

PATENT SPECIFICATION

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(54) IMPROVEMENTS IN OR RELATING TO A DOMESTIC LINEN IRONING MACHINE

(71) We, SEB S.A., a Body Corporate organized under the laws of France, of 21260 Selongey, France, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to a domestic ironing machine.

The use of linen-ironing machines offered on the market since some time ago avoids the tedious use of hand-held irons. These machines comprise generally a cylinder surrounded with a cloth and driven in rotation by an electric motor, and also a heating shoe which is applied on a portion of the surface of the cylinder to iron the linen as it is driven.

According to the present invention there is provided a domestic ironing machine having a cylinder driven in rotation by an electric motor and a shoe adapted to co-operate with the cylinder for ironing linen disposed thereon, and including a frame formed of at least three tubular arms extending in parallel relationship to one another and each mounted at one end on a casing containing the electric motor, namely a first arm forming a shaft on which the said cylinder rotates, a second arm forming a shaft on which the shoe pivots and a third arm forming a base for the machine, the casing having a projecting portion forming a double sleeve which receives on the one hand the first arm and on the other hand a gear wheel meshing with teeth provided at the internal periphery of the cylinder.

It is thus seen that the working members of the machine are simply mounted on two tubes secured to a casing containing the electric motor as well as various elements partaking in the driving of the ironing cylinder, and which will be described here-

inafter.

Preferably, the gear wheel is extended by an internally splined hollow portion serving as a housing for a correspondingly slotted cylindrical member driven by a toothed ring gear which is itself driven by a set of gear wheels forming a speed reducer and housed within the casing. In this embodiment, the toothed ring gear drives the slotted cylindrical member and therefore the gear wheel which in its turn drives the ironing cylinder.

The said slotted member and toothed ring gear may together form a clutch ensuring a positive unidirectional drive of the ironing cylinder, while at the same time enabling it to be operated as a free wheel.

This arrangement is particularly advantageous, for the user can rotate the ironing cylinder manually in order, for example, to free the linen from the machine, this free rotation of the cylinder constituting, in a way, an automatic unclutching of the machine readily performed by the user.

A spring may be provided in the hollow portion of the gear wheel co-operating with the internal teeth of the cylinder, which spring permanently urges the slotted cylindrical member against the said toothed ring gear.

This spring therefore partakes in the unclutching of the machine, in the sense that when the ironing cylinder is rotated manually, the slotted cylindrical member is readily freed from the toothed ring gear, which means that the teeth of these two elements are disengaged by jumping over one another.

The cylinder drive pinion, the cylindrical member and the toothed ring gear preferably rotate about a shaft attached to the double sleeve of the casing and to a plate supporting the speed-reducing gear wheel set mounted in the casing.

The shoe is preferably pivoted about the second tubular arm by a handle actuating a tube mounted freely on the said second arm and containing means for the return of the shoe to its withdrawn position with respect to the cylinder.

The said return means are advantageously constituted by a torsion bar, one end of which is immobilized in a flattened portion of the said tube and the other end of which is bent and abuts against a projection provided in the casing.

The shoe actuating handle may be retained in a portion of the casing forming a hook while at the same time actuating a small lever pivotally mounted on the plate by means of which the gear-wheel set is mounted within the casing, and actuating a switch of the electric supply circuit of the machine.

Thus, when the shoe is applied against the cylinder and the machine is therefore in the working position, the cylinder is started automatically. On the contrary, when the shoe actuating handle is freed from the aforesaid hook, the ironing cylinder stops automatically and the shoe moves away from the cylinder by itself.

Preferably an element serving as a support on which the ironing cylinder rotates is secured to the end of the first arm. In this case, there is preferably provided a centrally-apertured diaphragm within the ironing cylinder which rotates on the said support element.

The shoe is preferably fixed by means of brackets on the flattened portion of the tube which is mounted freely around the second arm.

It should be noted that the fixing of the brackets on the flattened portion ensures at the same time the fixing of the torsion bar.

The tubular arms forming the frame of the machine may each have a previously deformed end which is simply force-fitted into the casing, said third arm forming the base of the machine being constituted by two tubes on which is fitted a protective enclosure for the casing.

A particular embodiment of the invention will now be described by way of example only with reference to the accompanying drawings wherein:

Figures 1 and 2 are perspective views showing respectively an ironing machine within the invention in working position (with the shoe applied on the ironing cylinder) and in idle position (with the shoe moved away from the ironing cylinder);

Figure 3 is a rear view of the casing of the machine, with the cover of the casing removed;

Figure 4 is a perspective view from the rear side of the machine, i.e. the side

opposite to the one shown in Figure 1;

Figure 5 is a view similar to Figure 4, but with the cover of the rear of the shoe removed;

Figure 6 is a view similar to Figure 5, but showing the machine with the shoe, ironing cylinder and base enclosure removed;

Figure 7 is a top view of the assembly shown in Figure 6, with parts in section and broken away, wherein, for the sake of clarity, the gear-wheel set forming the speed reducer as well as the slotted member have been extracted respectively from the casing and the cylinder drive gear wheel; and

Figure 8 is a sectional view upon the line VIII-VIII of Figure 7, the slotted cylindrical member being placed in the cylinder drive gear wheel.

As illustrated in the drawings, a domestic linen ironing machine has a frame 1 formed essentially of four tubular arms extending in substantially parallel relationship to one another and each mounted at one end in a casing 2 containing a certain number of drive elements. The tubular arms and their functions will be described hereafter.

The frame 1 of the machine comprises: a first tubular arm 3 forming a shaft on which is rotatably mounted a cylinder 4 covered with a cloth 5 suitable for ironing; a second arm 6 carrying a shoe plate 7 heated by resistors 8 (see Figure 5), and a third arm constituted by two tubes (Figures 3, 6 and 7) forming the base of the machine and covered with an enclosing element 10 and part of which forms a cover 11 for the casing 2. At 12 in Figures 1 and 2 is shown a portion formed in the cover 11 on which are provided the control means of the machine.

As appears clearly from Figure 3, the tubular arms 3 and 9 are simply force-fitted into the casing 2 at their ends 13 which have been previously deformed. The tubular arm 6 is constituted by two portions, namely a tube section 14 (Figure 8) tightly anchored in a boss 15 (Figure 3) which is moulded integral with the casing 2, and a tube 16 having a portion adapted to rotate freely about the tube section 14 and a flattened end 17 which will be described in detail later.

The casing 2 includes a projecting portion in the form of a double sleeve 18 which receives on the one hand the tubular arm 3 and on the other hand a gear wheel 19 meshing with teeth 20 provided at the internal periphery of the cylinder 4. The gear wheel 19 is extended within the double sleeve 18 of the casing 2 by a hollow portion 21 provided with internal splines 22 and serving as a housing for a

cylindrical member 23 provided with slots 24 co-operating, of course, with the splines 22. The cylindrical member 23 is driven in rotation by a toothed ring gear 25 which is itself driven by a gear wheel set 26 forming a speed reducer, driven by an electric motor (not shown) and housed in the casing 2, as appears clearly in Figure 3. At 27 is shown a cooling impeller for the electric motor, the impeller concealing the motor in Figure 3.

As appears clearly in Figure 7, the cylindrical member 23 and the toothed ring gear 25 form together, by their portions 23a and 25a, a clutch, a spring 48 being provided in the hollow portion 21 of the gear wheel 19 to permanently urge the cylindrical member 23 against the toothed ring gear 25. Owing to this clutch, a positive unidirectional drive of the cylinder 4 is obtained in the direction of the arrow F shown in Figure 7, while at the same time allowing at any moment the user to manually rotate the cylinder 4 (in the direction of the arrow F) which will then operate as a free wheel. Indeed, it is understood in this last case that, owing to the spring 48, the portion 23a of the cylindrical member 23 escapes, while turning, the teeth of the portion 25a of the toothed ring 25. This is extremely advantageous, since, depending upon the kind of linen to be ironed, the roller or cylinder 4 can be rotated faster and, therefore, the linen can be driven faster.

The toothed wheel 25, the cylindrical member 23 and the gear wheel 19 driving the cylinder 4 rotate about a shaft 28 secured at 29 to the double sleeve 18 of the casing 2 and attached at 30 (Figure 3) to a plate 31 mounted on the casing 2 and on which is arranged the whole set of gear wheels 26 forming the speed reducer.

The shoe 7 carries a thermostat 32 (Figure 5) of the instantaneous switch-off type and necessitating no particular comment, and is covered on the external side by a cover 33 (Figure 4) from which the control shaft 34 of the thermostat 32 projects, the said shaft being operated by means of a button 35 provided on the cover 33. The cover 33 of the shoe 7 is for instance screwed at 36 in the shoe. The shoe 7 can be actuated manually by means of a handle 37 introduced at 38 in an additional member 39 secured to the tube 6 freely mounted on the tube section 14. As seen in Figure 5, the shoe 7 is more precisely attached to the flattened portion 17 of the tube 16 by means of brackets 40 and screws 41. A torsion bar 42 is located in the tube 16 and ensures the return of the shoe 7 to its withdrawn position with respect to the cylinder 4. As appears clearly in Figures 3 and 7, one end 43 of

the bar 42 is bent and attached at 41, together with one of the brackets 40, in the flattened portion 17 of the tube 16, as a result of which it is prevented from rotating in the tube 16. The other end 44 of the bar 42 is also bent and abuts against a projection 45 moulded integral with the boss 15 of the casing 2. Another projection 46 limits the rotary travel of the bent portion 44 of the bar 42.

It is therefore understood that when the handle 37 is pressed to apply the shoe 7 to the cylinder 4, a certain pressure must be exerted on the handle 37 to overcome the resistance opposed by the torsion bar during the rotation of the tube 16.

The shoe 7 can be maintained applied against the cylinder 4 by engaging the handle 37 into a hook 47 provided on the casing 2. This results in a pivoting motion of a lever 49 pivotally mounted at 50 on an incurved edge 51 of the plate 31. More precisely and as seen clearly in Figures 3 and 7, the handle 37 is adapted to act upon a boss 52 provided at one end of the lever 49, whereas the other end of this lever 49 is in the shape of a pawl 53 allowing a blade switch 54 to be operated to open or close the supply circuit.

At 55 in Figure 7 is shown an element forming a support on which the cylinder 4 rotates, the element being mounted at the end of the tubular arm 3 and provided with an annular portion 56 on which a diaphragm 57 secured to the cylinder 4 rotates.

The support element 55 is formed of an annular portion 58 enclosing the end 59 of the arm 3. More precisely, when a screw 60 is rotated, it drives a small taper member 61 which has fins 62 interposed between other fins 63 on the element 58. Thus, when the screw is rotated, the taper member 61 is prevented by the interlocking fins 62 and 63 from rotating in the element 58, and the taper member 61, as its displacement proceeds during the rotation of the screw, progressively presses the fins 63 on the end 59 of the tubular arm 3, so that finally the end 59 is nipped in the element 58 forming a support on which the portion 56 of the cylinder 4 rotates.

At 64 is shown another diaphragm forming a bearing 65 and co-operating with the diaphragm 57 to ensure the rotation of the cylinder 4 about the tubular arm 3.

The operation of the machine just described can be understood from the description just made. It is not necessary to repeat the operation of each member, since it has been described in the foregoing.

It should only be mentioned that after a linen article to be ironed is placed on the cloth-covered cylinder 4, the machine starts automatically when the shoe is applied on

the cylinder by the handle 37 engaging in the hook 47. The ironing takes place at the temperature selected by means of the thermostat, and the user can, if he so desires, rotate the cylinder 4 as a free wheel to drive the linen. Lastly, when the machine is to be stopped, it is sufficient to disengage the handle 37 from the hook 47, the said handle being so mounted in the member 39 as to allow it to be subjected to a very slight rotation. The handle 37 being thus disengaged, the machine stops and the shoe is returned automatically to its withdrawn position with respect to the cylinder 4, owing to the torsion bar 42.

WHAT WE CLAIM IS:—

1. A domestic ironing machine having a cylinder driven in rotation by an electric motor and a shoe adapted to co-operate with the cylinder for ironing linen disposed thereon, and including a frame formed of at least three tubular arms extending in parallel relationship to one another and each mounted at one end on a casing containing the electric motor, namely a first arm forming a shaft on which the said cylinder rotates, a second arm forming a shaft on which the shoe pivots and a third arm forming a base for the machine, the casing having a projecting portion forming a double sleeve which receives on the one hand the first arm and on the other hand a gear wheel meshing with teeth provided at the internal periphery of the cylinder.

2. A domestic ironing machine according to claim 1, wherein the gear wheel is extended by a hollow and internally splined portion serving as a housing for a correspondingly slotted cylindrical member driven by a toothed ring gear, which is itself driven by a set of gear wheels forming a speed reducer and located in the casing.

3. A domestic ironing machine according to claim 2 wherein the slotted member and the toothed ring gear form together a clutch ensuring a positive unidirectional drive of said cylinder, while at the same time enabling it to be operated as a free wheel.

4. A domestic ironing machine according to claim 2 or claim 3 wherein a spring is provided in the hollow portion of the cylinder drive gear wheel to permanently urge the slotted cylindrical member against the toothed ring gear.

5. A domestic ironing machine according to any one of the foregoing claims wherein the cylinder drive gear wheel, slotted cylindrical member and toothed ring gear rotate about a shaft secured to the

double sleeve of the casing and to a plate supporting the set of speed-reducing gear wheels mounted in the casing.

6. A domestic ironing machine according to claim 1 wherein the shoe is pivoted about the second tubular arm by a handle actuating a tube freely mounted on the second arm and containing means for the return of the shoe to a withdrawn position with respect to the ironing cylinder.

7. A domestic ironing machine according to claim 6 wherein the return means are constituted by a torsion bar, one end of which is immobilized in a flattened portion of the said tube and the other end of which is bent and abuts against a projection provided in the casing.

8. A domestic ironing machine according to claim 1, claim 6 or claim 7, wherein the shoe actuating handle is adapted to be retained in a portion of the casing forming a hook while at the same time actuating a lever pivotally mounted on the said plate and acting upon a switch of the electric supply circuit of the machine.

9. A domestic ironing machine according to any one of the foregoing claims wherein a support element on which the cylinder rotates is mounted at the end of the first tubular arm.

10. A domestic ironing machine according to claim 9 wherein there is provided within the said cylinder a centrally apertured diaphragm rotating on the support element.

11. A domestic ironing machine according to any one of the foregoing claims wherein the shoe, provided with a thermostat of the instantaneous switch-off type, is secured by means of brackets or fixing strips on the said flattened portion of the tube which is freely rotatable about the second tubular arm.

12. A domestic ironing machine according to claim 1 wherein the tubular arms each have one of their respective ends deformed and force-fitted in the casing, while the third arm is constituted by two tubes on which is fitted at least a portion of a protective enclosure for the casing.

13. A domestic ironing machine substantially as herein described with reference to and as illustrated in the accompanying drawings.

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the cylinder by the handle 37 engaging in the hook 47. The ironing takes place at the temperature selected by means of the thermostat, and the user can, if he so desires, rotate the cylinder 4 as a free wheel to drive the linen. Lastly, when the machine is to be stopped, it is sufficient to disengage the handle 37 from the hook 47, the said handle being so mounted in the member 39 as to allow it to be subjected to a very slight rotation. The handle 37 being thus disengaged, the machine stops and the shoe is returned automatically to its withdrawn position with respect to the cylinder 4, owing to the torsion bar 42.

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2. A domestic ironing machine according to claim 1, wherein the gear wheel is extended by a hollow and internally splined portion serving as a housing for a correspondingly slotted cylindrical member driven by a toothed ring gear, which is itself driven by a set of gear wheels forming a speed reducer and located in the casing.

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