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2 Sheets-Sheet 1

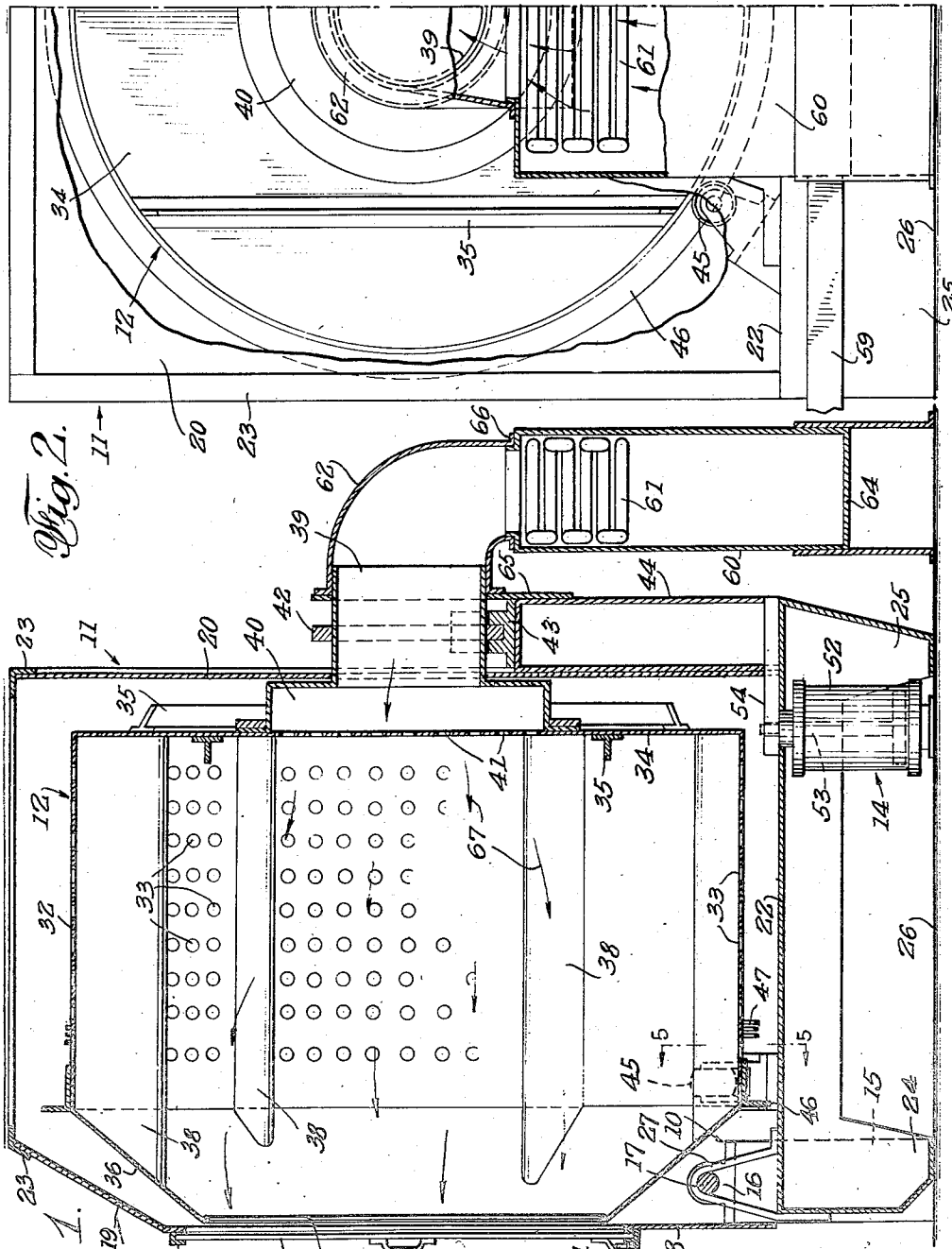


Fig. 2.

Fig. 1.

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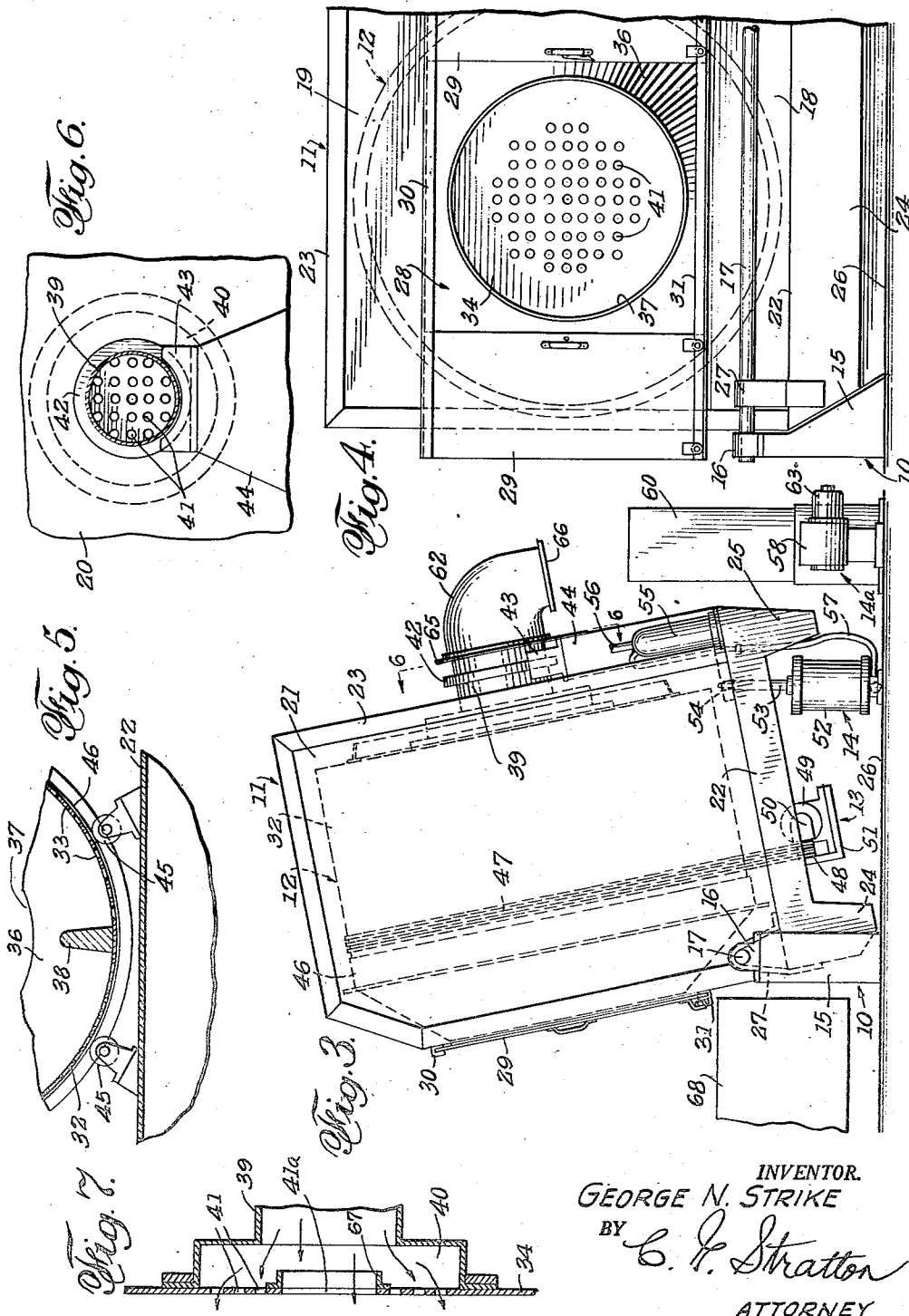
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CLOTHES PRE-DRIER AND CONDITIONER

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9 Claims. (Cl. 34—87)

This invention relates to a laundry machine that has for its primary purpose the pre-drying and/or conditioning of moisture-containing wash or clothes to condition either for proper ironing or folding according to the character of said wash.

A more particular object of the invention is to provide a heated shaker in which clothes are fluff-dried more economically and rapidly than in existing drying machines.

Another object of the invention is to provide a shaker in which the clothes are dropped in a manner to cause separation of the different items and to direct a continuous stream of heated air in a path transverse to the path in which the clothes drop, thereby achieving effective contact between air and clothes to expedite drying of the latter.

The invention also has for its objects to provide such means that are positive in operation, convenient in use, easily installed in a working position and easily disconnected therefrom, economical of manufacture, relatively simple, and of general superiority and serviceability.

The invention also comprises novel details of construction and novel combinations and arrangements of parts, which will more fully appear in the course of the following description. However, the drawings merely show and the following description merely describes, preferred embodiments of the present invention, which are given by way of illustration or example only.

In the drawings, like reference characters designate similar parts in the several views.

Fig. 1 is a vertical sectional view of a clothes pre-drier and conditioner according to the present invention.

Fig. 2 is a rear view thereof with parts broken away for clearer illustration, one-half of the machine being shown, the other half being substantially similar.

Fig. 3 is a side elevational view, to a reduced scale, showing the machine in clothes-discharging position.

Fig. 4 is a broken front elevational view in the position of Fig. 3.

Figs. 5 and 6 are fragmentary sectional views as taken on the respective lines 5—5 and 6—6.

Fig. 7 is a fragmentary vertical sectional view of a modification.

The machine that is illustrated comprises, generally, a pivot frame 10, a housing 11 tiltably carried by said pivot frame, a drum or basket 12 rotationally supported in said housing, means 13 to rotate said drum or basket, means 14 to tilt the housing and the basket therein, and means 14a to supply a flow of heated air to said basket.

The pivot frame 10 is shown as a pair of standards 15 arranged at the sides of the front of the machine, the same being each provided with a bearing 16, a shaft 17 spanning across the front of the machine and being supported by said bearings.

The housing 11 has sides that may be generally rectangular. The housing that is shown has a front wall 18 that may have an upper rearwardly sloping portion 19, a rear wall 20, and side walls 21. The top of said

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housing may be open, as best shown in Fig. 1. The bottom of the housing is here defined by a base 22 which, in part, may be open also. In this case, the housing is formed of front, rear and side panels mounted in a frame 23 comprised of angle iron. The base 22 may have front feet 24 and rear feet 25 that serve to support the housing from the floor 26.

Adjacent to and inward of the bearings 16, the base is provided with hanger bearings 27 that are engaged over shaft 17, it being clear that the housing may be moved between the position of Fig. 1 in which the feet 24 and 25 rest upon the floor 26 and the tilted position of Fig. 3, in which said housing is suspended from shaft 17. Since the pivot is at the lower front, the frame 11 tilts forwardly and downwardly, as in Fig. 3.

The front wall 18 is provided with a central opening 28 that is normally closed as by a pair of sliding doors 29 that are guided in upper and lower horizontal channels or tracks 30 and 31, respectively. Fig. 4 shows said doors in open position to clear opening 28, it being understood that said doors, when moved to closed position across said opening, close the front wall.

The drum or basket 12 comprises a cylindrical wall 32 that may be provided with perforations 33, a rear wall 34 that may be stiffened as by T irons 35, and a conical front wall 36 that frames a central opening 37. Said drum is disposed with its axis of rotation horizontal with the opening 37 adjacent to the housing opening 28.

The drum is provided with a set of ribs or vanes 38 that extend inward from wall 32, and it will be evident that, upon rotation of the drum, said vanes act as clothes-lifting elements which, as they successively approach an elevated position, release the clothes caught thereby so that they fall back to the bottom of the drum. Thus, as the drum rotates, the clothes therein are tumbled as they are lifted and dropped, as indicated.

Said drum 12 is provided with an inlet 39 that is disposed on the drum axis and comprises a tubular trunnion that extends through a hole provided in the rear wall 20 of the housing 11. Said trunnion is provided with an enlargement 40 inside the housing, the same being connected to the drum wall 34 which is provided with perforations 41 in the area thereof that is encircled by the trunnion enlargement 40. Air directed into the trunnion 39 enters the interior of the drum through said perforations 41.

Said trunnion is provided with a ring plate 42 that has bearing in pillow block 43 mounted on a standard 44 mounted on the frame base 22. This rear rotational support of the drum is supplemented by a pair of circumferentially spaced rollers or wheels 45 that are carried by said base 22 and support a forward portion of the cylindrical wall 32, as best shown in Fig. 5. In this case, said wall is encircled by an angle member 46 forming a track for said rollers 45.

The drum-rotating means 13 is here shown as a set of endless belts 47 that are trained over the drum and over a set of pulleys 48 on the output end of a motor 49, a suitable speed reducer 50 being preferably used to reduce rotation of the pulleys 48 and of the drum 12. Said motor is carried by base 22 as by means of a bracket 51, as indicated in Fig. 3.

The means 14 to tilt the housing and the drum therein around shaft 17 as a pivot is here shown as a fluid-operated cylinder 52 that is mounted on the floor 26 and is provided with a projectable piston stem 53 that is engaged with a finger plate 54 affixed to the base 22 or standard 44. The stem may be projected in various ways. Fig. 3 shows a surge tank 55 that uses pressure air from a line 56 to supply hydraulic fluid to cylinder 52, by way of a connecting pipe 57, when tilting of the

housing is desired. The tank 55 is shown carried by base 22, although the same may be mounted in other positions.

The means 14a for supplying a flow of heated air to the interior of the drum comprises a fan 58 for producing the air flow, a duct 59 that pipes said flow into the interior of chest 60 that is preferably placed in register with the open end of trunnion 39, a heat exchanger 61 in said chest, and a transition fitting 62 carried with the tilting part of the machine and connecting said chest and the trunnion 39.

The fan 58 may be driven as by a motor 63 and the same may be supported from the floor 26. The chest 60 may be provided with a removable bottom wall 64 if removal of lint from the air flow is desired. The upper end of said chest is open and the heat exchanger 61 may be so placed inside said chest that the same effectively warms the air directed therepast by the fan 58.

The fitting 62 is shown as an elbow that is affixed, as to standard 44, by a plate 65 and in telescoped connection with the trunnion 39. In the normal untilted position of the housing and drum, the end 66 of said fitting effects connection with the mentioned open end of chest 60.

Fig. 1 shows, by means of arrows 67, that the flow of heated air produced by the means 14a is directed in a transverse path from the perforations 41 in wall 34 toward the open front 37 of the drum. Since, when the clothes are falling loosely after being released by the vanes 38, they are separated rather than being compacted, the heated air effects efficient drying contact with the clothes before bleeding outward of the drum and exiting through the upper and lower ends of housing 11. It will be seen that the opening 37 of the drum is immediately adjacent to the front wall 18 and particularly the doors 29. Therefore, said doors constitute a barrier against which the air stream impinges and from which said stream rebounds back into the interior of the drum. The mentioned bleeding of the air through perforations 33 establishes desired circulation as above described.

It will be noted that compacting of the clothes is obviated and the air circulation rendered more efficient by an air flow that is transverse to both the raising and the falling movements of the clothes and that the exit of the air is laterally through perforations 33. In practice, the shaker action of the drum is first in one direction for several revolutions and then in the other. This alternate rotation obviates undue tangling of the clothes and, therefore, improves separation between the different items.

In the modification shown in Fig. 7, the inlet of heated air is divided by an annular flange 67 provided on the wall 34 of the drum. Within the flange 67, the wall 34 is provided with a relatively large opening 41a that affords unimpeded passage of air into the drum. Outside said flange, the perforations 41, as before, are provided. Thus, two air streams, one within the other, enter the drum, the center stream striking the rear wall with somewhat greater pressure than the stream passing through perforations 41 to provide an efficient turbulence within the drum that improves the clothes-drying properties thereof.

Since the outer stream, as well as the outer portion of the stream in the earlier form, diverges during movement across the drum, the same will impinge the conical wall 36 and be deflected back toward the drum interior.

Dumping of the clothes from the machine is rendered simple by provision of the tilting feature, it only being necessary to place a cart 68 against the front of the machine, open the doors 29, and, while the drum is rotating, operate the means 14 to tilt the housing and drum in the manner indicated. The ribs or vanes 38 lift the clothes as before and the latter fall progressively nearer the drum opening 37 and then through said opening into cart 68.

While the foregoing has illustrated and described what are now contemplated to be the best modes of carrying out my invention, the constructions are, of course, subject to modification without departing from the spirit

and scope of the invention. It is, therefore, not desired to restrict the invention to the particular forms of construction illustrated and described, but to cover all modifications that may fall within the scope of the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A clothes pre-drier and conditioner comprising a tiltable housing, said housing being mounted on a pivot adjacent to the bottom wall and one side wall of said housing, there being an opening in the mentioned side wall, a drum rotatably mounted within said housing, said drum being rotatable on a horizontal axis and having an opening therein in register with the opening in the side wall, means for rotating the drum, means within said drum for lifting and dropping clothes within the drum as it is rotated, means coaxial with said drum for directing a flow of heated air transversely across the drum and across the path of the clothes as they are dropped, and means to tilt said housing on its pivot, the angle of tilt not exceeding an acute angle, whereby the clothes can fall through the opening in the mentioned side wall.

2. A clothes pre-drier according to claim 1: in which the means coaxial with the drum comprises a tubular trunnion, said trunnion being adapted to support said drum for rotation, and means for directing a flow of air through said trunnion.

3. A clothes pre-drier according to claim 2: in which the last-mentioned means comprises an open-topped chest embodying a heat exchanger, and an extension from said trunnion in separable engagement with the open top of the chest, said extension separating from the chest when the drum is tilted.

4. A clothes pre-drier and conditioner comprising a drum having a perforate cylindrical wall and an open side, said drum being tiltable mounted, means supporting said drum for rotation, a set of clothes-lifting vanes in the drum, the drum-supporting means including a tubular trunnion in communication with the drum interior, means to direct heated air through said trunnion into the drum and in a path across the drum and through the clothes therein toward the open side thereof, the last-mentioned means comprising an open-topped chest embodying a heat exchanger, and an extension from said trunnion in separable engagement with the open top of the chest, and means to tilt the drum and thereby separate the drum from the chest.

5. A clothes pre-drier and conditioner comprising a floor-supported housing, a horizontal hinge on which said housing is tiltable, a rotating drum carried by the housing on a horizontal axis and tiltable with the housing, means to tilt the housing, means to direct heated air into the interior of the drum and disposed separate from the housing, the last mentioned means comprising a fan, an open-topped chest receptive of air moved by the fan, a heat exchanger in the chest to heat the air moving therein, and means connected to the axial center of the drum and having separable connection with the open top of the chest to direct said air into the interior of the drum.

6. A clothes pre-drier and conditioner according to claim 5: in which the housing has a side with an opening therein, said side tilting forward and downward as the housing is tilted, and the drum having an open side adjacent said side of the housing and through which clothes in the drum are adapted to be dumped upon tilting of the drum and housing.

7. In a clothes pre-drier and conditioner, a rotating drum having an open side and provided with a tubular axial trunnion at the opposite side, vanes within the drum to alternately lift and drop clothes therein, means to direct a continuous flow of heated air through said trunnion toward the open side of the drum and in a path across the lifting and dropping movement of the clothes, and means mounting the drum to tilt in a direction to move the open side thereof forward and downward,

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whereby the vanes move the clothes in a direction to fall through said opening when the drum is tilted.

8. A clothes pre-drier according to claim 7: the drum being provided with a wall in the path of the air, said wall having a central large hole and a plurality of smaller perforations around said hole, and a flange encircling said hole.

9. A clothes pre-drier and conditioner comprising a drum having a perforate cylindrical wall and an open side, means supporting said drum for rotation, a set of clothes-lifting vanes in the drum, the drum-supporting means including a tubular trunnion in communication with the drum interior, means to direct heated air through said trunnion into the drum and in a path across the drum

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and through the clothes therein toward the open side thereof, the drum being provided with a wall in the path of the air, said wall having a central large hole and a plurality of smaller perforations around said hole, and a flange encircling said hole.

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