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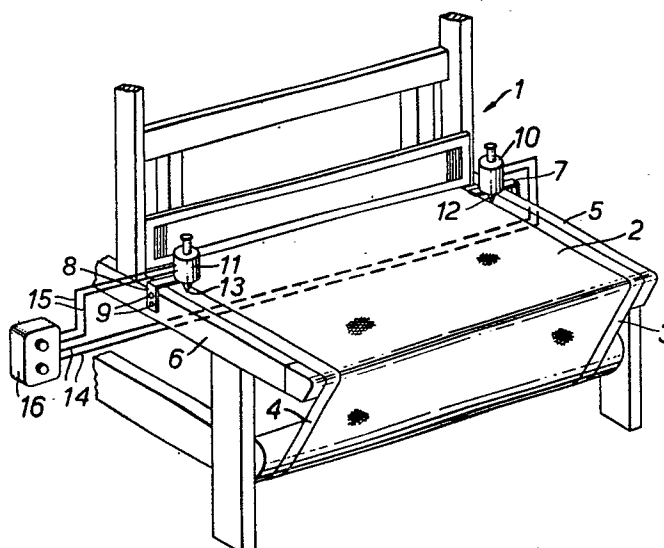
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⑤④ **Fabric production machine and method of marking fabric.**

⑤⑦ To reduce cutting errors arising through distortion of fabric during processing, marks are made on the fabric during fabric production, the marks having an accurately known predetermined relationship with one another so that distortions in the fabric can be monitored throughout the finishing thereof. The monitoring apparatus comprises a marking pen and means responsive to predetermined signals for urging the marking pen into contact with the fabric, for example a solenoid (10, 11) operating through a lever system (29, 30, 31). A pair of such marking devices can be operated simultaneously to give marks accurately opposite one another at the fabric production stage and such marks may be maintained in that relationship throughout finishing to ensure that the fabric is not distorted.



- 1 -

FABRIC PRODUCTION MACHINE AND METHOD OF MARKING FABRIC

This invention relates to a fabric production machine and to a method of marking fabric. The objective of the invention is to simplify the detection of fabric distortion that may arise during the processing of fabric after it leaves the fabric
5 production machine.

In the manufacture of clothing from fabric, woven or otherwise, it is now common to use very sophisticated automatic techniques in the laying out and cutting of
10 fabrics. Often, for example, many layers of fabric are cut simultaneously at one pass of an automatically programmed band saw or the like device. Naturally, for such an operation to be successful, any design or pattern on the fabrics must be aligned exactly so that
15 each cut piece of fabric is identical. This requires much finer tolerances on the part of the fabric finisher to ensure that the finished fabric is free from bowing, skewing or check size variation. Often, this can result in additional processing by the finisher
20 if it is discovered that the tolerances of the finished fabric are unacceptable to the end user.

The invention seeks to provide a method and apparatus for reducing this problem by enabling the dimensions of the fabric to be monitored throughout
25 processing so that a far more accurate check may be kept

on variations on the fabric during finishing and the necessary preventative or corrective actions can be taken.

According to the present invention we provide
5 a fabric production machine having marking apparatus mounted so as to be capable of marking fabric before the fabric leaves the machine, the marking apparatus comprising ^{at least one} / marking pen and means responsive to predetermined signals for moving the marking pen into
10 contact with the fabric.

According to a further aspect of the invention we provide a method which comprises making marks on a fabric before the fabric leaves the fabric production machine, the marks being made by a marking pen contact-
15 ing the fabric in response to predetermined signals such that the marks have an accurately known predetermined relationship one to another so that distortions in the fabric can be monitored throughout subsequent processing thereof.

20 When the production machine is a loom, and the fabric is a woven fabric, it is preferred that the marks are made as close as possible to the cloth fell line, i.e. the point of fabric construction, so that the fabric is marked before any distortion has developed.
25 The marks are conveniently made on either or both of the fabric selvages as these are not used in the finished product, and it is preferred that marks are applied simultaneously to both selvages. Thus, by subsequently ensuring that successive sets of marks
30 are maintained opposite one another throughout finishing, the fabric will be free from distortion and can be presented with confidence to the eventual user.

Conveniently the means responsive to said predetermined signals is a solenoid means mounted on
35 the machine and operative to move the pen. Any suitable solenoid arrangement, and arrangement linking

the solenoid to the pen may be used, and the pen may be of any convenient form, for example one of the commercially available pens that are used for marking fabric.

5 In order that the invention may be better understood embodiments thereof will now be described in more detail, by way of example only, with reference to the accompanying drawings in which:-

10 Figure 1 is a schematic view of the delivery end of a loom equipped with marking apparatus; and

 Figure 2 is an elevational view of an alternative embodiment of marking apparatus.

 Referring now to Figure 1 there is shown the delivery end of a loom generally indicated at 1, the loom producing a woven fabric 2 delivered from the loom, the fabric having selvages 3 and 4. Respective side frame members 5 and 6 of the loom each have a bracket 7,8 secured thereto by bolts such as 9 or by other suitable securing means. Each of the brackets 7,8 supports solenoid means 10,11, each solenoid means having an associated marking pen the tips 12,13 of which normally lie slightly above the respective selvages 3 and 4. Each of the solenoid means 10 and 11 can be actuated by an electrical signal on lines 14, 15 respectively, the signals being supplied simultaneously from a control unit schematically shown as 16. On supply of such a signal the pen tip 12 or 13 is moved into contact with the fabric selvedge running below it. The two solenoid means and associated pens are located as close as possible to the cloth fell line so that the marks are made as early as possible before significant distortion of the fabric is possible.

35 In operation, the solenoids are energized simultaneously so that marks are produced on the selvages exactly opposite one another. The control unit 16 may

form part of the overall control unit for the loom, or may be geared to the running of the loom so that signals are sent to the solenoids at intervals such that the marks made on the fabric are always a set distance apart on the fabric. Alternatively, the solenoids may be controlled independently of the running of the loom and controlled by a timing device so that marks are made at fixed intervals. In this case the distances between adjacent marks along the selvages may vary.

10 In either arrangement, during finishing, the finisher can easily monitor these sets of marks and identify variations in finishing where distortion occurs and take the necessary preventative or corrective action.

15 The solenoid units 10 and 11 that hold and move the marking pens may be of any suitable form and their detailed construction does not form part of the invention. In one embodiment the pencil may be held in the hollow movable core of the solenoid means as suggested in
20 Figure 1. In an alternative embodiment shown in Figure 2 the fabric marking pen may be releasably held by a clip 21 in an essentially tubular holder 22, such that the marking tip 24 of the pen protrudes from the bottom of the holder 22. The holder 22 is slidably
25 mounted on a support 25 which may be bolted to a bracket on the loom through a bolt hole 26. The support 25 also carries a solenoid 28 capable of pivoting a bell crank lever 29 about a pivot 30 also secured to the support. An arm 31 of the bell crank
30 lever engages between projections 32 on the side of the tubular holder so that pivotal movement of the arm can move the holder downwardly or upwardly as indicated by the arrow in Figure 2. Downward movement moves the marking tip 24 into contact with fabric passing
35 thereunder.

Although particularly described in the context of a

loom, other forms of fabric production machines, for example knitting machines, may be provided with marking apparatus capable of marking the fabric before the fabric leaves the machine. In such machines the marking apparatus is again preferably positioned as close as possible to the point of fabric construction, and marks are desirably made at corresponding locations at each side of a width of fabric. The marks may thus be used for monitoring distortion during subsequent processing, and/or for other purposes such as marking lengths of fabric for subsequent cutting.

Solenoids having adequate power tend to be rather bulky and this can cause difficulties in locating the nib of the pen close to the fell line. The problem varies according to the construction of the fabric making machine. However, where the problem does exist, various methods can be employed to alleviate it. For example, in some situations the solenoid can be inclined slightly, away from the obtruding part of the machine. Alternatively, the core of the solenoid can be provided with an extension bearing the pen so as to enable the solenoid to be positioned above the obtruding part of the machine in such a way that the narrower pen portion can project downward through the machine so the nib has access to the fell line.



CLAIMS:

1. A fabric production machine having marking apparatus mounted so as to be capable of marking fabric before the fabric leaves the machine, the marking apparatus comprising ^{at least one} marking pen and means responsive to predetermined signals for moving the marking pen into contact with the fabric.
2. A machine according to claim 1 and comprising solenoid means mounted on the machine and responsive to said predetermined signals to move said pen.
3. A machine according to claim 1 or claim 2 and including a holder mounted for movement in response to said predetermined signals, and means for releasably securing a marking pen in the holder to be movable therewith.
4. A machine according to any one of the preceding claims and including means for transmitting said predetermined signals in timed relationship with the operation of the machine.
5. A machine according to any one of the preceding claims, the machine being a loom and the marking pen being movable to contact the fabric close to the cloth fell line.
6. A machine according to claim 6 in which two sets of marking apparatus are provided, one at each side of the loom, the marking pens being movable to contact the respective selvages of the fabric.
7. A method which comprises making marks on a fabric before the fabric leaves the fabric production machine, the marks being made by a marking pen contacting the fabric in response to predetermined signals such that the marks have an accurately known predetermined relationship one to another so that distortions in the fabric can be monitored throughout subsequent processing thereof.
8. A method according to claim 7 in which the

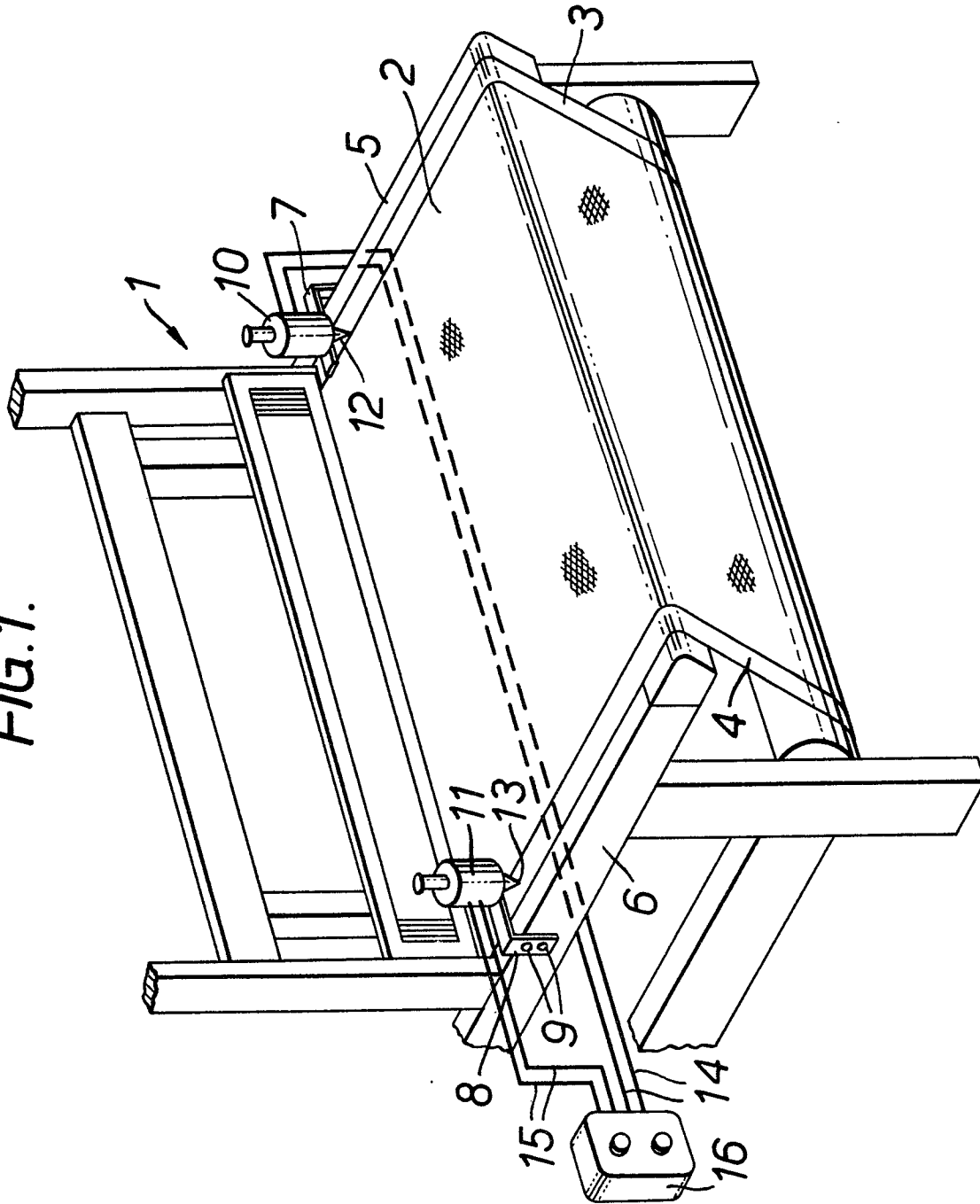
predetermined signals are transmitted in timed relationship with the operation of the production machine.

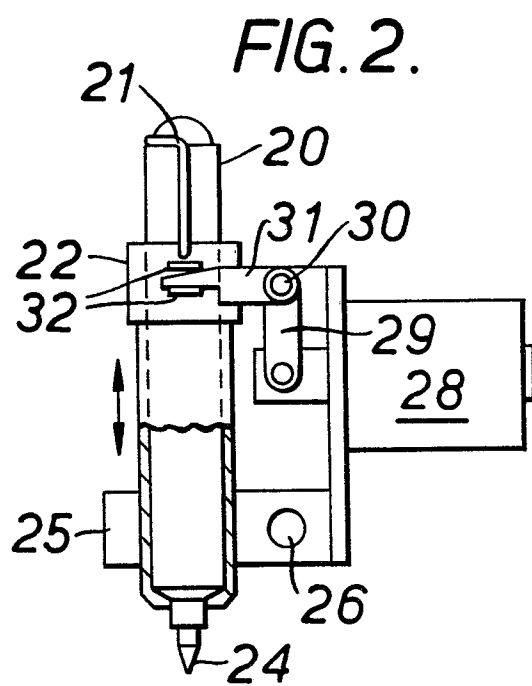
5 9. A method according to claim 7 or claim 8 in which the production machine is a loom and the marks are made close to the cloth fell line.

10. A method according to claim 9 in which the marks are made on either or both of the fabric selvages.

10 11. A method according to claim 10 in which marks are made simultaneously on both the fabric selvages.

FIG.1.







European Patent
Office

EUROPEAN SEARCH REPORT

0043704

EP 81 30 3018

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
X	FR - A - 1 525 620 (CORAH-MATIC) * Page 1, column 2, line 33 - page 2, column 1, line 34; fi- gures 1,2 *	1-4,7, 8	D 06 H 1/00 D 03 J 1/00 D 04 B 35/00
	-- FR - A - 2 382 531 (NISSAN) * Page 1, lines 1-16; page 2, lines 1-29; figure 4 *	1,5,7- 10	
	-- DE - A - 2 320 492 (HAGEMANN) ----	1,6,7, 10,11	TECHNICAL FIELDS SEARCHED (Int. Cl. ³) D 03 J D 06 H D 04 B
			CATEGORY OF CITED DOCUMENTS X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons
☒ The present search report has been drawn up for all claims			&: member of the same patent family, corresponding document
Place of search The Hague		Date of completion of the search 01-10-1981	Examiner BOULEGIER