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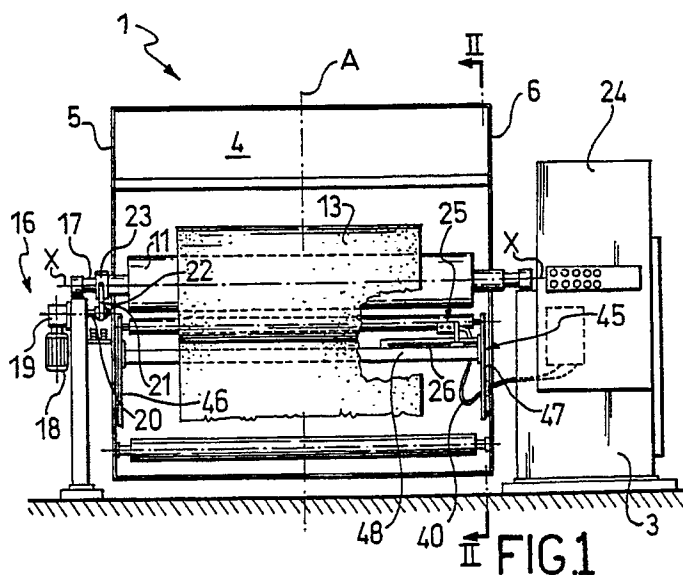
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Jigger.

A jigger machine (1) for dyeing a fabric (2) across the width, which enables the fabric to be passed back and forth in a perfectly regular and truly centered manner through a dyeing bath (9), comprises a closed chamber (4), a fabric path (15) extending in said chamber (4) between a first, fabric-loading roll (11) and a second roll (12), both rolls being motor-driven and said first roll (11) being

shiftable axially by the action of a motive means (16), and a transducer (25) located along said (15) proximate to the first roll (11) and mounted in an adjustable manner on a guide (26) extending parallel to the axis of the first roll (11) to issue a signal correspondingly with the fabric position, said motive means (16) being controlled by said signal.



This invention relates to a jigger machine for dyeing a fabric across the width, with the fabric passed back and forth through a dyeing bath, being of a type which comprises a closed chamber, a fabric path extending in said chamber between a first, fabric-loading roll and a second roll, both rolls being motor-driven rolls and said first roll being shiftable axially by the action of a motive means.

A fabric to be dyed is usually wound, in a stretched state across its width, on a beam carried by a cart. To effect a desired dyeing, the fabric is transferred to the jigger, after the chamber has been opened, by simultaneously paying it off the beam and taking it up on the loading roll.

The coil of fabric thus formed on the loading roll is then coarsely centered by an operator shifting the roll in the axial direction.

After closing the chamber, the fabric is passed through a dyeing bath provided within the chamber, as by taking it up on the second roll and then again on the first in a succession of back-and-forth passages until the completion of the dyeing operation.

This procedure, while being substantially satisfactory and achieving its objective, still has a recognized drawback in that the fabric moves in an irregular pattern while being transferred from one roll to the other. In fact, the coil of fabric formed on the loading roll is quite uneven, with the fabric selvage that bulges in and out of the sides in quite a random between coil turns.

The centering operation, as performed by the operator through an axial shift of the loading roll, is also inevitably carried out in only a coarse manner, since the operator is confronted with an irregular and geometrically inaccurate coil.

Thus, the machine will usually be operated with the fabric in an off-centered condition and unevenly shifted first to one side and then to the other in an unpredictable manner to result, at each pass, into renovated geometrically irregular coils.

The problem that underlies this invention is to provide a machine of the kind specified above which has such construction and performance characteristics as to overcome the cited drawback.

This problem is solved by a machine as indicated being characterized in that it comprises a transducer along said path mounted adjustably along a guide extending parallel to the axis of the first roll to issue a signal correspondingly with the fabric position, said motive means being controlled by said signal.

Advantageously, the transducer is located in the vicinities of the first roll.

Further features and the advantages of a machine according to this invention will become apparent from the following detailed description of a preferred embodiment thereof, to be taken by way of illustration and not of limitation in conjunction

with the accompanying drawings, where:

Figure 1 is a front view of a machine according to the invention;

Figure 2 is a side view of the machine shown in Figure 1;

Figure 3 is a diagrammatic detail view of the machine shown in Figure 1; and

Figures 4, 5 and 6 show in diagrammatic form another detail of the machine in Figure 1, shown at different stages of its operation.

With reference to the drawing figures, generally indicated at 1 is a jigger machine for dyeing a fabric 2 laid widthwise stretched across its width h .

The machine 1 comprises a load-bearing frame structure 3 and a closed chamber 4 supported on the frame structure 3. The chamber 4 has oppositely located sidewalls 5 and 6, a bottom portion 7, and a ceiling portion 8.

The reference character A denotes a center-plane of the chamber 4 extending parallel to the walls 5 and 6 at equal distances therefrom.

At the bottom portion 7 there is provided a dyeing bath 9. The ceiling portion 8 is openable with the assistance of a counterweight 10, known per se.

Carried rotatably on the frame structure 3 are a first roll 11 and a second roll 12 having respective axes X-X and Y-Y which are parallel to each other and extend through the chamber 4 after being passed in a sealed fashion through the sidewalls 5 and 6.

The fabric 2 is wound around the first roll 11 and the second roll 12 into respective coils 13 and 14. The fabric 2 would travel a fabric path, indicated at 15, between the coil 13 and the coil 14.

Along said travel path 15, which partly extends through the bath 9, the fabric 2 is guided by lay rollers 41, 42, 43 and 44.

The roller 41 is mounted on a rocking holder 45 and held in pressure contact with the coil 13 by conventional springs, not shown.

More specifically, the rocking holder 45 comprises an arm pair 46 and 47 made rigid together by a crosspiece 48 lying parallel to the axis X-X, which arms have first ends journaled on the walls 5 and 6, respectively, with the roller 41 carried on the second ends thereof for idle rotation.

The rollers 42 and 43 are supported for idle rotation on the walls 5 and 6 at the bottom portion 7, within the bath 9.

As for the roller 44, this is mounted on a rocking holder 49 in quite the same manner as described above in connection with the roller 41, and is held in pressure contact with the coil 14.

The first roll 11 and second roll 12 are both motor-driven such that they can perform, the one the function of a motor-driven take-up roll and the other that of a braked pay-off roll, and vice versa,

according to necessity.

The first roll 11 or fabric-loading roll for a fabric to be dyed, is shiftable axially along the direction of the axis X-X back and forth by the action of a reversible motive means indicated at 16 and located adjacently the wall 5.

In particular, the roll 11 is supported on the frame structure 3 by means of a coaxial shaft 17 wherewith it is made rigid rotatively and relatively to which it is shiftable axially. For the purpose of shifting the roll 11 along the shaft 17, the motive means 16 comprises an electric motor 18 driving, via a reduction gear 19, a screw 20 which extends parallel alongside the axis X-X. Coupled to the screw 20 is a screw nut 21 which is mounted on the end of an arm 22 projecting from a sleeve 23 being mounted, in turn, to the roll 11 for idle rotation and axially constrained thereon.

The motive means 16 is completed by an electrical apparatus 24 for controlling the electric motor 18 to rotate in either directions, and hence, displace the roll 11 axially in either directions.

The machine 1 of this invention further comprises a transducer, generally designated 25, which fits adjustably along a guide 26 carried on the arm 47 and extends parallel to the axis X-X. The axial position of the transducer 25 along the guide 26 is first defined to suit the width h of the fabric to be dyed, such that the fabric 2 will be centered relatively to the centerplane A of the machine with its margin or selvedge 2a located at the transducer.

The transducer 25 locates along the path 15 of travel of the fabric 2 proximate to the first roll 11, and faces the fabric 2 to issue a signal correspondingly with the actual position of the fabric, and more specifically, with the axial position occupied by its selvedge 2a. The motive means 16 is controlled by said signal to axially shift the roll 11, and accordingly the fabric 2, toward the target centered position.

The transducer 25 comprises two side-by-side nozzles 27 and 28 defining a short segment therebetween which extends parallel to the axis X-X and has a length i of a few millimeters. Of the two nozzles 27 and 28, the outermost one relatively to the centerplane A, and therefore closest to the wall 6, is the nozzle 28.

The nozzles 27 and 28 are supplied a pressurized fluid, preferably air, through respective conduits 29 and 30 which are connected to a conventional compressed air delivery line 31 including a strainer 32 and a pressure regulating valve 33.

The conduits 29 and 30 are equipped with respective throttling devices 34 and 35 which are set to provide a pre-determined fluid flow rate, and at a location between the throttling devices 34, 35 and the nozzles 27, 28, with respective pressure switches 36 and 37.

In particular, the pressure switches 36 and 37 are connected, via respective conduits 38 and 39, in parallel with their respective conduits 29 and 30.

A suitable sheath 40 encloses the four conduits 29, 30, 38 and 39 in a bundle and takes them out of the chamber 4 by going sealingly through the wall 6.

Each pressure switch 36 (37) will be activated by a raise in the pressure downstream from the throttling device 34 (35) occurring due to the fabric 2, in moving from the roll 11 to the roll 12 (see Figures 4, 5 and 6, arrow F) covering the respective nozzle 27 (28), and de-activated with the nozzle uncovered.

The pressure switches 36 and 37 are led to the electrical apparatus 24, and are connected to the latter such that the electric motor 18 is held stationary with the pressure switch 36 activated and the pressure switch 37 de-activated (see Figure 4), is operated to shift the roll 11 axially toward the wall 6 with both pressure switches de-activated (see Figure 5, arrow G), and operated to produce displacement in the opposite direction with both pressure switches activated (see Figure 6, arrow H).

During operation of the machine, as the fabric is being paid off the loading roll to the second roll, it is constantly held in a centered state. In fact, on the fabric, or rather its selvedge, moving away from the short segment between the two nozzles 27 and 28, thus uncovering the nozzle 27 as well or alternatively also covering the nozzle 28, the motive means 16 will be operated to shift the roll axially toward the wall 6, or alternatively, toward the wall 5, thereby bringing the fabric selvedge back to within said segment.

Accordingly, fabric wound unevenly around the loading roll, in moving to the second roll, will be automatically centered and wound faultlessly around the second roll.

Once an even coil has been thus formed, the machine is allowed to operate until completion of the fabric dyeing process, even with no further intervention by the transducer. Nothing forbids, however, that it be kept in operation at each pass of the fabric from the first roll to the second.

A major advantage of the machine according to the invention is that it enables a desired dyeing to be performed on the fabric with constantly regular and centered passes of the latter, in a fully automated manner irrespective of the initial winding condition thereof and of the operator's own skill.

A further important advantage afforded by the inventive machine is that its operation is made specially reliable by the nozzles having shown on testing that they are unaffected by the severity of their operating conditions, and particularly by high temperature and humidity, and by the chemically aggressive conditions which prevail in the chamber

on account of the presence of the dyeing bath therein and of the splashes of dyeing matter created therein by the moving fabric.

Understandably, the machine described herein above may be altered and modified in several ways by a skilled person in the art to meet specific and contingent requirements within the scope of the invention as defined in the appended claims.

Claims

1. A jigger machine (1) for dyeing a fabric (2) across the width, with the fabric (2) passed back and forth through a dyeing bath (9), being of a type which comprises a closed chamber (4), a fabric path (15) extending in said chamber (4) between a first roll (11), or fabric-loading roll, and a second roll (12), both rolls (11,12) being motor-driven rolls and said first roll (11) being shiftable axially by the action of a motive means (16), characterized in that it comprises a transducer (25) along said path (15) mounted adjustably along a guide (26) extending parallel to the axis of the first roll (11) to issue a signal correspondingly with the fabric position, said motive means (16) being controlled by said signal.
2. A machine (1) according to Claim 1, characterized in that the transducer (25) is located proximate to the first roll (11).
3. A machine (1) according to Claim 2, characterized in that the transducer (25) comprises two nozzles (27,28) laid side by side and being supplied a pressurized fluid through respective conduits (29,30).
4. A machine (1) according to Claim 3, characterized in that it comprises, on each conduit (29,30), a throttling device (34,35) and a pressure switch (36,37) between the throttling device (34,35) and the nozzle (27,28).
5. A machine (1) according to Claim 4, characterized in that the fluid is air.

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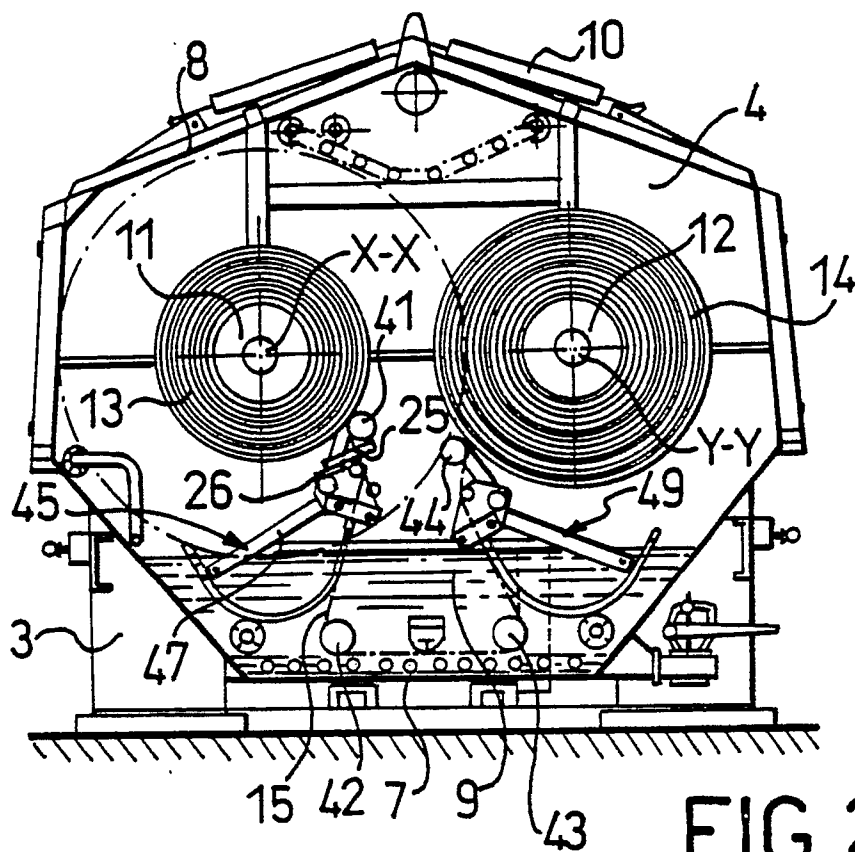


FIG. 2

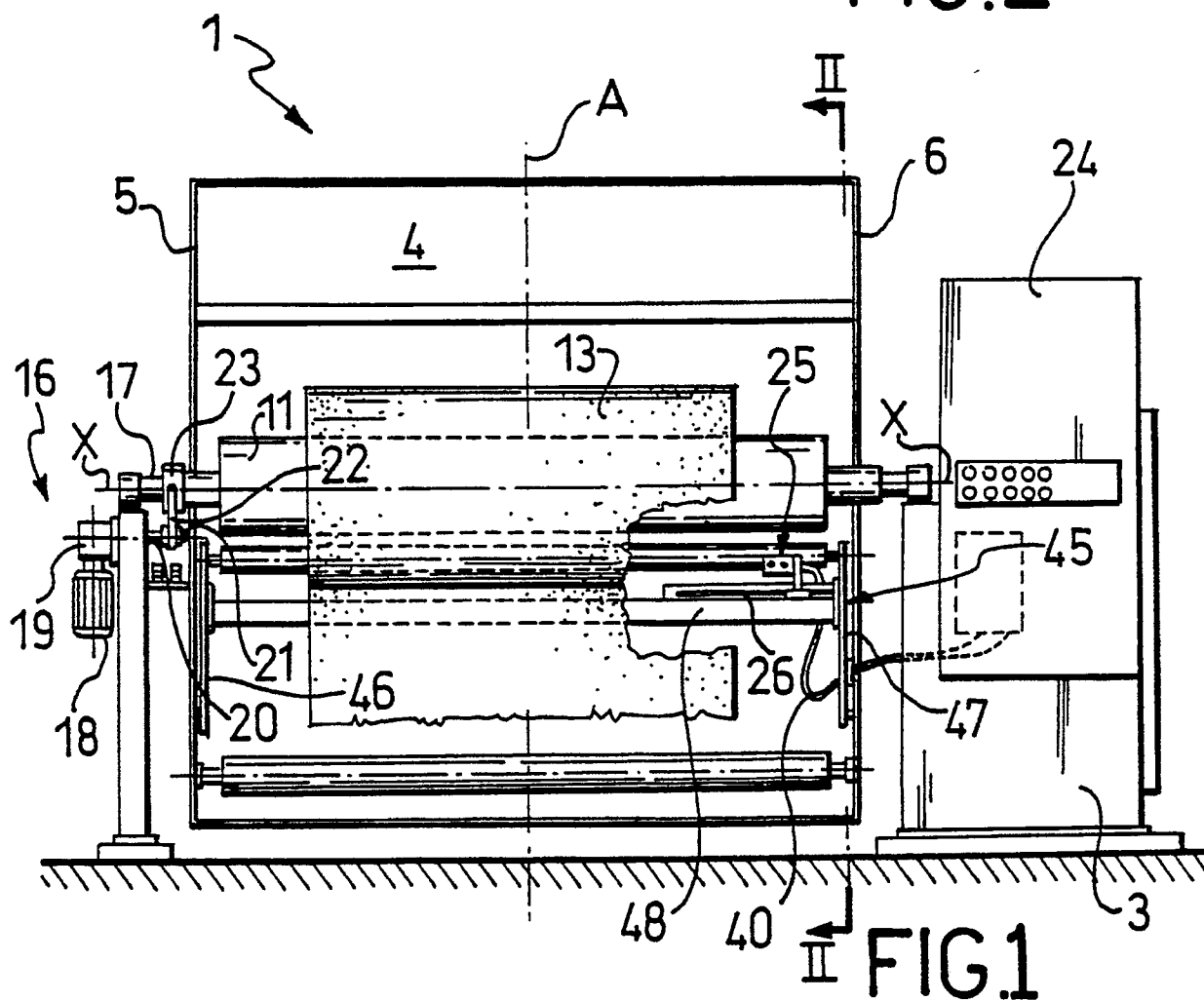
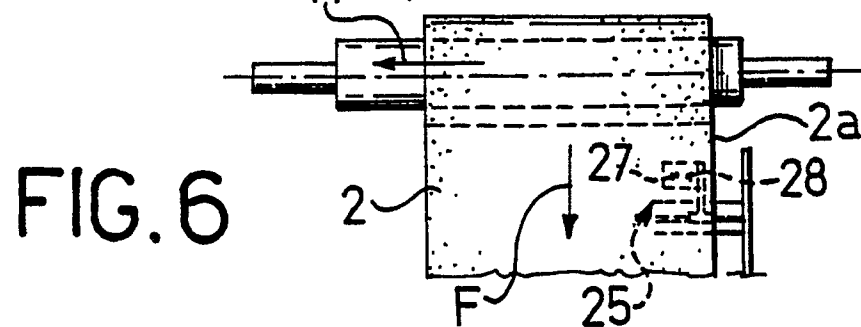
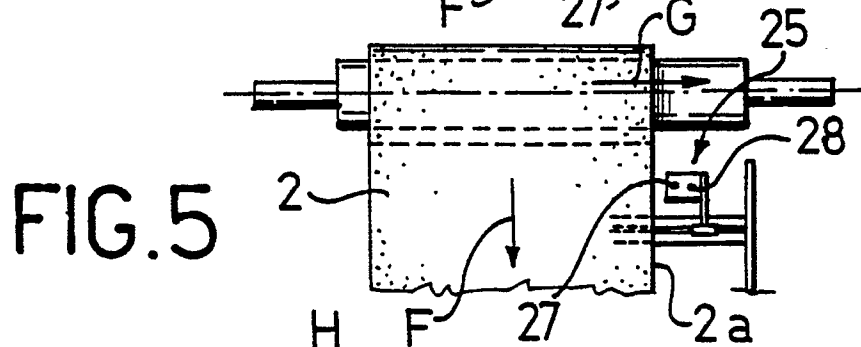
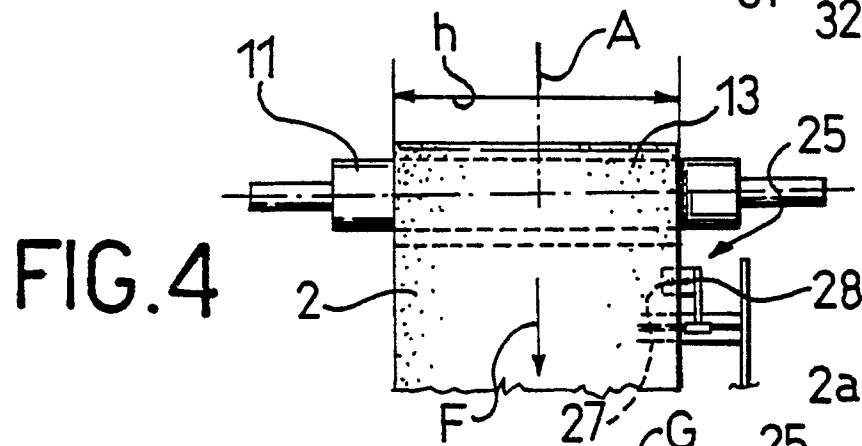
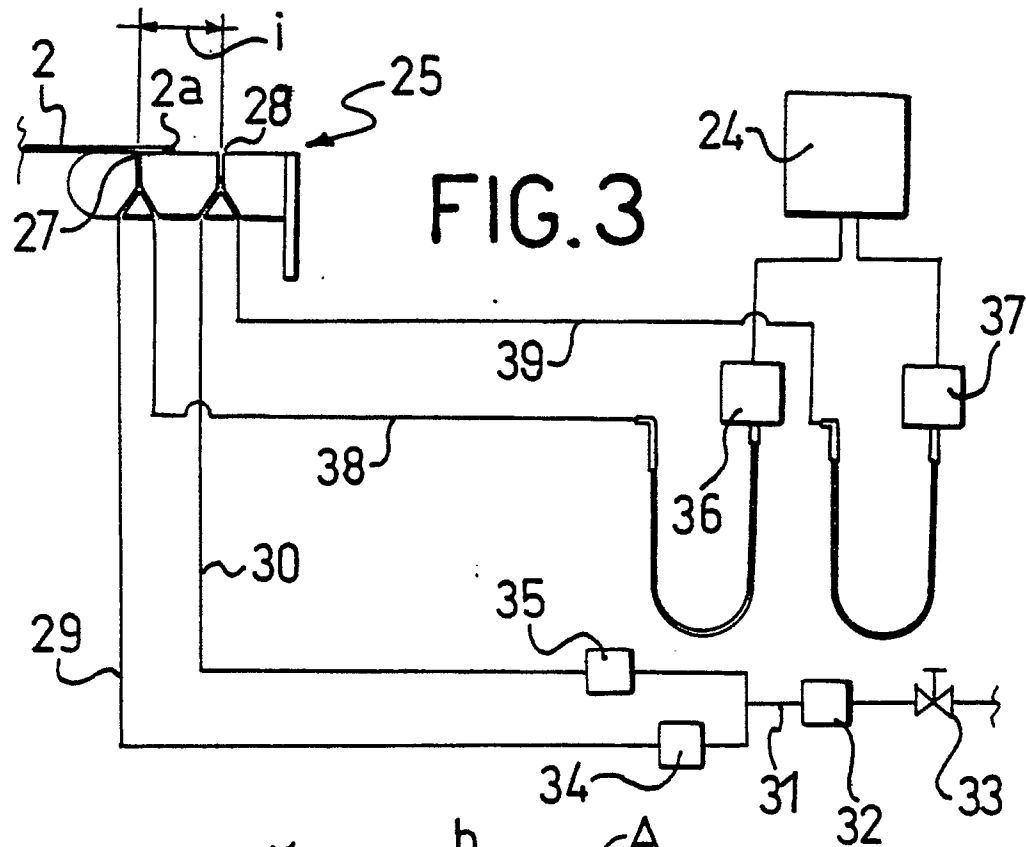


FIG. 1





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number

EP 90 10 3073

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages.	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	CH-A-667478 (BENNINGER) * the whole document *	1, 2	D06B3/32 B65H23/02
Y	----	3-5	
Y	US-A-3727817 (LEIGH SYSTEMS) * the whole document *	3-5	
A	GB-A-1300011 (KNOX) * the whole document *	3-5	
A	GB-A-1148837 (GPE CONTROLS) -----	3-5	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			D06B B65H
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 01 JUNE 1990	Examiner PETIT J. P.
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	