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(54) System to handle and store woven piece goods.

(57) System to handle and store woven piece goods, or cloth, which are produced on looms (11) and wound thereby (11) on cloth rollers (19), the woven piece goods thereafter having to undergo an operation of inspection and quality control, the system providing for the employment of movable means (13) able to run independently on pre-set and predeterminable (12) runways in weaving sheds, the movable means (13) being equipped to unwind automatically at the looms (11) the woven piece goods, or cloth, from full cloth rollers (19) and to take up such piece goods on empty cloth supports (21) borne on the movable means (13) themselves and being suitable also to move the piece goods thus taken up from the weaving shed to a temporary storage zone (14) located immediately upstream of a cloth inspection zone (15) and also to cooperate with an area (34) for temporary storage of empty cloth supports (21).

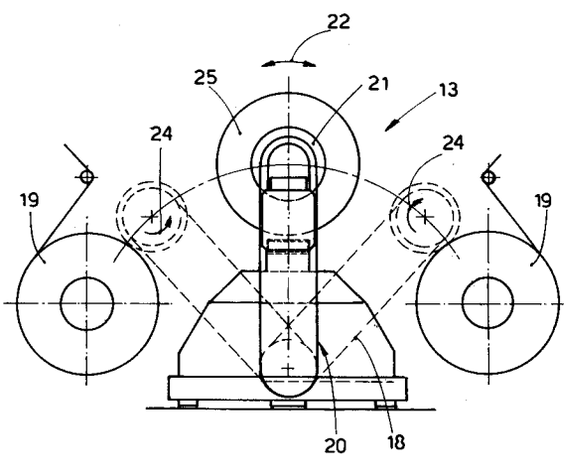

fig.3

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This invention concerns a system to handle and store woven piece goods. To be more exact, the invention concerns a system able to remove woven goods produced on looms, to convey them to appropriate storage zones and to store them thereafter in temporary storage.

The system of the invention can be applied to any weaving shed where woven piece goods are taken up on traditional cloth rollers on the looms.

The system will operate avantageously, but not only, in coooperation with the department that inspects the woven goods downstream of the looms.

The problems linked to the discharge and removal of prepared woven piece goods from looms are known in the state of the art. These goods are taken up on the well known cloth supports which are handled with manual methods by the machine operators.

In particular, when the length of the woven product to be discharged is not great, one or more operators normally unwind the product by hand from its relative take-up support and themselves convey it to the zone of inspection of the woven goods.

In this zone the woven products are run on appropriate apparatuses where their suitability as regards quality is inspected; they are then wound up to form a finished product or a product ready for further treatment.

The present applicant is not aware of systems or apparatus suitable to automate the operational methods set forth above.

The present applicant has designed, tested and embodied a system for handling and storage of woven piece goods which is suitable to overcome all the drawbacks of the state of the art.

The invention is set forth in the main claim, while the dependent claims describe various features of the invention.

The system according to the invention provides for the inclusion of movable means able to run through the weaving shed independently, these movable means being advantageously of a type guided by a magnetic wire.

The movable means are equipped to unwind automatically from, and at the side of, the looms the woven products wound on the cloth rollers and thus to empty the full cloth rollers and make them suitable for another weaving step.

The unwound woven product is taken up on a support borne by the movable means and capable of being fully analogous to the cloth rollers of the looms.

The movable means are summoned advantageously to the looms which require tending, and follow pre-set and pre-determinable paths between the looms and a zone for storage of such supports full of woven products taken from the looms.

In the storage zone the movable means cooperate with means which unwind the woven products from a full support and rewind it on available analogous empty supports.

According to a variant the full support on the movable means is unloaded in the storage zone and an empty support is loaded thereafter on the same movable means.

The storage zone provides for temporary storage of the full supports before use of the latter in the equipment used for inspection of the prepared woven goods.

The storage period and the number of full supports being temporarily stored will normally depend on the daily working period of the looms and of the inspection equipment and will therefore provide also for a possible buffer stock.

Means to handle and store empty supports will also be included in the storage zone, such empty supports waiting to take up woven products from the looms or else to be loaded on the movable means according to the variant cited above.

The system according to the invention provides a plurality of advantages, particularly as regards the labour force required, transport, overall working times of the cycle and the space taken up together with the relative savings of costs.

The attached figures, which are given as a non-restrictive example, show the following:

- Fig.1 gives an example of a lay-out of a weaving shed employing the system of the invention;
- Fig.2 is a diagrammatic side view of a movable means according to the invention;
- Fig.3 is an enlarged front view of the movable means of Fig.2;
- Fig.4 is an organizational working diagram of a zone to store supports according to the invention.

Fig.1 gives a diagram of a weaving shed 10 holding a plurality of looms 11, which are arranged in this example in such a way as to have their sides discharging the woven product facing each other.

In this way it is possible to tend both the facing sides with one single runway 12 between the looms 11.

One or more of the movable means, which are advantageously trolleys 13 of a type guided by a magnetic wire, can run along the runways 12.

Each trolley 13 is equipped with devices able to converse with each loom 11 so that it can be summoned and directed as required.

The trolley 13 can halt conveniently immediately upstream of a zone 14 for temporary storage of woven products taken from the looms 11, this storage zone 14 in turn being located immediately upstream of a zone 15 for inspection of the

woven products.

Figs.2 and 3 show diagrammatically one form of embodiment of the trolley 13, which consists of a frame 16 able to move on wheels 17.

The frame 16 comprises casing means 18 to hold the drive means and motion transmission means, and also actuation means, such as sets of batteries and other devices.

The trolley 13 travels on runways 12 in the direction of its lengthwise development and is halted at the loom 11 which has summoned it in the vicinity of the full cloth roller 19.

Fig.3 shows an example, with lines of dashes, of possible full cloth rollers 19 on two facing looms 11; in Fig.3 the trolley 13 is shown in an enlarged front view for illustrative purposes.

The trolley 13 is equipped with a pair of oscillatory arms 20, which are conformed to bear a cloth support 21 and to position the same 21 by means of a suitable angular displacement 22 (positions shown with lines of dashes in Fig.3) in its working position against a full cloth roller 19 of the loom 11.

This angular displacement 22 is obtained by suitable motor means in the casing 18, these motor means not being shown in the figures.

The cloth support 21 is connected to a drive means 23, which rotates the support 21 about its axis according to the arrow 24 whenever the support 21 is brought into contact with a full cloth roller 19.

Rotation 24 of the cloth support 21, suitable assisted by pre-positioning the end of the cloth on the support 21, leads to unwinding of the cloth from the roller 19 and to winding of the cloth on the support 21, as shown by the layer of cloth 25 in Fig.3 in the inactive position of the oscillatory arms 20.

The trolley 13 is therefore able to remove the prepared cloth from the loom 11 and to enable the loom 11 to start a new weaving step.

Fig.4 gives a diagrammatic side view of a temporary storage zone 14 and a connected zone 15 for inspection of woven products.

The trolley 13 returning from a travel in the runway 12 is brought to a cloth unwinding zone 26, in which suitable unwinding means 27 unwind the woven cloth from the support 21 on the trolley 13 and wind it on an analogous support 21 borne by the unwinding means 27.

When this operation has ended, the trolley 13 therefore holds an empty support 21 and can return to the weaving area, while the full cloth packages 28 are discharged onto a buffer storage unit 29 suitable to accommodate a plurality of such packages 28.

The buffer storage unit 29 may be a conveyor belt, roller conveyor or another means suitable to feed a plurality of adjacent packages in succession.

According to a variant the trolley 13 discharges directly onto the buffer storage unit 29 the woven cloth support 21 with the layer of wound cloth 25 thereon and is loaded with a fresh empty support 21, as will be made clearer hereafter.

A further movable storage 30, such as a chain or the like comprising advantageously multiple runways, cooperates with the buffer storage unit 29 and receives wound cloth packages 28 from the buffer storage unit 29, thus providing a further buffer storage zone for the packages 28.

Such a lay-out makes it possible to deal automatically with different offtake rates in the weaving shed of the looms 11 and the inspection zone 15.

For instance, the looms 11 may work three shifts, whereas the inspection department 15 may work only one shift, and it will be possible to have available a storage zone 14 of a size able to accommodate the output of at least two shifts of the looms 11.

One or more machine operators 31 are usually present in the inspection zone 15 and are able to take the wound cloth packages 28 from the movable store 30 so as to feed an inspection apparatus, which is normally a winding machine 32; this removal of packages 28 from the store 30 may also be of an automatic type.

The removal of packages 28 from the movable store 30 by the machine operator 31 may take place at any position of the movable store 30 without impairing the continuity of feed to the winding machine 32 and with advantage to the working methods of the operator 31.

The winding machine 32 winds the inspected woven cloth on final packages 33, while the empty support 21 of the unwound packages 28 may be put advantageously onto an endless circuit 34 able to carry and deliver the empty supports 21 to the cloth unwinding zone 26 so that one of the supports 21 can be automatically engaged and used by the unwinding means 27.

According to a variant described earlier the empty cloth supports 21 are loaded directly in the unwinding zone 26 onto the movable trolley 13 on arrival there of the latter 13.

We have described here a preferred embodiment of the invention, but it is obvious that many variants are possible for a person skilled in this field without departing thereby from the scope of the invention as claimed.

Claims

1. System to handle and store woven piece goods, or cloth, which are produced on looms (11) and wound thereby (11) on cloth rollers (19), the woven piece goods thereafter having

to undergo an operation of inspection and quality control, the system being characterized in that it provides for the employment of movable means (13) able to run independently on pre-set and pre-determinable (12) runways in weaving sheds, the movable means (13) being equipped to unwind automatically at the looms (11) the woven piece goods, or cloth, from full cloth rollers (19) and to take up such piece goods on empty cloth supports (21) borne on the movable means (13) themselves and being suitable also to move the piece goods thus taken up from the weaving shed to a temporary storage zone (14) located immediately upstream of a cloth inspection zone (15) and also to cooperate with an area (34) for temporary storage of empty cloth supports (21).

2. System as claimed in Claim 1, in which the movement of the wound piece goods by the movable means (13) to the temporary storage zone (14) takes place by unwinding the woven piece goods from their cloth supports (21) borne by the movable means (13) and by taking up the piece goods on analogous empty cloth supports (21).

3. System as claimed in Claim 1, in which the movement of the wound piece goods by the movable means (13) to the temporary storage zone (14) takes place by discharging from the movable means (13) the cloth supports (21) having piece goods (25) wound thereon and by replacing the same with empty cloth supports (21) on the same movable means (13).

4. System as claimed in any claim hereinbefore, in which the movable means are trolleys (13) which comprise means with an oscillatory arm (20) to bear the cloth supports (21).

5. System as claimed in any claim hereinbefore, in which the oscillatory arm (20) comprise means (23) for rotary actuation of the shaft of the cloth supports (21).

6. System as claimed in any claim hereinbefore, in which the cloth supports (21) themselves carry out the unwinding of the woven piece goods from the full cloth rollers (19).

7. System as claimed in any claim hereinbefore, in which the oscillation (22) of the oscillatory arms (20) can take place clockwise or anticlockwise.

8. System as claimed in any claim hereinbefore, in which the rotation (24) of the actuation means (23) can take place clockwise or anticlockwise.

9. System as claimed in any claim hereinbefore, in which the trolley (13) is advantageously of a type guided by a magnetic wire.

10. System as claimed in any claim hereinbefore, in which the trolley (13) comprises means to converse with the looms (11).

11. System as claimed in any claim hereinbefore, in which the temporary storage zone (14) comprises a station (26) for unwinding the woven piece goods by means (27) that unwind the piece goods from the cloth support (21) and take up the piece goods on an empty cloth support (21) available at the station (26).

12. System as claimed in any of Claims 1 to 10 inclusive, in which the temporary storage zone (14) comprises a station for discharge of full cloth supports (21) from the movable means (13).

13. System as claimed in any claim hereinbefore, in which the temporary storage zone (14) comprises buffer storage means (29-30) which lodge and circulate full cloth packages (28).

14. System as claimed in any claim hereinbefore, in which the temporary storage zone (14) comprises means (34) to lodge and circulate empty cloth supports (21).

15. System as claimed in any claim hereinbefore, in which the buffer storage means (29-30) cooperate with the trolley (13) directly and automatically.

16. System as claimed in any claim hereinbefore, in which the means (34) to lodge and circulate empty cloth supports (21) cooperate with the trolley (13) directly and automatically.

17. System as claimed in any of Claims 1 to 15 inclusive, in which the means (34) to lodge and circulate empty cloth supports (21) cooperate with the unwinding means (27) directly and automatically.

18. System as claimed in any claim hereinbefore, in which the buffer store (30) comprises automatic means to feed the full cloth packages (28) to an inspection winding machine (32).

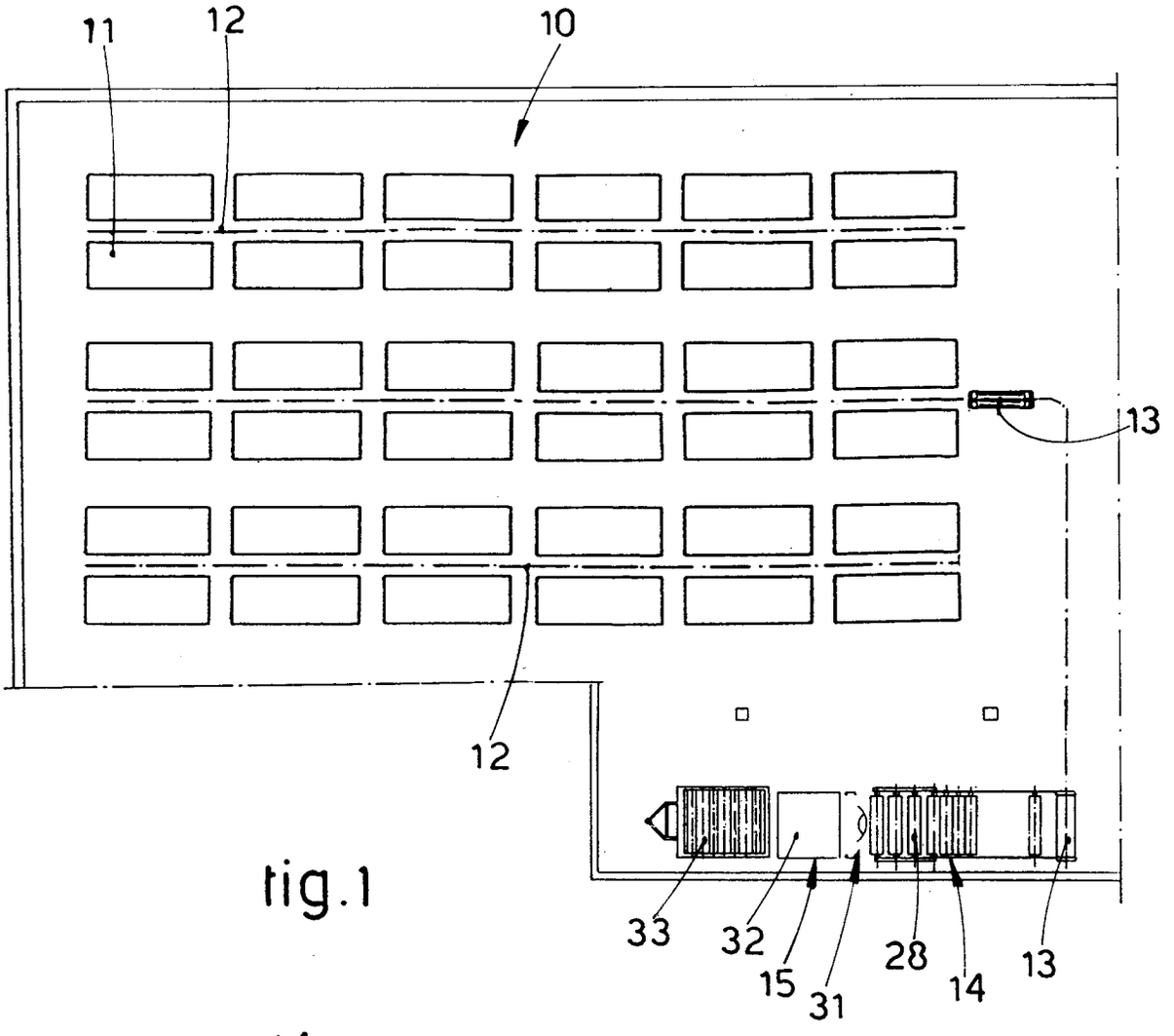
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fig.1

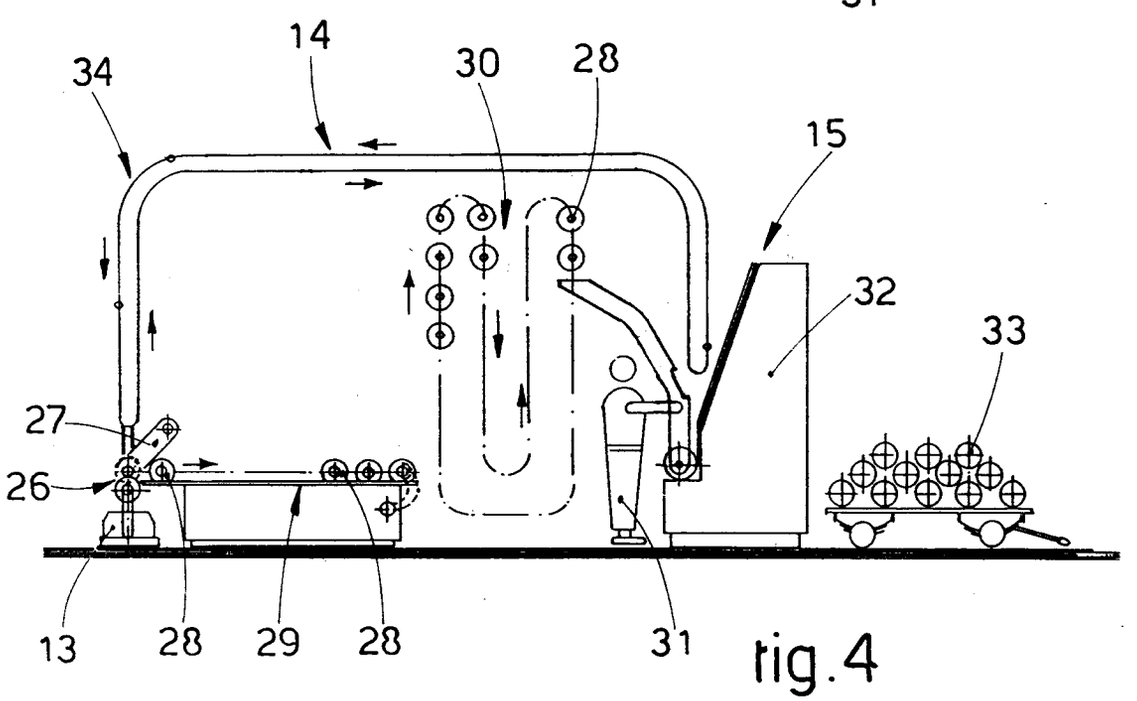
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fig.4

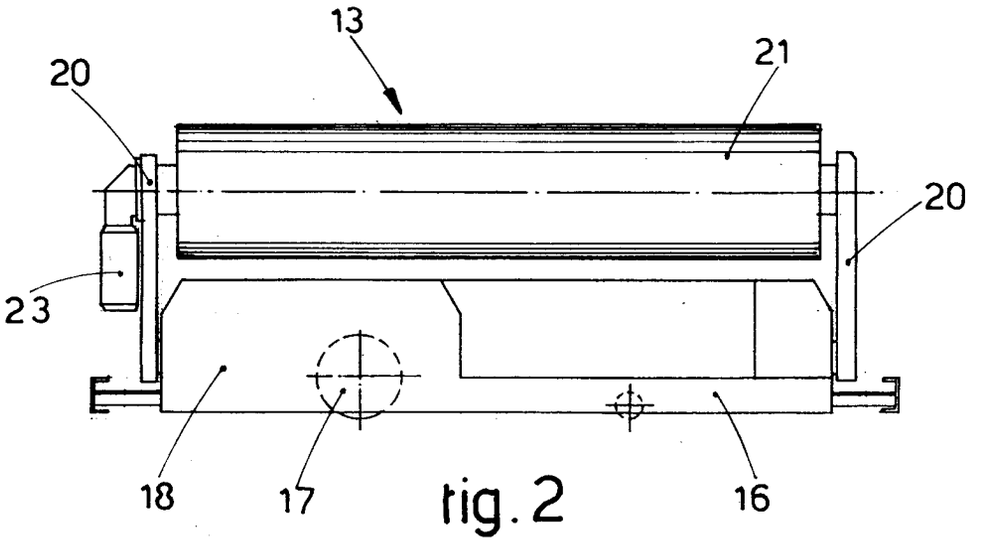

fig. 2

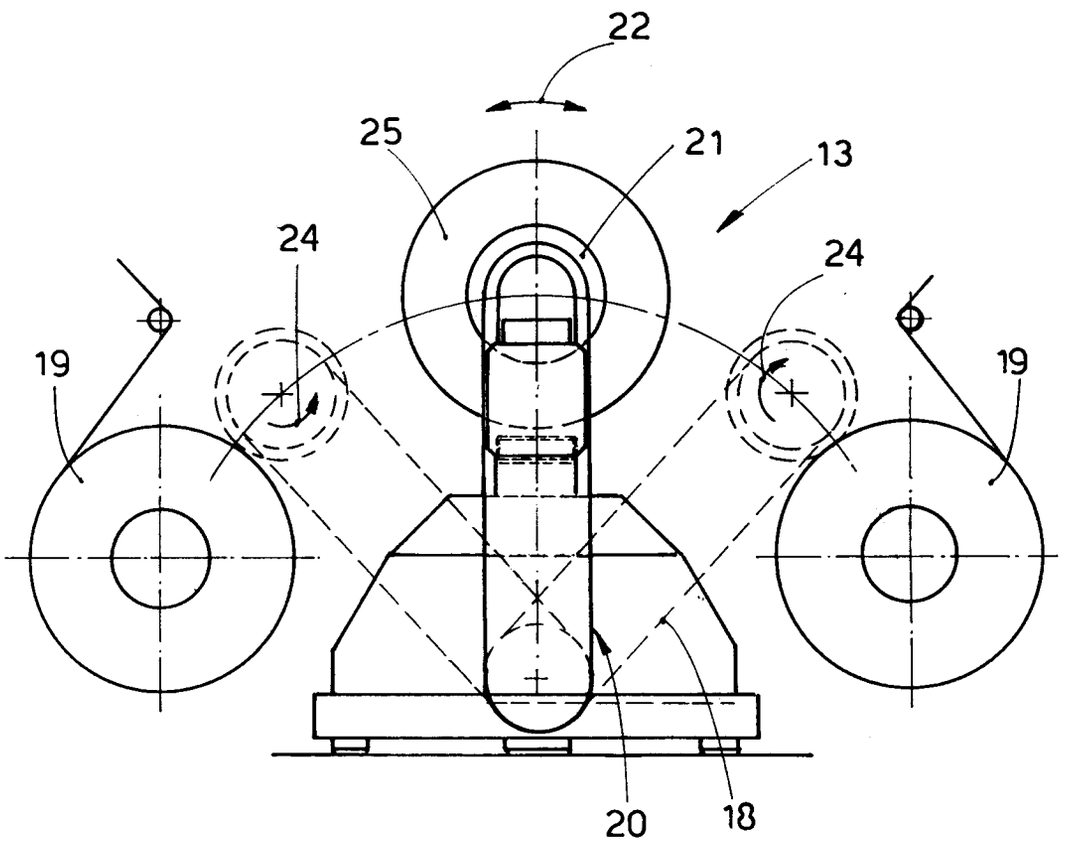

fig. 3

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EUROPEAN SEARCH REPORT

Application Number

EP 91 11 5922

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)
A	EP-A-0 296 113 (SULZER) * the whole document * *	1,2,4-7	D 03 J 1/00
A	INDUSTRIE TEXTILE. no. 1193, November 1988, PARIS FR & ZUND: 'Changement automatique du rouleau toilier' * page 1155 - page 1157 * *	1,2,4-7,9, 10,12-18	
A	DE-A-3 828 730 (KABUSHIKI KAISHA TOYODA JIDOSHOKKI SEISAKUSHO) * the whole document * *	1,4,7,9, 10,12	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

D 03 J
B 65 H

The present search report has been drawn up for all claims

Place of search	Date of completion of search	Examiner
The Hague	13 January 92	BOUTELEGIER C.H.H.

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