

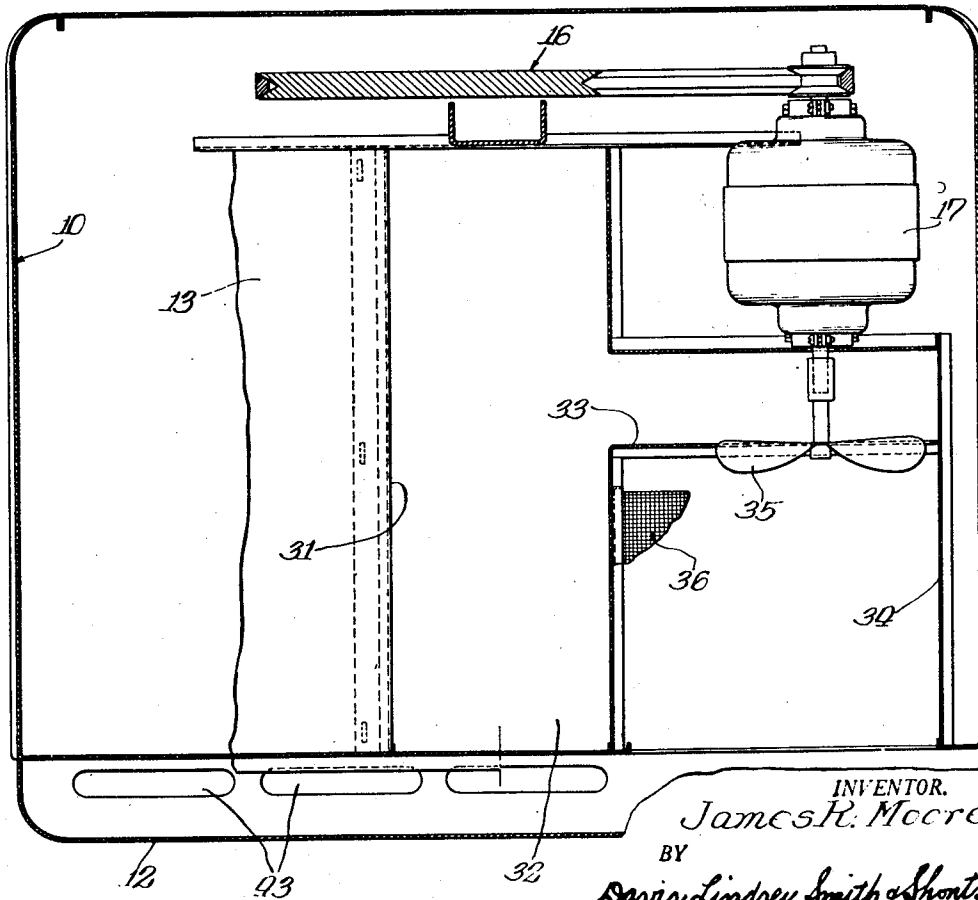
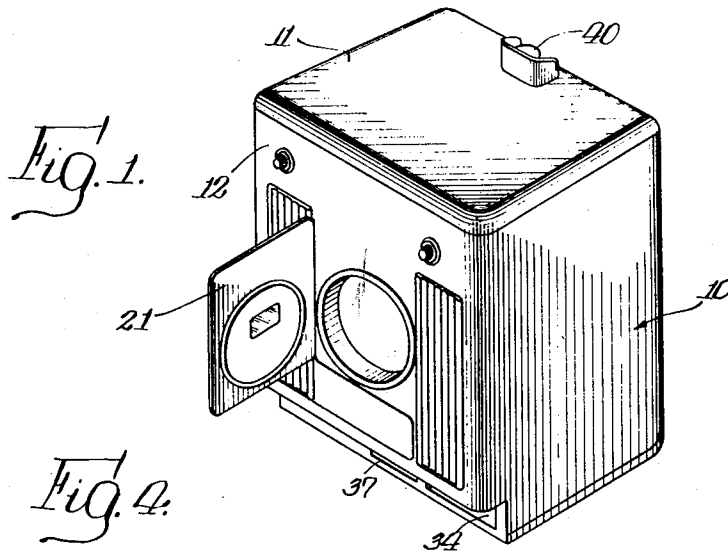
May 2, 1950

J. R. MOORE
LAUNDRY DRIER

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4 Sheets-Sheet 1



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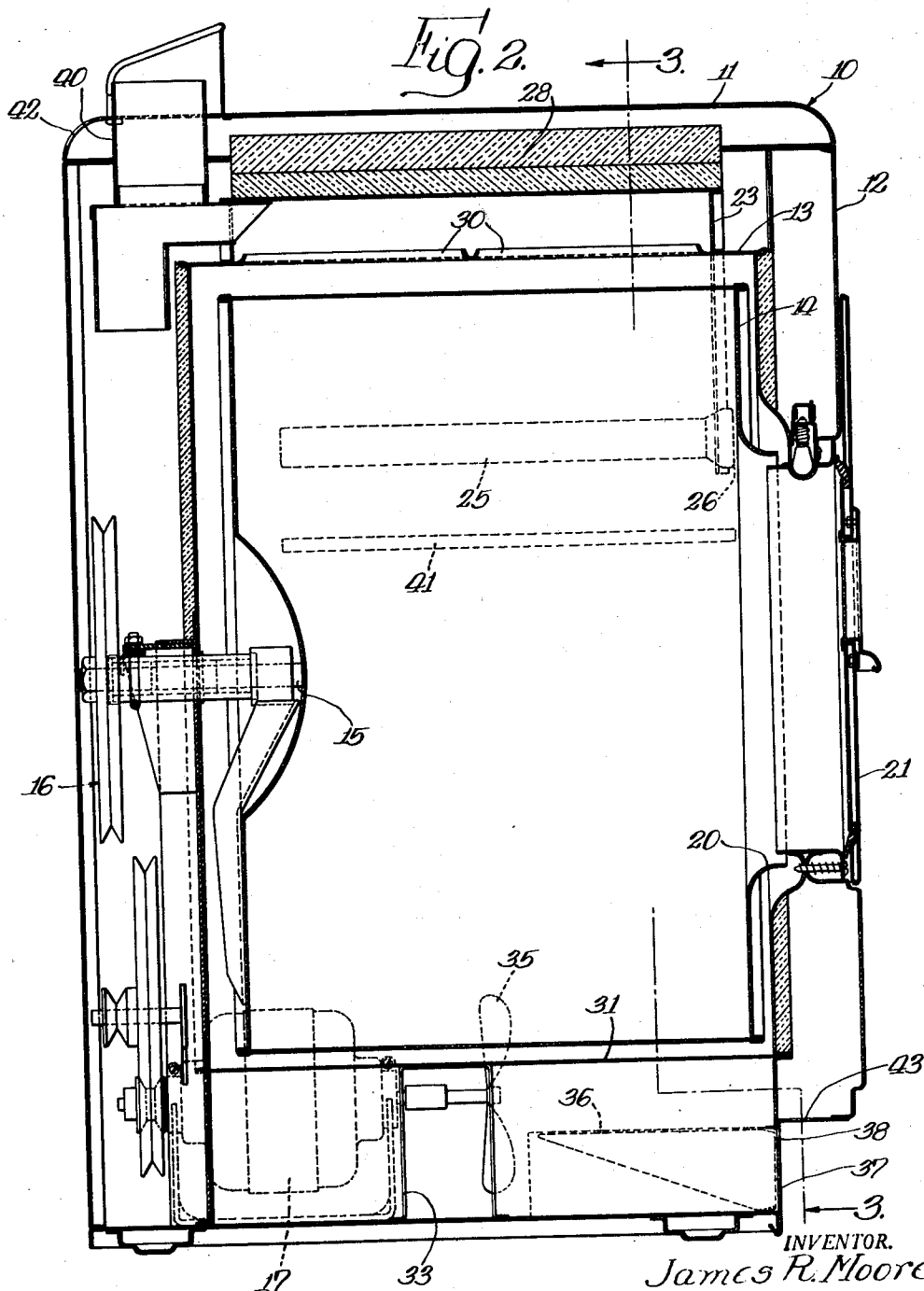
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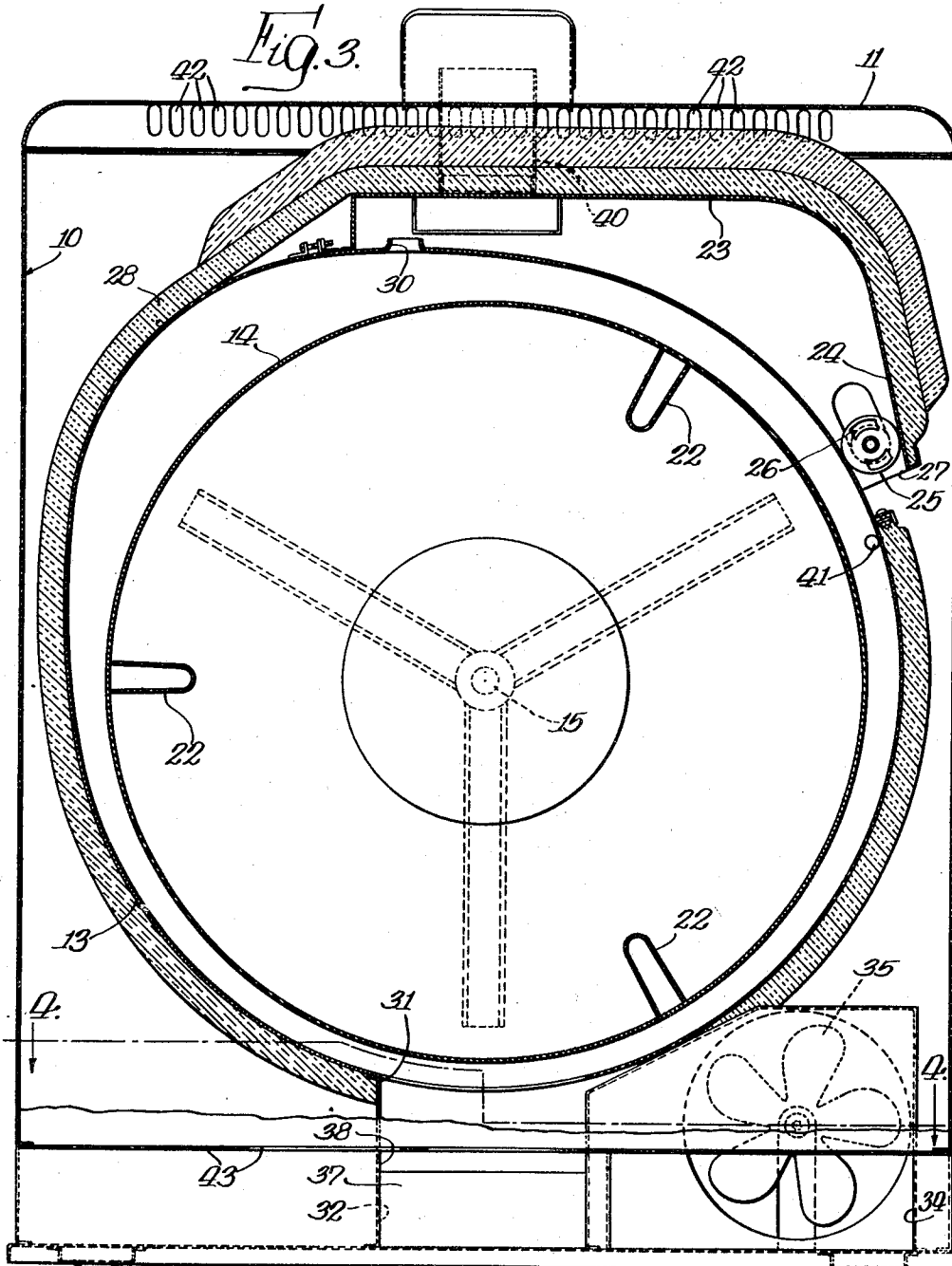
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4 Sheets-Sheet 3



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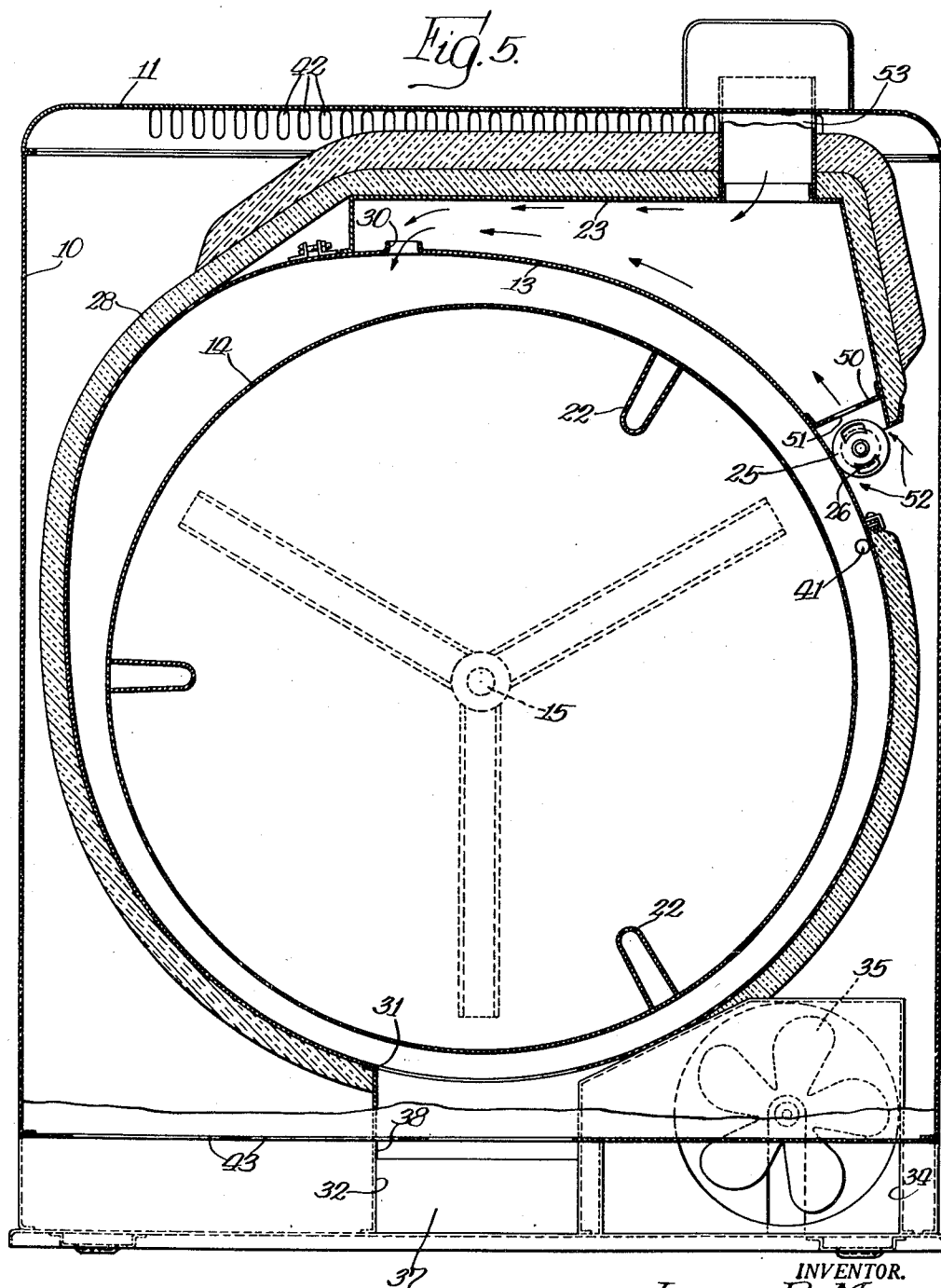
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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

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LAUNDRY DRIER

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3 Claims. (Cl. 263—32)

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The invention relates generally to driers and more particularly to a laundry drier adapted for household use.

The general object of the invention is to provide a novel laundry drier in which the laundry is dried in the presence of heat, with gas utilized as the source of heat, the drier being highly effective in performing the drying operation and being economical and safe to operate.

Another object is to provide a laundry drier utilizing gas as a source of heat, and in which the products of combustion are drawn into the drying chamber in a novel manner to effect the drying of the laundry in said chamber.

A further object is to provide a novel laundry drier utilizing gas as a source of heat, in which the products of combustion are drawn by a fan or otherwise conveyed through the drying chamber to effect the drying, the products of combustion being prevented from entering the drying chamber, should the conveying means be stopped.

Still another object is to provide a novel laundry drier having a heated drying chamber, which is adapted to be immediately cooled, when the machine is stopped, to prevent residual heat in the machine from overheating the drying chamber.

A still further object is to provide a novel laundry drier utilizing gas as a source of heat, in which air supplied to the gas burner for combustion is preheated by heat which would otherwise be wasted.

Another object is to provide a novel method of drying laundry.

Other objects and advantages will become apparent from the following description taken in connection with the accompanying drawings, in which:

Fig. 1 is a perspective view of a drier embodying the features of the invention.

Fig. 2 is a vertical sectional view of the machine taken in a plane extending from front to rear of the machine.

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

Fig. 4 is a horizontal sectional view taken substantially on the line 4—4 of Fig. 3.

Fig. 5 is a vertical sectional view similar to Fig. 3, but showing a modified form of drier.

The machine disclosed herein is of the type comprising a drying chamber having mounted therein a rotatably driven drum to receive the laundry, the drum being rotated during the drying operation to tumble the laundry and thereby

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expose all parts thereof to heat supplied to the drying chamber.

In the present instance, the heat is supplied from a burner utilizing gas, such as the ordinary domestic gas, as a fuel.

Generally described, the present drier comprises an outer casing, an inner casing constituting a drying chamber and having mounted therein the rotatably driven drum. Positioned between the two casings is a combustion chamber in or adjacent which a gas burner is located, the combustion chamber being so arranged that a portion of the wall of the inner casing is heated to impart heat to the contents of the drying chamber.

To make the maximum use of the heat supplied by the burner, the machine is so constructed that the products of combustion from the combustion chamber are drawn through the drying chamber during the drying operation, the temperature of the drying chamber, of course, being controlled by a thermostat serving to limit the maximum temperature attained therein by varying the rate of burning of the fuel. When the means for drawing the products of combustion through the drying chamber is shut off, the residual heat in the machine has a tendency to overheat the drying chamber. To eliminate this difficulty, the machine is so arranged that, when said means is rendered inoperable, the products of combustion are prevented from entering the drying chamber, and relatively cool air is drawn there-through to prevent such overheating. There is thus no opportunity for the laundry to become scorched by overheating, and the machine is thus rendered safe to operate.

As illustrated in the drawings, the outer casing, indicated generally at 10, is of generally rectangular form and includes a flat top wall 11 and a front wall 12. Mounted within the outer casing in spaced relation thereto is an inner casing 13 of generally cylindrical form with its axis horizontal. The spacing between the two casings, as will be noted by an inspection of Figs. 2 and 3, extends around substantially the entire periphery of the cylindrical inner casing 13 as well as the front thereof.

Mounted within the inner casing is a rotatably driven drum 14 carried by a shaft 15 at the rear of the drum and adapted to be rotated by a pulley and belt drive, indicated generally at 16, connected to a motor 17 mounted in the lower part of the machine at one side of the inner casing. To permit the insertion and removal of laundry from the drum 14, it is provided with a central open-

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ing 20 at its front adjoining a door 21 hinged on the front wall 12 of the outer casing. The drum 14 is provided with a plurality of radially extending vanes or blades 22 to tumble the laundry during the drying operation and cause it to be spread out so that all portions thereof are uniformly exposed to the heat within the drying chamber.

To facilitate the drying operation and hasten the rate at which moisture is absorbed from the laundry, heat is supplied to the contents of the drying chamber. To this end, a box-like structure 23 is mounted over the top of the peripheral wall of the inner casing 13 and extends downwardly, as at 24, along one side of the inner casing. The box-like structure 23 cooperates with the adjoining peripheral wall portion of the inner casing 13 to provide a combustion chamber, the said wall portion thereby being heated to radiate heat directly to the contents of the drying chamber. To provide heat, a gas burner 25 is positioned in or adjacent the combustion chamber. In the form shown in Fig. 3, the burner 25 is mounted in the lower portion of the combustion chamber, the burner 25 being of an elongated form which extends from front to rear of the combustion chamber parallel to the peripheral wall of the inner casing 13. The gas burner 25 is of conventional construction, having a primary air intake 26 formed in the end of the burner, with secondary air entering the combustion chamber adjacent the burner 25 through a slot 27 provided in the bottom of the box-like structure 23 and extending substantially the full length of the burner. The primary and secondary air is drawn from the space between the inner and outer casings 13 and 10. The inner casing 13 as well as the combustion chamber is surrounded by insulation 28 to reduce the radiation of heat from the drying chamber and the combustion chamber to a minimum. The insulation also prevents condensation on the walls of the drying chamber by keeping the walls thereof sufficiently warm.

To utilize the heat resulting from the combustion of the fuel to the maximum extent in performing the drying operation, the products of combustion from the combustion chamber are drawn through the drying chamber during the drying operation. Thus, the products of combustion, which, if they were used only to heat the peripheral wall of the drying chamber, would be discharged from the combustion chamber at a relatively high temperature, are carried through the drying chamber and thereby reduced in temperature in absorbing moisture from the laundry so that a maximum use of the heat in the fuel is thereby obtained. With the ordinary domestic gas and a properly regulated burner, the products of combustion are clean and will not leave any dirty deposit on the laundry.

To this end, the inner casing 13 is provided with openings 30 providing communication with the combustion chamber and extending from front to rear of the combustion chamber at the top of the inner casing and at the end of the combustion chamber opposite to that where the burner 25 is located. The inner casing 13 is also provided with an opening 31 at its bottom extending from front to rear thereof.

Within the base structure of the machine there is provided means for drawing the products of combustion downwardly from the openings 30 through the drying chamber and thence through the bottom opening 31 to be discharged to the outside atmosphere. In the present construc-

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tion, a passage is provided in the base structure comprising an intake portion 32 extending under the opening 31, an intermediate portion 33 extending laterally from one side of the intake portion 32, and an outlet portion 34 extending forwardly from the intermediate portion 33 at the right-hand side of the machine, as shown in Fig. 4. Located at the point where the outlet portion 34 and intermediate portion 33 meet is a fan 35 carried and driven by the shaft of the motor 17. The intake portion 32 of the passage extends for the full length of the inner casing 13 so that any lint developed during the drying operation will drop into the intake portion 32. To prevent the lint from being discharged into the room in which the machine is located, a lint catcher 36 formed of screening may be located in the outlet portion 34. Preferably, some air is introduced into the intake portion 32 to mix with the products of combustion as they are drawn downwardly through the drying chamber. To this end, the front of the intake portion 32 is partially closed by a plate 37, leaving an opening 38 for the intake of air. The plate 37 is preferably removable so that access may be had to the interior of the intake portion 32 to clean out any lint that might accumulate therein.

With a drier utilizing gas as a source of heat, considerable residual heat will remain in the machine after the gas burner is shut off and the fan 35 is stopped. Such residual heat tends to overheat the drying chamber and would thereby tend to scorch the laundry if the latter were permitted to remain within the drying chamber. Moreover, there would be a tendency to overheat the drying chamber if the current supply for the motor 17 were accidentally shut off so that the fan was stopped while the gas burner continued to operate. The present construction is so arranged that such overheating cannot occur, and whenever the fan is stopped, the products of combustion are prevented from entering the drying chamber and relatively cool air is drawn there-through.

To this end, the combustion chamber is provided with a flue 40 opening to the exterior of the machine. In the present instance, the flue 40 is mounted at the rear of the machine and extends through the top wall 11, the flue opening from the combustion chamber at a point adjacent the openings 30 in the inner casing 13. Thus, when both the motor 17 and the burner 25 are shut off, as at the conclusion of a drying operation, the flue 40 provides sufficient draft to draw off any products of combustion remaining in the combustion chamber. The draft thereby provided is also sufficient to cause a flow of relatively cool air upwardly through the drying chamber, the cool air being taken into the passage in the base structure of the machine either through the opening 38 or through the opening of the outlet portion 34, and passing upwardly through the bottom opening 31 of the inner casing, then through the drying chamber and through the top openings 30. The relatively cool air thus taken into the drying chamber prevents the residual heat in the machine from overheating the contents of the drying chamber and there is, therefore, no danger of scorching the laundry.

In the case where the motor 17 is accidentally shut off while the gas burner 25 continues to operate, a thermostat 41 is mounted in the drying chamber so that, when the contents thereof reach a predetermined temperature, the thermostat 41 will reduce the supply of gas to the burner

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25 and thus reduce the rate of burning. With the fan 35 rendered inoperable by the motor 17 being shut off, the flue 40 operates to draw off the products of combustion resulting from the reduced rate of burning and also draws cool air through the drying chamber, as heretofore described. The machine thus may be safely operated without danger of scorching the laundry. The fact that the products of combustion from the combustion chamber are drawn downwardly through the drying chamber by the fan 35 permits the natural draft resulting from the use of the flue 40 to cause a reversal of flow through the drying chamber and thus permits cool air to be drawn upwardly therethrough when the fan 35 ceases to operate.

The air supplied to the burner 25 to support combustion is preferably preheated by heat which otherwise might be wasted from the machine. To this end, the air supporting combustion is drawn from the space between the inner casing 13 and the outer casing 10. Such air is admitted to this space both through a series of openings 42 provided in the upper rear edge of the outer casing 10 and through a plurality of openings 43 in an inset formed in the lower portion of the front wall to provide toe space. Thus, the air supporting combustion is drawn through the space between the inner and outer casings, particularly under the top wall 11 and immediately inside of the front wall 12 so that these two walls, which are the ones most apt to be contacted by an operator, are maintained in a relatively cool condition. The heat utilized, of course, is such heat as is radiated through the inner casing 13 and the insulation 28 to the space between the two casings.

In the modified form of drier shown in Fig. 5, a transverse wall 50 is mounted in the combustion chamber 23 immediately above the burner 25 and is provided with a slot 51. Primary air for the burner 25 enters through the openings 26 in the burner while secondary air is provided around the burner as indicated by the arrows 52.

The foregoing construction is provided so that the burner may operate at atmospheric pressure. Thus, the suction produced by the fan 35 causes a slightly reduced pressure in the drying chamber as well as in the combustion chamber. By providing the wall 50 and placing the burner 25 outside thereof, the burner is located at a place where the pressure is atmospheric rather than the reduced pressure within the combustion chamber. The burner is arranged so that the flame therefrom is directed toward the slot 51, and the reduced pressure within the combustion chamber draws the products of combustion through the slot.

In the form of drier shown in Fig. 5, a flue 53 is provided, which is positioned remote from the openings 30 into the drying chamber and adjacent the burner 25. When the fan 35 is operating, not only are the products of combustion from the burner 25 drawn through the combustion chamber and the drying chamber, but a small amount of relatively cool air is drawn from the outside downwardly through the flue 53. Such cool air passes through the combustion chamber in somewhat stratified form immediately under the top wall of the combustion chamber, thereby tending to maintain said top wall cool. The cool layer of air also tends to force the hot products of combustion downwardly against the adjacent wall of the inner casing 13 to increase the heating thereof. When the

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fan is stopped, the relatively cool air drawn upwardly through the drying chamber also cools the major portion of the combustion chamber since it has to pass from the openings 30 to the flue 53. It thus tends to cool the heated portion of the inner casing 13 to prevent residual heat from overheating the interior of the drying chamber.

From the foregoing, it will be apparent that I have provided a novel gas-fired laundry drier which is highly effective in performing the drying operation and is economical and safe to operate. By utilizing the products of combustion to absorb the moisture from the laundry, in addition to heating a portion of the peripheral wall of the drying chamber to radiate heat directly onto the laundry therein, a maximum use of the heat is thereby obtained. By drawing the products of combustion downwardly through the drying chamber during normal operation and by having the machine automatically reverse the flow therethrough so that relatively cool air is drawn into the drying chamber, when the fan is stopped, and the products of combustion are prevented from entering the drying chamber, no overheating of the contents of the drying chamber can occur. The air supplied to the burner to support combustion is preheated by heat which would otherwise be wasted so that any loss in this direction is thereby prevented.

I claim:

1. A laundry drier comprising a drying chamber to receive the laundry and having a top opening and a bottom opening, a gas-fired combustion chamber positioned over said drying chamber and communicating therewith through said top opening, base structure providing a passage communicating with said drying chamber through said bottom opening and having an intake and an outlet open to the outside atmosphere, means for drawing the products of combustion from said combustion chamber downwardly through said drying chamber and through said passage and discharging them to the outside atmosphere, and a flue extending from said combustion chamber for drawing the products of combustion from said combustion chamber without passing through said drying chamber when said means is rendered inoperable and for drawing outside air through said intake into said passage and upwardly through said drying chamber.

2. A laundry drier comprising a drying chamber to receive the laundry, a combustion chamber communicating with said drying chamber, a gas burner mounted to supply products of combustion to said combustion chamber, means for drawing the products of combustion from said combustion chamber through said drying chamber, a thermostat for reducing the rate of burning of said burner when a predetermined temperature is reached in said drying chamber, and a flue connected to said combustion chamber and having a capacity to draw off the products of combustion resulting from the reduced rate of burning and to draw outside air through said drying chamber.

3. A laundry drier comprising a drying chamber, a combustion chamber mounted over the top of said drying chamber, said drying chamber and said combustion chamber being in communication at one end of the latter and said combustion chamber having an opening at its other end, a gas burner positioned outside of the combustion chamber and adjacent said opening, means for producing a reduced pressure in said combustion

chamber and said drying chamber for drawing the products of combustion from said combustion chamber through said drying chamber, and a flue extending from the combustion chamber and likewise producing a reduced pressure in said combustion chamber for drawing off the products of combustion therefrom without passing through said drying chamber when said means is rendered inoperable, the gas burner being outside of said combustion chamber thereby operating at substantially atmospheric pressure with the products of combustion being drawn into the combustion chamber through said opening by the reduced pressure therein resulting either from the action of said means or the action of said flue.

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REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
1,432,388	Davis	Oct. 17, 1922
1,548,218	Sieben	Aug. 4, 1925
1,607,841	Nelson	Nov. 23, 1926
1,689,345	Kellman	Oct. 30, 1928
2,135,645	Spencer	Nov. 8, 1938
2,341,101	Howard	Feb. 8, 1944
2,422,825	Davis, Jr.	June 24, 1947