

[54] CLOTH LAYING MACHINE

3,557,457 1/1971 Rashbaum..... 33/1 R

[75] Inventor: Roland Stengle, Stuttgart-Munster,
Germany

[73] Assignee: Krauss U. Reichert,
Spezialmaschinenfabrik, Fellbach,
Germany

Primary Examiner—William D. Martin, Jr.
Attorney—Christen & Sabol

[22] Filed: June 16, 1971

[21] Appl. No.: 153,672

[57] ABSTRACT

[30] Foreign Application Priority Data

June 20, 1970 Germany..... P 20 30 559.3

[52] U.S. Cl..... 33/1 R, 26/70, 33/11

[51] Int. Cl..... A41h 1/00

[58] Field of Search..... 33/1 R, 11; 26/70

Aparatus for determining whether an imperfection in fabric will lie within or without a pattern to be cut out from the fabric while the fabric is being laid out on a cutting table by means of a carriage for a supply of the fabric to be laid out which also carries a replica of the pattern to be cut and means to move the replica to correspond with the laying out of the fabric and indicia means to correlate the positions of imperfections in the cloth with the replica of the pattern to be cut.

[56] References Cited

UNITED STATES PATENTS

3,540,830 11/1970 DiCanio..... 33/11 X

9 Claims, 3 Drawing Figures

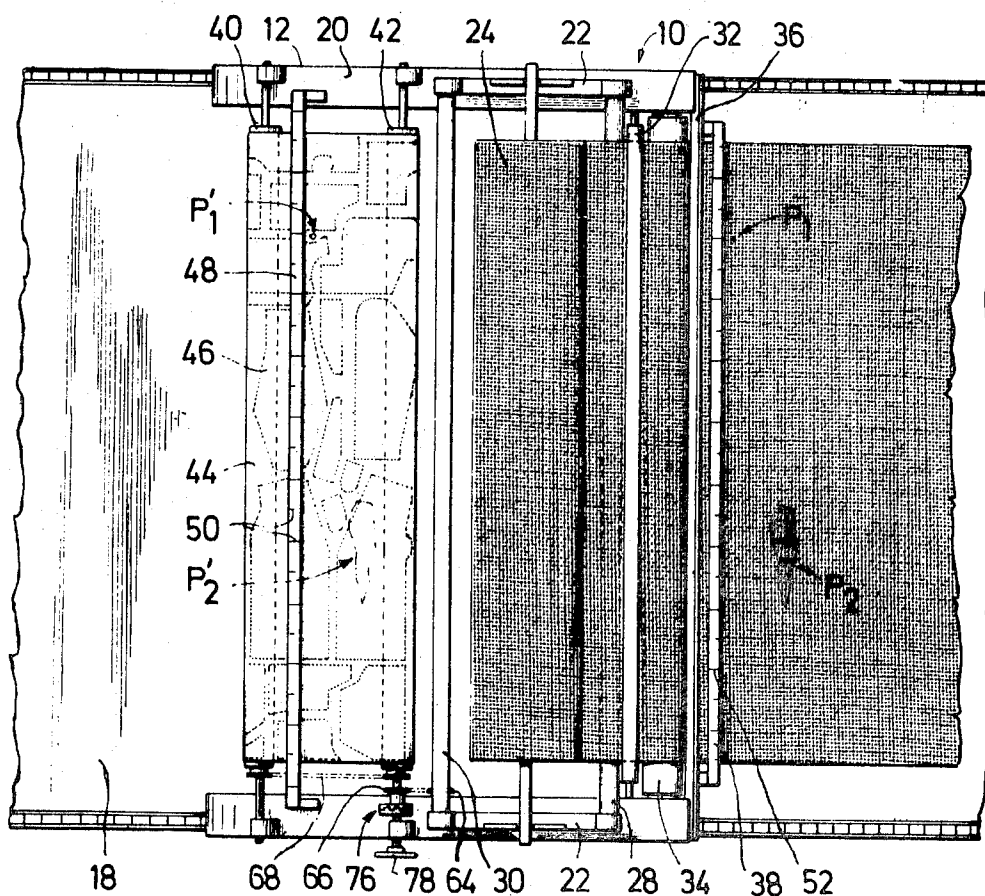


Fig. 1

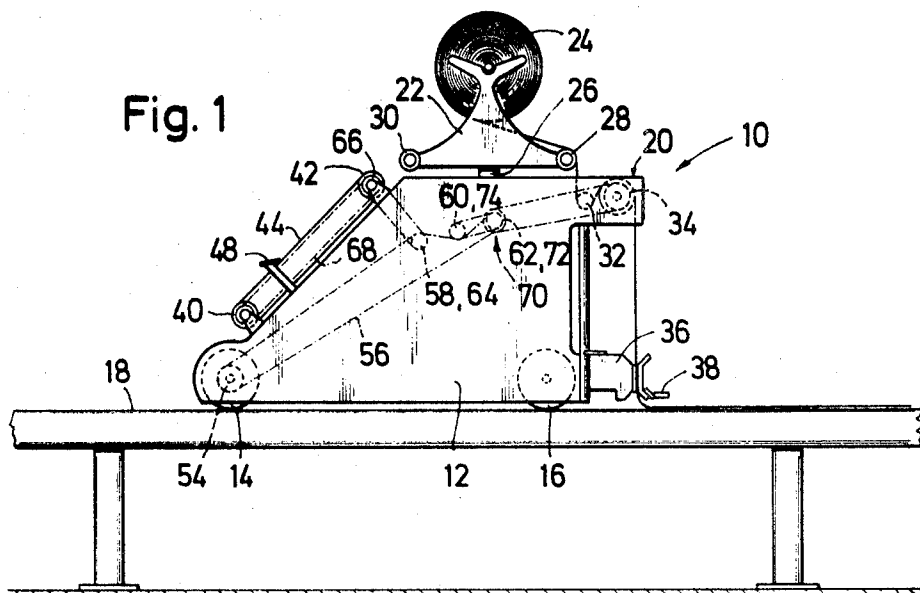
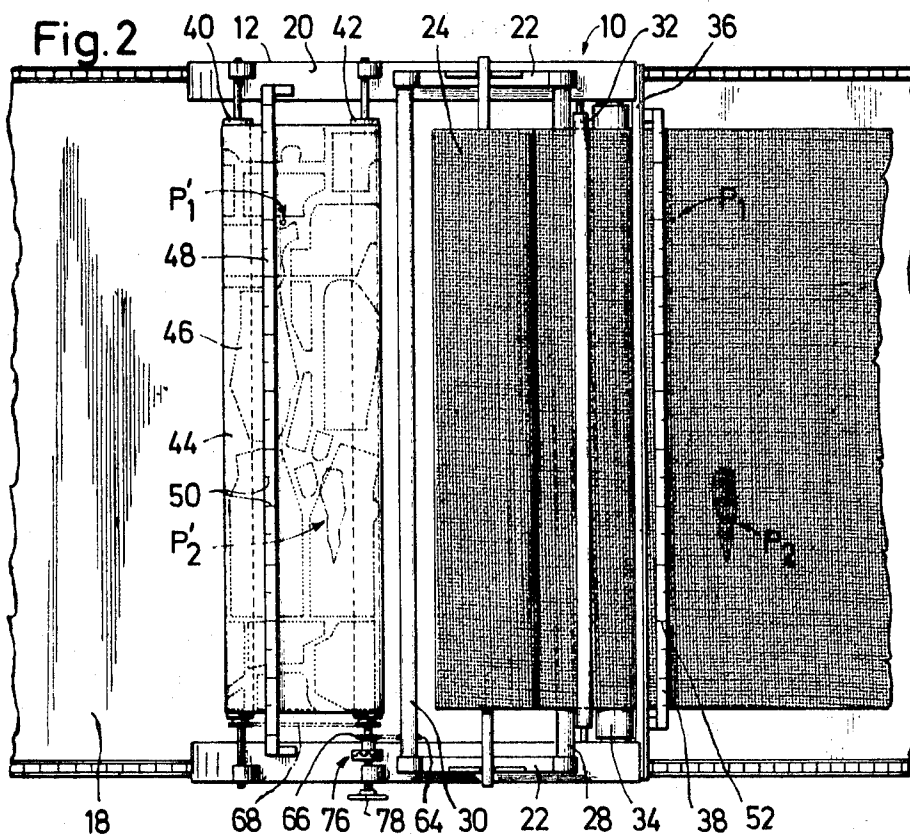
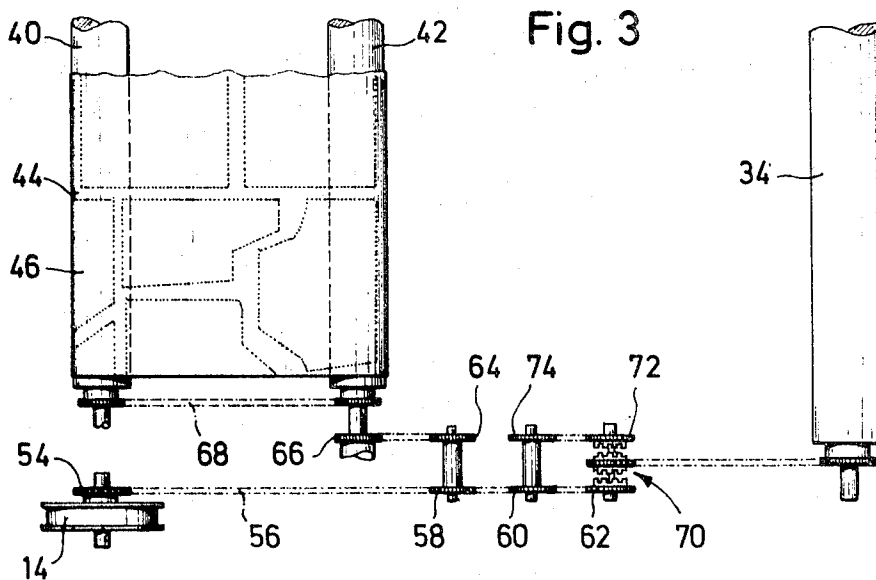


Fig. 2





CLOTH LAYING MACHINE

The present invention relates to a cloth laying machine for laying out webs of fabric on a table in order to manufacture cutouts thereof which correspond to a given cutting pattern, the machine being provided with means for supporting a supply of fabric such as a bolt of cloth to be reciprocatingly driven over the table surface.

The known cloth laying machines of this type have the drawback that imperfections in the fabric or in the weave, which may appear in one, or even in several, of the webs of fabric laid out by the machine, have to be eliminated by cutting out the corresponding portions of fabric. However, this removal of the damaged portions of fabric is often unnecessary if afterwards it is found that the fault in the fabric or in the weave lies between two cutout portions, that is in the scrap portion, and thus being of no consequence.

The object of the invention is therefore to improve the structure of cloth laying machines to the extent that when the single webs of fabric are laid out on the table it can immediately be determined if the imperfections in the fabric will be located inside or outside of a portion of the fabric to be discarded later.

This object can be realized, according to the invention, by providing the carriage with a design of the cutting pattern and means to correlate movement of the design with movement of the carriage in order to determine where it is essential to cut out the imperfections.

It is advantageous that the reproduction of the cutting pattern be made on the same, or on a reduced, scale with respect to the original cutting pattern.

Further features and advantages of the invention will be apparent from the following description and the claims, with reference to the accompanying drawings, in which:

FIG. 1 is an elevational view of the cloth laying machine of the invention;

FIG. 2 is a plan view of the machine shown in FIG. 1; and

FIG. 3 is a simplified plan view of a driving mechanism.

FIG. 1 shows a cloth laying machine, according to the invention, indicated generally by numeral 10. The cloth laying machine comprises a carriage 12 which can be reciprocatingly driven on a table 18 by means of two pairs of wheels 14 and 16. The reciprocating movement of carriage 12 on table 18 can either be done manually or by a power driving means (not shown) such as an electric motor to produce the displacement of the carriage, in which latter case reversing elements (also not shown) are mounted at both ends of the table to automatically produce the reversal of the direction of movement of the machine 12.

A support means 22 for rotatably supporting a bolt of cloth 24 is mounted on an upper platform 20 of the cloth laying machine 10. This support means 22 can be oscillated 360° by means of a centrally arranged, vertical pedestal 26.

Each one of the two diverging lower ends of the support means 22 is provided with a deflecting roller 28 and 30, respectively, so that the fabric of bolt 24, which is to be laid out in layers on table 18, is conveyed over one of these deflecting rollers, around an additional deflecting roller 32 and to a winding off roller 34. From the winding off roller the fabric is conveyed to a guid-

ing device 36 located in its starting position at the lower end of carriage 12 shown at the right end of the carriage in FIG. 1.

The web of fabric wound off from bolt 24 is deflected in such a manner by the guiding device 36 that it is laid out on the table surface, said guiding device being adapted to be moved up and down in the vertical direction on the carriage 12 by means of guides. As can be appreciated in FIG. 1, the guiding device 36 is additionally provided with a projecting positioning ruler 38 which is parallel to the table surface and whose purpose will be explained later on.

The automatic vertical height adjustment of the guiding device 36 and, consequently, of the positioning ruler 38 is necessary due to the fact that during the movement of the carriage 12 on the table 18, the height of the pile of the laid out webs of fabric gradually increases.

As can be appreciated in FIG. 1, the side of carriage 12 opposite to the winding off roller 34 is inclined and is adapted to support an endless belt 44 mounted around two rollers 40 and 42 which are journaled in respective bearing brackets. As shown in FIG. 2, the belt 44 is provided with an endless cutting pattern design 46, which exactly corresponds to the cutting pattern which is to be applied later on the pile of laid out webs of fabric, for the purpose of cutting out the individual cloth portions.

Additionally, it can be seen in FIG. 2 that a second positioning ruler 48 is mounted above the upper portion of belt 44 and extends over the whole width of the belt.

According to FIG. 2, both positioning rulers 38 and 48 are provided with graduations 50 and 52, respectively, which correspond to each other. In the particular embodiment shown the scale of both graduations 50 and 52 is the same. However, as it will be explained in more detail later on, the scale of the graduations on the second positioning ruler 48, can be different than on the positioning ruler 38.

The actuation of the belt 44 and of the winding off roller 34 is accomplished by the reciprocating movement of the carriage 12. For this purpose, as can be seen in FIGS. 1 and 3, a driving pulley 54 is secured to one of the wheels 14 which is visible in FIG. 1. The driving pulley 54 is connected to another driving pulley 62 by means of a belt, or chain, 56, and by means of deflecting pulleys 58 and 60 which are located in between.

Another pulley 64 is fixedly secured to the first deflecting pulley 58 and by means of an intermediate pulley 66 it drives two rollers 40 and 42 which are connected to each other by means of a belt 68. This driving arrangement causes the direction of movement of the belt 44, carrying the cutting pattern design 46, to change when a change occurs in the direction of movement of carriage 12.

The winding off roller 34 must always turn in the same direction. To accomplish this, a shiftable, two-position clutch 70 is provided on the second driving pulley 62, by means of which the winding off roller 34 is driven in clockwise rotation when the carriage 12 moves to the right in FIG. 1. During the return movement of the carriage 12 from its right-hand end position the shiftable clutch 70 is disconnected from the second driving pulley 62 and is now coupled with a driving pulley 72 mounted on a common shaft with pulley 62,

which by means of an intermediate pulley 74 secured to the deflecting pulley 60 drives the winding off roller 34, again in the clockwise direction, during the return movement of the carriage 12 from its right-hand to its left-hand end position. This clockwise rotation of the winding off roller 34 is accomplished by the fact that the deflecting pulley 60 is in engagement with the outer side of belt 56 whereas the other pulley 62 engages with the inner side of belt 56. Thus, the two pulleys must rotate in opposite directions, as viewed in FIG. 1. Furthermore, since pulley 72 turns in the same direction as pulley 60, the direction of rotation of roller 34 depends on whether clutch 70 is engaged with pulley 62 or 72.

Instead of a mechanically operated reversing clutch 70, an electromagnetic clutch could also be used, particularly in the case where a reversible electric motor is used to automatically produce the reciprocating movement of the carriage 12, in which case the position of the electromagnetic clutch will be reversed when the polarity of the current supplied to the motor windings is reversed.

As shown in FIG. 2, the endless belt 44 is provided with a design of the cutting pattern 46, as already mentioned, which exactly corresponds to the cutting pattern which is to be applied to the laid out webs of fabric in order to guide the workmen in cutting out the cloth.

Due to the reciprocating movement of the carriage 12 the web of fabric wound off from the cloth bolt 24 is gradually piled up in layers on the table 18. Simultaneously, the movement of the carriage 12 produces a movement of the belt 44 and the cutting pattern 46 located thereon, as already mentioned, whereby a speed reduction of the belt drive means is necessary if the cutting pattern 46 is reduced in size with respect to the original size of the cutting pattern to be applied to the fabric on the table.

An imperfection, for example a fault in the weave, is discovered by an operator on the web of fabric laid out on table 18. The location of the fault can be accurately determined by means of the positioning ruler 38, mounted on the guiding device 36, and by means of the graduations 52. In the embodiment shown in the drawings, such a fault is indicated by P_1 in FIG. 2. By means of the positioning ruler 48 mounted above the belt 44 and provided with the same scale of graduations, the fault P_1 on the laid out fabric can be located on the cutting pattern 46. As shown in FIG. 2, the point P'_1 located on the cutting pattern 46, corresponding to the point P_1 on the web of fabric, lies between two cutouts, so that in this case the fault existing in the fabric will not show up in the portion of the fabric to be used. Thus, due to the simultaneously moving cutting pattern 46, the later position of the original cutting pattern corresponding to the cutting pattern design 46 can be determined at any time on the fabric by means of the two positioning rulers 38 and 48.

When the faulty area P_2 (FIG. 2) comes under the positioning ruler 38 during the laying out operation, this faulty area can also be located on the cutting pattern 46 by means of positioning ruler 48. As shown in FIG. 2, this faulty area P'_2 lies partially within a cutout so that a corresponding strip can now immediately be cut out of the faulty web of fabric, and the cut ends can be overlapped.

If the fault occurring in the material covers for example a larger surface area it is usually necessary to start again laying out a new web of fabric. For this purpose

the cutting pattern 46 must also be returned to its starting position. To achieve this object the roller 42 is provided with a coupling means 76 having a hand wheel 78 which permits the cutting pattern 46 to be manually turned to its starting position.

In the just described embodiment, the positioning ruler 48, associated with the cutting pattern 46, is fixedly mounted on the carriage 12. In another embodiment of the invention this positioning ruler can be reciprocated, by means of a belt drive or a similar device, in accordance with the direction of movement of the carriage, in which case the cutting pattern 46 will be fixedly mounted on carriage 12, for example in the form of a plate or a film.

In addition to the correlation means described with reference to the illustrated embodiment, it is also possible to use other devices to correlate imperfections P_1 and P_2 on the fabric to a cutting pattern without departing from the scope of the invention.

By means of the cloth laying machine of the invention, several embodiments of which have been described above, it is possible to determine, directly during the laying out operation of the single webs of fabric, if an imperfection in the fabric lies within or without a cutout portion. If it does lie within a cutout portion, the fabric can be cut and the ends overlapped.

I claim:

1. Apparatus for laying out a plurality of layers of cloth on an elongated cutting table, comprising carriage means reciprocatorily movable along the length of a cutting table, said carriage means including means to support a supply of cloth to be laid out on a table during said reciprocatory movement, pattern means reproducing the outlines and relative positions of pieces of cloth to be cut out when the layers of cloth are in position on a table, and correlation means to continuously disclose the relative position of an imperfection in the cloth with respect to the outlines of pieces of cloth to be cut out, said pattern means including two elements, one of said two elements comprising a sheet bearing outlines of the pieces of cloth to be cut out, the other of said two elements comprising indicia means disposed to coact with said sheet, and said correlation means including means to move one of said two elements continuously with respect to the other of the two elements in synchronism with movement of the carriage means during laying out of said fabric.

2. The apparatus as defined in claim 1, wherein the scale of the pattern means is the same as that of the pieces of cloth to be cut out.

3. The apparatus as defined in claim 1, wherein the scale of the pattern means is reduced with respect to the scale of the pieces of cloth to be cut out.

4. The apparatus as defined in claim 1, wherein said sheet comprises a transparent image of said outlines.

5. The apparatus as defined in claim 1, wherein one of said two elements of the pattern means comprises a visual representation of said outlines and the other of said two elements comprises scale means positioned for visual comparison with said one element.

6. The apparatus as defined in claim 5, wherein said visual representation is embodied in a sheet, and said pattern means includes means to mount said sheet on the carriage means for movement with respect to the scale means corresponding to movement of the carriage means.

5

6

7. The apparatus as defined in claim 6, wherein said carriage means includes means to feed cloth to a cutting table in response to movement of the carriage means, said last named means including reversing clutch means.

8. The apparatus as defined in claim 6, wherein said visual representation includes an endless sheet of material, and a pair of rotatably mounted support rollers for said sheet, said carriage means including a supporting wheel in contact with a cutting table, driving means connecting said supporting wheel with one of said rollers, scale means positioned adjacent said sheet, and corresponding scale means adjacent the cloth being fed

to a table, both said scale means extending transversely with respect to the direction of movement of the elements with which they are associated.

9. The apparatus as defined in claim 8, wherein said driving means includes belt means connecting said supporting wheel with said one roller, and also includes belt means and winding off roller means for feeding cloth to a table in response to movement of the carriage means, said last named belt means including reversing clutch means to permit cloth to be fed in either direction of movement of the carriage means.

* * * * *

15

20

25

30

35

40

45

50

55

60

65