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LAUNDRY SHAKER AND CONDITIONER

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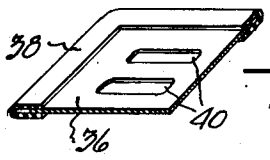



FIG. 5




FIG. 1

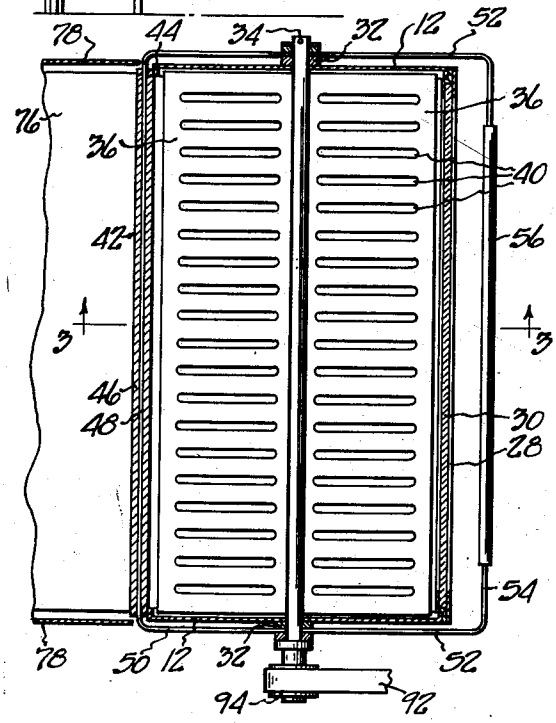



FIG. 2

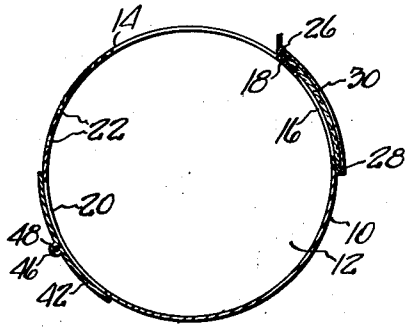



FIG. 3

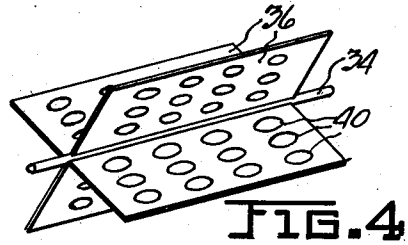



FIG. 4

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## LAUNDRY SHAKER AND CONDITIONER

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7 Claims. (Cl. 34—181)

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This invention relates to a laundry shaker and conditioner, and more particularly to a device for conditioning small laundry items for ironing. The device is particularly intended for use in a commercial laundry which handles groups of laundered items in net bags during the washing and extracting operations.

Considerable time is now expended in a commercial laundry in handling small pieces from bundles which have passed through the washing and extracting machines, in order to prepare those pieces for ironing. The washing and extracting operations tend to twist the individual laundry pieces into compact rolls or wads, and frequently cause the different work-pieces to interwine in a compact mass formed of a number of work-pieces. This occurs despite the fact that the items of a given bundle are confined together in a net bag during washing and extracting, and the bags separate the laundered items into groups during the washing and extracting operations. As a consequence of the wadding and intertwining of the individual laundry pieces, those individual pieces must be separated and shaken or otherwise spread or flattened in order to permit them to be placed in an ironer. A considerable amount of manual manipulation and handling is now required to accomplish this service, and it is a common practice to station a number of operators at the feeding station of an ironing machine in order to feed the workpieces to the machine at a rate which permits the machine to operate at any reasonable speed at or approaching its capacity. The number of workers required at this particular station entails a substantial labor cost, and, therefore, any reduction in the number of workers required constitutes a commercial advantage and cost saving to the laundry operator.

The primary object of this invention is to provide a device which will shake out and separate small laundered items quickly and expeditiously with minimum personal attendance or manual handling and which will enable a large volume of small laundered pieces to be fed to an ironing machine at a rapid rate.

A further object is to provide a device of this character which is compact and inexpensive, which is easy to operate and control, and in which the condition of the work can be viewed by the operator to accurately control the time during which any group of laundered items is treated in the device.

A further object is to provide a device of this character wherein laundered items are agitated mechanically in a confined space and are simultaneously subjected to a blast of heated air at high velocity.

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A further object is to provide a device of this character including a cylindrical housing provided with an agitator and having an inlet opening and an outlet opening, said inlet opening having a transparent panel, and said outlet opening being spaced from said inlet opening but provided with a control member extending adjacent to the inlet opening for ready manipulation thereof by an operator stationed adjacent to the inlet, and wherein a conveyor and guides are associated with the cylindrical housing and with the outlet thereof whereby laundered items are discharged thereon when the outlet is opened and are carried thereby to a delivery station.

Other objects will be apparent from the following specification.

In the drawing:

Fig. 1 is a side view of the device illustrating the parts thereof in vertical longitudinal section.

Fig. 2 is a top view of the device with parts shown in section.

Fig. 3 is a transverse sectional view of the cylindrical housing of the device taken on line 3—3 of Fig. 2.

Fig. 4 is a perspective view of one form of agitator employed in the device.

Fig. 5 is a fragmentary perspective view illustrating a modified embodiment of an agitator blade.

Referring to the drawing which illustrates one embodiment of the invention, the numeral 10 designates an elongated cylindrical housing having end walls 12. The housing is preferably positioned with its axis horizontal. At its upper end the housing has an opening 14 formed in its circumferential wall and extending substantially full length thereof, said opening preferably being of a circumferential extent slightly less than 90 degrees. A second opening 16 is formed in the circumferential wall of the housing, also extending substantially the full length of the housing. The opening 16 is preferably separated from the opening 14 by a narrow web or wall portion 18 and, as best illustrated in Fig. 3, is of an extent slightly less than 45 degrees circumferentially of the housing. The opening 16 preferably is positioned with its lower edge at or slightly above a horizontal plane passing centrally through the axis of the housing. A third opening 20 is formed in the circumferential wall of the housing substantially diametrically opposed to the opening 16. The opening 20 extends substantially the full length of the housing 10 and is of an angular displacement of 45 degrees

or more. The upper edge of the opening 20 is located adjacent to but below a horizontal plane extending through the center of the housing. If desired, a plurality of comparatively small apertures 22 may be formed in the cylindrical housing between the openings 14 and 20 and preferably above the horizontal plane passing through the center of the housing.

The housing 10 may be mounted upon any suitable support 24 elevated above the floor so that the opening 16 will be at an elevation convenient to an operator for the purpose of inserting laundered items therethrough and for the purpose of permitting the operator to look into the cylinder.

The opening 16 is provided with a closure pivoted thereto at 26. The pivot is here shown as being positioned adjacent to the upper end of the opening 16, and this position is preferred, but there may be some instances in which the user will prefer a hinging of the closure adjacent to the lower edge of the opening 16 and it will be understood that the pivot may be located at that position. The closure preferably comprises a rigid marginal frame 28 spanned by a transparent panel 30, the closure and its transparent panel being arcuate in shape, as best illustrated in Figs. 1 and 2, so that it marginally contacts the circumferential wall of the cylinder around the opening 16 and provides an effective closure therefor so that laundered items which are agitated while within the housing 10 cannot be discharged therefrom. Also it is desirable to construct the closure in such a manner that it extends partly into the opening and provides at its inner face a surface which is substantially flush or a streamlined continuation of the adjacent inner surfaces of the circumferential housing 10 so as to avoid obstructions upon which laundered items could be caught while being agitated. The end walls 12 of the container 10 mount suitable bearing spacers 32 centrally thereof. Within these bearing spacers are journaled opposite end portions of a shaft 34 concentric with and passing through the cylindrical housing. A plurality of substantially radial blades 36 are fixed to the shaft 34 and preferably extend in equiangular relation to one another. As here shown, four blades 36 are employed, but it will be understood that this number is illustrative and that, while the use of two or more blades is preferred for purposes of balance in the operation of the device, the device does not require more than one radial blade. The blades 36 extend substantially the full length of the cylindrical housing and their radial dimension is preferably slightly less than the radius of the inner face of the cylindrical wall of the housing so that the free or outer longitudinal edges of said blades extend adjacent to but are clear of the inner circumferential wall of the housing. The blades 36 are preferably rigid for at least the major portion of their extent and, for this purpose, are preferably formed of metal although they may be formed of other materials if desired. In some instances it may be desirable to form the blades at least in part from flexible material, and an illustrative construction of that character is shown in Fig. 5 wherein a marginal member 38 formed of flexible material, such as rubber or synthetic rubber, is attached at the free edges of the panel, preferably at the free longitudinal edge and at the two end edges. In the form illustrated in Fig. 5, the member 38 is preferably U-shaped and fits around the margins of the blades 36, extending therefrom to afford flexibility.

Each of the blades is provided with a series of apertures 40 of comparatively small size. The size and shape of the apertures is selected to insure against loss or discharge of laundered articles therethrough or the catching and retention of laundered articles therein. Alternatively, the openings may be of sufficient size to permit an average laundered article to pass freely therethrough. In either instance it is desirable that the blades will function to agitate laundered items within the housing 10 as said blades rotate and to discharge those laundered items through the opening 20 when it is desired, that is, when the closure for the opening 20, which will be described hereinafter, is opened.

An arcuate closure panel 42 of a length and a width to span and close the aperture 20 has an inner arcuate surface substantially conforming to the outer surface of the circumferential wall of the housing and adapted to bear thereagainst, both in open and in closed position. In this connection, the opening 20 will preferably be slightly shorter than the housing, whereby flanges 44 are formed at each end thereof. The flange 44 must be narrow to minimize the possibility that laundered items will catch thereon or be retained thereby when the closure is in open position. It will be understood also that the use of the flange 44 is not essential in cases where the end wall of the container which defines each end of the cylindrical housing has its edge extending flush with the outer surface of the cylindrical wall and where the closure panel 42 is of a length sufficient to permit it to bear upon such edge.

The closure panel 42 is preferably a sliding panel and, for this purpose, has formed therein substantially at its center a boss or enlargement 46 provided with a longitudinal bore within which is received a run 48 of a carrier member having radially extending arms 50 projecting from its opposite ends. The arms 50 are pivoted upon the projecting end portions of the shaft 34 and have rigid portions 52 extending therefrom, preferably at an angle to the portions 50 as seen in Fig. 1. The arm portions 52 are of a length or dimension greater than the radial dimension of the cylinder and are connected at their free ends by a cross-run 54 upon which a handle member 56 is mounted. The handle 56 is preferably positioned adjacent and outwardly spaced from the closure panel 28, 30 in a manner to avoid interference with the opening and closing of that panel when the handle is in its normal position, that is, in a position with the panel 42 closed and spanning the opening. The handle 56 at the same time will be located adjacent to the inlet opening 16 and the closure panel 28, 30 so as to be within the reach of and readily grasped and manipulated by a user stationed adjacent to the inlet opening. It will be apparent that a downward pull upon the handle 56 in a clockwise direction will cause an upwardly sliding movement of the closure 42 to open the outlet 20 progressively from its lower end.

The opening 14 of the cylindrical housing 10 is located in communication with a hood member having upright walls 60 and an opening 62 at its top, preferably spanned by a cross-member 64. As here illustrated, the hood 60 is supported separately from the housing 10, but it will be understood that the hood may be supported by and form a part of the housing 10 if desired. The opening 62 at the upper end of the hood 60 is preferably spanned by a screen to exclude

particles of lint or dirt or particles of foreign matter. The screen does not interfere with the flow of air into the hood, and such flow of air is caused to occur at high velocity by a fan or blower 68 of any form found suitable positioned in the upper portion of the hood. At an intermediate level of the hood and below the blower 68 a second screen or filter member 70 may be mounted, if desired, to span the hood. Heating means, here illustrated as a steam coil 72 but which may constitute an electrical heating element or any other type of heat transfer means, is positioned within the portion of the hood between the blower 68 and the uppermost portion of the cylinder 10. By this arrangement, air is caused to enter the cylinder 10 at high velocity when the blower 68 is operating, and that air is heated by the member 72 when the latter is functioning. The air within the device circulates through the entire cylinder as permitted by the apertures 40 in the blades 36. Exhaust of the air from the cylinder may occur through the openings 22.

A conveyor is included in the device, the same being here illustrated as constituting a belt 72 trained around pulleys 74. The upper run 76 of the belt preferably extends substantially horizontally and at a level below the lower edge of the opening 20. The pulley 74 adjacent to the cylindrical housing is located below the housing, and the belt itself is of such width that any laundered article which falls or is discharged from the cylindrical housing 10 through the outlet opening 20 comes to rest upon the upper run 76 of the belt. The belt preferably travels between side guide panels 78 which are suitably supported to extend lengthwise of the belt at opposite sides thereof, projecting above the level of the upper run 76 of the belt and projecting longitudinally beyond the discharge end of the belt as viewed at the left in Fig. 1. The side guide panels 78 may be supported in any suitable manner as by the support 80. In the form of the invention illustrated in Fig. 1, the top panel 82 carried by the upper edges of the side walls 78 and extending from the lower edge of the hood 66 at one end to an upright end wall 84 at its opposite end, serves with the belt to form a tunnel. This tunnel directs the heated air discharged through the opening 22 in the housing 10, whereby that heated air must traverse the tunnel for discharge at the opening 86 through which the laundered articles are discharged from the belt 76. It will be understood, however, that the tunnel action may be completely dispensed with by elimination of panels 82 and 84. It will also be understood that the length of the belt 76 is optional and that it may be either longer or shorter than that here illustrated. It will further be understood that the belt 76 and the side panels 78 may be dispensed with completely in which event a receptacle to receive the laundered articles discharged from the machine would be provided below the opening 20. Such a receptacle is here shown at 88 positioned below the discharge opening 86 in Fig. 1.

Any means found suitable may be employed to drive the shaft 34 and one of the belt pulleys 74. Thus a motor or other prime mover 90 may have a pair of pulleys mounted upon its shaft, one of which pulleys receives or mounts a belt 92 trained around a pulley 94 carried by one end of the shaft 34. A second motor pulley may receive a belt 96 trained around a pulley fixed upon a shaft mounting one of the belt pulleys 74. Individual motor drives may be provided for the various driven shafts, or gear drives or other types of drives may be substituted for this belt drive if desired.

In the use of the device the operator is stationed alongside the cylindrical housing 10 at the opening 16 thereof so as to be able to manipulate the closure 28, 30 and also the handle 52, 56 at will. When the device operates, the shaft 34 rotates to move the blades 36 in a circular path, and the belt operates in a counterclockwise direction as viewed in Fig. 1 so that items carried upon the upper run of the belt are carried away from the housing 10. The blower 68 forces air at high velocity and in high volume through the hood and into the cylinder where it is permitted to circulate because of the openings 40 in the blades and from which it may be discharged through the openings 22.

The user, upon receiving a group of laundered items in the bundle in which those items have been retained during the washing and extracting operation, and which items may include pillow cases, napkins, handkerchiefs, dish towels, hand towels and other pieces of flat work which are to be passed through a flatwork ironer, removes those articles from the net bag or other container and inserts them into the housing 10 through the openings 16. The items will preferalby be distributed in the device so that some items from the group are positioned between each adjacent pair of blades. In other words, the items are so divided or distribluted as to balance the load in the device. The position of the opening 16 permits this to be accomplished easily while the shaft 34 is rotating, preferably at slow speed, by merely dropping items through the opening after each blade passes the opening. As soon as the articles of the group have been deposited into the housing 10, the closure 28, 30 will be closed. The operator will soon learn the amount of time which is required for agitation and shaking of the articles to flatten the same and to alter them from their previously wadded and compacted or clumped condition. As this time ends, the user can look into the container through the transparent panel 30 and ascertain whether the operation has been effective. As soon as the operator sees that the work-pieces are in the desired shaken, aerated and extended position, the closure 42 for the outlet may be opened by grasping and pulling downwardly upon the handle 56. This permits the articles to be discharged through the outlet opening 20. The low position of the outlet 20, together with the movement of the blades in either clockwise or counterclockwise direction as viewed in Fig. 1, rapidly discharges the laundered items and, as they are discharged, they are deposited upon the belt and carried thereby and between the guides 78 until they are discharged into the container 88. In cases where the belt is omitted, the items will be deposited directly within the container 88 when the same is positioned below the opening 20, as will be obvious.

The blades 36 while rotating at a low speed, preferably not greatly exceeding 200 R. P. M., cause the laundered items to move about in the housing 10. At the same time that the articles are so moved by the rotating blades, they are subjected to the action of air circulated in the device by the blower 68. As previously mentioned, the blower 68 preferably operates to circulates a large volume of air at high velocity. This air circulation serves two purposes. It cooperates with the movement of the laundered

articles to tend to extend and shake the articles and to release them from their wadded condition. Second, it preheats the laundered articles and removes some of the moisture therefrom so that the articles are in a condition for rapid passage through an ironer. As soon as the articles from one group are discharged from the device, the handle 56 may be released and the handle and its closure will normally swing by gravity to a closed position. A spring may be provided for positive assurance of return of the sliding closure 42 to its closed position if desired, as will be well understood in the art. The operator then repeats the process by feeding to the device the contents of another bundle of laundered items.

The flattened, extended, aerated and preheated condition of laundered items as they are discharged into the container 88 facilitates their rapid handling by operators stationed at the feed end of an ironing machine. Thus it is only necessary that the operator grasp the items and position them properly upon the feed web of the ironing machine, and this operation can be performed rapidly and successively. The necessity heretofore commonly experienced of shaking laundered items to permit them to be laid flat upon the ironer is obviated. Thus a very substantial amount of time can be saved in the ordinary operation of feeding an ironing machine, and the number of people and the time required for the operation both are substantially reduced.

It will be understood that the construction herein described is illustrative and that the invention may take other forms and may be changed in its construction, and yet remain within the scope of the appended claims and hence within the spirit of this invention.

I claim:

1. A laundry shaker and conditioner comprising a housing having a substantially cylindrical portion and a pair of end walls, said housing being positioned with its axis substantially horizontal and having a feed opening in its cylindrical portion above the level of said axis and a discharge opening therein substantially opposite said feed opening and below the level of said axis and extending substantially full length of said housing, a shiftable closure for said feed opening, a shiftable closure for said discharge opening, an actuator for said discharge closure having a handle portion positioned adjacent to said feed opening, a rotor journaled in said housing, and means for driving said rotor.

2. A laundry shaker and conditioner comprising a housing having a substantially cylindrical portion and a pair of end walls, said housing being positioned with its axis substantially horizontal and having a feed opening in its cylindrical portion above the level of said axis and a discharge opening therein below the level of said axis and extending substantially full length of said housing and an air inlet opening, a shiftable closure for said feed opening, a shiftable closure for said discharge opening, an actuator for said discharge closure having a handle portion positioned adjacent to said feed opening, a rotor journaled in said housing, means for driving said rotor, and a blower discharging into the air inlet opening of said housing, said feed and discharge openings being located at opposite sides of a vertical plane through said axis.

3. A laundry shaker and conditioner comprising a housing having a substantially cylindrical portion and a pair of end walls, said housing being positioned with its axis substantially horizontal and having a feed opening in its cylindrical portion above the level of said axis and a discharge opening therein below the level of said axis and extending substantially full length of said housing, said feed and discharge openings being substantially diametrically opposed, a shiftable closure for said feed opening, a shiftable closure for said discharge opening, an actuator for said discharge closure having a handle portion positioned adjacent to said feed opening, a rotor journaled in said housing, and means for driving said rotor, said housing having air inlet and air outlet openings, said rotor having air circulating passages, and means for circulating air in said housing from said inlet to said outlet.

4. A laundry shaker and conditioner comprising a housing having a substantially cylindrical portion and a pair of end walls, said housing being positioned with its axis substantially horizontal and having a feed opening in its cylindrical portion above the level of said axis and a discharge opening therein substantially opposite said feed opening and below the level of said axis and extending substantially full length of said housing, a shiftable closure for said feed opening, a shiftable closure for said discharge opening, an actuator for said discharge closure having a handle portion positioned adjacent to said feed opening, a rotor journaled in said housing, and means for driving said rotor, said rotor including a rigid substantially radial blade extending substantially full length of said housing and adjacent to said cylindrical portion and having a plurality of apertures therein.

5. A laundry shaker and conditioner comprising a housing having a substantially cylindrical portion and a pair of end walls, said housing being positioned with its axis substantially horizontal and having a feed opening in its cylindrical portion above the level of said axis and a discharge opening therein below the level of said axis and extending substantially full length of said housing, a shiftable closure for said feed opening, a shiftable closure for said discharge opening, an actuator for said discharge closure having a handle portion positioned adjacent to said feed opening, a rotor journaled in said housing, and means for driving said rotor, said rotor including a rigid substantially radial apertured blade, and a flexible marginal portion wiping at least a portion of the inner surface of said housing, said feed and discharge openings being on opposite sides of a vertical plane through said axis.

6. A laundry shaker and conditioner comprising a housing having a substantially cylindrical portion and a pair of end walls, said housing being positioned with its axis substantially horizontal and having a feed opening in its cylindrical portion above the level of said axis and a discharge opening therein below the level of said axis and extending substantially full length of said housing, a shiftable closure for said feed opening, a shiftable closure for said discharge opening, an actuator for said discharge closure having a handle portion positioned adjacent to said feed opening, a rotor journaled in said housing, and means for driving said rotor, said actuator being pivoted concentrically of said housing to swing said discharge closure between open and closed positions, said discharge closure being arcuate.

7. A laundry shaker and conditioner compris-

ing a housing having a substantially cylindrical portion and a pair of end walls, said housing being positioned with its axis substantially horizontal and having a feed opening in its cylindrical portion above the level of said axis and a discharge opening therein below the level of said axis and extending substantially full length of said housing, a shiftable closure for said feed opening, a shiftable closure for said discharge opening, an actuator for said discharge closure having a handle portion positioned adjacent to said feed opening, a rotor journaled in said housing, and means for driving said rotor, said actuator comprising a pair of arms connected at one end to said discharge closure and pivoted



intermediate their ends concentrically of the end walls of said housing, and a handle connecting the opposite ends of said arms.

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