

July 16, 1929.

J. JUDELSON

1,720,678

ELECTRICALLY HEATED DRIER

Filed March 18, 1926

2 Sheets-Sheet 1

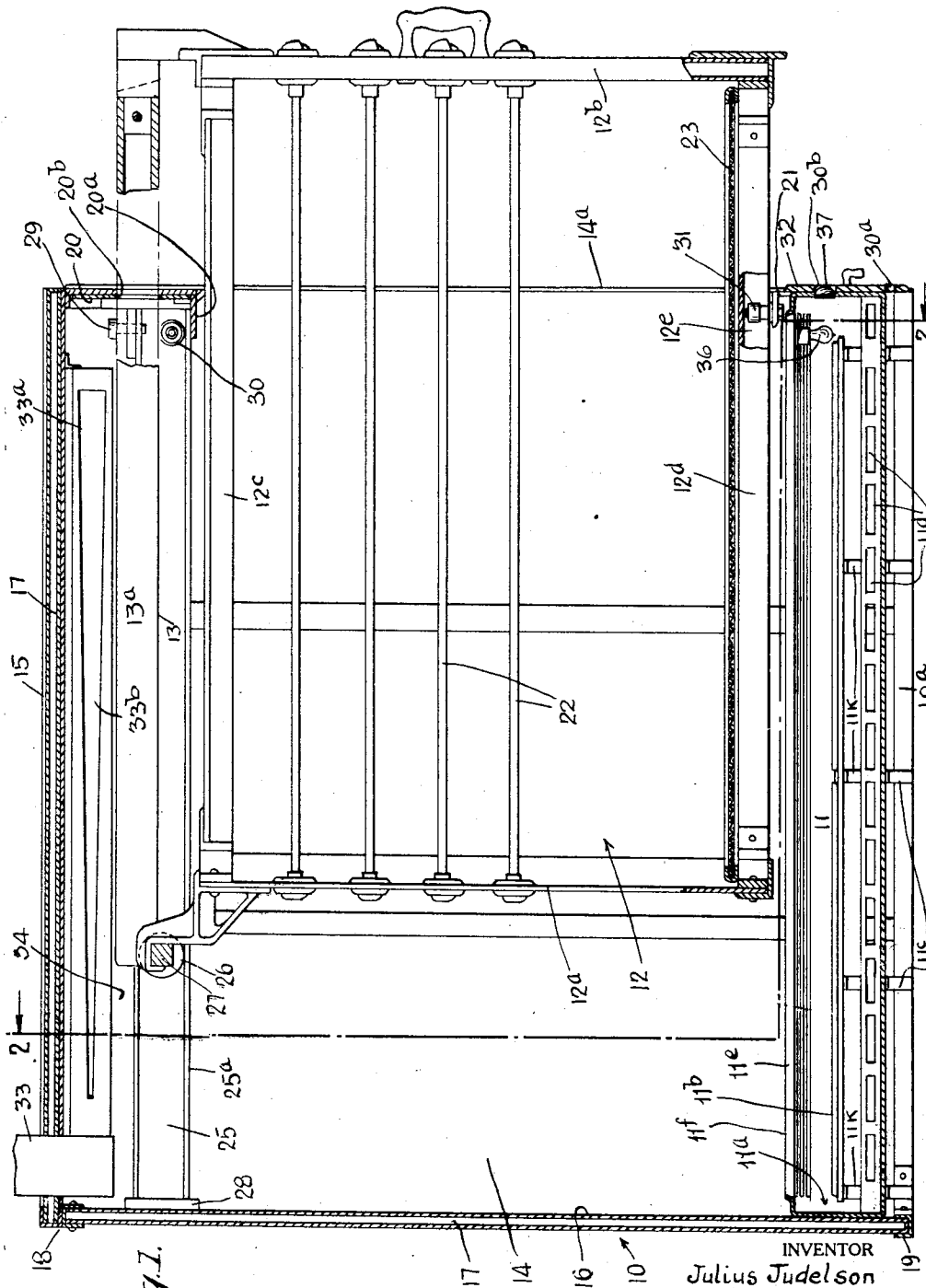


Fig. 1.

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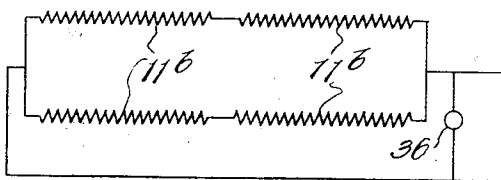
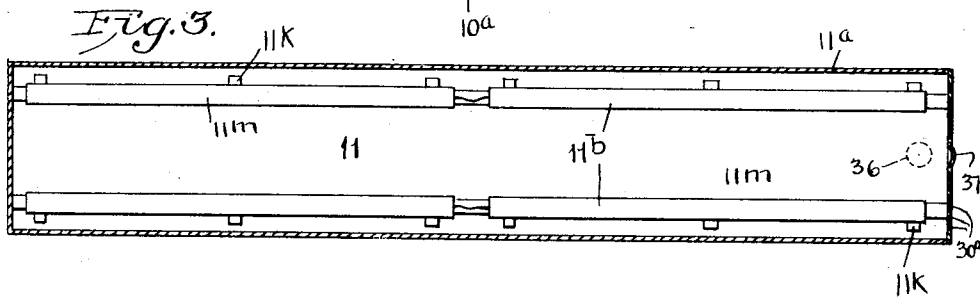
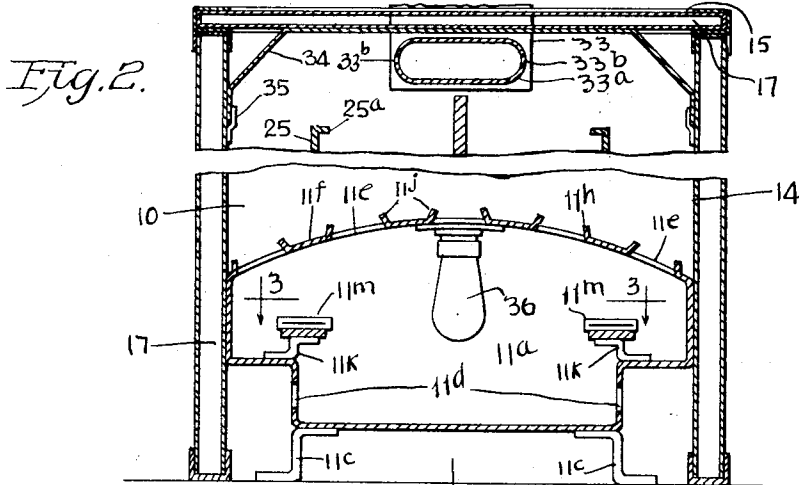


Fig. 4

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UNITED STATES PATENT OFFICE.

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ELECTRICALLY-HEATED DRIER.

Application filed March 18, 1926. Serial No. 95,548.

This invention relates to driers, and is directed to the provision in a drier for clothes or other materials of an improved electrically heated drying system.

One object of the invention is to provide in a drier of the character described an improved electrical means for heating and circulating a drying medium whereby moist clothes or other material in the drier may be quickly and effectively dried.

Another object of the invention is to provide in a drier a heating means of improved construction which shall efficiently and economically heat and circulate a drying medium.

A further object of the invention is to provide in a drier of the character referred to, an improved electrically heated drying apparatus comprising a few and simple parts, which shall be relatively cheap to manufacture, economical in operation, and practical and efficient to a high degree for the purposes described.

Other objects of this invention will in part be obvious and in part hereinafter pointed out.

The invention accordingly consists in the features of construction, combinations of elements and arrangement of parts which will be exemplified in the construction hereinafter described and of which the scope of application will be indicated in the following claims.

In the accompanying drawing, in which is shown one of the various possible illustrative embodiments of this invention

Fig. 1 is a side elevational view in cross-section of a clothes drier embodying the invention, showing the interior construction;

Fig. 2 is a fragmentary cross-sectional view taken on line 2-2 in Fig. 1;

Fig. 3 is a cross-sectional view of the electrically operated heater unit taken on line 3-3 in Fig. 2; and

Fig. 4 is a diagrammatic view showing the terminal connections in circuit.

Referring in detail to the drawing, the invention is here shown as applied to a clothes drier which may consist of one or more units each comprising a drying chamber or cabinet 10 provided with the electrically operated air-heater unit 11 for supplying heated air for drying clothes hung in the chamber

10. The clothes are carried on one or more rack-frames 12 suspended from a carrier 13 which is adapted to reciprocate in and out of said cabinet.

The cabinet 10 may be of any suitable construction, and is here seen to comprise side walls 14 and a top wall or roof 15 and is closed on the rear side by a wall 16, said walls being joined together in any suitable manner, and being preferably made in sections.

The side walls, roof and rear wall may be made of single or double sheet metal construction, and are here shown to comprise a pair of parallelly disposed sheets suitably reinforced in any well understood manner and spaced from each other to provide a heat insulating air space 17 for the drying chamber 10. The rear and top wall sections forming the chamber 10 may be secured together by top and bottom corner rails 18 and 19 respectively, said chamber being braced on the front side by the upper and lower cross pieces 20 and 21 which interconnect the upstanding edges of the front side wall-section 14^a, as shown in Fig. 1.

The rack frame 12 may comprise a rear panel 12^a and a front vertical panel 12^b adapted to provide a closure or door on the upper front portion of the cabinet 10. Extending between the panels 12^a and 12^b are horizontally and parallelly spaced rack rods 22 from which the clothes or other materials are suspended. Close to the bottom of the frame 12 the usual wire mesh shelf or tray 23 is provided.

The carrier 13 is adapted to reciprocate the rack frame 12 in and out of the chamber 10 and to support the same in an extended and overhanging position outside the cabinet. Said carrier 13 comprises a main longitudinal tubular member or bar 13^a, the rear end of which is supported to travel between the flange portions 25^a of parallelly spaced channel rails 25 on a pair of rollers 26, the latter being mounted on an axle 27 secured to the carrier bar 13^a by any suitable well known means. The channel rails 25 have the rear ends thereof rigidly supported by a bar 28 secured to the rear wall 16, the front ends of said rails being supported on an extended portion 20^a of the cross piece 20. The rails 25 may be secured to the cross

piece extension 20^a by pins 29, as shown in Fig. 1.

The front end of the carrier 13 rides on a roller 30 mounted for rotation on the cross piece 20, an opening 20^b being provided in said cross-piece to permit the passage of the carrier bar 13^a therethrough.

The drier frame 12 may be provided with rigid bracing means comprising bars 12^c connecting the upper ends of said rear panel 12^a and front panel 12^b and a bar 12^d joining the lower ends of said panels. The lower brace bar 12^d is preferably provided with a longitudinally extending channel 12^e for engaging over a roller 31 mounted on the lower cross-piece 21 to serve as a guiding means for the drier frame 12 during the reciprocating movement in and out of the cabinet. For closing the lower front opening under the front panel 12^b a suitable hinged door 32 may be provided, as shown in Fig. 1.

The improved electrically heated drying system embodying the invention for supplying the necessary heat to a drying medium such as air and for circulating the heated medium through the cabinet to dry the clothes or materials placed therein, will now be described.

Located preferably so as to occupy the entire bottom of the cabinet 10 is the heater unit 11 which is seen to comprise a box-like casing 11^a in which are enclosed suitable electric heater elements 11^b. As shown in the drawing, the casing is preferably supported above the floor level on suitable legs 11^c, said casing being preferably constructed to form a passage 10^a of U-shaped cross section between the bottom and side walls thereof, and the bottom of the chamber 10. The vertical walls of said passage formed by the casing 11 may be provided with a plurality of suitable perforations 11^d to permit air passing from said passage 10^a into the casing, said passage 10^a communicating with the outside of the cabinet through openings 30^a provided in the front door 32.

In order to permit the free distribution of the air heated from the unit 11 into the chamber 10, the top 11^f of the casing is preferably made with slots 11^a, said slots being of any suitable size and shape, and arranged in any suitable manner, and as here shown are formed in uniformly spaced rows, each row extending substantially the entire length of the casing top 11^f.

As seen from Fig. 2, the rim portions 11^b of the slots are preferably upwardly bent to form fins or flanges 11^j so that the portions of the casing top 11^f between adjacent slots have a channel shaped cross section. The purpose of the said fins or flanges will more fully appear hereinafter.

For removing the moisture laden air from the chamber 10, a flue 33 connecting the top portion of said chamber with a suitable

exhaust system (not shown) is provided. Said flue is preferably formed with a branch portion 33^a which extends substantially the entire top of the chamber over the carrier 13. Said branch portion may be of any suitable construction, and as here shown, comprises a pipe which communicates with the chamber in any suitable manner, as through elongated triangular shaped slits 33^b. The latter extend substantially the entire length of the branch portion 33^a so that the rising moisture-laden air readily passes to the exhaust flue. The effective openings of the slits 33^b are preferably made greatest adjacent the free end of the branch portion 33^a so as to reduce to a minimum the resistance to the passage of the air through said branch portion.

Electric heater means of any suitable construction may be provided for the unit 11, said means being adapted to connect with a suitable electric supply source (not shown) in any well understood manner. As seen from Figs. 2 and 3, said means comprises the spaced heater elements 11^b which are suitably mounted on brackets 11^k supported from the walls of the casing 11^a. Said heater elements 11^b are preferably arranged to lie directly beneath the channel-shaped sections of the casing top 11^f so that said sections may serve as a drain for guarding and shielding the elements against injury from drippings from wet clothes or other materials hung on the rack frame 12 in the chamber 10.

The operation of the improved electrically heated drying system will now be clear. On connecting the heater elements 11^b to an electric supply source, the air surrounding said elements in the casing 11^a will be heated and will rise through the slots 11^e in the casing top 11^f and enter the chamber 10. Fresh air will be drawn from the outside of the cabinet through the door opening 30^a into the passage 10^a and through the opening 11^d in the sides of the casing into the unit 11. The heated air rising from the unit 11 will be uniformly distributed to flow upwardly into contact with the clothes or other material supported by the rack frame 12 and will extract moisture from said clothes or other material. The moisture-laden air on reaching the top of the cabinet will be exhausted through the branch portion 33^a and flue 33.

From the drawing it is apparent that the casing top 11^f serves as means for retarding the flow of the air in the casing so that it may be in contact with the heating elements a longer time than if no casing top were provided. The casing and more particularly the top thereof is preferably made of a finished material having relatively high heat conducting and reflecting properties, such as sheet copper, brass, aluminum, and

the like, provided with polished surfaces. The heat reflecting properties of the surfaces of the casing top thus provide an efficient means for transmitting heat to the air.

5 To further increase the heat reflection, suitable means may be provided to extend along the entire top of the chamber over the carrier 13. Said means may comprise a sheet 34 finished to have a relatively highly
10 heat reflecting surface, removably mounted on brackets 35 secured to the inner walls of the chamber as shown in Fig. 2.

If desired, an electric light 36 may be mounted on the front end of the heater unit
15 11 within the casing and connected in circuit with the heater elements 11^b to serve as a signal for indicating whether or not the unit is connected to the electric power source.

A colored window in the form of a bull's-
20 eye 37 may be fitted into the front side of the casing through which the light 36 may be observed through an opening 30^b in the door 30.

By constructing the electrically heated
25 drying system as described above, it is obvious that the heat is not only transmitted by conduction, radiation and reflection to the drying medium in a practical and efficient manner, but also the heat transmission
30 to the air is greatly increased due to the convection effects in the system.

It will thus be seen that there is provided a device in which the several objects of this invention are achieved and which is well
35 adapted to meet the conditions of practical use.

As various possible embodiments might be made of the above invention and as various changes might be made in the embodiment
40 above set forth, it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention I claim as new and desire to secure by Let-
45 ters Patent:—

1. In a drier of the character described comprising a cabinet having a chamber, a drying system incorporated in the cabinet,
50 said system including a casing positioned in the bottom of the cabinet, an electric heating means extending in said casing, said casing having an opening communicating with the chamber wherethrough a drying
55 medium heated by said means is circulated, and a flue extending into the top of the cabinet and having a branch extending within the drying chamber for exhausting the drying medium, said branch having a tri-
60 angular opening extending substantially the entire length of said branch.

2. In a drier of the character described comprising a cabinet having a chamber, a drying system incorporated in the cabinet,
65 said system including a casing positioned in

the bottom of the cabinet, an electric heating means extending in said casing, said casing having an opening communicating with the chamber wherethrough a drying medium
70 heated by said means is circulated, the portions of the casing adjacent the opening being formed to serve as a drain for guarding and shielding the heating means against possible injury.

3. In a drier of the character described
75 comprising a cabinet having a chamber, a drying system incorporated in the cabinet, said system including a casing positioned in the bottom of the cabinet, an electric heating means extending in said casing, said casing
80 having an opening communicating with the chamber wherethrough a drying medium heated by said means is circulated, the portion of said casing adjacent said opening being formed to serve as a heat reflecting
85 means, as and for the purpose described and specified.

4. In a drier of the character described comprising a cabinet having a chamber, a drying system incorporated in the cabinet,
90 said system including a casing positioned in the bottom of the cabinet and exhaust means within said chamber, an electric heating means extending in said casing, said casing having an opening communicating with the
95 chamber wherethrough a drying medium heated by said means is circulated, and heat reflecting means mounted in the top portion of the cabinet adjacent the exhaust means for reflecting heat into the cabinet.
100

5. In a drier of the character described comprising a cabinet having a chamber, a rack frame movable in and out of said chamber, a drying system incorporated in the cabinet, said system including a casing posi-
105 tioned in the bottom of the cabinet, an electric heating means extending in said casing, said casing having an opening communicating with the chamber wherethrough a drying medium heated by said means is circulated, and means extending into the top of the cabinet for exhausting the drying medium, said exhaust means including a branch pipe wholly within said chamber and independent of the top wall of said cabinet
115 extending over the rack frame.

6. In combination with a drier of the character described, electric heating means for supplying a heated drying medium to said drier, said means including a casing having
120 a curved top wall, said casing top wall having extending portions to present a relatively large radiating surface and having a slot therein to permit the heated drying medium to circulate in said drier.
125

7. In a drier of the character described, a cabinet having a drying chamber, means within said chamber for mounting objects to be dried, heating means for supplying a heated drying medium to said chamber, said
130

means including a casing having a top wall,
an electric heating element in said casing,
said top casing wall having slots therein ar-
ranged to permit the heated drying medium
5 to uniformly circulate from said means into
said chamber, said wall being formed with
channel shaped members having projecting
portions to increase the radiating surfaces
thereof and to catch drippings from said
10 objects within said chamber, as and for the
purpose described and specified.

8. In a drier of the character described, a
cabinet having a chamber, heating means for
supplying a heated drying medium to said

chamber, said means including a casing hav- 15
ing a top wall, an electric heating element
in said casing, said top casing wall having
slots therein arranged to permit the heated
drying medium to uniformly circulate from
said means into said chamber, said wall be- 20
ing formed with projecting portions to in-
crease the radiating surfaces thereof, said
surfaces being finished to provide a heat
reflecting means as and for the purpose de-
scribed and specified. 25

In testimony whereof I affix my signature.

JULIUS JUDELSON.