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C. O. RASMUSSEN  
LAUNDERING MACHINE  
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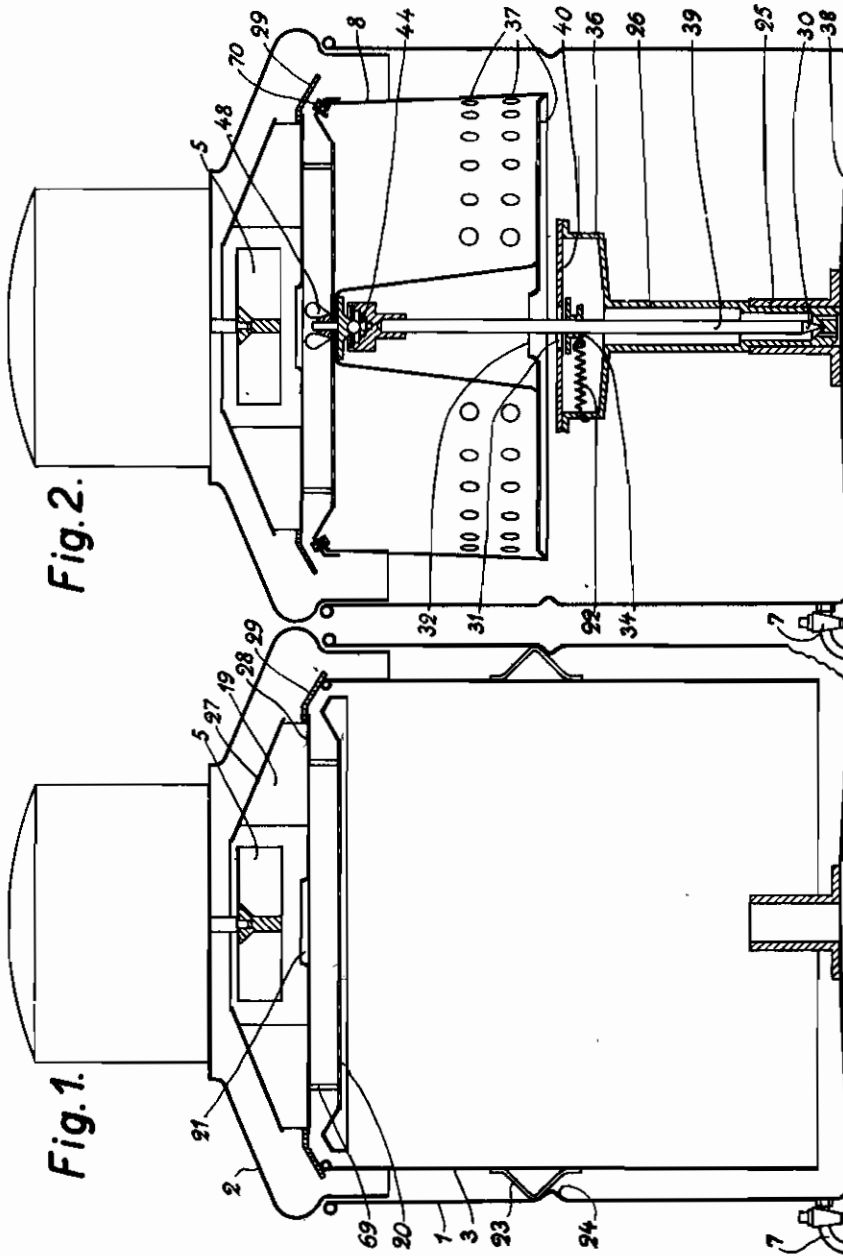


Fig. 2.

Fig. 1.

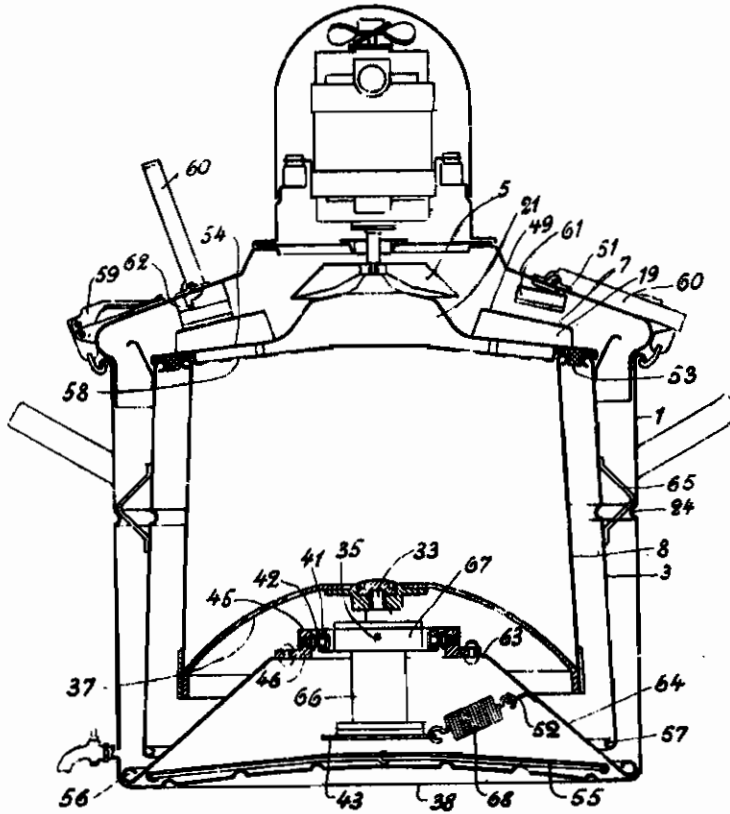
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Fig. 3.



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# ALIEN PROPERTY CUSTODIAN

## LAUNDERING MACHINE

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The invention deals with a laundering machine with a cylindrical bell or casing which is rotatable around a vertical axis and a removable centrifugal drum, which may be connected to a winged wheel, which may be driven by an air current produced in the upper part of the casing preferably by a fan situated in the lid of the same the wings of which are situated within the winged wheel of the drum.

In the known laundry machines of this kind the driven winged wheel is mounted so that it can freely rotate on the shaft of the fan directly above the driven winged wheel and as the fan is mounted in the lid of the casing the driven winged wheel will be removed every time the lid is taken off. When the lid is placed in position on the casing a plate on the underside of the driven winged wheel will have to catch and clamp on to the upper edge of the centrifugal drum whereby a connection between the drum and the driven winged wheel will be brought about in such a manner that these parts during the rotation of the laundering clothes will rotate as a whole unit supported by a pin in the bottom of the casing and the driven winged wheel's bearing on the shaft of the fan.

When the known machines are employed in the laundering of clothes the casing is filled with water up to the winged wheels and the centrifugal drum will act as a washing bell through the interior of which the air will be drawn by suction to the driving winged wheel, which will thereafter press the air out between the vertical walls of the casing and the drum, whereafter the air at the bottom will be driven in underneath the washing bell and by passing through the clothes and thereby stirring the same accelerate the cleaning process. In the washing periods the air current is not able to rotate the drum because of the resistance in the water.

It is a serious drawback in these machines that the driven winged wheel with its lower plate has to catch and clamp upon the drum simultaneously with the putting on of the lid, because during the placing of the wet clothes in the empty drum which is only supported by the said pin in the bottom of the casing the drum will easily be tilted so that it is difficult to obtain connection with the plate of the driven winged wheel, the more so as the drum cannot be governed or guided as the lid below is already partly put on and will prevent admission to the interior of the bell.

The purpose of the present invention is to remove this drawback and this is done thereby

that the driven winged wheel is mounted loosely in the upper part of the machine and partly thereby that it has a flange for the purpose of tightening against the lower part of the washing bell when it rests upon the same during the laundering and partly thereby that it has means by the aid of which it may be clamped on to the laundering drum. The lower part of the washing bell is removed during the period of rotation.

The loose, driven winged wheel will therefore be removed and put on separately when the lid has been removed, and the centrifugal drum may be entirely removed from the machine during the laundering periods, whereby the capacity of the machine during these periods is increased considerably. Furthermore one may, prior to the periods of rotation, fasten the driven winged wheel rigidly to the centrifugal drum and further ensure the clamping on of the assembled rotatable body to the upper separate, rotatable parts of the shaft mounted separately in the casing. In order to ensure this manner of assembly a perforated plate mounted below the driven winged wheel may be employed. This perforated plate constitutes a lid for the centrifugal drum during the rotation and has in its center the necessary fastening means for clamping on to the central shaft.

The lower part of the central shaft is thus not taking part in the rotation, but it is, however, mounted resiliently in the lower bearing so that it may bend and take up a circulating movement during the centrifugal movement of the centrifugal drum. For this purpose the said bearing is mounted in a holder which almost in half the length of the shaft has radial springs which extend into and are fastened to a rigid bushing on the shaft.

During the laundering periods the centrifugal drum as well as the vertical shaft and the holders for the same are removed from the machine and the driven winged wheel will thereafter rest directly on the lower part of the washing bell which is mounted in the casing and which is tightened along its edge against the same. The lower perforated plates of the driven winged wheel will during the laundering periods allow air to pass up to the winged wheels of which only the driven winged wheel will rotate whereas foam and squirts will hit against the plate and be prevented from reaching the winged wheels which may otherwise be damaged thereby.

The drum wings, however, may also be disposed on the top of the drum, encircling the fan. The drum wings are then, according to the invention,

disposed in such a manner that they form a driven winged wheel loosely disposed in the upper part of the machine, the said wheel being fitted with a border strip serving to tighten against the bottom part of the laundering bell, when the wheel rests against the latter during laundering, as well as means by which it can be clamped to the centrifugal drum.

The driven winged wheel, however, may also be disposed above the centrifugal drum and the laundering bell, but below the fan acting a driving winged wheel, as according to a special construction of the invention the driven winged wheel is arranged to support a central, upwardly directed air muzzle, by way of which the air from the interior of the centrifugal drum is directed axially upward towards the driving winged wheel, which is arranged in such a manner that it reflects the air obliquely outward, towards the winged wheel disposed on the drum, opposite the muzzle. By this arrangement the two winged wheels can rotate independently of each other, and the lower winged wheel together with the air muzzle may oscillate freely sideways, without hitting the upper winged wheel, as the upper edge of the air muzzle and the upper face of the driven winged wheel may be given such a height and shape that they will be situated on a spherical surface having its center in axial pressure bearing of the centrifugal shaft, while the driving winged wheel is disposed in such a manner that it is entirely situated above the said spherical surface.

The winged wheel of the centrifugal drum may further be fitted, on the upper face, with a braking surface co-operating with one or more braking blocks disposed in the cover of the laundering machine and adapted to be moved from the outside, it becoming thereby feasible to stop the centrifugal drum, before the cover is removed.

The members disposed on the outside of the cover and serving to move the braking blocks may further be built together with the fastening means of the cover itself, in such a manner that the latter cannot be tightened up without the drum being braked simultaneously, this arrangement resulting in security against any faulty operation, as this building together of braking members and clamping members prevents the machine from being opened, without the centrifugal drum being first stopped at the same time.

In the said laundering machine, the centrifugal drum may preferably be journaled in a bearing suspended in gimbals, which bearing by means of several springs disposed in a circular ring below the bearing and extending between a fixed stationary part and an extension of the casing of the bearing, is maintained in a vertical position, the number and size of the springs being adjusted in such a manner that there is attained a suitable effect serving to counteract the lateral oscillation of the rotating drum. The springs must on the one hand be so stiff that they prevent any too large lateral oscillations of the drum, while on the other hand they must be so soft that only a minimum of vibrations from the rotation of the drum will be transmitted to the surroundings.

The fixed stationary part to which the said springs are attached may preferably be the said small legs or the conical supporting member. By using a conical supporting member, we attain, during the drying periods, and when the machine is stored away, a practically entirely closed space

at the bottom of the laundering machine, which space may serve to hold various minor parts and accessories, for instance a perforated bottom or a wire netting which during the operation may be placed at the bottom of the laundering bell, in such a manner, besides its other functions, viz. to wash and dry the clothes, may be used as a dish-washing machine.

The drawing shows a few constructions of the invention.

Fig. 1 shows a vertical section of a laundering machine with only the laundering bell inserted;

Fig. 2 the same with only the centrifugal drum inserted, and

Fig. 3 a vertical section through another laundering machine which can also be used for washing of household utensils, and which has a special suspension of the centrifugal drum allowing large lateral oscillations of the latter during the run.

On the drawings, 1 is the casing of the laundering machine, 2 the cover of the same and 3 a cylindrical part of a laundering bell, which part is firmly disposed in the casing 1 with its lower edge raised some distance above the bottom of the casing.

In the machine the top part of the laundering bell can be freely removed, when the cover 2 has been opened. When the cover is placed into position, this cover fits airtightly to the casing 1, while the top part 4 fits airtightly to the top edge of the part 3.

In the cover 2, a fan or a winged wheel 5 is disposed directly above an opening 21 in a plate 28 in the top part.

The interior of the laundering bell is filled with clothes and washing water, and the winged wheel 5 inhales, by way of a central hole or muzzle 21 in the plate 28, the air from the interior of the bell, and this air is flung out between the wings of the stationary winged wheel 19, and is pressed downward through the space between the casing 1 and the bottom part 3, and below the lower edge of the latter the air returns to the interior of the bell, and bubbles up through the washing water and the clothes, in order to promote the laundering process. In order to prevent foam and water jets from hitting the winged wheel 5 which easily might become injured thereby, a perforated plate 20 is disposed below the plate 29, the said plate 20, from which any foam and squirts of water will be reflected, is attached to the plate 28 by means of spacing bolts 69.

The removable part 8 rests by means of a couple of clips 23 on an internal bead 24 in the wall of the casing. When the laundering process has been finished, the water is emptied from the casing by way of the cock 7 at the bottom of the latter, and the cover 2, as well as the winged wheel 19 with the parts attached thereto is removed, in such a manner that the laundered clothes can be removed from the interior of the machine.

Then the machine is arranged for centrifugal treatment of the clothes, and for this purpose the part 3 is removed, and a holder 26 in Fig. 2 is disposed in a stationary bush 25 at the centre of the bottom 38 of the casing. The holder 26 has, at the bottom, a pin bearing for supporting the lower pin-shaped part 30 of a shaft 39, and at the top the holder has an expanded part 36, at about half height of the shaft 39. In the expanded part 36, tensile springs 22 are provided, extending radially towards the shaft 39 and attached to a sleeve 34 fixed on the shaft 38. The

shaft supports, at the top, a ball-bearing 44 by means of which the top part of the shaft can rotate relatively to the lower part which is stationary, but nevertheless is free to oscillate, within certain limits and subject to the control of the springs 22.

The centrifugal drum 8, without its cover, is placed on to the upper rotary part of the shaft 39, and then the clothes to be treated by centrifugal treatment are deposited, and finally the driven winged wheel 19 with the perforated plate 20 is deposited on the top of the drum, and is secured in position by means of a winged nut 48 and bolts 70.

During the centrifugal treatment, the winged wheel 5 will suck air up through the hole 21, and will press it out between the wings of the winged wheel 19, and thus the latter which is firmly connected to the centrifugal drum 8 will be caused to rotate, and the drum will gradually reach such a high rotary velocity as is needed in order to attain an effective flinging away of the water. For this purpose the drum is fitted with holes 37 in the side and bottom.

The centrifugal drum may oscillate freely within certain limits, but the springs 22 will nevertheless tend to produce a stable running. During the centrifugal motion, the shaft 39 will perform a rotary motion which, however, is kept within certain limits by means of the springs 22. Especial care should here be taken, in order that the winged wheels 5 and 19 may not hit each other, and for this reason a circular aperture 31 in the upper end plate 40 of the expansion 36 forms an absolute limit for the lateral oscillation of the shaft 39, before such a concussion between the winged wheels may be feared. The lateral oscillations of the centrifugal drum, relatively to the shaft 39 are limited by a circular hole 32 in the bottom of the centrifugal drum.

The air having passed out through the winged wheel 19 will pass between the flange 29 and the plate 20 into the space below the plate 28 and up again through the hole 21. The upper annular plate 27 of the winged wheel 19 serves to force out, through the winged wheel 19, all the air flung out from the winged wheel 5.

The central openings of the said plates 27 and 28 should be sufficiently large, in such a manner that free access may be had for placing into position and removing the winged nut 48.

The laundering machine shown in Fig. 3 has the centrifugal drum 8 journalled freely rotatable on a shaft pin 33 in a bearing 67 suspended in gimbals. By means of pins 35, the casing of this bearing is suspended rotatably in a ring 41 which by means of pins 42, at right angles to the pins 35, are rotatably suspended in an outer ring 45 which by means of a lower flange 46 is clamped to a circular intermediate bottom 63 passing, at its periphery, into a conical supporting part 64 resting directly on the bottom 38 of the receptacle, along the periphery of the latter. The casing of the bearing 67 has a downwardly directed extension 66 with a flange 43 which is engaged by one end of a number of springs arranged in a circular row, out of which helical springs 68 only a single one is shown on the drawing, while the other ends are attached to an angular member 52 on the inner face of the supporting member 64. The number and stiffness of these springs are adjusted in such a manner that they will exert a suitable stabilizing effect on the centrifugal drum 8 when the latter,

during the operation, has a tendency to deviate sideways.

Above the part 3 and the drum 8 and tightly against the edges of the same, there is disposed an easily removable plate 54 corresponding to the plate 28 in Figs. 1 and 2 and being fitted with an annular tightening body 53. The plate supports the winged wheel 19, and the central aperture in the plate is shaped as an upwardly directed air muzzle 21 above which the driving winged wheel 5 is disposed.

In Fig. 3, the laundering machine is shown with the drum 8 and the bell part 3 inserted, but when the laundering machine is to be used for washing of clothes, the drum 8 and the supporting member 64 with bearing 67 are removed. Further a wire net 55 disposed below the supporting part 64 is removed, the said net being circular and adapted to be folded together about a diameter. Then the other parts of the laundering machine are placed into position as shown on the drawing, and the cover 2 is closed. The lower bent edge 56 of the supporting part 64 as well as the internal bead 24 in the wall of the casing 1, on which the brackets 23 are resting, are discontinued for considerable lengths, in such a manner that they can pass free of each other, when the supporting part is raised from or lowered down into the receptacle. Finally, the machine is filled with water, until the latter entirely covers the clothes disposed in the bell part. Owing to the action of the fan, the air will be sucked up through the laundering bell formed by the part 3 and the plate 54, while any foam following along will be cut into pieces by a perforated reflection plate 58 corresponding to the plate 20. The air is sucked up by way of the muzzle 21, and is pressed by means of the winged wheel 5 into the space surrounding the laundering bell, after which the air once more enters into the interior of the laundering bell, at the bottom edge of the same.

According to the invention, the laundering machine may also be used as a dish-washing machine, i. e. for cleaning of plates and dishes, cutlery and other household utensils. The above mentioned wire netting 55, which also may be shaped as a perforated bottom is now again placed into the part 3, in such a manner that the wire net will be resting on the inwardly bent edge 57 of the part 3. Plates and dishes etc. are placed on to the wire net, and the receptacle is filled with water, into which soda or some other cleaning powder may be poured, after which the machine is started, in exactly the same manner as described above.

When the laundered clothes are to be dried in the machine, the water is emptied out from the receptacle by means of the cock 7, and the part 3 is removed, while the supporting part 64 and the drum 8 are placed into position in the receptacle, after which the plate 54 is placed on to the drum 6, and the cover 2 is closed and clamped into position by means of special clamping devices 59.

The fan or the winged wheel 5 sucks air up through the interior of the drum 8, and flings the air out into the winged wheel 19, and thus the centrifugal drum 8 is caused to rotate, and the air passes further down through the space between the wall of the casing 1 and the drum 8, after which the air once more enters into the interior of the drum, by way of holes 37 in the bottom of the latter.

The plate 54 forms one single unit with the winged wheel 19, and the latter has, at the top on

the plate 27, a smooth braking surface 48 against which a number of braking blocks 51, moved by outside levers 60, can be pressed resiliently. Each braking block 51 is disposed at the end of a heavy plate spring 61, the other end of which is attached to the inner face of the cover 2, and the plate spring runs mainly tangentially to the braking surface 48. Each lever 60 has an inner pin 62 pressing against the plate spring 61 concerned, and when the lever 60 is raised, from the position shown to the right in Fig. 3 to the position shown to the left, then the pin 62 will move the free end of the spring 61 downward, in such a manner that the braking block 51 will be pressed towards the braking surface 48, in order to brake 15

the drum 8. In the laundering machine shown in Fig. 3, the levers 60 are shaped like bent bars each of which takes hold of the corresponding clamping mechanism 58.

Thus the advantage is attained that the mechanisms 59 cannot be opened, and the cover removed, without the levers 60 having first been raised into the position shown to the left in Fig. 3, and one will thus be forced to stop the drum, before the cover 2 is removed. Thus a simple safety device is attained against accidents likely to occur if the machine is opened, before the drum is stopped.

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