

Feb. 5, 1963

R. L. BULOW

3,076,887

DRYER

Filed Dec. 30, 1959

FIG. 3

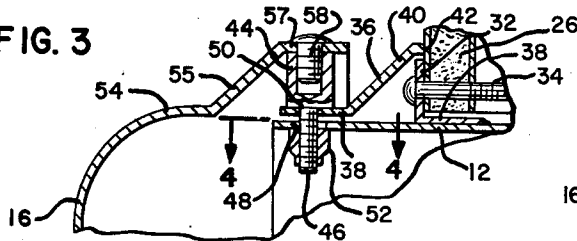


FIG. 5

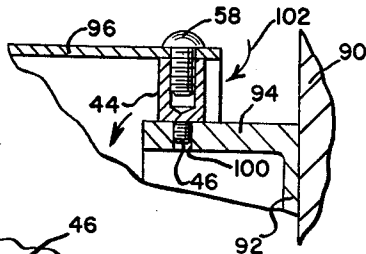


FIG. 4

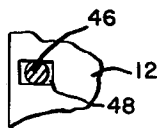


FIG. 2

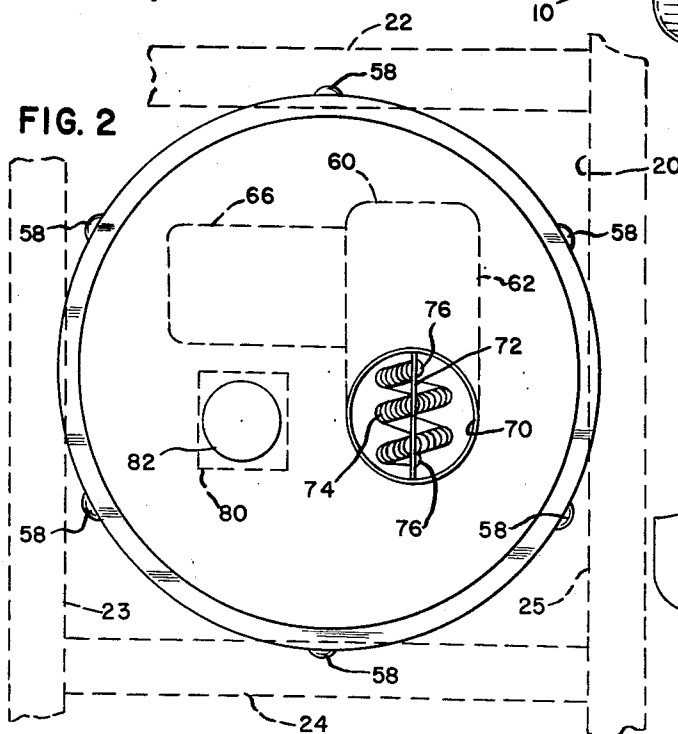
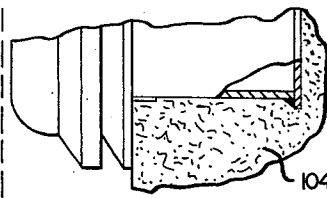
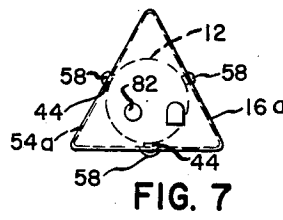
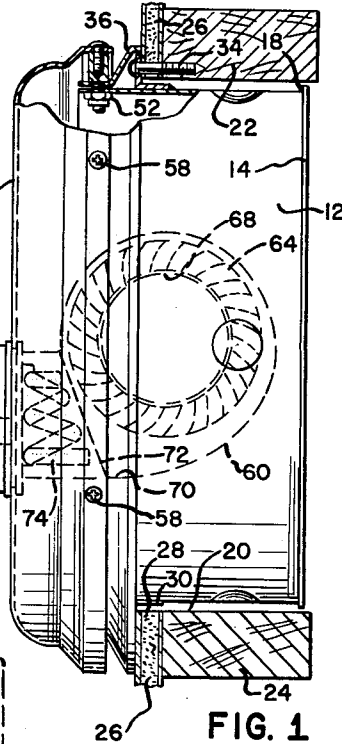


FIG. 1



INVENTOR.

BY RICHARD L. BULOW
WILSON, LEWIS & McRAE
ATTORNEYS

1

3,076,887
DRYER

Richard L. Bulow, Bloomfield Hills, Mich., assignor, by
mesne assignments, to The Interstate Sanitation Com-
pany, Detroit, Mich., a corporation of Ohio
Filed Dec. 30, 1959, Ser. No. 862,970
4 Claims. (Cl. 219—39)

This invention relates to dryers, as for example hands
dryers.

The conventional hands dryer comprises a casing in
which is disposed an air blower, electric heater for heat-
ing the air drawn through the blower, and a manually ac-
tuated timer for controlling the time of energization of
the blower and heater. In use of the dryer the person
stands in front of the dryer and manually depresses the
timer actuator, whereupon the blower and heater are en-
ergized for a predetermined length of time, as for exam-
ple fifteen seconds, so as to discharge a blast of heated
air onto the person's hands.

The early dryers were rather bulky affairs, usually lo-
cated on pedestals or stands. However, in recent years
the dryers have been improved, with the aim of reducing
and simplifying the construction for achieving cost reduc-
tions and improved performance.

The present day dryers are relatively compact, low cost
structures, and are usually adapted to mount on the room
wall without support from pedestals or stands. It is an
object of the present invention to provide a dryer consti-
tuting a further improvement on present constructions,
particularly as regards cost of manufacture and efficiency
of performance.

A further object is to provide a dryer having an im-
proved air intake arrangement and improved heater struc-
ture.

An additional object is to provide a dryer having an
improved low cost arrangement of parts for passing air
therethrough.

Another object is to provide a dryer assembly having a
novel mounting box and front wall so arranged as to
permit interchangeable use of differently configured front
walls with a standard mounting box, thereby enabling the
manufacturer to produce a varied line of dryers with mini-
mum parts inventory and tooling charges.

A further object is to provide a dryer which can be
mounted in a wall recess without any unsightly gaps or
irregularities at the wall-dryer joint.

A still further object is to provide a dryer particularly
designed to be built as an eye pleasing unit in harmony
with the present trend toward simplicity and compactness
of appearance.

An additional object is to provide a dryer which does
not require the conventional unsightly air intake grille
usually employed.

Another object is to provide a dryer which is readily
adapted for mounting in a variety of different types of
building walls, as for example dry walls, concrete walls,
or brick walls.

Other objects of this invention will appear in the follow-
ing description and appended claims, reference being had
to the accompanying drawings forming a part of this
specification wherein like reference characters designate
corresponding parts in the several views.

In the drawings:

FIG. 1 is a side elevational view, with parts in section,
of one embodiment of the invention installed in a recess
in a building dry wall.

FIG. 2 is a front elevational view of the FIG. 1 embodi-
ment, with a discharge nozzle thereof removed for better
illustrating a heater structure located within the dryer
blower.

2

FIG. 3 is an enlarged sectional view of a portion of
the structure shown in FIG. 1.

FIG. 4 is a fragmentary sectional view taken on line
4—4 in FIG. 3.

FIG. 5 is a fragmentary view of a portion of a second
embodiment of the invention.

FIG. 6 is a fragmentary view of a portion of the FIG.
1 dryer, but showing it embedded in a concrete building
wall.

FIG. 7 is a reduced view taken in the direction of FIG.
2, and illustrating the dryer as equipped with a triangu-
larly shaped front wall.

Before explaining the present invention in detail, it is
to be understood that the invention is not limited in its
application to the details of construction and arrangement
of parts illustrated in the accompanying drawings, since
the invention is capable of other embodiments and of
being practiced or carried out in various ways. Also, it
is to be understood that the phraseology or terminology
employed herein is for the purpose of description and not
of limitation.

In the drawings there is shown a hands dryer 10 com-
prising a housing defined by an annular cylindrical side
wall 12, a rear wall 14, and a front wall or cover 16.
Side wall 12 is preferably affixed to rear wall 14, as by
welding at 18, prior to mounting of the housing within
the recess 20 defined by horizontal building frame mem-
bers 22 and 24. By reference to FIG. 2 it will be seen
that members 22 and 24 extend between two studs 23 and
25 to define the substantially square shaped recess 20.
The frame members are faced with the building dry wall
26 which is suitably cut to form a circular opening 28
therein having a sufficient diameter to permit the housing
side wall 12 to pass therethrough to the FIG. 1 position.
Preferably side wall 12 is dimensioned to have a diame-
ter slightly less than twelve inches, which is less than nor-
mal spacing between building studs. In this manner the
housing is accommodated in conventional building walls
with minimum labor and material expense.

In order to mount the side wall-rear wall assembly
there are provided four similar tabs 30 secured to wall
12 at evenly spaced points therearound, as by welding
or the like. The tab arrangement is such that each of
the tabs lies adjacent a different one of the frame mem-
bers 22, 23, 24 or 25. Each of the tabs is of right angle
configuration to provide a leg 32 positionable against the
external face of the dry wall. Wood screws 34 may
be extended through suitable openings in legs 32 and
thence into the dry wall and framing to mount the
dryer housing assembly 12, 14 in place.

Surrounding the projecting portion of wall 12 is an
annular ring element 36 defining an axially extending
annular wall portion 38 and an outwardly flaring an-
nular wall portion 40. Wall portion 38 has an internal
diameter slightly in excess of the outer diameter of wall
12 so that after the wall 12, 14 assembly is in place
element 36 may be slipped over wall 12 until its right
edge 42 abuts against the surface of dry wall 26. Walls
12 and 38 are each provided with six openings 43 and
50 at evenly spaced points therearound. Thus, after
element 36 has been slipped into place the six similar
cylindrical spacers 44 can be positioned with their re-
duced diameter stud portions 46 extended through the
aligned openings, whereby to secure the ring element
36 in position. Six nuts 52 may then be tightened on
studs 46 to lock ring element 36 against displacement.

It will be noted that openings 43 are in the nature
of axially extending slots so as to permit ring element
36 to have an axial adjustment on wall 12 prior to
tightening of nuts 52. In this manner element 36 is
ensured of making a tight eye-pleasing joint with wall

26 irrespective of manufacturing errors in the dryer parts, or installation misalignments.

The front wall 16 of the dryer is provided with a turned peripheral flange 54 which flares outwardly at 55 and then extends axially at 57. The axial portion is provided with six evenly spaced openings therearound for reception of the shank portions of screws 58, the arrangement being such that the screws may be threaded into internally threaded sockets in spacers 44 to lock member 16 on casing side wall 12.

Spacers 44 space walls 38 and 57 from one another so as to define six peripheral air intake openings for supplying air to the blower 60. The air intake openings extend around the entire periphery of the dryer housing (except for the areas occupied by spacers 44), and the blower is thus supplied with a plentiful source of air even though the air openings are relatively narrow in the radial direction. Proper entrance of the air into the dryer housing is facilitated by the flaring contour of wall portions 40 and 55. Thus, as the air enters the intake opening it is baffled in a smooth sweep by wall 40 and then wall 55, without any abrupt changes in direction as would cause excessive turbulence and pressure drop. The arrangement of wall portions 36, 55 and 57 not only directs the air but also serves to substantially conceal the air intake openings from the casual view of the users so as to lessen the possibility for tampering with the housing, or clogging the intake openings so as to interfere with proper operation of blower 60.

Blower 60 comprises a centrifugal fan housing 62, centrifugal fan wheel 64 and electric motor 66. Housing 62 is provided with the usual inlet opening or eye at 68 and the usual discharge passage at 70, the arrangement being such that when motor 66 is energized wheel 64 is rotated to draw air in through eye 68 and discharge it through passage 70.

Passage 70 mounts an electric heater which comprises a stiff sheet of insulation 72, as for example Sheetrock, and a continuous electric heater filament 74. The filament takes the form of a thin wire spiralled to define a generally hollow tube-like configuration, with the formed tube being trained through openings in the opposite edge portions of sheet 72 so as to occupy the passage areas on both sides of the sheet. Terminals in the form of screws 76 may be connected with the ends of the heater wire to supply the heater with current.

The arrangement of filament 74 is such as to satisfactorily heat the passing air without producing an excessive pressure drop. In this connection it will be noted that the heater filament extends both laterally of the passage (FIG. 2) and longitudinally of the passage (FIG. 1) so that the air has more than a momentary contact with the heater as it passes through the passage. The air is therefore exposed to the heater for a relatively long period of time so as to be effectively raised to the desired discharge temperature. The sheet 72 is the only "non-heating" structure in passage 70 and its flat character is such that it does not seriously interfere with air flow. It will therefore be seen that the heater is characterized by the desired features of efficiency, simplicity and low manufacturing cost.

Energization of the heater and blower motor is preferably controlled by a conventional timer structure 80 located in back of wall 16. A manually depressible button or plunger is provided at 82 for actuating the timer in the conventional manner. The heated air is preferably directed from passage 70 into a discharge nozzle 84, said nozzle having a rotary fit in wall 16 so that its discharge opening 86 may be directed downwardly, laterally or upwardly in accordance with the desires of the user.

FIGS. 1 through 4 illustrate the invention as applied to a recessed dryer. However the invention may also be applied to a set-out dryer, i.e. a dryer which mounts

on the building wall instead of within the building wall. FIG. 5 shows a portion of a set-out type dryer adapted for mounting on a building wall 90. The dryer comprises a base 92 having a peripheral flange 94 for connection thereof with the cover 96. The operating component (blower-heater assembly) is preferably mounted on base 92, and cover 96 is made with a considerably greater axial dimension than cover 16 shown in FIG. 1.

Thus cover 16 in a particular size unit may have an axial dimension of about two inches whereas cover 96 in a corresponding size unit might have an axial dimension of about seven inches.

It will be noted from FIG. 5 that the set out dryer is provided with the same type spacers 44 and screws 58 as are employed in the FIG. 1 unit. However, the stud portions 46 of the spacers may extend into threaded openings 100 in base flange in lieu of using the nuts 52. As with the FIG. 1 unit the spacers define air intake openings around the periphery of the dryer housing, the arrangement being such that air is taken into the housing in the arrow 102 direction. The blower and heater for the FIG. 5 unit may be constructed in the same manner as the corresponding structures in the FIG. 1 unit.

The FIG. 1 unit is adapted to mounting in other than dry wall building structures. Thus, as shown in FIG. 6 the unit may be embedded in a concrete mounting 104. It will be noted that the peripheral edge of housing rear wall 14 extends slightly outwardly of annular wall 12; this arrangement is advantageous in that it ensures a good anchoring of the housing in the concrete even in the presence of excessive shrinking of the concrete during the cure period. Thus, the projection of wall 14 is so chosen that even if the concrete should pull away from wall 12, the housing will still remain anchored by wall 14. Since wall 14 is spaced a considerable distance from the exterior face of the concrete (as for example four inches) there will be a relatively long, high strength ring of concrete for anchoring purposes.

Referring to FIG. 7 there is shown the FIG. 1 unit supplied with a triangular shaped cover 16a. This cover is provided with a peripheral flange 54a which is axially dimensioned to terminate short of the building wall in the same manner as flange 54 illustrated in FIG. 3.

Only three spacers 44 are employed to mount cover 16a in place, it being noted however that the spacer disposition is such that the same housing 12-14 can be employed in both the FIG. 1 and FIG. 7 arrangements. Thus in the FIG. 7 arrangement alternate ones of the six spacers 44 are removed or not used, but the mounting of the wall 12, 14, 36 assembly can be the same as with the FIG. 1 arrangement.

The spacer arrangement is such that additional cover configurations can be employed if desired. Thus a square-shaped cover can be employed using two spacers (one at the top and one at the bottom), a diamond-shaped cover can be employed by using four spacers, and a hexagonal cover can be employed by using all six spacers.

From the above description it will be appreciated that the invention is capable of employment in several different forms and arrangements, as defined by the appended claims.

I claim:

1. A dryer comprising a housing including an annular side wall, a rear wall and a front wall; said housing defining an air intake and an air discharge opening; a blower within the housing for pumping air from the intake through the discharge opening, a heater located in the pump air stream for heating it prior to its passage through the discharge opening; an annular ring element adjustably carried for axial movement along the housing side wall to permit the housing to be mounted on a building wall with the ring element abutting against the building wall surface; and the housing including a front section having a rearwardly extending wall portion termi-

5

nating in spaced relation to the ring element and housing side wall so as to cooperate therewith in defining said air intake.

2. A dryer comprising a housing including an annular side wall, a rear wall and a front wall; said housing defining an air intake and an air discharge opening; a blower within the housing for pumping air from the intake through the discharge opening; a heater located in the pumped air stream for heating it prior to its passage through the discharge opening; an annular ring element adjustably carried for axial movement along the housing side wall to permit the housing to be mounted on a building wall with the ring element abutting against the building wall surface; said housing including a front section having a rearwardly extending wall portion terminating in spaced relation to the ring element and housing side wall so as to cooperate therewith in defining said intake; a series of spacer devices connecting the rearwardly extending wall portion, ring element and annular side wall; each of said spacers comprising a socket portion and a stud portion, each of said stud portions extending through the ring element and side wall; one of said ring element and side wall having a series of axially extending slots therein receiving said stud portions for accommodating the axial adjustment.

3. In a wall mounted hot air blower having an open-front casing defined by an annular peripheral wall and a rear wall, said housing enclosing blower and heater elements for issuing a stream of hot air, the improvements of a front cover plate having a front wall extending diametrically of the casing in axially spaced relation to the open front of the casing and having a peripheral flange concentric with the annular casing wall and in telescopically surrounding relation thereto, said peripheral flange terminating short of the casing rear wall, and peripherally spaced mounting studs bridging the gap between the annular casing wall and the surrounding cover plate flange to secure the cover plate to the casing while leaving openings therebetween through which ambient air can flow between the flange and the peripheral casing

6

wall into the interior of said casing, said cover plate front wall having an aperture therein registering with the outlet of said blower, said cover plate being otherwise imperforate.

4. In a hot air blower for installation in a building wall or the like, a casing having an annular peripheral wall and a rear wall closing one open end of the casing, at least a portion of the peripheral wall and the rear wall being disposed interiorly of the building wall, an air blower disposed interiorly of said casing and a heater element in the outlet of the blower for heating air issuing therefrom, the improvements of a cover plate having a front wall spaced from the projecting extremity of the annular casing wall and a peripheral flange integral with the front wall and disposed concentrically to the annular casing wall, said flange telescopically partially enclosing that portion of the casing wall projecting beyond the building wall and terminating short of the building wall, and means for securing the cover plate peripheral wall to the annular casing wall and including a plurality of peripherally spaced, radially extending studs bridging the radial gap between the cover plate peripheral flange and the casing peripheral wall, the spaces between said studs accommodating the entry of ambient air therebetween for flow to the inlet of the blower, said cover plate front wall having an aperture therein registering with the outlet of said blower, said cover plate being otherwise imperforate.

References Cited in the file of this patent

UNITED STATES PATENTS

1,423,800	Hibbard et al.	July 25, 1922
1,455,034	Small	May 15, 1923
1,627,229	Brown	May 3, 1927
2,260,233	Ripley	Oct. 21, 1941
2,655,587	Steingruber	Oct. 13, 1953
2,765,393	Theisen	Oct. 2, 1956
2,870,319	Ford	Jan. 20, 1959
2,875,316	Ford et al.	Feb. 24, 1959