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FEEDING OF SHEETS TO MULTIROLL LAUNDRY IRONING MACHINES

Filed July 16, 1951

2 Sheets-Sheet 1

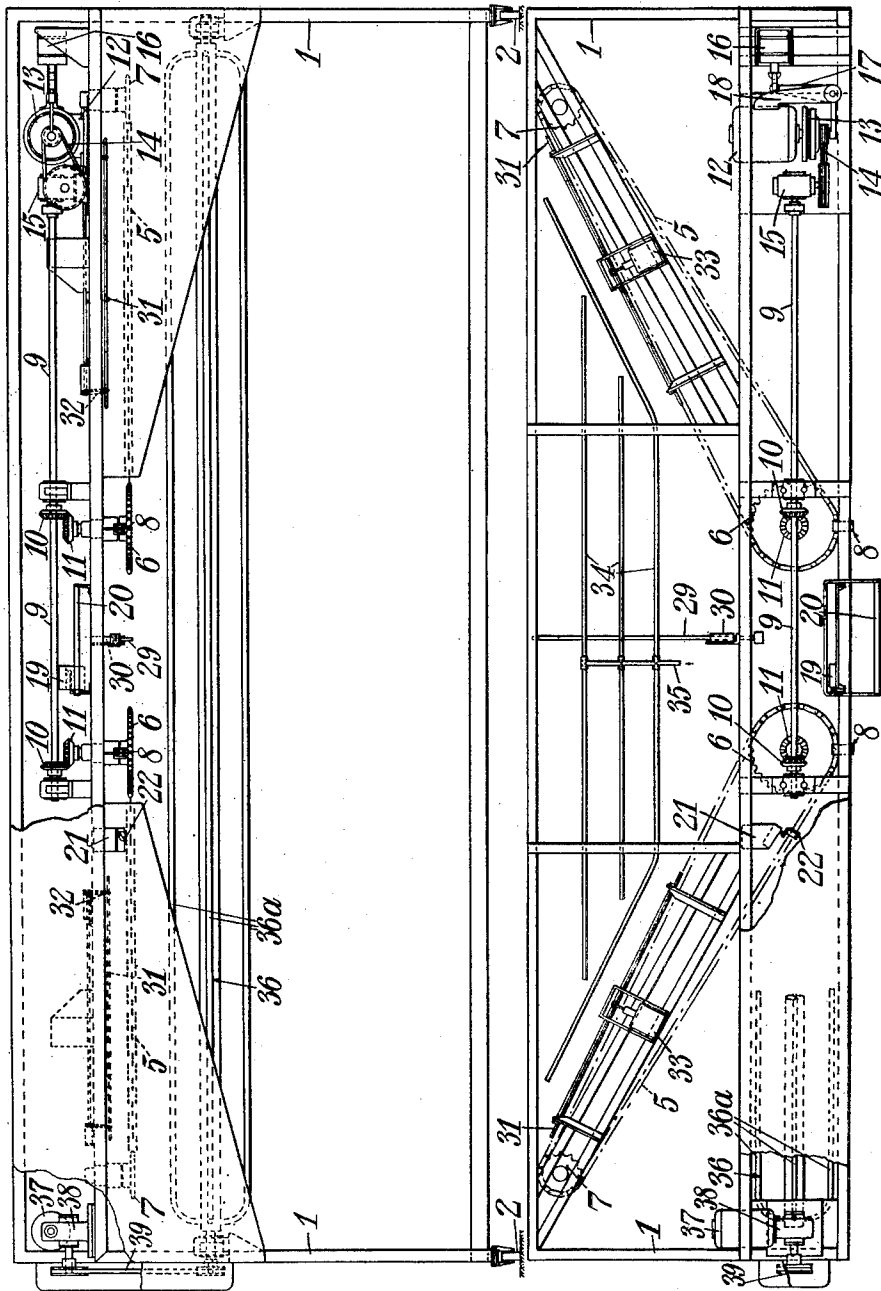


FIG. 2.

Fig.

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2 Sheets-Sheet 2

FIG. 3.

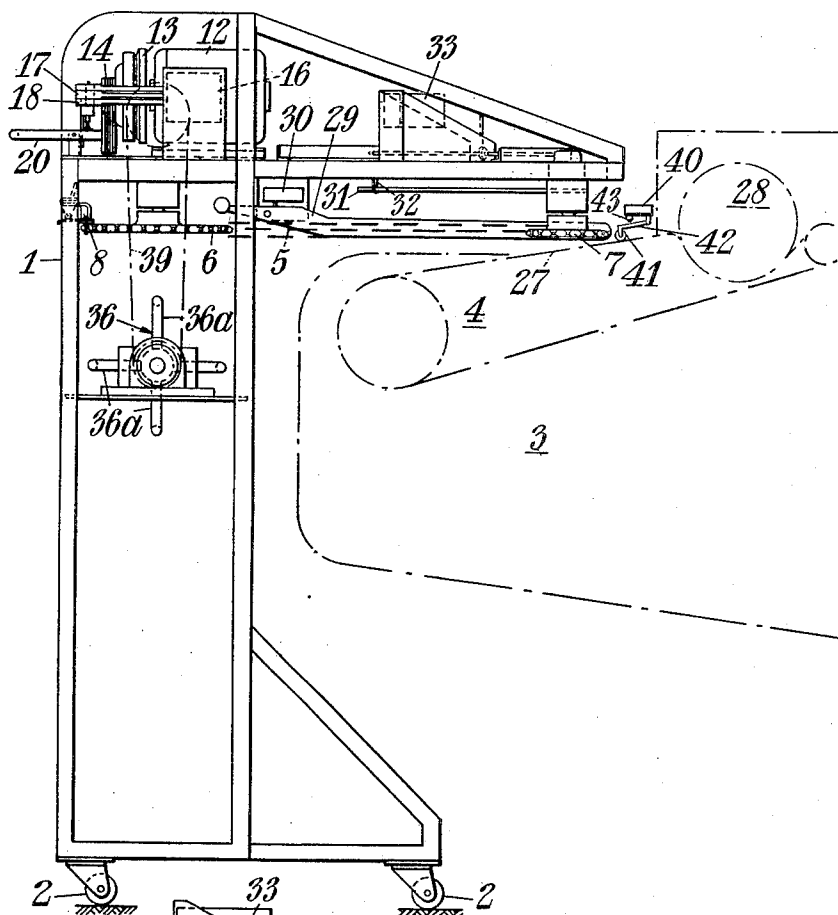
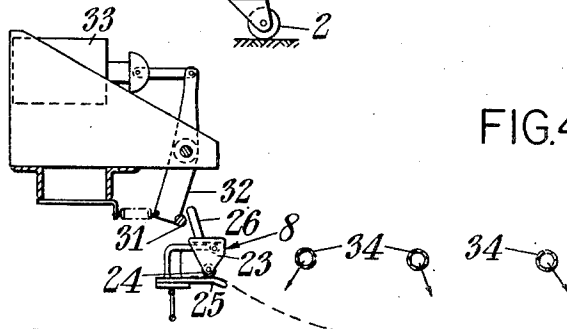


FIG. 4.



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FEEDING OF SHEETS TO MULTIROLL
LAUNDRY IRONING MACHINESStanley Woodward, Peterborough, England, as-
signor to Baker Perkins Limited, Peterborough,
EnglandApplication July 16, 1951, Serial No. 237,033
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10 Claims. (Cl. 38—143)

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It is customary to present sheets and the like materials (hereinafter called sheets) to the feed bands of multi-roll ironing machines by hand, and it normally requires two attendants to perform this operation, taking the sheet (separated by the shaker tumbler or similar device) previously laid out on a tray or trolley by two other attendants. The sheets are fed in succession to the ironer, and are tended throughout the time they are being fed into the ironer.

The aim of the present invention is to substitute for the manual feeding of sheets, a mechanical device or feeder which may be served by a single attendant who may be conveniently seated at the front of the machine. This attendant can deal with sheets as separated from the shaker tumbler without requiring their laying out, and consequently a substantial decrease in labour costs is effected, both in preparation work and in tending the ironer.

The invention also provides the further advantage that as soon as the attendant has positioned a sheet in the feeder, which requires little or no skill, the feeder takes charge of the sheet and the rest of the operation is automatic, reliable and accurate.

The invention consists in a sheet feeder comprising a pair (or pairs) of releasable clamps or clips, in which the corners of the selected leading edge of the sheet are engaged by the attendant, means for supporting the clips in the central zone of the front of the device and traversing them back and forth along divergent paths, to cause the said edge to be stretched or tautened as it travels forward over the feed bands of the ironing machine, a detector device operable by the taut or tautening edge when it is in a predetermined position, clip release means actuated by the detector to liberate the sheet and allow it to fall upon the feed bands, the arrangement being such that the return movement of the clips is terminated automatically at the starting position or a succeeding pair of clips may move into and automatically stop at the starting position.

The invention also comprises a sheet feeder having the features specified in the preceding paragraph and comprising a sheet straightener device operating to smooth out puckers or overlaps as the sheet is fed forward, which may consist of a rotary paddle, brush or like device located transversely beneath the path of the sheets.

Instead of or in addition to the transverse smooth paddle or like device, a pair of obliquely arranged rotary smoothing brushes may be pro-

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vided, each brush being disposed with its axis preferably parallel with a clip path and located such that the brushes overlap the sheet edges and operate on the adjacent marginal portions with a thrust having an outward component and one opposite to the direction of infeed.

It is preferred that the traversal path of the clip be afforded by an endless conveyor band or chain (hereinafter referred to as chain) disposed on terminal rolls or sprockets, the axes of which are located vertically, that the conveyor chains be driven by an electric motor and that the detection and clip release means be operated electrically.

The sheet feeder may be built as a unit on wheels to enable it to be moved into and out of service or moved from machine to machine as required.

In the accompanying drawings—

Figure 1 is a front elevation of a sheet feeding machine according to the invention.

Figure 2 is a corresponding plan.

Figure 3 is an end elevation of the machine.

Figure 4 is a detail view of a clip and mechanism for releasing the clip.

In carrying the invention into effect according to one mode, described by way of example as applied to feeding sheets to a "single lane" machine, a suitable framework 1 mounted on wheels 2 is provided to extend the full width of the ironing machine 3 such that it may be moved into position immediately in front of the feed band roll 4 of the ironer. On this frame 1 a pair of clip supporting endless conveyor chains 5 are mounted with the axes of the terminal sprockets 6 and 7 located vertically. The front terminal sprockets 6 of these conveyors are positioned one on either side of the operator or attendant's position at the front of the feed machine so that the clips 3 (described below) in their cyclic travel are conveniently accessible to the hands of the attendant when seated in front of the middle of the machine.

Each chain 5 is driven by one or other of its terminal sprockets, preferably the sprocket 6, through shafting and suitable gearing 10, 11 from an electric motor 12 which can be coupled (and uncoupled from) to the transmission means by any suitable electrically controlled clutch 13, such for example as is used in connection with the fractional motors on sewing machines. The shaft 9 is driven by the motor 12, through clutch 13, belt drive 14 and gear 15. The clutch 13 is actuated by a solenoid 16 through a bell-crank lever 17 pivoted on a bracket 18 carried by the

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motor casing. The clutch is put in by energising the solenoid 16 by any appropriate electric switch 19 operated by a push button or operating bar 20 arranged conveniently accessible to the attendant and upon the operation of the switch the electric motor 12 drives the shaft 9 so that the chains 5 may make one complete cycle, at the termination of which the clutch solenoid 16 is de-energised by a limit switch device 21 operated by a stop 22 on one of the chains or by a clip as it returns to the initial position. The second pair of terminal sprockets 7 are spaced apart transversely of the machine a distance greater than the largest sheet with which the machine is intended to deal. These second terminal sprockets 7 are also spaced from the sprockets 6 longitudinally of the machine so that the chains 5 occupy outwardly inclined positions when viewed in plan, thus affording paths divergent from the central zone which overlies the ironer feed bands.

Each chain 5 has a clip device 3 which is secured to it in any suitable manner such that it will project radially outwards when passing round the terminal sprockets. The clips 8 may be of any suitable character, but it is preferred to employ ones which are similar to those used on air ironing or drying machines. These clips comprise a pivotally mounted carrier 23 having a roller 24 adapted to cooperate with a bed or plate 25 such that the sheet may be readily introduced under the roller and when so placed is difficult to withdraw due to the wedging action of the carrier 23. The carriers 23 have extensions or arms 26 for convenience in mechanically operating them to release the sheet.

The initial or starting position is one in which the clips 8 in turning round the front sprockets 6 occupy a radial position facing the attendant who in order to introduce a sheet places one corner thereof in one of the clips and the other corner in the other clip, with the residue of the sheet lying loosely between the clips. When the clutch 13 is inserted by operation of the starting switch 19, the chains 5 carrying with them the clipped corners of the sheet proceed on the divergent outwards and forward paths. At a suitable point before the clips 8 reach the other terminal sprockets 7 of the chains, the clips are operated to release the sheet as will be hereinafter described. After release of the sheet it is deposited on the ironer feed bands 27 which carry it under the first roll 28 of the ironer and the clips 8 turn around the adjacent terminal sprockets 7 and return on the return lap of the chains to their initial position at which they and the chains are arrested by contact of the stop 22 on one of the chains with the switch 21 of known character which de-energises the solenoid 16 and opens the clutch.

The release opening of the clips 8 is governed by a sheet releasing device which comprises a light arm or lever 29 located in the central longitudinal plane of the machine, such that it extends over the maximum forward position at which the sheet is to be released. The arm or lever 29 is pivoted at the end towards the attendant and the lever is counterbalanced so that it normally occupies a horizontal position above the sheet edge as it is moved forward in the clips. The lever is counterbalanced such that it is sensitive to contact by the sheet edge when it rises in being drawn taut. The lever 29 is operatively connected to or associated with a micro-switch 30 which controls releasing mechanism for the

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clips 8, and as the sheet edge in becoming taut flicks up the lever, the switch is actuated to close a clip release circuit.

The clip releasing means suitably comprises a bar or rod 31 arranged parallel with the inward or operative lap of each chain 5 and just clear of the actuating lever or arm 26 of the clips, such that by slight movement towards the chain the arm 26 will be actuated and the roller 24 holding the corner of the sheet will be raised. The release bars or rods 31 are each mounted upon a spring biased lever 32 linked to the plunger of a solenoid 33 which is in circuit with the micro-switch 30. The bars or rods 31 are positioned and extend such that they are operative for a suitable range of sheet sizes.

As soon as the clips 8 are released with the leading edge of the sheet in a tautened condition, the sheet falls upon the ironer feed bands 27, the friction therewith being sufficient to draw the sheet forward under the first roll 28 of the ironing machine.

It will be appreciated that the edge of the sheet prior to the release of the clips 8 will be somewhat tensioned and there will be a tendency of the edge to shrink and pucker when released. In order to smooth out such puckering air blast means are provided adapted to provide air currents directed transversely of the sheet or feed bands of the ironer. The air currents are provided by pipes 34 connected to manifold 35 which is coupled to a source of compressed air. The pipes 34 are located above the ironer feed bands 27 and are perforated to provide downwardly and outwardly directed jets of air.

For straightening the trailing portion of the sheet, i. e. removing any puckers or overlaps which might occur whilst the sheet is being fed into the ironing machine, a paddle device or rotary frame 36 is located with its axis parallel with the axis of the front roll supporting the feed bands 27 of the ironer, and is driven by an independent motor 37 through gearing 38 and a belt drive 39. The paddles or bars 36a of the frame 36 in revolving, stroke the underside of the sheet which is being drawn forward over it by the ironer feed bands 27. The paddle rotates counter to the feed of the sheet. It is preferred to start the motor 37 for the paddle device by switch means through a finger or lever protruding between the feed bands 27 with which the sheet contacts as it falls onto the feed bands, so that the smoothing device or paddle comes into operation after the clips have been released and the sheet is in charge of the feed bands of the ironer.

As an alternative the paddle device may operate in a direction opposite to the feeding movement of the sheet for a predetermined short period and then have its direction of rotation reversed by the provision of a suitable changeover switch operated by band or automatically from a suitable part of the machine by which the motor 37 will be reversed.

In order to prevent the attendant putting in the clutch 13 and starting the feeding operation before the ironer has cleared the preceding sheet, a delay switch 40 may be provided through which the current to the solenoid 16 passes, which switch is held in the open position by the presence of the sheet being fed, and does not close until the sheet has passed the predetermined position of the switch on the ironer feed bands 27. For this purpose a roller 41 mounted on the end of a lever 42 rides on the fed sheet in a position over the space between a selected pair of ironer

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feed bands, such that when the sheet is not present the roller and lever will fall. The lever 42 actuates the switch plunger 43 such that when the lever is in the fallen or lower position the circuit to the solenoid 16 is completed, while when the lever is raised or held in the upper position by its roller riding upon a sheet, the circuit is open and clutch 13 cannot be put in, should the attendant prematurely operate the starting bar 20. As soon as the trailing edge of the sheet has passed under the roller 41 it will fall, permitting the switch 40 to close the circuit of the solenoid at this point and permit the attendant to actuate the bar 20 and cause another sheet to be fed to the ironer by the machine.

It will be appreciated that the motor 12 will be running all the time, such motor being controlled for example by a starting button which the attendant will operate at the commencement of the ironing period.

The switch 40 may be arranged to control the operation of the paddle device as well as the clutch solenoid by a suitable arrangement of the circuits.

For convenience in supplying sheets to the attendant in the seated or feeding position, an endless conveyor may be mounted appropriately to convey sheets deposited thereon, from some suitable point to the said feed position, for example the sheets may be supplied by the attendant whose duty it is to take the sheets from the shaker tumbler or similar device and disentangle and separate them. The sheets so separated may be placed on the conveyor one by one without any further preparatory work. As these sheets arrive on the conveyor at the feeder attendant's position, they are picked up and the selected corners placed in clips as described above. The sagging portion of each sheet between the clips may, if desired, be placed in a hopper, which is positioned in front of the attendant's knees, until it is drawn forward into the ironing machine.

Instead of a single pair of clips as described above each conveyor chain 5 may be provided with a pair or other suitable number of equally spaced clips so that each pair of clips will be operative in each half cycle or other division of the cycle.

The arm or lever 29 may be replaced by a light sensitive cell actuated when the edge of the sheet cuts a beam of light to operate a suitable relay for closing the clip release circuit.

For "double lane" ironers a pair of "single lane" machines as described above may be used abreast or a wheeled frame unit may be built with a pair of corresponding feed mechanisms, one for each lane, in which case an attendant would operate each feed lane or one attendant might serve each lane alternately.

I claim:

1. A machine for feeding sheets or like flat work to a laundry ironing machine having feed bands, comprising a framework, pairs of releasable clips adapted to engage the corners of the leading edge of the sheet, means carried by said framework for supporting the clips and traversing the clips of each pair along divergent paths to cause said edge of the sheet to be stretched as it travels forward over said feed bands, a detector device carried by said framework and operable by engagement therewith of the tautened edge of the sheet, clip release means mounted on said framework and actuated by the detector to liberate the sheet and allow it to fall upon said feed bands, means for returning the released clips

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to and automatically stopping them in the starting position.

2. A machine as claimed in claim 1, wherein the clip supporting means comprises a pair of endless chains, each chain being mounted on spaced terminal sprockets carried by the framework, said sprockets being revolvable about vertical axes, each of said chains having an operative lap, said laps travelling along said divergent paths, means for driving said chains and means for cutting out the drive when a pair of clips move into a starting position.

3. A machine as claimed in claim 1 wherein the clip supporting means comprises a pair of endless chains, each chain being mounted on spaced terminal sprockets carried by the framework, said sprockets being revolvable about vertical axes, each of said chains having an operative lap, said laps travelling along said divergent paths, means for driving said chains, means for cutting out the drive when a pair of clips moves into a starting position, said detector means comprising a pivoted switch controlling lever, and circuit breaking means controlled by said lever.

4. A machine as claimed in claim 1 wherein the clip supporting means comprises a pair of endless chains, each chain being mounted on spaced terminal sprockets carried by the framework, said sprockets being revolvable about vertical axes, each of said chains having an operative lap, said laps travelling along said divergent paths, means for driving said chains, means for cutting out the drive when a pair of clips moves into a starting position, said clip releasing means comprising pivotally mounted bars located adjacent the operative laps of said chains, electro-magnet means for pivoting said bar to clip releasing position, said detector means comprising a pivoted lever, and a switch in circuit with the electro-magnet means, said switch being actuated by said lever, said clips having arms actuable to open the clips by said bars.

5. A machine as claimed in claim 1, wherein the clip supporting means comprises a pair of endless chains, each chain being mounted on spaced terminal sprockets carried by the framework, said sprockets being revolvable about vertical axes, each of said chains having an operative lap travelling along said divergent paths, means for driving said chains comprising an electric motor, clutch means in transmissions between said motor and said chains, a solenoid for actuating said clutch, a manual actuable switch in circuit with the solenoid and a limit switch operable automatically to break the circuit and release the clutch when a pair of clips return to the starting position.

6. A machine as claimed in claim 5, wherein a control switch in the circuit of the solenoid is mounted in the path of a sheet, said control switch having an arm adapted to be lifted by a sheet to the open position, said arm dropping to close the switch when the trailing edge of a sheet moves past the arm.

7. A machine as claimed in claim 1, wherein the clip supporting means comprises a pair of endless chains, each chain being mounted on spaced terminal sprockets carried by the framework, said sprockets being revolvable about vertical axes, each of said chains having an operative lap, said laps travelling along said divergent paths, means for driving said chains, means for cutting out the drive when a pair of clips moves into a starting position, wherein said detector

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means comprises a photo-electric cell, and circuit breaking means controlled by said cell.

8. A machine as claimed in claim 1, wherein said framework is mounted upon wheels whereby the machine may be moved into position over the feed bands of the ironing machine.

9. A machine as claimed in claim 1, wherein the clip supporting means comprises a pair of endless chains, each chain being mounted on spaced terminal sprockets carried by the framework, said sprockets being revolvable about vertical axes, each of said chains having an operative lap, said laps travelling along said divergent paths, means for driving said chains, means for cutting out the drive when a pair of clips moves into a starting position, and air blast means located in the space between the diverging operative laps of the chains, said air blast means providing downwardly directed jets of air onto the sheet when released and supported by the oven bands said air blast means being supported from the framework.

10. A machine as claimed in claim 1, wherein the clip supporting means comprises a pair of

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endless chains, each chain being mounted on spaced terminal sprockets carried by the framework, said sprockets being revolvable about vertical axes, each of said chains having an operative lap, said laps travelling along said divergent paths, means for driving said chains, means for cutting out the drive when a pair of clips moves into a starting position, and rotary paddle means carried by said framework beneath the trailing part of the sheet for smoothing the sheet as it is fed forward by the clips.

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