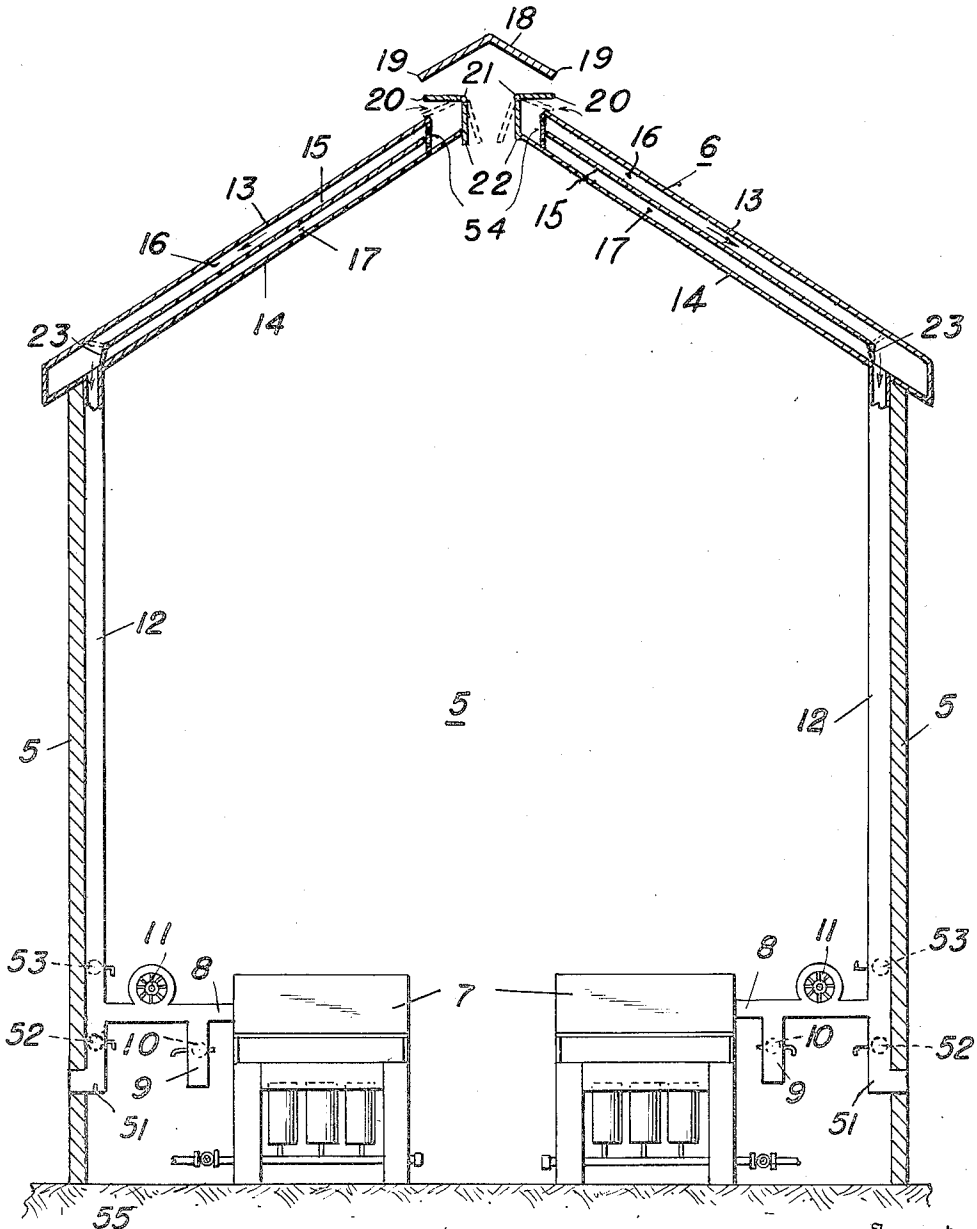
Nov. 14, 1950 R. E. MAYO 2,529,621

DRYING HOUSE

Filed May 31, 1946 3 Sheets-Sheet 1

FIG. 1



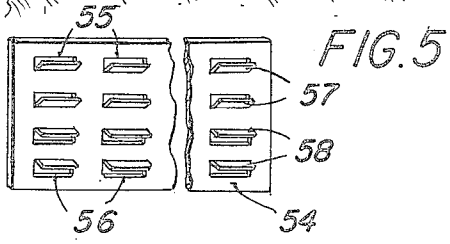




FIG. 5

Inventor

R. E. MAYO.

By Barry & Cyr.

Attorneys

Nov. 14, 1950 R. E. MAYO 2,529,621

DRYING HOUSE

Filed May 31, 1946 3 Sheets-Sheet 2

FIG. 2

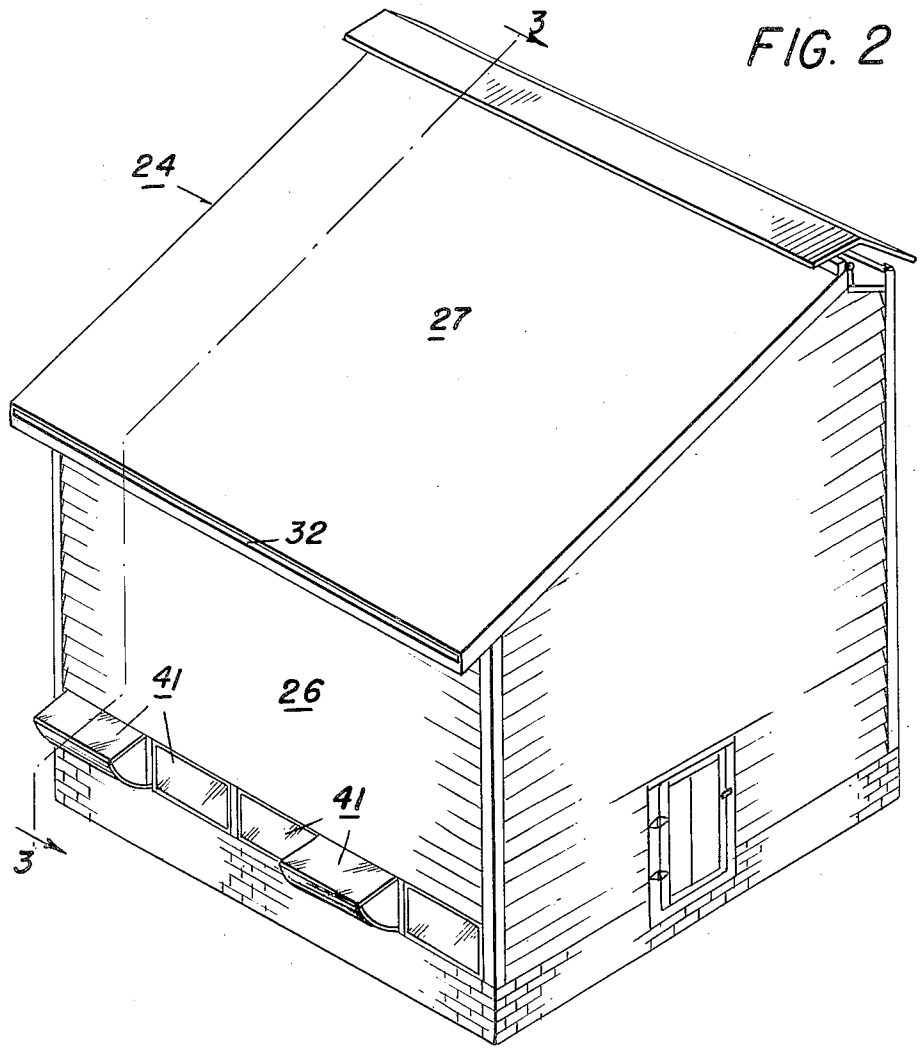
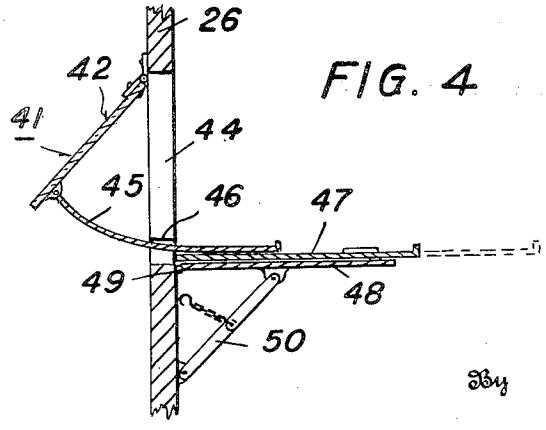



FIG. 4




Inventor

R. E. MAYO.

By Barry + Cyr,

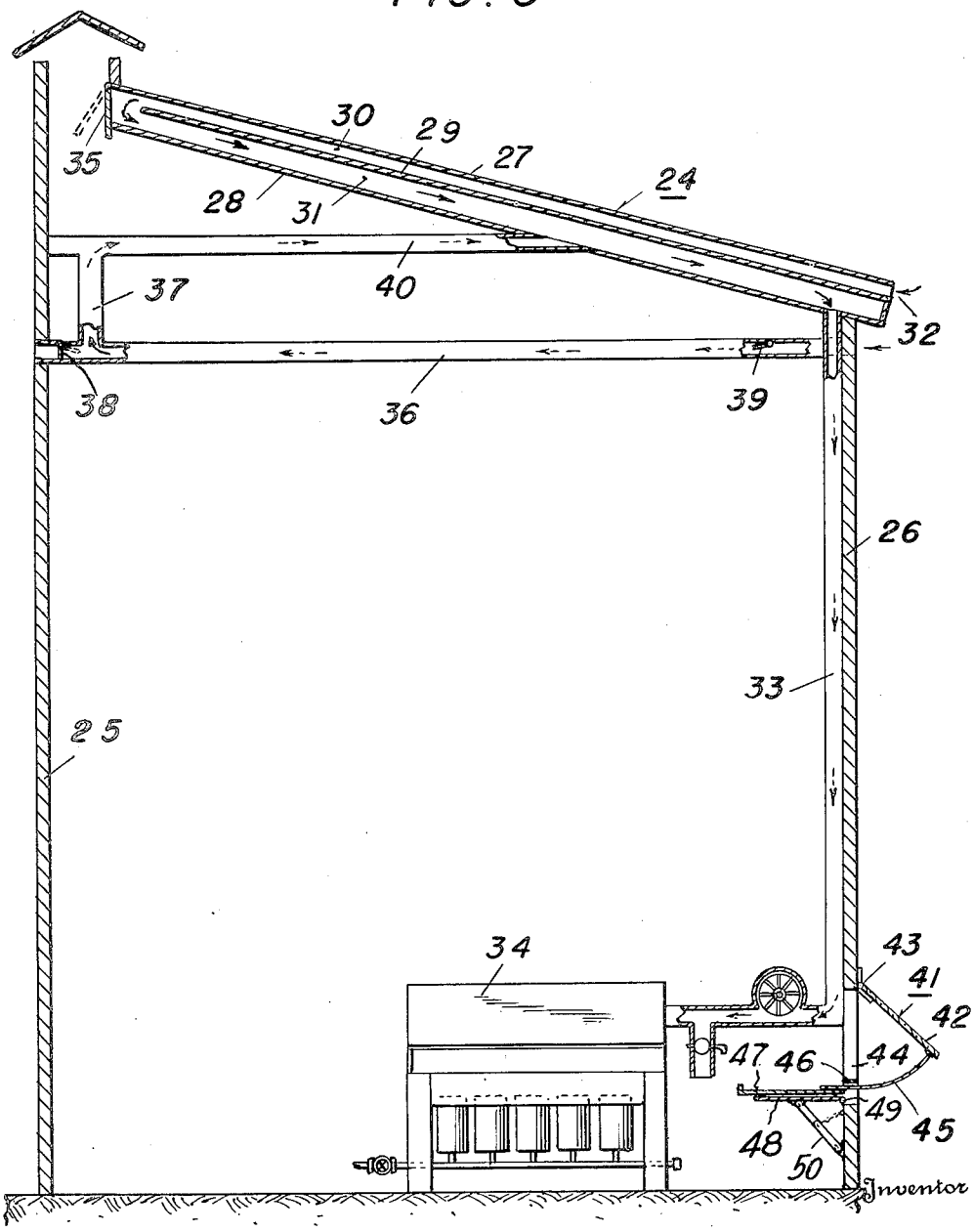
Attorneys

Nov. 14, 1950 R. E. MAYO 2,529,621

DRYING HOUSE

Filed May 31, 1946 3 Sheets-Sheet 3

FIG. 3




Inventor

R. E. MAYO.

By Barry & Cyr.

Attorneys

Patented Nov. 14, 1950 2,529,621

# UNITED STATES PATENT OFFICE

2,529,621

## DRYING HOUSE

Reubin E. Mayo, Maury, N. C.

Application May 31, 1946, Serial No. 673,591

16 Claims. (Cl. 263—1)

1

This invention relates to drying houses and more particularly to solar heaters and novel means combined therewith for conditioning air for use in tobacco curers or the like.

One of the objects of the invention is to improve tobacco curers of the kind employing fuel so that heat from the sun may be employed to aid in the curing or drying whereby fuel may be saved.

Another object is to supply a dryer having the above-mentioned features, and in which the air supplied to the fuel burning unit or units, may be preheated by the sun during the daytime and by waste heat from the fuel burning unit or units during the night.

A still further object is to furnish a curer or dryer having means for recycling mixed products of combustion and air from the top of the barn, when desirable, to the fuel burning unit or units.

Another object is to provide a novel solar heater especially designed for heating air or the like at the bottom portion of a tobacco curing barn or its equivalent.

The above, as well as various other objects will become apparent from the following description, considered together with the accompanying drawings, the latter of which illustrate exemplary forms of the invention.

In the drawings—

Fig. 1 is a transverse vertical sectional view of one type of tobacco curing barn, provided with an embodiment of my invention.

Fig. 2 is a perspective view of another type of tobacco curing barn and illustrating some other features of my invention.

Fig. 3 is a transverse vertical sectional view taken on the line 3—3 of Fig. 2.

Fig. 4 is an enlarged vertical sectional view of a detail.

Fig. 5 is a perspective view of a detail of the structure shown in Fig. 1.

In the embodiment of the invention illustrated in Fig. 1, 5 designates the side walls of a drying house of a tobacco curing barn having a peak roof 6 of special construction.

Arranged on the floor of the barn is one or more oil burning units 7, preferably of the open burner type, disclosed in my Patent 2,090,633. Each of such units is provided with an air inlet 8 that may have a branch 9 controlled by a damper 10, to permit the introduction of air from the floor portion of the barn. Each inlet 8 may also be provided with a suction fan 11 to facilitate the drawing of air downwardly from the roof portion of the barn through a conduit 12.

2

As hereinbefore mentioned, the roof is of special construction, and it preferably consists of a top 13 and bottom 14 spaced apart and with the intervening space divided by a partition 15 into an upper passageway 16 and a lower passageway 17. Each of the parts 13 to 17, inclusive, may extend from end to end of the barn or for any desired length thereof, as will be obvious. The parts 13 and 14 are formed of any suitable sheet material, capable of being rapidly heated and of retaining heat impounded therein. For example, the parts 13 and 14 may be made of sheet metal. The part 15 preferably has heat insulation to prevent the dissipation of heat from the interior of the barn when the heat of the sun cannot be utilized to preheat air fed to the oil burning units.

The ventilating peak 18 of the barn has its longitudinal edge portions 19 spaced from the roof so as to allow air to enter the upper ends of the passageways 16, when desired, and such entry is controlled by any suitable means, such as angular dampers 20, pivotally supported at 21 for movement about horizontal axes. The downwardly extending wings 22 of these dampers function to control the entry of heated air and gases from the interior of the barn into the upper ends of the passageway 17, and also to 16, if desired. Other dampers 23 are pivotally mounted in the space between the parts 13 and 14 so as to close off the lower end of either passageway 16 or 17, when desired. As the upper ends of the pipes 12 communicate with such spaces, it will be evident that the dampers 23 will permit the entry of preheated air from either the passageway 16 or 17 into the upper end of the conduits 12.

With the parts arranged as shown in Fig. 1, incoming air will enter the upper ends of the passageways 16 and may be heated by solar heat while travelling through those passageways into the conduits 12 from which the preheated air will pass through the inlets 8 of the oil burning units into the lower portion of the barn beneath the tobacco, not shown, suspended therein. If the heat of the sun is sufficient, it is obvious that little or no heat need be supplied by the oil burners. At night when the solar heat is not available, the dampers can be moved into the dotted line position so that the incoming air will then be heated by heat rising from the burners and which has been impounded in the inner roof 14.

When the dampers 20 are in the dotted line position, it is evident that heated gas from the top portion of the barn may be recirculated through passageways 16, 17, or both, back to the

oil burning units. If dampers 20 are in a neutral position, some air may be introduced from the exterior of the barn while gases are being recirculated from the top of the barn. Also, when desired, air at the bottom portion of the barn may be introduced into the heaters through the branches 9.

In the embodiment of the invention illustrated in Figs. 2 to 4, inclusive, the barn is of the type having a roof 24, slanting from a tall side wall 25 to a shorter side wall 26. Here also the roof has a top 27 and a bottom 28, formed of readily heated and heat retaining material, and these parts are spaced from one another and the space is divided by a partition 29 into an upper passageway 30 and a lower passageway 31. The parts 27 to 31 may extend from end to end of the barn, or for any desired portion of the length thereof. In this form of the invention, the air is introduced into the barn at 32 through the lower end of the passageway 30 and passes upwardly therethrough and then downwardly through passageway 31 into the vertical conduit 33 which leads the preheated air to the oil burning unit or units 34, of any suitable type, such as disclosed in my Patent 2,090,633. When desired, gases may be recirculated from the top of the barn through the passageway 31 and this is provided for by a pivoted damper 35, which, when moved into the dotted line position shown in Fig. 3, will allow gases from the top portion of the interior of the barn to pass downwardly through the passageways 31 and 33.

In order to fully utilize heat within the barn for the preheating of air passed to the oil burning unit or units, a metal pipe or pipes 36 may extend across the barn and through the opposite walls thereof so that air may enter through either end of the pipe. Such pipe is provided intermediate its ends with a discharge pipe 37 and dampers 38 and 39 are interposed in the pipe 36 between its ends and the branch 37 to control the entry of air to the branch from either of the opposite sides of the barn.

The branch communicates with another metal pipe 40 discharging into the passageway 31. Due to this construction, air currents moving toward either side of the barn may be used for moving the air through the preheating pipes 36, 37, 40 and 33, to the oil burning unit.

With the embodiments of the invention illustrated, or with any other type of tobacco curer or the like, I may employ the solar heater indicated generally by the reference character 41. This consists of a door 42 of glass or the like, pivotally suspended at 43 from a side of the barn and adapted to control a window 44. The door is connected at its lower end to a flexible sheet 45 of heat reflecting material, such as polished steel or the like and this sheet, in moving outwardly and inwardly with the glass door, is guided by guiding means 46 arranged at the bottom of the window opening. As best shown in Fig. 4, the sheet cooperates with another similar sheet 47 slidably mounted on a shelf 48, arranged within the barn and pivotally supported by the wall 26, as indicated at 49. The shelf is preferably provided with toggle brackets 50 to hold the shelf in horizontal position or to allow it to hang down on the side wall, as will be evident. Due to this construction, sun rays passing through the glass door or the like will be reflected by the reflectors 45 and 47 into the interior of the barn for heating purposes, and in this way, the solar heat will augment or may be substituted for the heat produced by the open oil burners.

The adjustable features of the plates 45 and 47 permits full use to be made of the sun rays in accordance with the position of the sun during utilization of its heat.

Reverting to Fig. 1, it will be noted that a branch pipe 51 may be used to introduce air into each of the pipes 8 from the exterior of the barn or drying house without passing the air along the roof and through the pipe 12. To control the passage of such air, a damper 52 may be interposed in the branch 51 and a second damper 53 may be interposed in the pipe 12.

As air entering the upper ends of the roof passageways 16 and 17, in Fig. 1, might have a tendency to travel in sheet form, I prefer to arrange a perforated plate 54 at the entrance ends of the passageways. Such plate, while obstructing the entrance to these passageways, is perforated at 55 for the admission of air into passageway 16, and perforated at 56 for the entrance of air into the passageway 17. Each perforation 55 is preferably associated with a tongue 57, struck from the plate 54 and so arranged as to direct the incoming air upwardly against the top sheet 13 of the roof. On the other hand, tongues 58, associated with the perforations 56 function to direct the incoming air downwardly against the bottom sheet 14 of the roof. By such means, turbulance is imparted to the air and it will be more effectively heated by the sheets 13 or 14 as it travels toward the pipe 12.

While the invention has been disclosed specifically in connection with tobacco barns, it is obvious that the same may be used in various types of drying houses for drying hops, fruit, lumber, or most any commodity requiring drying.

It is to be understood that I do not wish to be limited by the exact embodiments of the equipment shown, which are merely by way of illustration and not limitation, as various and other forms of the invention will, of course, be apparent to those skilled in the art without departing from the spirit of the invention or the scope of the following claims.

What I claim and desire to secure by Letters Patent is:

1. In a drying house, a slanting roof comprising top and bottom sheet like heat-conducting members spaced apart and with a partition arranged between them to provide top and bottom passageways, means for admitting air from the exterior of the house into the upper end of either one of said passageways, damper means associated with the partition for preventing air from travelling through one or the other of said passageways, and conducting means for leading air from the passageways to the lower portion of the interior of the house.

2. A drying house as claimed in claim 1, comprising damper means for controlling the entrance of air into the upper ends of the passageways or the closing off of such entry while recirculating gas from the interior of the house into the upper ends of the passageways and through one or both of said passageways.

3. A drying house as claimed in claim 1, in which the upper ends of the passageways are open, and a common damper is used to control the entrance of air from the exterior of the house into the upper end of either passageway or the recirculation of gas from the interior of the house into the upper end of either passageway.

4. A drying house as claimed in claim 1, in

which a fuel burner is arranged within the house and the air from said passageways is conducted to the burner.

5. A drying house as claimed in claim 1, including an open type fuel burning unit arranged in the lower portion of the house, and means for leading air from said passageways to said fuel burning unit.

6. An apparatus of the character described, comprising an open type fuel burning unit, a conduit for conducting air to said unit where it may mix with the products of combustion and pass upwardly through material in a drying house, a roof comprising top and bottom heat conducting portions spaced apart with a partition therebetween to provide upper and lower passageways, said conduit communicating with the lower ends of said passageways, damper means in the roof for controlling the flow of air from either or both of said passageways into said conduit, and other damper means for controlling the introduction of air from the atmosphere into the upper ends of the passageways or from the house into said passageways.

7. An apparatus as claimed in claim 6, in which a suction fan is interposed in the conduit between said passageways and the fuel burning unit.

8. An apparatus as claimed in claim 6, in which an air entry branch leads into the conduit adjacent to the fuel burner unit and is provided with a control damper.

9. In a drying house, substantially vertical walls, a sloping sheet-metal member forming a roof for the house adapted to absorb radiant energy from the sun, a sheet-like member of heat conducting material arranged below and substantially parallel to said sheet-metal member, a partition between the sheet-metal member and the sheet-like member forming upper and lower communicating passageways, said roof having a ventilating opening at the highest point thereof, each of said passageways having an open end, a conduit communicating with the lower passageway extending downwardly therefrom along the inside of one wall, a heating unit mounted at the bottom portion of the interior of the house receiving air from said conduit, and a damper mounted adjacent the ends of the passageways adjacent the ventilating opening mounted for movement to a position to permit air from within the interior of the house to enter the lower passageway at the end adjacent said ventilating opening.

10. In a drying house, substantially vertical walls, a sloping sheet-metal member forming a roof for the house adapted to absorb radiant energy from the sun, a sheet-like member of heat conducting material arranged below and substantially parallel to said sheet-metal member, a partition between the sheet-metal member and the sheet-like member forming upper and lower communicating passageways, said roof having a ventilating opening at the highest point thereof, each of said passageways having an open end, a conduit communicating with the lower passageway extending downwardly therefrom along the inside of one wall, a heating unit mounted at the bottom portion of the interior of the house receiving air from said conduit, a damper mounted adjacent the ends of the passageways adjacent the ventilating opening mounted for movement to a position to permit air from within the interior of the house to enter the lower passageway at the end adjacent said ventilating



opening, said conduit having an air inlet therein adjacent the heating unit, and a damper for controlling said air inlet.

11. In a drying house, substantially vertical walls, a sloping sheet-metal member forming a roof for the house adapted to absorb radiant energy from the sun, a sheet-like member of heat conducting material arranged below and substantially parallel to said sheet-metal member, a partition between the sheet-metal member and the sheet-like member forming upper and lower communicating passageways, said roof having a ventilating opening at the highest point thereof, each of said passageways having an open end, a conduit communicating with the lower passageway extending downwardly therefrom along the inside of one wall, a heating unit mounted at the bottom portion of the interior of the house receiving air from said conduit, a damper mounted adjacent the ends of the passageways adjacent the ventilating opening mounted for movement to a position to permit air from within the interior of the house to enter the lower passageway at the end adjacent said ventilating opening, said conduit having an air inlet therein adjacent the heating unit, a damper for controlling said air inlet, and a fan for moving air in said conduit.

12. A drying house provided with a roof, said roof comprising top and bottom sheet-like members of heat conducting material spaced apart with a partition therebetween forming upper and lower communicating passageways, means for introducing air from the atmosphere into the upper passageway, a conduit communicating with the lower passageway and extending downwardly within the house, a heating unit arranged at the bottom portion of the interior of the house receiving air from said conduit, a pipe extending across the top portion of the house and having its ends arranged at opposite sides of the house to permit air to enter the pipe from the exterior of the house at either of two opposite sides thereof, air conducting means placing said pipe in communication with said lower passageway, and dampers arranged in the pipe between the ends thereof and said air conducting means.

13. In a drying house, side and end walls, a sheet-metal member sloping with respect to the horizontal forming a roof for the house adapted to absorb radiant energy from the sun, a sheet-like member to heat conducting material arranged below and substantially parallel to said sheet-metal member, a partition between the sheet-metal member and the sheet-like member forming an upper passageway and a lower passageway, said upper passageway being opened at the lower end of the sloping sheet-metal member and in communication with the lower passageway adjacent the highest point of the roof, a conduit communicating with the lower passageway, a heater unit within the drying house receiving air from said conduit, said roof having a ventilating opening therein adjacent the highest point thereof, and a movable damper mounted adjacent the ventilating opening for controlling the entrance of air into the lower passageway adjacent the ventilating opening.

14. In a drying house, walls for the house, a roof including top and bottom sheet-like members of heat conducting material spaced apart with a partition therebetween to form upper and lower passageways, said upper passageway being opened at one side of the building and communicating with the lower passageway adjacent

the other side of the house, a conduit communicating with the lower passageway adjacent the first side of the house, a heating unit within the house for receiving air from said conduit, and a damper for controlling the admission of air into the lower passageway at said other side of the house.

15. In a drying house, an inverted V-shaped roof having a ventilating opening at the apex thereof, said roof including top and bottom sheet-like members of heat conducting material spaced apart with a partition therebetween of heat insulating material forming upper and lower passageways, a damper mounted on said roof adjacent the ventilating opening for admitting air from the atmosphere to the associated end of the upper passageway, a conduit extending downwardly from an eave portion of the roof to a lower part of the house, means movable to a position directing air from the upper passageway into said conduit, said damper being movable to another position to admit air from the interior of the building to the associated end of the lower passageway, said movable means being shiftable to a position directing the air from the lower passageway into said conduit, and means for moving air downwardly through said conduit.

16. In a drying house, side and end walls, a sheet-metal member sloping with respect to the horizontal forming a roof for the house adapted to absorb radiant energy from the sun, a sheet-



like member arranged under said sheet-metal member forming an inclined passageway from the highest point of the roof sloping downwardly towards one side wall, a conduit extending downwardly from said passageway along the inside of a side wall of the house, a burner unit within the house receiving air from said conduit, means for controlling the entrance of air into the passageway at the highest point of the roof, and means for moving air downwardly in said conduit.

REUBIN E. MAYO.


## REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

| Number | Name | Date |
|---|---|---|
| 200,789 | Davis | Feb. 26, 1878 |
| 246,626 | Morse | Sept. 6, 1881 |
| 409,359 | Johnson | Aug. 20, 1889 |
| 430,762 | Taylor | June 24, 1890 |
| 965,391 | Little | July 26, 1910 |
| 1,277,619 | McMullen | Sept. 3, 1918 |
| 1,615,964 | Straight | Feb. 1, 1927 |
| 1,645,760 | Knipschild | Oct. 18, 1927 |
| 2,095,186 | Gill | Oct. 5, 1937 |
| 2,273,284 | Plott et al. | Feb. 17, 1942 |
| 2,358,423 | Stone | Sept. 19, 1944 |