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(54) A method of feeding signatures to a saddle of a stitching machine.

(57) A method for feeding signatures (2) to a saddle (4) of a stitching machine which permits a high feed velocity, and therefore a high productivity, comprises the steps of transporting the signatures (2) in a predetermined direction towards the saddle (4) with a stepwise advancement and in an inclined orientation, and opening each signature with the signature stationary.

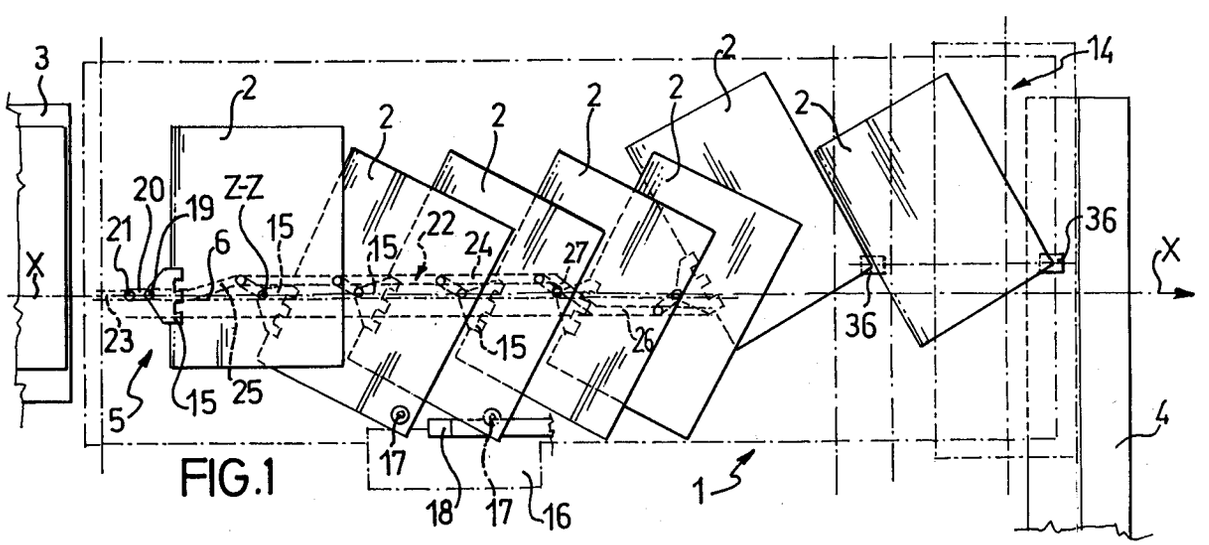

FIG.1

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The present invention relates to a method for supplying signatures to a saddle of a stitching machine, comprising the steps of transporting the signatures in a predetermined direction towards the saddle, and separating the leaves of the signature during transport.

Known methods of the above specified type leave something to be desired as far as productivity is concerned. In fact, they involve a rather slow transport of the signatures. On the other hand, the speed cannot be increased because the separating of the leaves of the signature or signature-opening operation would have to take place in an irregular and insufficiently reliable manner.

The problem on which the present invention is based is that of devising a method of the specified type which will allow a high productivity without interruption or lack of certainty.

This problem is resolved by a method of the above-specified type which is characterised by the fact that during transport the signatures are advanced in an inclined orientation and with a step wise advance so that signature opening is performed when the signature is stationary.

Further characteristics and advantages of the method according to the present invention will become apparent from the following description of a preferred embodiment, given with reference to a signature feed device which is illustrated in the attached drawings, in which:

Figure 1 is a schematic plan view of a signature feed device for performing the method of the invention;

Figure 2 is a schematic side view of the device of Figure 1;

Figure 3 is a perspective view of a detail of the device of Figure 1; and

Figure 4 is a perspective view of a further detail of the device of Figure 1.

With reference to the attached drawings, the reference numeral 1 generally indicates a feed device for feeding signatures 2 in a direction X-X, from a signature store 3 to a fixed saddle 4 of a stitching machine.

The device 1 includes a chain conveyor 5 having a closed chain 6 tensioned between pulleys 7 and 8 supported by a frame 9, one of the said pulleys being driven by motor means 10.

An active branch 11 of the chain extends along the direction X-X. The signature store 3 is located at a first end 12 of the active branch 11. An accelerator device 14 is interposed between a second end 13 of the active branch 11 and the saddle 4.

The chain 6 is provided with pincers 15 regularly spaced incrementally along it at a predetermined pitch.

In the example the pitch is about 200mm. For medium or large signatures these are partially superimposed over one another.

Each pincer 15 is intended to grip one signature 2 by its spine 2A and to propel the signature in the direction X-X from the store 3 to the saddle 4 in such a way that the free edge 2B and the associated corners 2C and 2D at the ends of the free edge 2B face forwardly with reference to the transport direction X-X.

To one side of the chain conveyor 5 there is provided a signature opening device 16 which comprises a sucker 17 or rather a blower nozzle acting on the venturi principle. The sucker 17 is intended to suck the upper sheet 2A of the signature 2 and to separate it from the lower sheet 2F of the signature, and a blade 18 constituting a ramp for the upper sheet 2E.

Each pincer 15 is supported by the chain 6 in such a way as to be rotatable about a pin 19 having a vertical axis Z-Z. In this way it can turn when required. It is thus possible to rotate the signature 2 from a position, in which its spine 2A lies perpendicular to the direction X-X, to a first rotated position in such a way that the corner 2A, for example the right hand corner with respect to the transport direction, is retarded and caused to project laterally towards the right, and then to a second position in which the signature is caused to rotate in the opposite sense in such a way as to make the same right corner 2A project forwardly so as to straddle the saddle.

For this purpose the pincer 15 is provided with an arm 20 having a roller 21 at its free end.

The roller 21 is in guided engagement in a groove 22 formed in the frame 9 and constituting a shaped track. The groove 22 extends along the X-X direction and has a first rectilinear section 23, a second rectilinear section 24 displaced laterally to the left with respect to the section 23 and joined to it by a ramp 25, and a third rectilinear section 26 displaced laterally of the section 23 on the opposite side from the section 24, that is to the right and joined to the section 24 by means of a ramp 27.

The accelerator device 14 includes a chain conveyor 28 having a chain 29 passing over pulleys 30, 31 and 32 so as to identify in the chain a horizontal section 33 in prolongation of the active branch 11, an inclined descending section 34 and an inclined return section 35.

Along the chain 28 are disposed pincers 36 operable to receive and retain the lower sheet 2F of the opened signature.

It is to be noted that the motor means 10 which drive the chain 6 are stepping or intermittent motor means.

During operation each signature is transported in the X-X direction for a first distance with its

spine perpendicular to the X-X axis. Subsequently it is turned by engagement of the roller 21 with the ramp 25 in such a way that its corner 2A is retarded and projects laterally towards the signature-opening device 16.

In this position the motor means 10 stops and the signature opening device is activated to cause separation of the corner 2A by the sucker 17 which acts on the upper sheet 2E of the signature to separate it or split it from the lower sheet 2F.

At this point the motor means 10 are reactivated and the chain starts to move again. The signature is then turned in the opposite sense by engagement of the roller 21 with the ramp 27 in such a way as to cause the separated corner 2A to move ahead and project forwardly as far as the pincer 36 of the accelerator device 14 which grips the lower sheet 2F of the open signature.

The signature is then transported and accelerated by the accelerator device along the section 33 and the section 34 until the open corner 2A straddles the saddle 4.

In accordance with the invention a method for feeding signatures 2 onto the saddle 4 of a stitching machine comprises the steps of transporting the signature 2 along the X-X direction towards the saddle 4 and opening the signature 2 during transport.

During transport the signatures 2 are caused to advance in an inclined orientation and with a stepwise advancement so that the signature opening is effected with the signature stationary. Each signature 2, thrust by its spine 2A, is caused to turn first in one sense in such a way as to retard and laterally project its corner 2C to bring it into engagement with the signature-opening device 16, and then in the opposite sense in such a way as to cause the separated corner 2C to advance and to project forwardly to cause it to straddle the saddle 4.

The transport of the signature is effected by gripping its spine 2A with an associated pincer 15 and rotation of the signature, first in one sense and then in the opposite sense is effected by orientating the pincer.

The principle advantage of the device according to the present invention is that it allows a reliable signature opening to take place in that this is effected with the signature stationary and therefore in the best conditions.

The mounting of the signature onto the saddle also takes place in a reliably certain manner in that the signature is presented to the saddle with its corner completely open.

The advantage of the device according to the present invention is that it allows a high productivity in that the signatures can be transported at a very high speed. This high speed does not compromise the signature opening in that when this operation takes place the signature is stationary.

Obviously, a man skilled in the art may introduce numerous modifications and variations to the method and device described above for the purpose of satisfying contingent and specific requirements, all, however, contained within the protective ambit of the invention as defined in the following claims.

Claims

1. A method for feeding signatures (2) to a saddle (4) of a stitching machine, comprising the steps of transporting the signatures (2) in a predetermined direction (X-X) towards the saddle (4) and opening the leaves of the signature (2) during transport, characterised by the fact that during transport the signatures (2) are caused to advance in an inclined orientation and with a step wise advancement so as to perform the leaf opening operation with the signature stationary.

2. A method according to Claim 1, characterised by the fact that during transport each signature (2) is propelled by its spine (2A) and is caused to turn first in one sense in such a way as to cause one corner (2C) to be retarded and to project laterally to bring it into engagement with a leaf opening device (16), and then in the opposite sense in such a way as to cause the separated corner (2C) to advance and project forwardly to cause it to straddle the saddle (4).

3. A method according to Claim 2, characterised by the fact that the transport of the signature (2) is effected by gripping the spine (2A) of the signature (2) with a pincer 15, and by the fact that the rotation of the signature (2) first in one sense and then in the opposite sense is effected by orientating the pincer (15).

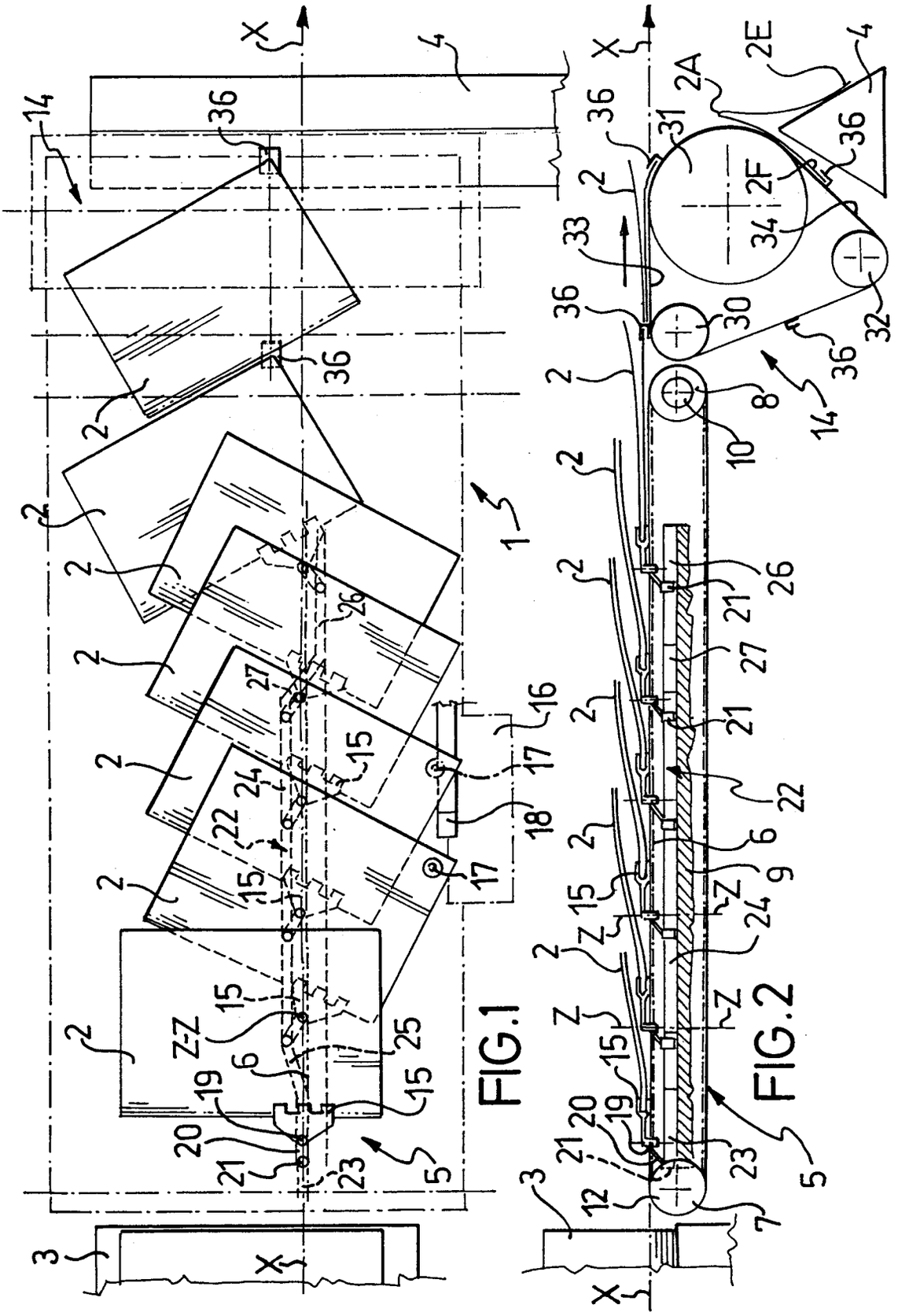

FIG.1

FIG.2

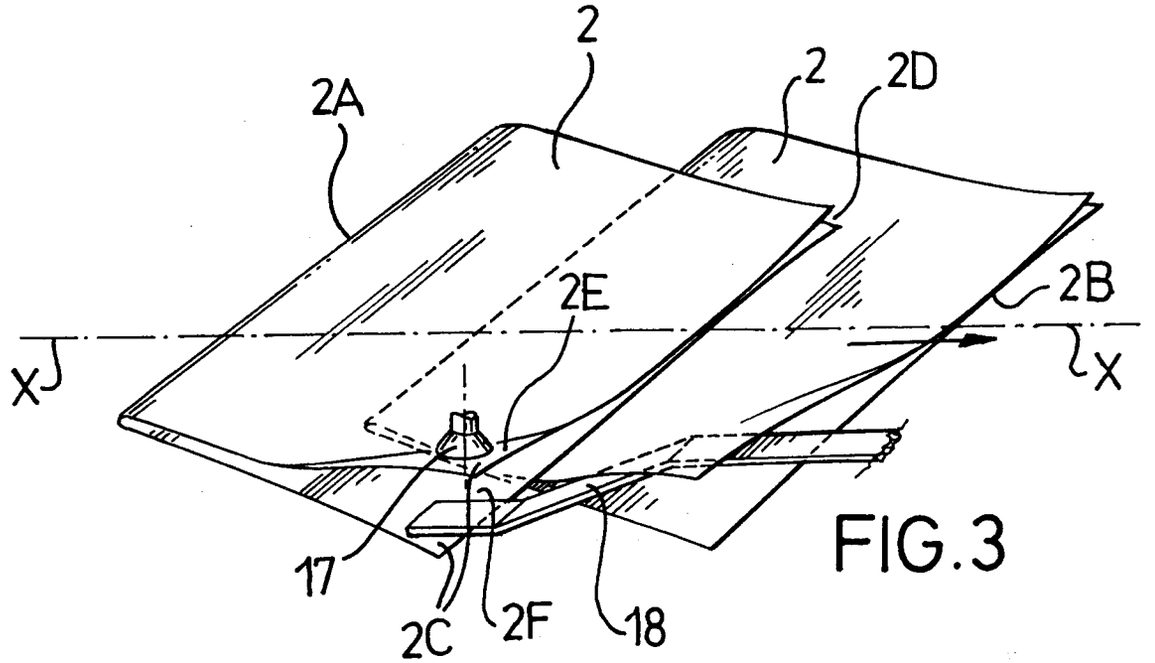

FIG.3

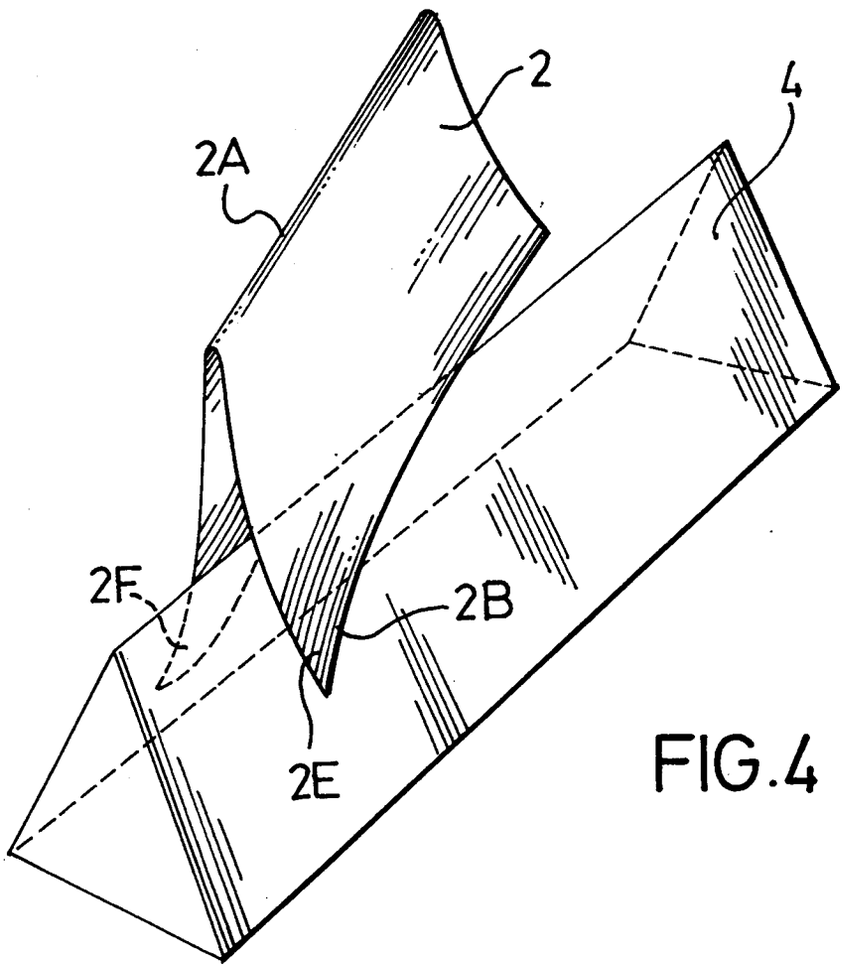

FIG.4

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EUROPEAN SEARCH REPORT

Application Number

EP 92 12 0620

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	US-A-3 008 705 (HARRIS-INTERTYPE)		B65H5/30
A	US-E-29 071 (SMYTH EUROPEA)		

TECHNICAL FIELDS SEARCHED (Int. Cl.5)
B65H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	20 SEPTEMBER 1993	LONCKE J.W.

CATEGORY OF CITED DOCUMENTS

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