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CONTROLLING DEVICES FOR LAUNDRY MACHINES

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2 Sheets-Sheet 1

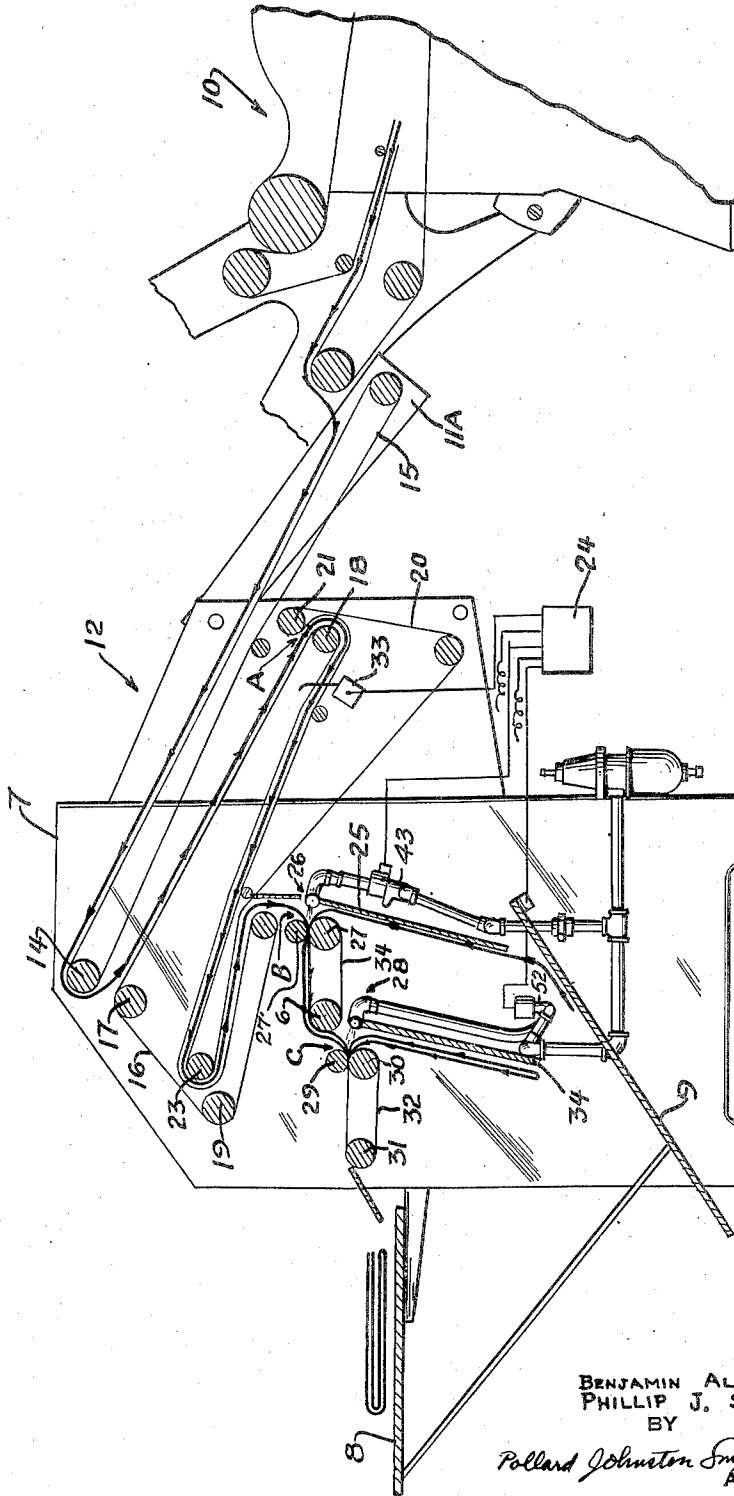


Fig. 1.

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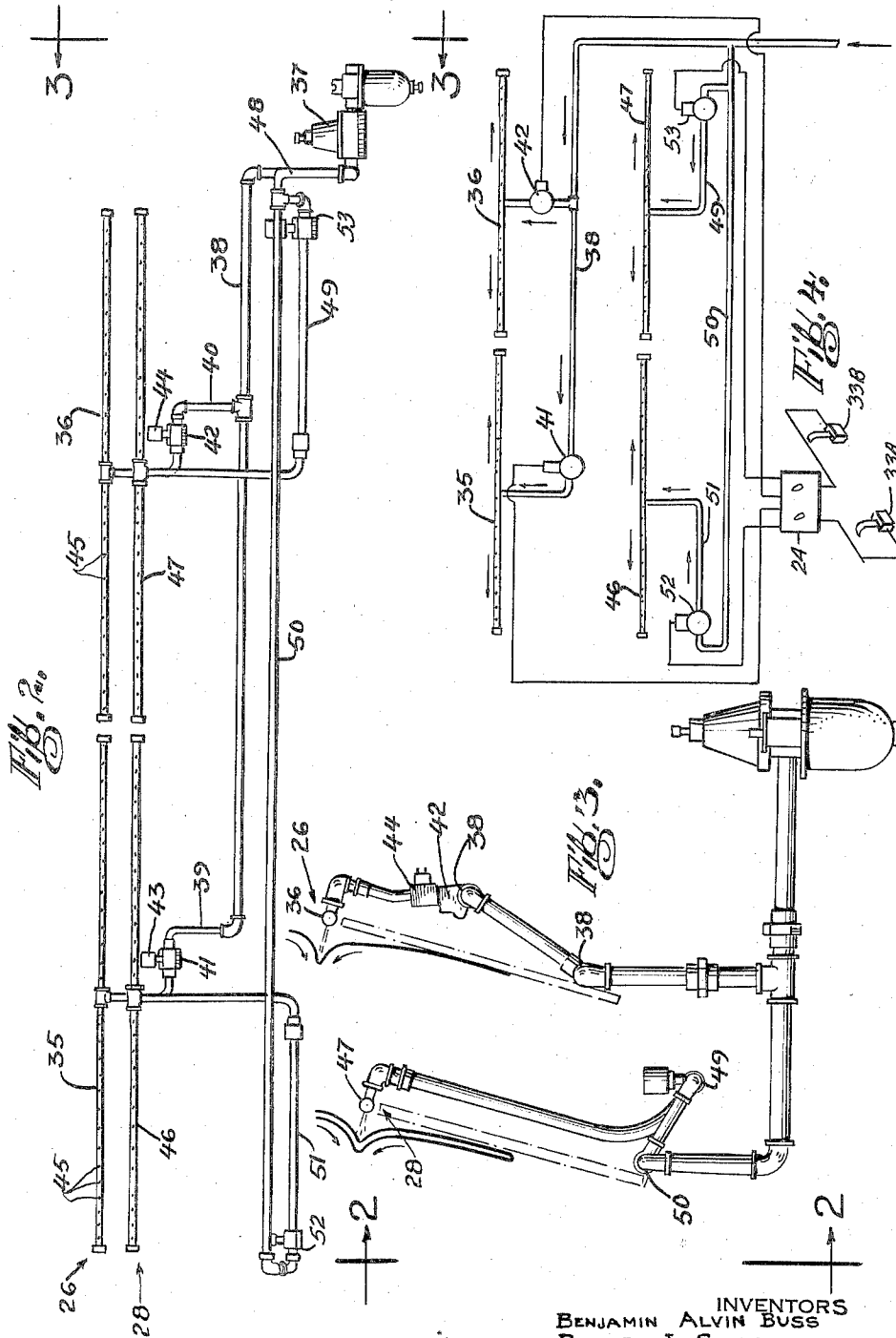
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CONTROLLING DEVICES FOR LAUNDRY MACHINES

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3 Claims. (Cl. 270—69)

This invention relates to folding machines, and particularly to a machine for folding articles such as bed sheets and the like in predetermined patterns.

In the folding of articles such as bed sheets, folds must be made in various patterns, for example, in half or in quarters. The sheet is carried through the folding machine past measuring and timer means arranged to measure each sheet and actuate folding mechanism at the correct times, the folding mechanisms causing a portion of the sheet, intermediate the ends thereof, to move in a direction so as to be engaged between a pair of rolls for the purpose of making the desired fold, the rolls drawing the sheet therebetween. It has been common practice in the past to employ mechanically operated reciprocating blade means actuated by a solenoid or electric motor, the blade means contacting the sheet as it passes and moving a portion thereof into gripping relationship with the folding rolls. Mechanical operation has not been completely satisfactory for many reasons, for example, inertia of the moving parts of the blades. The use of air for folding machines has presented numerous problems in obtaining a uniform folding operation.

One of the objects of the present invention is to provide an improved pneumatically operated arrangement for folding bed sheets and the like.

In one aspect of the invention, the sheets are fed onto conventional conveyor means or belts which can be in the form of a plurality of parallel ribbons passing around spaced rollers. Suitable measuring and timing devices, such as disclosed in U. S. Patent No. 2,652,246, can be provided for selecting and setting timing means and activating folding mechanisms in accordance with the length of each sheet to be folded. The sheets are carried by the conveyor means and directed downwardly at a first fold station in front of pneumatic blast folding means, the blast means being arranged to be activated by the timing means to provide at the proper time a properly directed jet of air across the sheet to force a linear portion toward a pair of rollers which engage the sheet and draw it therebetween to make a fold therein. The folded sheet then can be carried downwardly in front of a second pneumatic blast apparatus where a second blast can be activated at a predetermined time if a second fold is to be made. It has been found that the blast or air pipe means must be arranged so that the sheet is gripped evenly along its width by the folding rollers. In a preferred aspect, this can be accomplished by utilization of a plurality of air blast pipes across the line of fold and adjacent the rolls for feeding air into each pipe at a point intermediate its ends, preferably near the center. Air valve means can be located near the point of entry of air into each blast tube and the valves selectively operated by the measuring and timer control organization to produce the desired results. Also, arrangements can be made so that several measuring fingers can be used to activate the several air blast pipes in accordance with the width of the sheet to be folded. The apertures in the pipe must be

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arranged so that the correct air pressure exists and so that the blast issuing therefrom directs the sheet evenly toward the folding rollers.

These and other objects, advantages and features of the invention will become apparent from the following description and drawings, which are merely exemplary.

In the drawings:

Fig. 1 is a side schematic view, partially in section;

Fig. 2 is a front view of the piping arrangement of

Fig. 1 looking in the direction 2—2 of Fig. 3;

Fig. 3 is a view looking in the direction 3—3 of Fig. 2;

Fig. 4 is a schematic piping diagram.

The invention will be described in conjunction with a machine for folding articles such as bed sheets and the like.

The end of a conventional ironing machine is illustrated generally at 10, said machine feeding bed sheets along the path indicated by line 11 to the folding machine illustrated generally at 12, the folding machine having side frame means 7 supporting the various parts including receiving table 8 and bottom shelf 9. Roll 13 may be carried on arm means 11A. Roll 14 can be mounted on frame means 7, rolls 13 and 14 carrying a plurality of parallel ribbons illustrated at 15, at least one of said rolls being suitably driven so as to cause a sheet delivered thereto to be carried up over roller 14 and onto conveyor ribbon means 16. Ribbons 16 are carried by rollers 17, 18 and 19, at least one of these rollers being driven in timed relation to conveyor ribbon means 15. Ribbon means 20 can be carried by rollers 21, 22, 23 and 24, said ribbon means cooperating with ribbon means 16 so as to engage a sheet delivered therebetween at A and carry it past measuring finger means 33, said finger being similar to the arrangement described in said Patent No. 2,652,246 or Patent No. 2,774,592. Ribbon means 16 and 20 cooperate to deliver the sheet to be folded in a vertical or downward direction at B, protector shield or support 25 suitably guiding the bottom part of the sheet as it moves downwardly. At an appropriate time, as governed by the measuring finger and associated selecting and timing mechanism 24, air is fed from air blast pipe means 26 so as to cause portions of the sheet opposite thereto to move sidewise into gripping relationship with rollers 27' and 27, said rollers being suitably spaced and driven so as to engage the sheet and draw it inwardly from both directions to fold the same.

The sheet is moved by ribbon means 34 carried by rollers 27 and 6, the sheet again descending at C in front of the second fold air blast or jet means 28. A second protector shield 34 can be provided to guide the lower part of the sheet. If a second fold is to be made, a blast of air from blast means 28 will be furnished at a predetermined time as governed by the measuring and timing means, the sheet being moved sidewise so that rollers 29 and 30 will grip the sheet and place a second fold therein. The sheet is delivered to conveyor means 32 carried by rollers 30 and 31, such delivering the folded sheet to table 8. The ribbons and rolls are suitably spaced relative to each other to grip the sheet properly, the spacing in Fig. 1 being for a schematic showing to facilitate explanation.

In a preferred form, each air blast means can comprise groups of two air blast pipes or tube means extending horizontally along the line between the rollers, air being fed to the center of each portion or pipe so as to distribute the air in each pipe to the perforations therein. The perforations are located along the pipe suitably spaced and sized so as to deliver the desired jet. As an example, in a machine of 120" width, the apertures may be 1" apart and about 1/16" diameter, a pressure of 15 to 85 p. s. i. being employed. The second fold air blast pipes

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46 and 47 (Figs. 2 and 4) are fed from manifold 48 by means of branches 49, 50 and 51, valves 52, 53 being provided.

The timing and air valve mechanism may be operated by a selector arrangement as described in said Patent No. 2,652,246, or may have two speed motors in the subtimers as described in Patent No. 2,774,592. Measuring fingers 33A, 33B (Fig. 4) can be provided on either side of the machine arranged to activate individual timing and air blast activating mechanisms for the pipes on one side of the machine or the other side of the machine depending upon which side the sheet is placed to pass through the machine, such being useful when narrow work is to be folded. Alternatively, when wide work is to be folded, i. e. work wider than one-half of the machine, the control 24 (Figs. 1 and 4) may be switched so that either measuring finger can operate both folding mechanisms simultaneously.

It is to be understood that details of construction can be varied without departing from the spirit of the invention except as defined in the appended claims.

What is claimed is:

1. In a flexible sheet folding machine, the combination comprising a first pair of fold producing means, a plurality of air blast pipes horizontally arranged relative to said first roller means, means feeding a sheet to be folded in a substantially vertical path between said air blast pipes and said roller means, a second pair of fold producing roller means, a plurality of air blast pipes horizontally arranged relative to said second roller means, means for conveying a folded sheet from said first roller means in a substantially vertical path between said second roller means and said second air blast pipes, air valve means for selectively and sequentially when activated feeding air to said air blast pipes in a predetermined relation to the length of a sheet to be folded so as to fold said sheet in a desired pattern, means feeding air to each of said air blast pipes intermediate the ends thereof, measuring fingers horizontally spaced and positioned across the path of a sheet to be folded for operating the corresponding pipes of each of said group of pipes, and timer means activated by said measuring fingers for activating said valve means for feeding air to the pipes corresponding to the position of the respective measuring fingers.

2. In a flexible sheet folding machine, the combination comprising a first pair of fold producing roll means, a first group of a plurality of air blast pipes horizontally arranged relative to said first roll means and extending thereacross, means feeding a sheet to be folded in a sub-

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stantially vertical path between said air blast pipes and said roller means, a second pair of fold producing roll means, a second group of a plurality of air blast pipes horizontally arranged relative to said second roll means and extending thereacross, means for conveying a folded sheet from said first roller means in a substantially vertical path between said second roll means and said second air blast pipes, means connecting an air supply to each of said pipes, air valve means for admitting air to each of said pipes when actuated, measuring fingers horizontally spaced and positioned across the path of a sheet to be folded for operating the corresponding pipes of each of said groups of pipes, timer means activated by said measuring fingers for activating said valve means for feeding air to the pipes corresponding to the position of the respective measuring fingers.

3. In a flexible sheet folding machine, the combination comprising a first pair of fold producing roll means, a first group of a plurality of air blast pipes horizontally arranged relative to said first roll means and extending thereacross, means feeding a sheet to be folded in a substantially vertical path between said air blast pipes and said roller means, a second pair of fold producing roll means, a second group of a plurality of air blast pipes horizontally arranged relative to said second roll means and extending thereacross, means for conveying a folded sheet from said first roller means in a substantially vertical path between said second roll means and said second air blast pipes, means connecting an air supply to each of said pipes, air valve means for admitting air to each of said pipes when activated, measuring fingers horizontally spaced and positioned across the path of a sheet to be folded for operating the corresponding pipes of each of said groups of pipes, timer means activated by said measuring fingers for activating said valve means for feeding air to the pipes corresponding to the position of the respective measuring fingers, and switching mechanism for selectively controlling said valve means from said measuring fingers.

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