SUCTION BOX FEEDER FOR A FLATWORK IRONER

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ABSTRACT OF THE DISCLOSURE

A feeding and smoothing apparatus for flatwork ironer wherein the flatwork is passed over a pair of belts moving toward the outer edges of the flatwork with a suction being applied to the belts so as to move the edges of the flatwork outwardly from the longitudinal axis thereof so that the flatwork is smooth before passing over an inclined feed plate and into the ironer.

The present invention relates to a feeding and smoothing apparatus for a laundry flatwork ironer and to an arrangement utilizing a suction applied to perforated moving belts to smooth the flatwork prior to entry into the ironer.

The laundry flatwork ironers such as generally used for ironing sheets and the like usually comprise ironing rolls through which the sheet is passed. A feed roll and usually a feed plate is positioned forwardly of the ironing rolls to facilitate the introduction of the flatwork into the ironer. It is conventional practice for the two operators who feed the initial edge of the flatwork into the ironer to tug or pull the sides of the flatwork to remove any wrinkles or folds in the fabric as it is being drawn into the rolls. This operation considerably limits the speed with which the operators can work and also does not produce a uniform pulling action along the longitudinal axis of the flatwork. Accordingly, many forms of apparatus have been devised in order to mechanically and automatically smooth the flatwork prior to feeding the flatwork into the ironer. Such arrangements have not been completely satisfactory since they do not always produce wrinkle-free flatwork prior to entry of the flatwork into the ironer.

One of the objects of the present invention is to provide an improved feeding and smoothing apparatus for a flatwork ironer.

Another object of the invention is to provide a smoothing apparatus which will apply a uniform tension along the longitudinal axis of the flatwork immediately prior to introducing the flatwork into a flatwork ironer.

It is a further object of the invention to provide a feeding and smoothing apparatus for a flatwork ironer which employs a suction applied through moving surfaces as the flatwork is passed over these surfaces prior to entry into the ironer.

The usual form of a flatwork ironer with which the smoothing apparatus of the present invention may be employed generally comprises an entry feed roll at the entrance to the ironer. In one aspect of the feeding and smoothing apparatus of the present invention, there may be provided an inclined, perforate feed plate positioned below and forwardly of the feed roll and extending transversely to the direction of movement of flatwork entering the ironer. Below the feed plate there may be a pair of aligned, perforated continuous belts with the forward reaches of the belts being substantially perpendicular to the feed plate and inwardly of the forward edge of the feed plate. The aligned continuous belts extend across the length of the feed plate. The forward reaches of the belts move in opposite directions laterally outwardly toward the outer edges of the feed plate. The belts may move over portions of a vacuum spreader box which has an elongated rectangular cross section. The face of the vacuum box which is traversed by a forward reach of the belt has openings therein with a suction being applied through these openings and through the perforations in the belt. Since the openings are discontinuous, the suction as applied will be pulsating. The apertured face of the vacuum box may either be planar or bowed slightly outwardly.

The forward reach of each belt extends over approximately one-half of the width of the flatwork being introduced into the ironer. The combined action of the outwardly moving belts and the pulsating suction applied thereto will apply a uniform tension along the longitudinal axis of the flatwork and move the outer edges of the flatwork outwardly. The flatwork is then passed over the projecting forward edge of the inclined feed plate, over the feed plate and to the feed roll of the ironer.

Other objects, advantages and features of the present invention will become apparent from the following description taken in conjunction with the accompanying drawings which are merely exemplary.

In the drawings:
FIG. 1 is an end elevational view of the forward or entry end of a flatwork ironer incorporating the smoothing apparatus of the present invention;
FIG. 2 is a sectional view taken along the line 2—2 of FIG. 1;
FIG. 3 is a sectional view taken along the line 3—3 of FIG. 2 with portions of the view being broken away;
FIG. 4 is a side elevational view of one of the drive motors for the belts illustrated in FIG. 3;
FIG. 5 is a plan view of a portion of a perforated belt passing over a portion of the apertured vacuum spreader box;
FIG. 6 is a transverse sectional view of a portion of a vacuum spreader box of FIG. 2 showing the forward reach of a belt passing therethrough;
FIG. 7 is a sectional view similar to that of FIG. 6 but in slightly enlarged scale and showing the apertured face of the vacuum spreader box as being slightly bowed outwardly.

The present invention may comprise a frame indicated generally at 1 supported on casters 2 to impart mobility to the feeder with a plurality of floor locks 3 being mounted on the frame to lockingly position the feeder in a desired location relative to the ironer.

The forward or entry end of the ironer as illustrated in FIGS. 1 and 2 comprises a feed apron 4 which is in the form of an endless web passing over a main feed roll 5 and between forward finger rolls 6 and 7. A second continuous web 8 passes over the upper roll 7 so that the flatwork indicated at 9 which is to be ironed passes between the two endless webs 4 and 8 to the ironer rolls.

Positioned below and forwardly of the feed roll 5 is an inclined feed plate 10, preferably of stainless steel, with its outer surface being highly polished to facilitate the
shown in FIG. 6, these surfaces may also be lightly passage of flatwork thereover. The feed plate 10 is continuous and, as seen in FIG. 1, extends across the entire width of the ironer.

The feed plate 10 is mounted on the top of a pair of vacuum spreader boxes 11 and 12 as may be clearly seen in FIG. 3. These vacuum spreader boxes have an elongated rectangular cross section and connect to a suction box indicated at 13. A pair of suction fans 14 and 15 driven by electric fan motors 16 is connected to the vacuum spreader boxes by ducts 17 and 18. The fan outlets are ducted at 19 and 20 to outlet louvers 21 and 22 located in the lower portion of a flutter box 23 which is in the form of a long, narrow, deep container having an open top 24.

The vacuum spreader boxes 11 and 12 each have planar inclined forward surfaces 25 and 26 which have elongated openings 27 therein, as may be seen in FIG. 5. Passing around the upper portions of the vacuum spreader boxes are continuous belts 28 and 29 moving in opposite directions, as may be seen in FIG. 3, with belt 28 supported by rollers 30 and 31 and belt 29 supported by rollers 32 and 33. The outer rollers 30 and 33 of each belt are driven through a flexible coupling 34 by gear motors 35 mounted on the frame of the ironer. Each of the belts 28 and 29 has perforations 36 therein, the perforations being arranged to pass over the openings 27 in the vacuum spreader boxes. As may be seen in FIG. 1, each of the belts extends over substantially one-half the width of the feed plate, and the forward reaches of the belts 28 and 29 move outwardly from the central longitudinal axis of the feed plate and of any flatwork passing thereover.

While the perforated surfaces 25 and 26 of the vacuum spreader boxes have been illustrated as being planar as shown in FIG. 6, these surfaces may also be lightly bowed as indicated at 40 in FIG. 7, so as to present a convex surface over which the forward reaches of the belts move.

A high-speed, chrome-plated roll 41 is mounted on a bracket 42 on the forward edge of flutter box 23 so as to throw the trailing ends of flatwork into the flutter box. The roll 41 is driven through drive belt 43 by a drive motor 44 which is mounted on an adjustable bracket 45. As may be seen in FIG. 2, the forward or leading edge of the plate 10 is indicated at 46 and projects forwardly of the moving perforated belts to present a sharp edge to the flatwork entering upon the feed plate.

In operation, the feeding and smoothing apparatus as described above functions in the following manner:

The leading edge of the flatwork which, for example, may be a sheet is smoothed by the operators and placed upon the feed apron where it passes over the main feed roll. The sheet is then smoothed and placed upon the inclined feed plate and pushed backwardly against the moving perforated belts so that the vacuum created in the vacuum spreader boxes acts upon the sheet and draws the sheet against the laterally moving spreader belts. The high-speed roll then flips the trailing end of the flatwork into the flutter box where the flatwork is agitated and shaken up under the action of streams of air introduced into the flutter box through lower openings.

As the sheet is drawn upwardly under the action of the feed apron, it is pulled out of the flutter box and drawn against the spreader belts where the belts pull the sheet laterally to smooth the sheet as it passes over the leading edge of the feed plate. The movement of the spreader belts imposes a uniform tension along the longitudinal axis of the sheet passing thereover. As the sheet passes over the leading edge of the feed belt, it is further smoothed and wrinkles are removed therefrom. In addition, any moisture remaining on the sheet may be removed by this relatively sharp leading edge of the feed plate.

Once the leading edge of the flatwork is introduced on the feed apron, the remaining portion of the flatwork will be fed automatically into the ironer without any assistance from the operators.

Thus, it can be seen that the present invention provides a simple yet effective apparatus for introducing smooth and wrinkle-free flatwork into the feed apron of a flatwork ironer. In addition, the smoothing and feeding is automatically carried on by the pulsating suction applied through the perforated spreader belts which move laterally outwardly in opposite directions. The flatwork is shaken and agitated prior to passing over the spreader belts so as to be in a relatively smooth position prior to being acted upon by these belts. The movement of the air through the material of the flatwork created by the vacuum also produces an advantageous moisture removal action and, at the same time, the sharp leading edge of the feed plate tends to scrape lint or other foreign objects free from the material as it is being fed into the ironer.

It is to be understood that various details of construction may be altered and other arrangements of parts can be made without departing from the spirit of the invention except as defined in the appended claims.

What is claimed is:

1. In a feeding and smoothing apparatus for a flatwork ironer having an entry feed roll at the entrance to the ironer, the combination of an inclined feed plate below and forwardly of the feed roll and transverse to the direction of movement of flatwork entering the ironer, a pair of aligned, perforated, continuous belts positioned below said feed plate with the forward reaches of said belts being substantially perpendicular to said feed plate and the forward edge thereof, said belts extending across said feed plate and the forward reaches thereof moving in opposite directions laterally toward the outer edges of said feed plate, and means for applying suction to the forward reaches of said perforated belts so that flatwork moving over said belts is moved laterally outwardly from the central longitudinal axis of the flatwork whereby the flatwork is smoothed before passing over said feed plate.

2. In a feeding and smoothing apparatus as claimed in claim 1 with said suction being pulsating.

3. In a feeding and smoothing apparatus as claimed in claim 1 and further comprising vacuum spreader boxes means below said entry feed roll with said feed plate being imperforate and mounted thereon, said belts moving over said vacuum spreader box means with a suction being applied to the forward reaches of said belts.

4. In a feeding and smoothing apparatus as claimed in claim 3 with said belts having spaced perforations therein, there being spaced openings in the faces of the vacuum spreader box means traversed by the forward reaches of said belts with said openings coinciding with the movement of the perforations of said belts as said belts move.

5. In a feeding and smoothing apparatus as claimed in claim 3 wherein said vacuum spreader box means have an elongated rectangular cross section, the reaches of the belts passing over the box means.

6. In a feeding and smoothing apparatus as claimed in claim 5 with the face of the suction box traversed by the forward reaches of said belts being planar.

7. In a feeding and smoothing apparatus as claimed in claim 5 with the face of the suction box traversed by the forward reaches of said belts being slightly convex.

8. In a feeding and smoothing apparatus as claimed in claim 1 wherein the forward edge of said feed plate is relatively sharp so as to remove wrinkles from flatwork passed thereover.

9. In a feeding and smoothing apparatus as claimed in claim 1 and further comprising vacuum spreader boxes means below said feed plate for agitating and shaking out flatwork before passing the flatwork over the belts and feed plate.

10. In a feeding and smoothing apparatus as claimed
in claim 9 wherein said agitating and shaking means comprises a box-like enclosure having an open top with flatwork being introduced therein through said open top, and means for introducing a plurality of streams of air into the lower portion of said enclosure to agitate the trailing end of flatwork therein as the leading edge of the flatwork is passing over said belts and feed plates.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,414,997

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It is certified that error appears in the above identified patent and that said Letters Patent are hereby corrected as shown below:

Column 1, line 12, after "for" insert -- a --. Column 2, line 20, "combnied" should read -- combined --; line 39, "elevationa" should read -- elevational --. Column 3, line 34, "lightly" should read -- slightly --. Column 4, line 32, after "and" insert -- below --.

Signed and sealed this 17th day of March 1970.

(SEAL)
Attest:

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