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3,229,973

MACHINE FOR THE AUTOMATIC FOLDING OF LAUNDRY FLATWORK

Filed Feb. 5, 1964

4 Sheets-Sheet 1

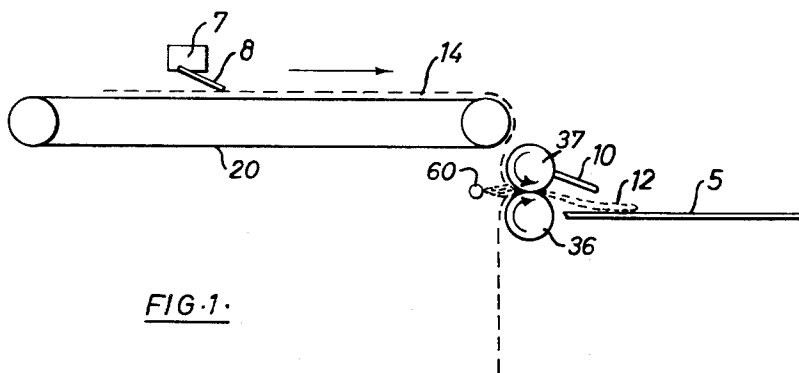


FIG. 1.

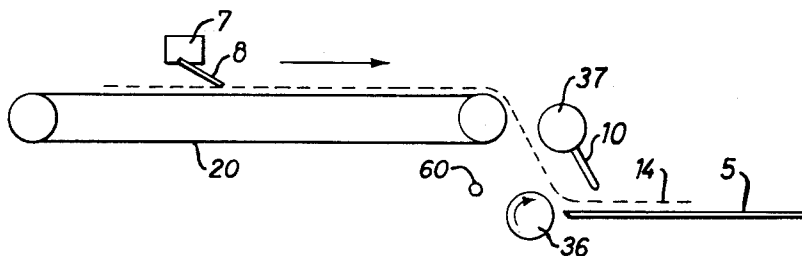


FIG. 2.

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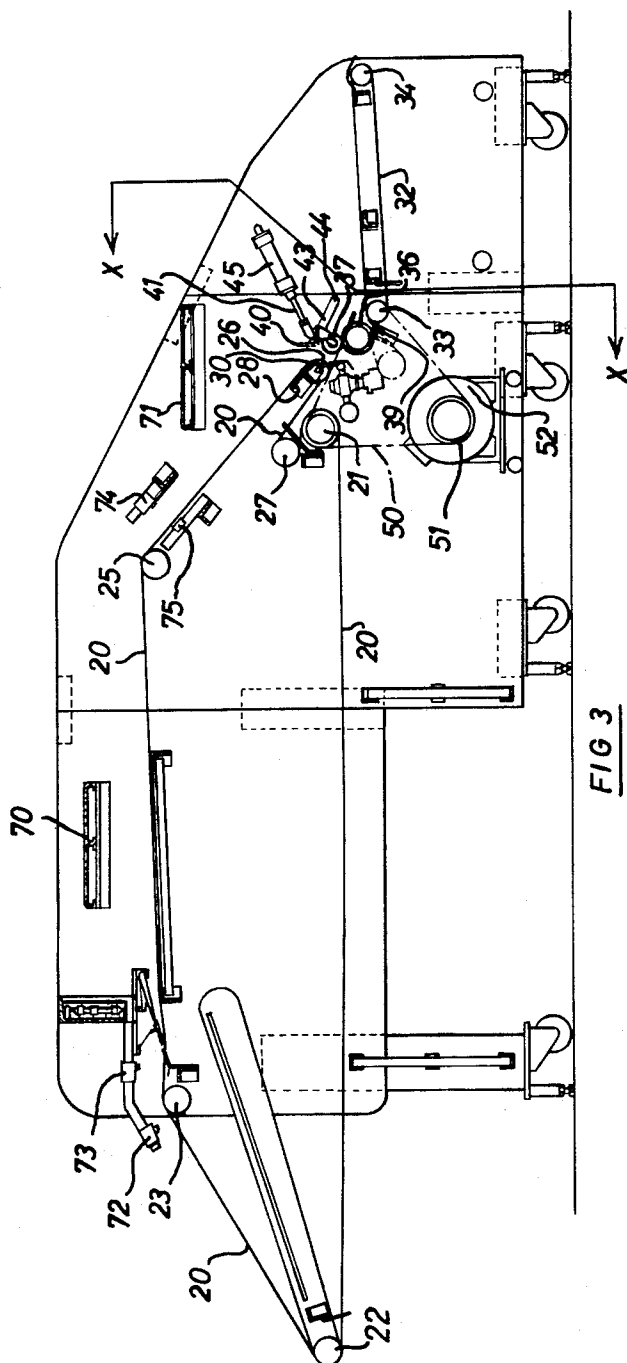
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4 Sheets-Sheet 2



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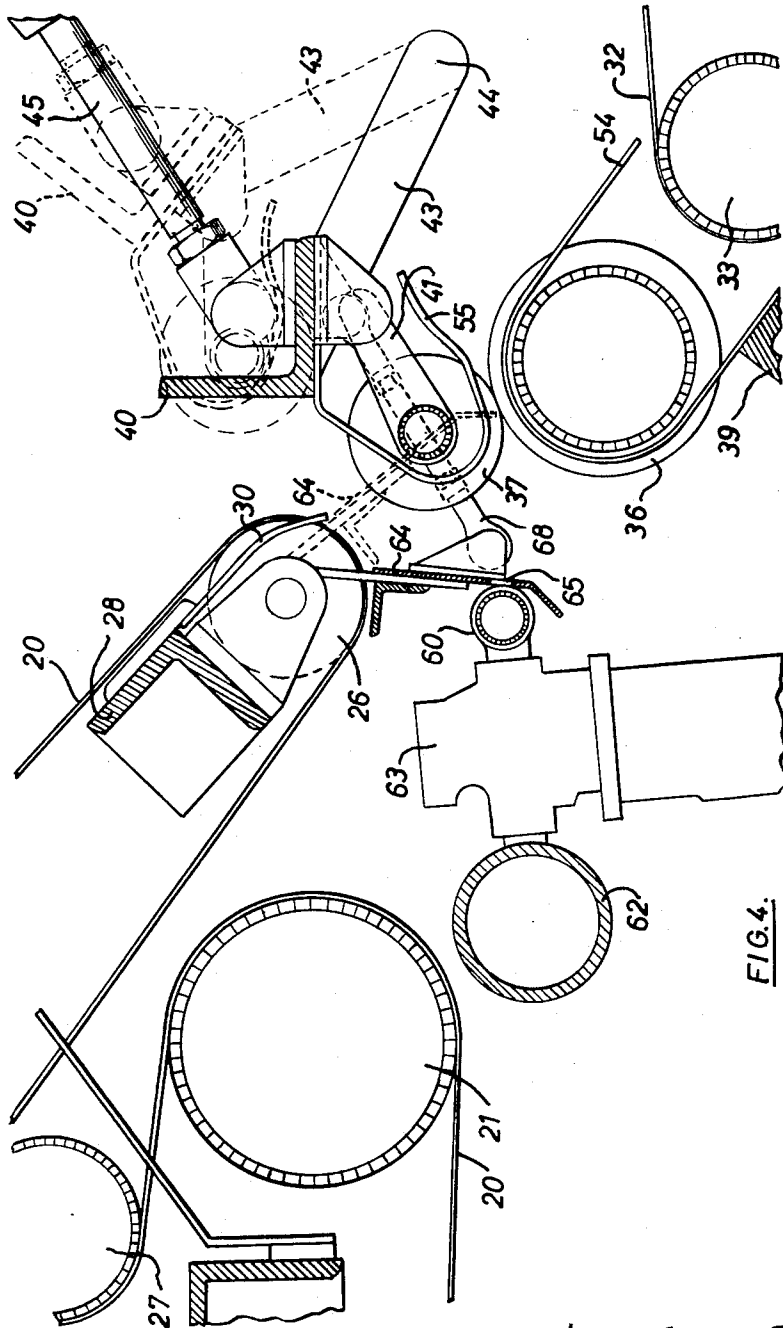
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MACHINE FOR THE AUTOMATIC FOLDING OF LAUNDRY FLATWORK

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4 Sheets-Sheet 3



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MACHINE FOR THE AUTOMATIC FOLDING OF LAUNDRY FLATWORK

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4 Sheets-Sheet 4

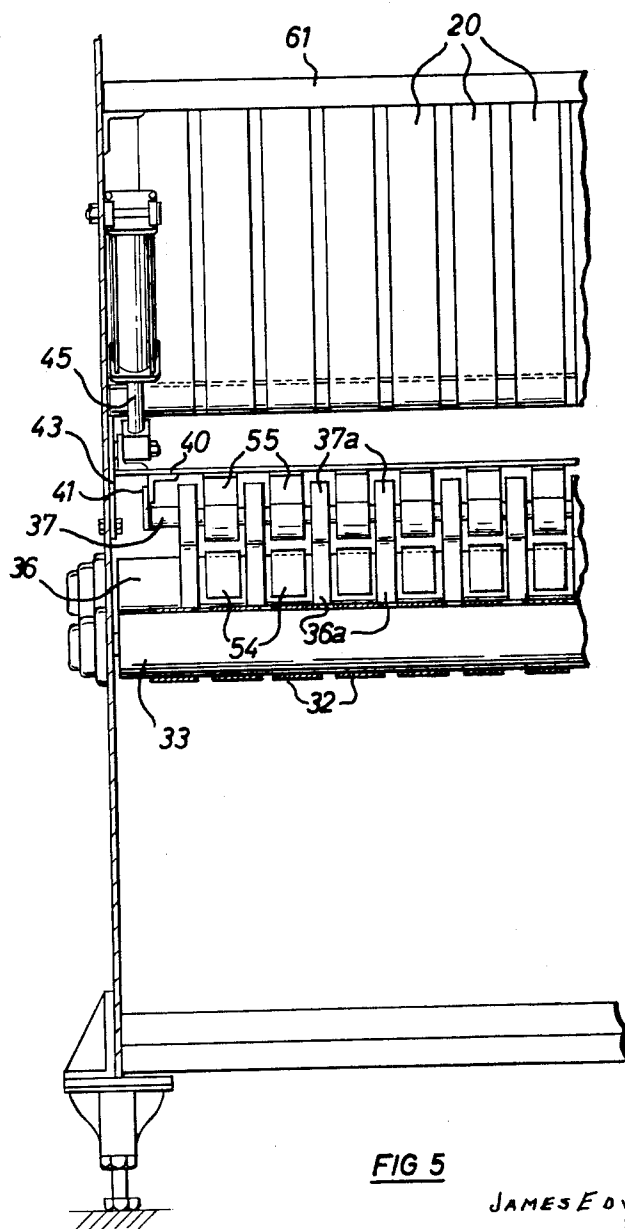


FIG 5

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3,229,973

MACHINES FOR THE AUTOMATIC FOLDING OF LAUNDRY FLATWORK

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6,169/63

7 Claims. (Cl. 270—69)

The present invention relates to machines for the automatic folding of laundry flatwork of the type in which, by means of a folder blade or a series of air jets, a bend of a workpiece intermediate the ends thereof is directed into the bight between two pressure members of a fold station. The pressure members may comprise for example two fold rollers or two fold conveyors between which the said bend is folded. Such machines may comprise a number of such fold stations and means for automatically actuating the fold blade or for automatically supplying air to air jet orifices when the place on the workpiece at which the fold is to be made comes into appropriate juxtaposition with the pressure members of each fold station.

In many laundry installations an automatic folding machine is arranged in series with an ironing machine with the result that all articles fed into the ironing machine have also to pass through the folding machine. In certain circumstances it may be desirable or necessary to omit the folding operation or to omit one of the folding operations of which a given machine is capable. For example short articles may need to be folded once but not twice. Other articles by virtue of their nature may require to be ironed but not folded at all and certain articles which require to be ironed might, by virtue of their texture or thickness be incapable of being folded in the folding machine and might give rise to damage or jamming of the folding machine if this were attempted.

One method of omitting the folding operation has been to divert the workpiece completely clear of the fold station of the folding machine. This tends to give rise to mechanical complication. Another method has been to use air jets to direct the leading edge of the workpiece into the bight between the pressure members at the fold station but this involves the provision of timing mechanism for this purpose unless the air jets are left on continuously, resulting in wastage of compressed air.

The object of the present invention is to provide a folding machine which can be readily adjusted so as to allow articles to pass through a fold station thereof without being folded.

According to the present invention a machine for the automatic folding of laundry flatwork comprises at least one fold station embodying two pressure members presenting a bight therebetween and adapted to receive workpieces therebetween and to propel them therethrough, means for feeding said workpieces to said fold station, said fold station being disposed so as to provide a normal workpiece path which passes adjacent to and beyond the bight between said pressure members, and means actuated in dependence on the progress of workpieces beyond the bight between said pressure members for forming a bend in a workpiece intermediate the ends thereof and for directing the bend into the bight between said pressure members and transfer means movable from the normal position clear of said workpiece path to a position in which it obstructs said path and directs the leading end of a workpiece into the bight between said pressure members to avoid folding thereof at said fold station.

The said transfer means may comprise a pivoted transfer plate and it may be movable independently of the progress of workpieces relatively to the fold station.

The invention is further described by way of example with reference to the accompanying drawings in which:

FIG. 1 is a diagrammatic illustration of a folding machine or part of a folding machine incorporating a pair of fold rollers according to the invention in their normal position for folding;

FIG. 2 is a view similar to FIG. 1 but illustrating the fold rollers spaced apart;

FIG. 3 is an outline view of a folding machine in side elevation;

FIG. 4 is a fragmentary view to a larger scale of a portion of FIG. 3; and

FIG. 5 is an outline view of a portion of the machine illustrated in FIG. 3 looking from the line X—X of FIG. 3.

The machine illustrated in FIGS. 1 and 2 comprises a fold conveyor 20, a pair of fold rollers 36, 37, of which roller 36 is driven and roller 37 is an idler, an air jet pipe 60 and a delivery table 5. A measuring and timing device 7 with feeler finger 8 measures the length of the workpiece and supplies pressure to the air jet pipe 60 when the locality of the workpiece at which it is to be folded comes opposite to the fold rollers 36, 37.

The idler roller 37 is mounted between a pair of arms 10 which are pivoted at their right-hand end to enable the idler roller 37 to be raised from the position shown in FIG. 1 to that shown in FIG. 2.

FIG. 1 illustrates the normal operation of the machine when a portion 12 of the workpiece 14 has been forced by air jets from pipe 4 into the nip between the fold rollers 36, 37.

FIG. 2 illustrates the alternative mode of operation in which the idler fold roller 37 has been moved away from the driven fold roller 36 to allow the leading end of the workpiece 14 to fall onto the driven roller 36 and to pass between the fold rollers 36, 37 to the delivery table 5 which is provided with conveyor tapes to draw the workpiece to the right.

The feed conveyor of the machine illustrated in FIGS. 3 to 5 comprises a plurality of parallel conveyor tapes 20 driven by a conveyor drive roll 21. The conveyor tapes 20 pass over an idler roll 22, a non-rotatable guide bar 23, and idler rolls 25, 26, 27. The idler roll 26 comprises a plurality of idler pulleys, one for each conveyor tape 20, arranged side by side on a shaft supported by brackets provided on an angle bar 28. Between each two adjacent conveyor tapes 20 there is a guide finger 30 supported from the angle bar 28. A delivery conveyor 32 passes over rolls 33, 34.

Fold rollers 36 and 37 are arranged between the main conveyor and the delivery conveyor 32. Fold roller 36, which is driven, is supported from an angle bar 39. Fold roller 37, which is an idler, is disposed above roller 36 and is supported from an angle bar 40 by links 41 which are capable of a limited degree of angular movement relative to the angle bar 40. Angle bar 40 is supported by arms 43 which are pivoted about a pivotal axis 44 and can be raised by pneumatically operated piston rods 45 to a position shown in broken lines in FIG. 4 to withdraw the idler fold roller 37 upwardly away from the driven fold roller 36. There are two piston rods 45, one at each end of angle bar 40 (FIG. 5).

Rolls 21, 33 and roller 36 have chain sprockets secured thereto through which they are driven by a chain 50 which is driven by a sprocket 51 secured to the shaft of an electric motor 52.

The driven fold roller 36 comprises a number of spaced rubber-sheathed pulleys 36a (FIG. 5) and the idler fold

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roller 37 comprises a number of spaced rubber-sheathed pulleys 37a. A plurality of guide fingers 54 are supported by the angle bar 39 and a plurality of guide fingers 55 are supported by the angle bar 40. There is one guide finger 54 between each two adjacent pulleys 36a and one 5 guide finger 55 between each two adjacent pulleys 37a. The guide fingers 54, 55 serve to guide folded material away from the fold rollers 36, 37.

An air jet pipe 60 has a series of jet orifices directed towards the bight between the fold rollers 36, 37. Air 10 is supplied to the jet pipe 60 from an air duct 62 under the control of a valve 63. During normal operation of the machine a workpiece passes downwardly between the jet pipe 60 and the bight between the fold rollers 36, 37 and is forced into the bight between the fold rollers when the locality thereof to be folded comes opposite to the jet pipe 60.

A transfer plate 64 is mounted for angular displacement about the axis of rotation of the idler roll 26 and its normal position is shown in full lines in FIG. 4. The transfer plate 64 has a series of openings 65 therein aligned with the jet openings in the jet pipe 60 so that during normal operation of the machine the air jets from the pipe 60 are directed through the openings 65 in the transfer plate 64 to the bight between the fold rollers 36, 37. The transfer plate is connected by links 68 (shown in FIG. 4 but not in FIG. 3) to the angle bar 40 so that when the fold roller 37 is raised the transfer plate 64 is also raised to the position shown in broken lines in FIG. 4 and serves, when the fold roller 37 is raised, to obstruct the normal path of a workpiece leaving the conveyor 20 and to prevent it from passing the fold rollers 36, 37 but rather to guide it from the feed conveyor to the lower fold roller 36.

The drawings illustrate various items whose use or functions are well understood by those skilled in the folding machine art and which thus do not require particular description herein. For example, the drawings illustrate catwalks 70, 71, photo-electric cells 72, 73, each incorporating a light source, and a photo-electric cell 74 and light source 75.

I claim:

1. In a machine for the automatic folding of laundry flatwork, at least one fold station comprising two pressure members disposed one above the other presenting a bight therebetween to receive workpieces, means for feeding workpieces to said fold station, said fold station being disposed so as to provide a normal workpiece path which passes downwardly from said feeding means towards and beyond said bight, means located below said feeding means and actuated in dependence upon the progress of the workpieces beyond said bight for forming a bend in a workpiece intermediate of the ends thereof and for directing the bend into said bight, and transfer means movable from a normal position clear of said normal workpiece path to an obstructing position in which it substantially bridges the gap between said feeding means and the lower of said pressure members whereby to cause the leading end of a workpiece to pass first over said transfer means and then over the lower of said pressure members to avoid folding thereof at said fold station.

2. A machine according to claim 1 comprising transfer means in the form of a pivoted transfer plate.

3. In a machine for the automatic folding of laundry flatwork, at least one fold station comprising two pressure members disposed one above the other presenting a bight therebetween to receive workpieces, mounting means for said pressure members enabling at least one of them to be moved away from the other to a position spaced therefrom, means for feeding workpieces to said fold station, said fold station being disposed so as to provide a normal workpiece path which passes downwardly from said feeding means towards and beyond said bight, means located below said feeding means and actuated in dependence upon the progress of the workpieces beyond 75

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said bight for forming a bend in a workpiece intermediate of the ends thereof and for directing the bend into said bight, and transfer means movable from a normal position clear of said normal workpiece path to an obstructing position in which it substantially bridges the gap between said feeding means and the lower of said pressure members whereby to cause the leading end of a workpiece to pass first over said transfer means and then over the lower of said pressure members to avoid folding thereof at said fold station.

4. A machine according to claim 3 comprising means for moving said one pressure member away from the other simultaneously with the movement of said transfer means into said obstructing position.

5. A machine according to claim 3 comprising common means for moving said one pressure member away from the other and for moving said transfer means into said obstructing position.

6. In a machine for the automatic folding of laundry flatwork at least one fold station comprising two pressure members disposed one above the other presenting a bight therebetween to receive workpieces, means for feeding workpieces to said fold station, said fold station being disposed so as to provide a normal workpiece path which passes downwardly from said feeding means towards and beyond said bight, a jet pipe located below said feeding means and having a series of orifices directed towards said bight, and a transfer plate movable from a normal position clear of said workpiece path to an obstructing position in which it substantially bridges the gap between said feeding means and the lower of said pressure members whereby to cause the leading end of a workpiece to pass first over said transfer means and then over the lower of said pressure members to avoid folding thereof at said fold station, said transfer plate having a series of openings therein which when the transfer plate is in its normal position are aligned with said orifices in the jet pipe.

7. In a machine for the automatic folding of laundry flatwork, at least one fold station comprising two fold rollers disposed one above the other and presenting a bight therebetween to receive workpieces, mounting means for said fold rollers enabling at least one of them to be moved away from the other to a position spaced therefrom, means for feeding workpieces to said fold station, said fold station being disposed so as to provide a normal workpiece path which passes downwardly from said feeding means and beyond said bight, a jet pipe located below said feeding means and having a series of orifices directed towards said bight, a transfer plate movable from a normal position clear of said normal workpiece path to an obstructing position in which it substantially bridges the gap between said feeding means and the lower of said fold rollers whereby to cause the leading end of a workpiece to pass first over said transfer plate and then over the lower of said fold rollers to avoid folding thereof at said fold station, said transfer plate having a series of openings therein which when the transfer plate is in its normal position are aligned with said orifices in the jet pipe, and common means for moving said one fold roller away from the other and for moving said transfer plate into said obstructing position.

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