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Armstrong, Jr.

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[54] **TRANSFER PRINTING MACHINE**

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[73] Assignee: **Alamance Industries, Inc.**, Burlington, N.C.

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[52] **U.S. Cl.** ..... **68/5 D**, 8/2.5, 34/73, 101/470, 112/147, 117/3.2, 118/32, 156/238

[51] **Int. Cl.** **D06p 7/00**, B41m 5/26

[58] **Field of Search** ..... 8/2.5; 156/230, 231, 240, 156/238, 285, 286; 68/5 D; 118/32; 112/147; 117/3.2; 34/73; 101/470

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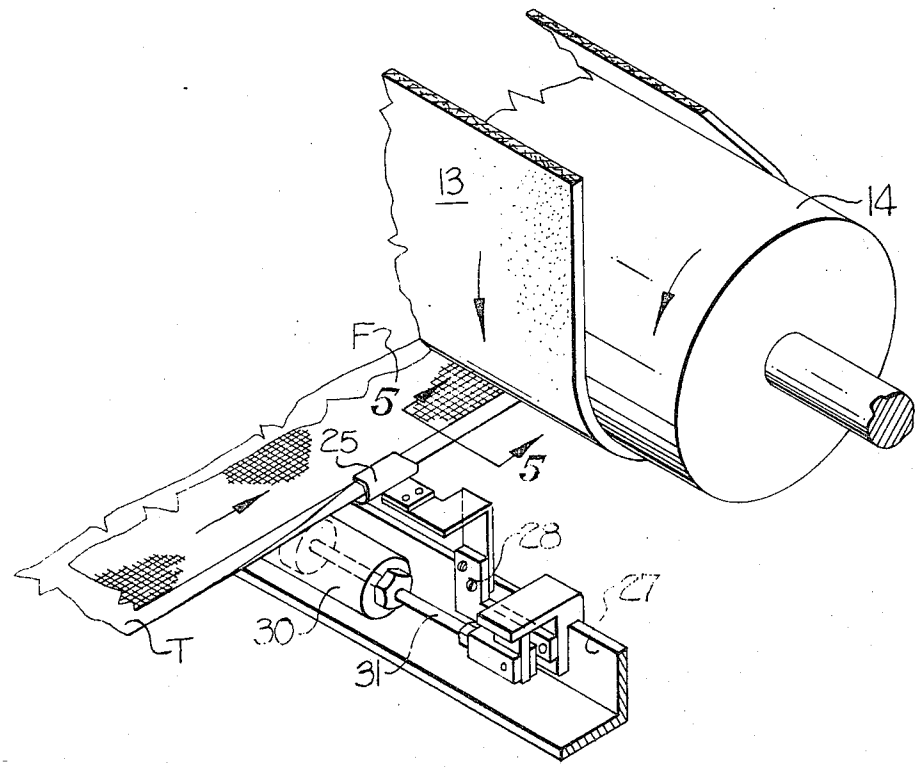
Primary Examiner—Clyde I. Coughenour

Attorney, Agent, or Firm—Parrott, Bell, Seltzer, Park & Gibson

[57] **ABSTRACT**

Folding devices are provided at opposite edge portions of the transfer paper as it approaches the blanket and transfer roll and in facing relationship with the fabric on which the heat transferable indicia is to be printed. The folding devices prevent the transfer of indicia to the blanket from the portions of the transfer paper which normally extend outwardly beyond the width of the fabric. The outer edges of the transfer paper are folded inwardly a sufficient distance that the heat transferable indicia along the outer edges will not be transferred to the blanket but will be transferred to the back of the fabric or to the opposite edge portions on the face side of the transfer paper.

6 Claims, 7 Drawing Figures



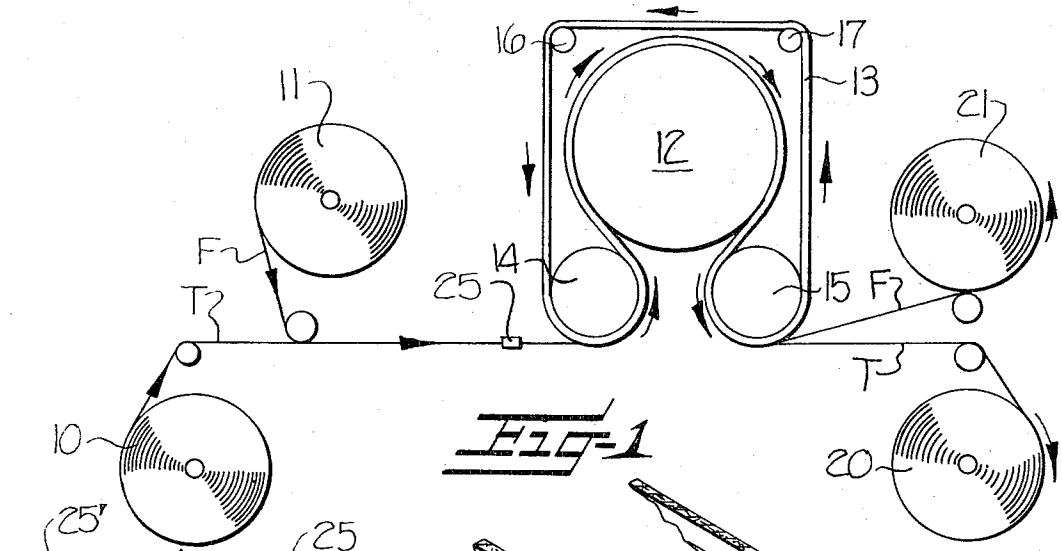


Fig-1

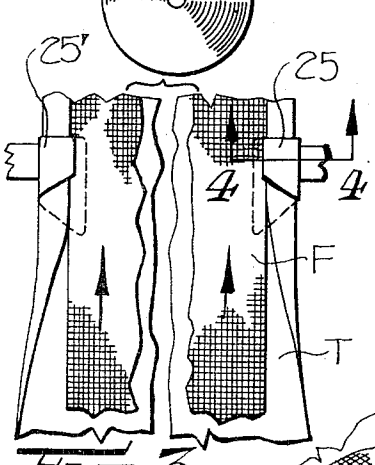


Fig-3

Fig-2

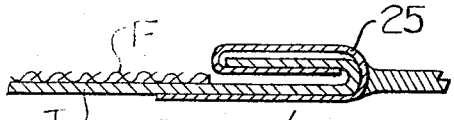


Fig-4

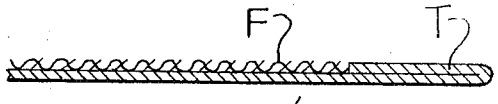


Fig-5

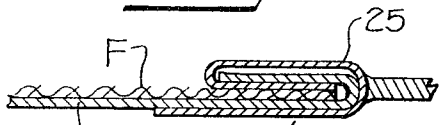


Fig-6

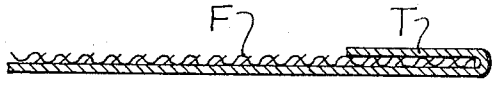


Fig-7

TRANSFER PRINTING MACHINE

This invention relates generally to transfer printing machines of the type wherein indicia is transferred from a transfer paper to a textile fabric as they pass through the machine in face-to-face relationship and between an endless blanket and a heated transfer roll. More particularly, the present invention relates to a means for preventing the transfer of indicia to the endless blanket from the portions of the paper which normally extend outwardly beyond the width of the fabric.

In the conventional transfer printing machine, the transfer paper is wider than the fabric to be printed and they pass between a rotating heated transfer roll and an endless blanket with the face side of the fabric and the indicia bearing side of the transfer paper in facing relationship so that the heat transferable indicia is transferred from the paper to the fabric and normally the indicia on the paper extending outwardly beyond the fabric is transferred to the blanket. This causes a buildup of transferred printing material on the blanket so that it is necessary to occassionally stop the machine and clean or replace the blanket.

In an attempt to overcome this problem, it has been proposed that relatively narrow strips of backing paper be fed to the machine with the transfer paper and the fabric so that the indicia at opposite sides of the transfer paper will be transferred to this narrow strip of paper and will not be transferred to the blanket. This method of preventing the transfer of the indicia to the blanket involves the use of additional strips of paper at each side of the fabric and this paper is wasted, thereby increasing the cost of the printing operation. It has also been proposed that a full width of paper be fed across and extend outwardly beyond the opposite side edges of the back side of the fabric to prevent the transfer of indicia to the blanket from opposite side edges of the transfer paper. The feeding of an extra width of paper extending across the full width and beyond the fabric further increases the cost of printing operation.

Also, where a backing paper is used, either in strip or full width size, there is a danger that the backing paper will be wrinkled as it is fed through the machine. If the backing paper is wrinkled, it will present an uneven surface and cause wrinkles in the fabric so that the print will not be evenly applied to the fabric.

With the foregoing in mind, it is an object of the present invention to provide means for preventing the transfer of indicia to the endless blanket from the portions of the transfer paper normally extending outwardly beyond the width of the fabric and eliminate the need for feeding backing paper to the machine.

In accordance with the present invention, folding devices are positioned at opposite edges of the transfer paper and in advance of the transfer roll for folding the opposite side edges of the transfer paper inwardly a sufficient distance that the heat transferable indicia along the outer edges will not be transferred to the endless blanket but will either be transferred to opposite side edge portions of the face side of the transfer paper or to the back side and along opposite edge portions of the fabric. The folding devices are supported for adjustment inwardly and outwardly relative to the width of the fabric so that the transfer paper may be either folded over upon itself a sufficient distance that the free edges thereof correspond with the width of the fabric or the opposite edge portions of the transfer paper may be folded inwardly and over and upon the back side of the fabric a sufficient distance that the fold line of the transfer paper corresponds with the width of the fabric. In the latter case, the indicia will be transferred to the entire face side width of the fabric and will also be transferred to a relatively narrow width along opposite side edges of the back side of the fabric.

Other objects and advantages of the invention will appear as the description proceeds, when taken in connection with the accompanying drawings, in which

FIG. 1 is a schematic longitudinal vertical sectional view through the transfer printing machine and illustrating the manner in which the fabric and transfer paper pass through the machine in facing relationship to each other and between the printing blanket and the transfer roll;

FIG. 2 is an enlarged fragmentary isometric view looking at one side edge portion of the machine and illustrating the folding device of the present invention in operation;

FIG. 3 is a fragmentary plan view, with the central portion broken away, illustrating the manner in which the folding devices operate to fold both side edge portions of the transfer paper inwardly to prevent the transfer of indicia to the endless blanket from the opposite side portions of the transfer paper;

FIG. 4 is an enlarged vertical sectional view taken substantially along the line 4—4 in FIG. 3 and illustrating one side of the transfer paper being folded over upon itself;

FIG. 5 is a sectional view being taken along the line 5—5 in FIG. 2 and illustrating the relationship of the folded transfer paper to the fabric as they pass between the blanket and the transfer roll;

FIG. 6 is a view similar to FIG. 4 but showing one side of the transfer paper being folded over onto the back side of the fabric; and

FIG. 7 is a view similar to FIG. 5 but illustrating the relationship of the folded transfer paper to the fabric when the transfer paper is folded over onto the back edge portion of the fabric.

The transfer printing machine schematically illustrated in FIG. 1, includes a transfer paper supply roll 10, a fabric supply roll 11, a heated transfer roll 12, an endless printing blanket 13 supported on guide rollers 14, 15, 16 and 17 for engagement with at least a portion of the peripheral surface of the transfer roll 12. The machine also includes a transfer paper take-up roll 20 and a fabric take-up roll 21. The transfer paper, indicated at T, is withdrawn from the supply roll 10 with its face or indicia bearing side upwardly and the fabric, indicated at F, is withdrawn from the supply roll 11 with its face side downwardly.

Suitable drive means, not shown, is provided for rotating the transfer roll 12 and the endless blanket 13 so that the transfer paper T and the fabric F are continuously withdrawn from the supply rolls and wound up on the respective take-up rolls 20, 21. The transfer paper T and the fabric F pass between the transfer roll 12 and the endless blanket 13 with the face side of the fabric F and the indicia bearing side of the transfer paper T in facing relationship so that the heat transferable indicia is transferred from the paper to the fabric as they pass between the endless blanket 13 and the heated transfer roll 12.

In order to ensure that the entire face surface of the fabric F is printed, it is customary for the manufacture of the transfer paper to make the paper approximately 1 to 2 inches wider than the width of the fabric to be printed. Thus, if the transfer paper is merely passed through the printing machine with the fabric in facing relationship, opposite side edges of the transfer paper extend outwardly beyond the width of the fabric and the indicia carried on the outer portions of the transfer paper is transferred to the blanket **13** as it passes around the transfer roll **12.**

In accordance with the present invention means is provided for preventing the transfer of indicia to the endless blanket from the portions of the paper normally extending outwardly beyond the width of the fabric. As illustrated in FIGS. **2** and **3,** folding devices, indicated at **25, 25'** are supported adjacent opposite side edges of the transfer paper T and in advance of the transfer roll **12** and blanket **13.** The folding devices **25, 25'** operate to fold the outer side edge portions of the transfer paper T inwardly a sufficient distance that the heat transferable indicia along the outer edges will not be transferred to the endless blanket **13.** The folding devices are of the conventional type which have been heretofore used in folding various types of material to be sewn as in forming hems and the like and for various other purposes to continuously fold the edge portion of a sheet of material passing therethrough.

With the folding devices positioned as shown in FIGS. **2** and **3,** each outer edge portion of the transfer paper T is folded over upon itself a sufficient distance that the free edge thereof corresponds with the width of the fabric F so that the indicia is not transferred to the blanket **13** but the edge portion of the back side transfer paper T is in engagement therewith. FIG. **4** illustrates the folding device **25** operating to fold the outer edge portion of the transfer paper T over on itself a sufficient distance that the free edge thereof corresponds with the edge of the fabric F. FIG. **5** illustrates the position of the folded transfer paper T and the fabric F with the face side of the transfer paper T being in engagement with the face side of the fabric throughout the width of the fabric and with the face side of the outer portion of the transfer paper T being folded over and upon itself so that no printed indicia is exposed on the upper surface to engage the blanket as the fabric and the transfer paper pass between the blanket **13** and the roll **12.**

In FIG. **6,** the folding device **25** has been adjusted inwardly from the position shown in FIGS. **2** and **3** so that the outer edge portions of the transfer paper T are folded inwardly and over and upon the back side of the fabric F and with the fold line of the transfer paper corresponding with the width of the fabric. As the fabric and transfer paper pass between the blanket **13** and the transfer roll **12,** in the folded condition illustrated in FIG. **7,** the indicia is transferred from the face side of the transfer paper T to the face side of the fabric F and throughout the width of the fabric and also the indicia from the outer folded edge portion of the transfer paper T is transferred to the back side and along the side edge of the fabric F. Thus, no indicia is exposed to the blanket **13** as the fabric and the transfer paper pass through with the paper being folded over in the condition shown in FIG. **7.**

As illustrated in FIG. **2,** means is provided for supporting the folding devices **25, 25'** for inward and outward adjustment relative to the width of the fabric, and only the adjustable support means for the folding device **25** is shown. The adjustable support means includes a support rail **27** which extends transversely of and beneath the path of travel of the transfer paper and the fabric and the rail **27** is positioned in advance of the transfer roll **12** and the blanket **13.** A bracket **28** is supported at one end for sliding movement along the rail **27** and its other end supports the folding device **25.** Suitable operator means is provided for imparting inward and outward movement to the bracket **28** and to thereby adjust the position of the folding device **25.** As illustrated in FIG. **2** the operator means comprises an air cylinder **30** which is suitably supported on the rail **27** and has a piston **31** connected to the adjustable bracket **28.** Suitable controls, not shown, are provided for directing air under pressure into either end of the air cylinder **30** to thereby move the piston **31** inwardly or outwardly the desired distance to properly adjust the widthwise position of the folding device **25.**

In the drawings and specification there has been set forth a preferred embodiment of the invention, and although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation.

That which is claimed is:

1. In a transfer printing machine adapted to continuously transfer printed heat-transferable indicia from the face side of lengths of transfer paper of a given width to the face side of lengths of fabric of a lesser width, said machine including a transfer paper supply, a fabric supply, a heated transfer roll, an endless blanket supported for engagement with at least a portion of the peripheral surface of said transfer roll, fabric take-up means, a transfer paper take-up means, and drive means for rotating said transfer roll and said endless blanket and continuously moving the fabric from the respective supplies to the respective take-up means and between said transfer roll and said endless blanket with the face side of the fabric and the indicia bearing side of the transfer paper in facing relationship so that the heat transferable indicia is transferred from the paper to the fabric as they pass between said endless blanket and said transfer roll, the combination therewith of means for preventing the transfer to the endless blanket of indicia from the portions of the paper normally extending outwardly beyond the width of the fabric, said means comprising folding means positioned at opposite edges of the transfer paper and in advance of said transfer roll for folding the outer edges of the transfer paper inwardly a sufficient distance that the heat transferable indicia along the outer edges will not be transferred to said endless blanket.

2. In an apparatus according to claim **1** including means for supporting said folding means for inward and outward adjustment relative to the width of the fabric.

3. In an apparatus according to claim **2** wherein said folding means is adjusted to fold opposite edge portions of the transfer paper inwardly upon itself a sufficient distance that the free edges thereof correspond with the width of the fabric.

4. In an apparatus according to claim **2** wherein said folding means is adjusted to fold opposite edge portions of the transfer paper inwardly and over and upon the back side of the fabric a sufficient distance that the fold

line of the transfer paper corresponds with the width of the fabric.

5. In an apparatus according to claim **2** wherein said adjustable support means comprises a support rail extending transversely and beneath the path of travel of the transfer paper and fabric and in advance of said transfer roll, a bracket supported at one end for sliding movement along said support rail and supporting said folding means at its other end, and operator means connected to said bracket for imparting movement to said bracket along said rail to adjust the position of said folding means.

6. In an apparatus according to claim **5** wherein said operator means comprises an air cylinder supported on said rail and having a piston connected to said bracket.

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