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(54) Traverse guide with detectors.

(57) A textile yarn winding apparatus having a traverse yarn guide mechanism including a yarn guide which is formed of two fingers, between which the yarn is guided when laying yarn on a flanged bobbin, the relatively leading finger in any yarn guide stroke being pivoted out of the plane of the fingers at or prior to, contact with the bobbin flange to a position clear of the flange so that the relatively trailing finger can be moved up to the flange to lay yarn closely adjacent the flange, there being detectors on said fingers for detecting the abutting of a respective trailing finger with a bobbin flange, said detectors each comprising a pivotally mounted elongate (21,21') member which has a roller (22,22') at one end for contacting a flange of a bobbin and adjustable means at the other end for displacing the actuating member of a micro-switch (50') when the elongate member is pivoted as a consequence of the roller contacting the flange, and in which the detector on one of the fingers (comprising the elongate member roller and switch) is itself mounted on a plate (46) which is pivotally attached to the respective finger, said plate being biased so as to be held at a position in which the pulley of the detector is located at, or sufficiently apart from, the inner face of the finger such that the pulley does not obstruct the pulley of the detector on the other finger, said plate co-operating with an inclined abutment (64) on the other finger such that when said other finger is raised to clear a bobbin flange the plate is pivoted so as to bring its respective detector into a position to detect the bobbin flange.

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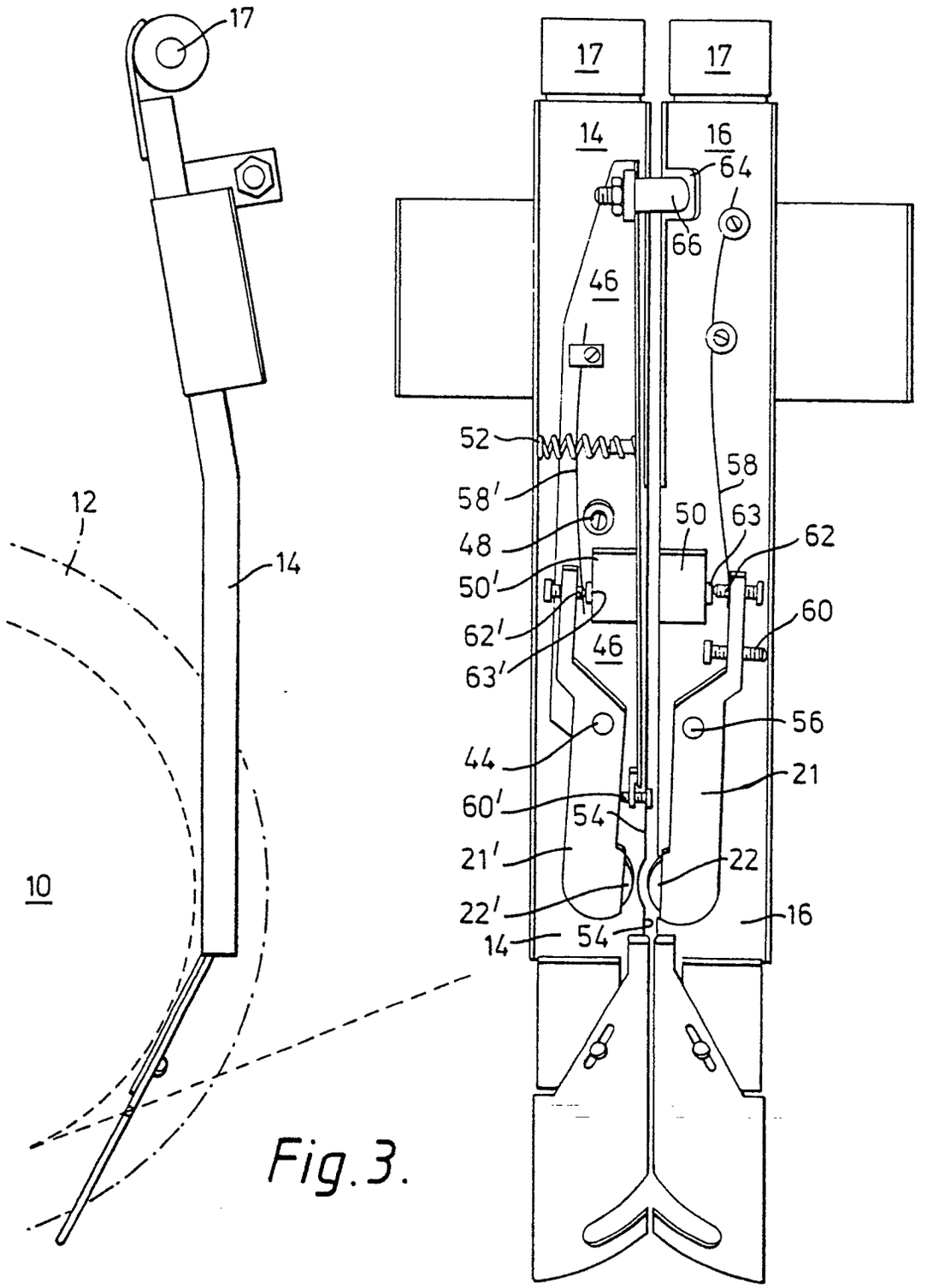
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Fig. 3.

"TRAVERSE GUIDE WITH DETECTORS"

This invention relates to textile yarn winding apparatus and in particular to the reciprocal traverse guide used in such apparatus for laying yarn in a precise position on to a bobbin.

Our British Patent No. 2127860 describes and claims a textile yarn winding apparatus comprising a yarn traverse mechanism including a yarn guide which is caused to reciprocate along the length of a flanged bobbin to be wound, to lay the yarn on the bobbin wherein the yarn guide is formed of two parts or fingers between which, in use, the yarn is located for movement along the length of the bobbin body, the relatively trailing part or finger in any particular stroke of the guide acting to cause the yarn to be moved fully up to the flange of the bobbin, the two parts of the guide each being movable independently from its normal position to a position clear of the flange of the bobbin, means being provided to displace the relatively leading guide part or finger in any particular stroke at or prior to the said leading part reaching the flange of the bobbin so that the said trailing part may move to a position closely adjacent the flange.

The winder described in Patent Specification No. 2127860 has on the inner face of each guide finger, a displaceably mounted detector member carrying a pulley. The arrangement is such that a respective pulley contacts the inside face of the corresponding flange of the bobbin at the end of each stroke. The pulley is rotated by the rotating flange to reduce friction and at the same time, the pressure on the pulley causes the detector to displace relative to its mount to send a signal to reverse the direction of the traverse movement of the yarn guide.

Such a winder will hereafter be referred to as "a yarn winder of the type described".

It was necessary for the pulleys carried by the detectors of "a yarn winder of the type described" to be offset to either side of the vertical diametral line of the bobbin, so as to avoid contact with each other. This arrangement, however, causes a problem due to the fact that, depending on which side of the diametral line the pulley makes contact with the rotating bobbin flange, that pulley is subjected to a force tending to either lift it from, or to press it down on to, the surface of the package being wound on the bobbin. These phenomena cause unwanted variations in the winding at both ends of the packet particularly when a fine filament is being wound.

The general object of this invention is to minimise or eliminate these variations.

A winder of the type described in accordance with the invention has the detector member of at least one of the guide fingers mounted on a carrying plate which is movably mounted on the respective finger, the carrying plate being normally held in an inoperative position in which the pulley of the associated detector member is located at, or sufficiently apart from, the inner face of the guidefinger for that pulley not to obstruct the pulley of the detector member carried on the other guide finger when said other detector member pulley is in its normal position for detecting a bobbin flange, means being provided to move the carrying plate and hence the detector member associated therewith from its inoperative position to an operative position in which the pulley of the said associated detector member is in a position to engage the respective flange of the bobbin, when, and only when, the said other guide finger is displaced from its normal detecting position, the carrying plate being moved to return the detector member to its normal inoperative position when the said other guide finger is returned to its normal detecting position.

The invention will now be further described by way of example with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of a yarn winder of the type described as illustrated in our British Patent Specification No. 2127860,

Figure 2 is a sketch illustrating the problem which may arise with yarn winding apparatus of the type described and as generally shown in Figure 1,

Figure 3 is a plan view of the yarn guide members of one embodiment of a winding apparatus in accordance with the present invention,

Figure 4 is a view correwponding to figure 3 showing the position of the guide members when at one end flange of a bobbin, and

Figure 5 is a view corresponding to Figure 4 showing the position of the guide members when the other flange of the bobbin is to be engaged.

Referring to Figure 1, the yarn laying mechanism of the winder comprises a traverse guide generally indicated at 2 which is caused to reciprocate along a screwed and rotating guide bar 4 by a nut formed in a traverse box 8.

The guide 2 rests on a package being wound on a bobbin 10 provided with flanges 12 and as can be seen in Figure 1 the guide is formed with two flat fingers 14 and 16 each pivoted separately at 17 on the traverse box 8. the fingers 14 and 16

can thus each hinge upwardly to accommodate the growth of the package. Each flat finger has a Tungsten carbide strip 18 to help to withstand abrasion of the filament being wound.

In practice filament or yarn is fed between the two parts or fingers 14, 16 of the guide so as to be reciprocated by the guide along the length of the bobbin between the flanges. As the guide is moved in the direction of the arrow A in Figure 1 towards the right hand flange 12 depending on the position of the yarn let-off guide (not shown), the trailing leg 14 of the guide acts to push the yarn along the bobbin over at least the last part of the traverse. In order to prevent the leading yarn finger 16 from fouling the flange 12, the leading finger 16 is lifted by engagement of the finger with a cam 20. The cam is formed so that finger 16 is lifted through a sufficient distance to clear the flange 12 (as can be seen in Figure 1) enabling the trailing finger 14 of the guide to lay the yarn very closely adjacent the right hand flange. The leg 16, although raised clear of the flange, still extends beyond the yarn line so that when the traverse is reversed it can, if required, immediately influence the movement of the yarn in the opposite direction.

A similar cam 20 is provided adjacent the left hand flange 12 of the bobbin so that the then leading guide finger 14 will itself be lifted as the guide approaches the other flange. The guide finger 16 will then act to push yarn against the said other flange.

In order to made sure that the length of each traverse stroke of the yarn guide is such as to lay the yarn closely adjacent each bobbin flange, a detector member 21 (21') carrying a pulley 22 - (22') is pivotally mounted on the inner face of each guide member 14, 16 so as to engage the inside face of each flange 12 at the end of each stroke respectively. The pulley then acts to reduce friction when engaging the flange.

When member 21 (21') engages a flange, through pulley 22 (22'), the member pivots on its guide member and an electrical signal is transmitted by means of a circuit indicated by dash lines 24 to a connecting box 26 and from thence to a fluid cylinder 28, the piston 30 of which is connected to a pivoted member 32 carrying two drive wheels 34, 36.

When the piston 30 is in the position illustrated in Figure 1, the drive wheel 36 extends between and connects a main driven wheel 38 and a driven wheel 40 attached at the end of the spindle 4 so as to rotate the spindle in one direction.

When a signal from a detector pulley is received the piston 30 is drawn into the cylinder 28 causing the arm 32 to pivot and the drive wheel 36 driven by wheel 34, to come into contact with the driven wheel 40 causing the wheel 40 to be driven in the opposite direction, the traverse box 8 and guide means 2 being then caused to move in the opposite direction along the bobbin 10.

In this way, the length of each traverse stroke is determined by the detectors on the guides thus ensuring that the yarn is laid up to the respective flanges. This also obviates the problem which could arise were the bobbin diameter to increase by build-up of yarn thereon, causing increased pressure on the flanges which could even cause distortion thereof.

With the device illustrated in Figure 1 it is necessary for the pulleys 22, 22' to be offset on either side of the vertical diametral line of the bobbin so as to avoid contact with each other as can be seen with reference to Figure 2. This arrangement, however, causes a problem as, depending upon which side of the vertical diametral line 42 the pulleys make contact with the rotating bobbin flange 12, the pulley is subjected to a force tending either to lift it from the package surface or to press it down on to the package surface.

This causes uneven winding adjacent the bobbin flanges and is overcome by the construction of the fingers in accordance with the invention, as will now be described with reference to Figures 3 to 5.

Figure 3 shows the two guide fingers 14 and 16 lying side by side in their normal position for winding. The detector member 21' of the finger 14 is pivotably mounted at 44 not to the finger itself as is the case with the detector member 21 of the finger 16 but rather to a carrying plate 46 which is itself pivoted at 48 to the finger 14. The micro switch device 50' to transmit the signal to the mechanism for reversing the traverse movement is also carried on the plate 46 which is biased by means of a spring 52 to the position shown in Figure 3 in which it is pivoted in a clockwise direction about the pivot 48 to move the detector pulley 22' to an inoperative position away from the inner edge 54 of the finger 14. It can thus be positioned opposite to the corresponding pulley 22 of the finger 16 which is not carried on a plate 46 but is rather pivoted about a pivot 56 directed to the finger 16.

Both the detector members 21 and 21' are biased by means of a spring member 58, 58' to a position in which they are held by stop screws 60, 60' with their switch contact adjustment screws 62, 62' held apart from the corresponding actuators 63, 63' on switch units 50, 50'. In this position, therefore, both the pulleys can be located on the diametral line 42 (see Figure 2).

When the finger 14 approaches the corresponding flange 12 of the bobbin at the end of one stroke it is lifted by a cam device as described with reference to Figure 1 to a position as illustrated in

the lefthand side of Figure 4 in which it can clear the flange. The pulley 22 then engages the flange and is moved against the bias of a spring 58 in an anti-clockwise direction about its pivot 56 until the contacts 62', 63 close and a signal is transmitted to reverse the traverse movement.

When the yarn guide unit reaches the other flange 12 of the bobbin the finger 16 is lifted as illustrated in the lefthand side of Figure 5. so as to be able to clear the corresponding flange 12 of the bobbin.

In so doing a deflecting surface 64 provided adjacent the inner end of the finger 16 engages a stud 66 connected to the inner end of the carrying plate 46 of the finger 14. This stud and hence the plate 46 is moved to the left as shown in Figure 5 as the surface 64 rises, causing the carrying plate 46 to pivot about its pivot 48 to bring the detector pulley 22' into the operative position as seen in Figure 5 overlapping the inner edge 54 of the finger 14 so that it can engage the adjacent flange 12 on the diametral line 42.

On contact with the flange the deflector member 21' is pivoted about its pivot 44 against the bias of the spring 58' in a clockwise direction so that the screw 62' and actuator 63' engage. This causes the traverse drive to reverse. As the fingers move away from the flange 12 the finger 16 is again lowered to the position shown in Figure 3 with the result that the carrying plate 46 is pivoted in a clockwise direction about the pivot 48 by the bias provided by the spring 52 with the stud 66 sliding back over the deflecting surface 64 until the position in Figure 3 is again reached.

It will be appreciated that the winder could be employed to wind two bobbins simultaneously positioned along the length of the winder. As seen in Figure 1, the screw thread in this case would extend entirely along the length of the spindle 4 and a second traverse box 8 and a yarn guide 2 would be incorporated.

Claims

1. A textile yarn winding apparatus comprising a yarn traverse mechanism including a yarn guide which is caused to reciprocate along the length of a flanged bobbin to be wound, to lay the yarn on the bobbin wherein the yarn guide is formed of two fingers between which, in use, the yarn is located for movement along the length of the bobbin body, the relatively trailing finger in any particular stroke of the guide acting to cause the yarn to be moved fully up to the flange of the bobbin, each of said fingers being displaceable from its normal position to a position clear of the flange of the bobbin and means for displacing the relatively leading finger in any particular stroke at or prior to the said leading finger reaching the flange of the bobbin so that the said trailing finger may move to a position closely adjacent the flange, each of said fingers having a respective detector member to sense the bobbin flange at the end of the respective stroke and to then transmit a signal to cause the drive for the traverse mechanism to be reversed, each respective detector member comprising a pulley positioned on the inner edge of the respective finger so as to contact a bobbin flange when the respective finger is the trailing finger and pivot relative thereto to transmit an appropriate signal to the control means, and wherein the detector member of at least one of the fingers is mounted on a carrying plate which is movably mounted on the respective finger, the carrying plate being normally held in an inoperative position in which the pulley of its associated detector member is located at, or sufficiently apart from, the inner face of the finger for that pulley not to obstruct the pulley of the detector member carried on the other finger when said other detector member pulley is in its normal position for detecting a bobbin flange, means being provided to move the carrying plate and hence the detector member associated therewith from its inoperative position to an operative position in which the pulley of the said associated detector member is in a position to engage the respective flange of the bobbin, when, and only when, the said other finger is displaced from its normal detecting position, the carrying plate being moved to return the detector member to its normal inoperative position when the said other finger is returned to its normal detecting position.

2. A winder according to Claim 1 wherein each said pulley is mounted at one end of a respective elongate member which is pivotally mounted at an intermediate position along its length and which co-operates with switch means at its other end, each said elongate member being rotatably biased with respect to its mount in a direction so as to enable the respective pulley to engage the respective flange of the bobbin.

3. A winder according to Claim 2 wherein said carrying plate extends along a portion of the respective guide finger, being pivotally mounted thereon at an intermediate position along its length and being rotatably biased to said inoperative position, and in which the respective switch means is also mounted on said carrying plate.

4. A winder according to any preceding claim wherein said fingers are displaceable in an upward direction and said carrying plate incorporates an abutment member which co-operates with a surface on the other finger which is inclined to the

vertical plane such that when one or other of the fingers is lifted, the carrying plate is pivoted by or against its bias.

5. A winder according to any preceding claim in which the means for displacing the finger comprises a cam or its equivalent positioned on the winder adjacent the or each flange of the body and which is engaged by the relatively leading finger and which acts to pivot the said leading finger upwardly at a position close to the flange so that the said leading finger may pass over the top of the flange.

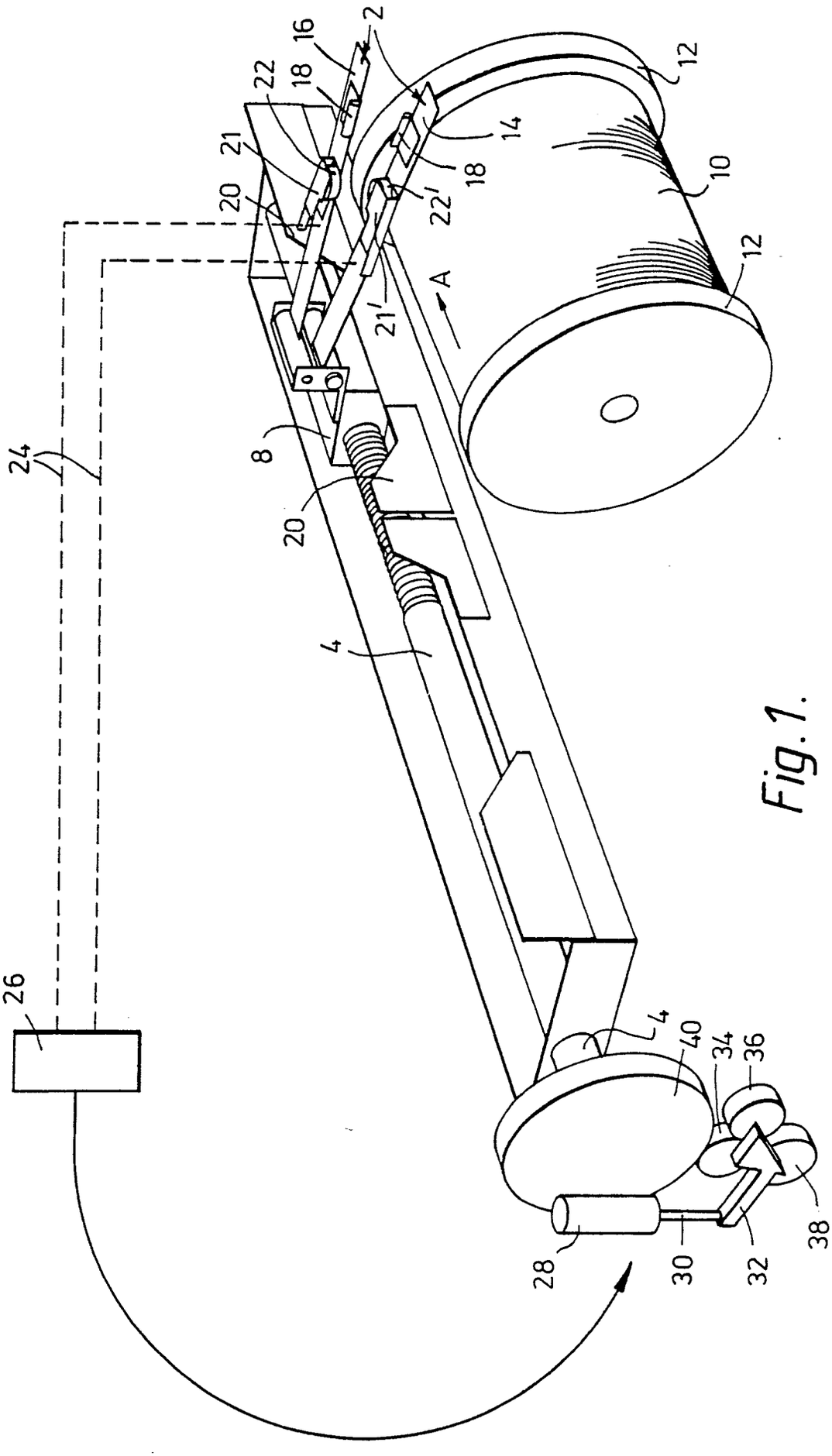
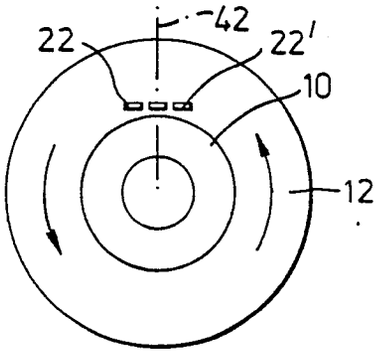


Fig. 1.

Fig.2.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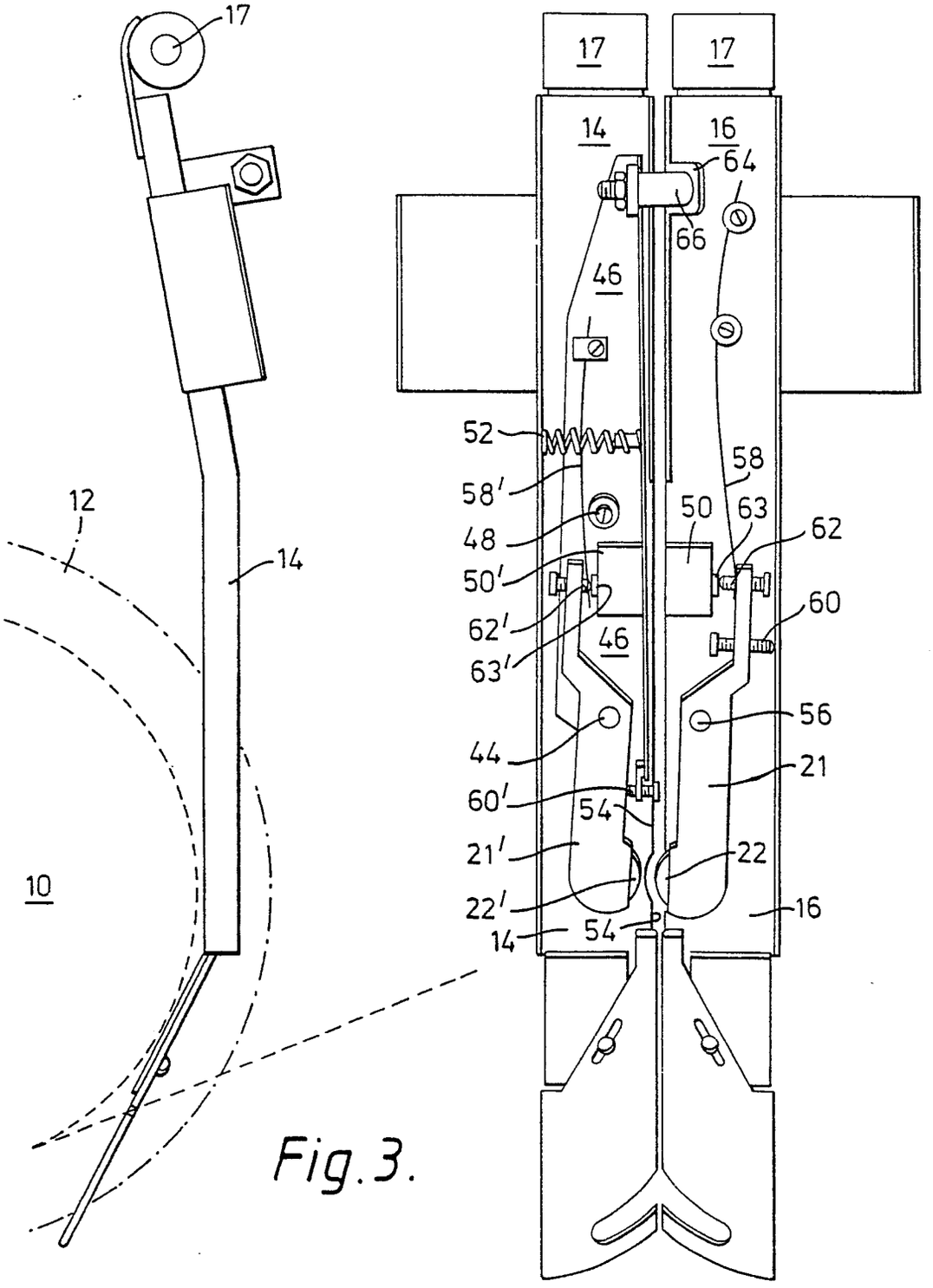
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Fig.3.

Fig. 4.

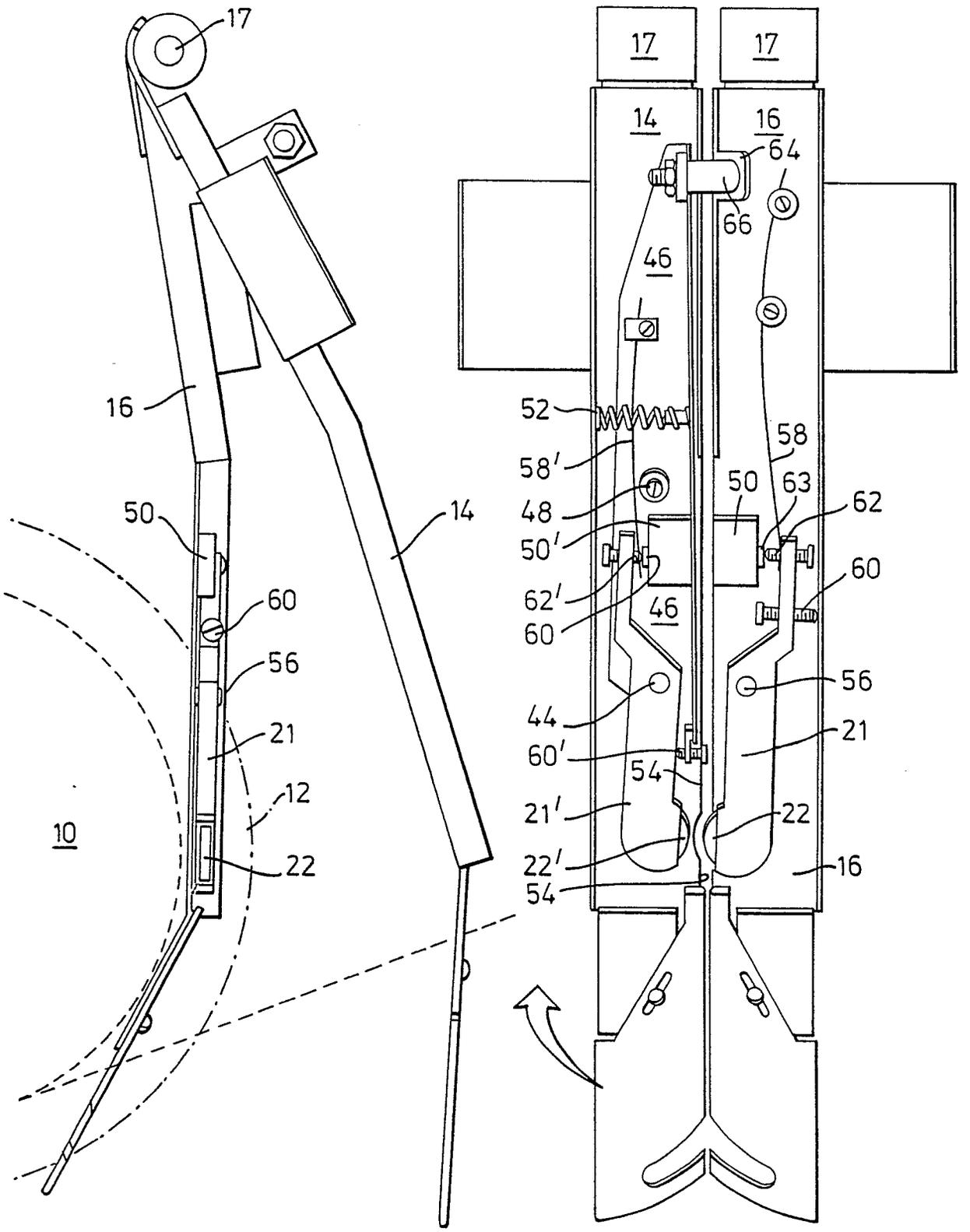
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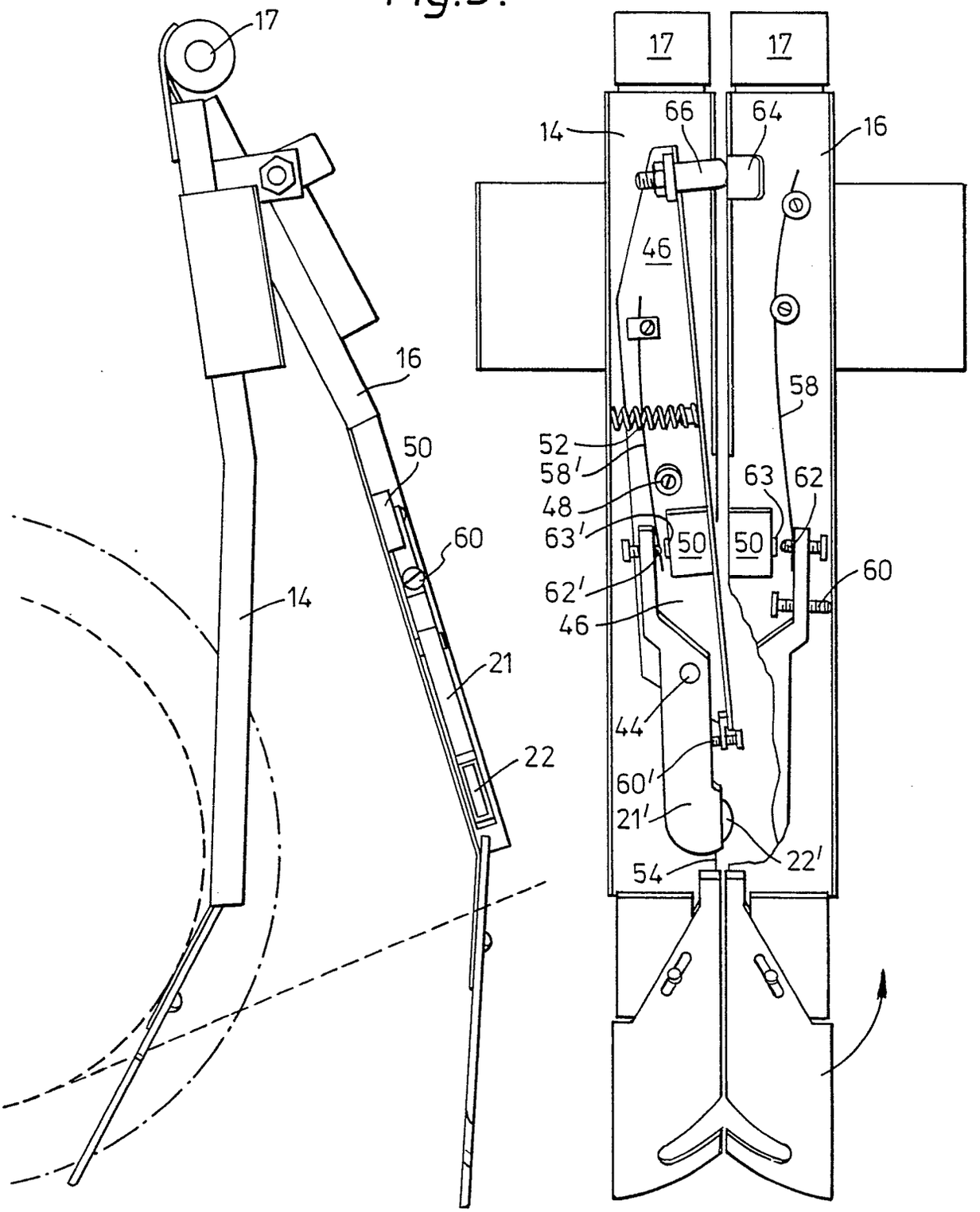
Fig.5.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European Patent Office

EUROPEAN SEARCH REPORT

Application number

EP 86304255.2

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.4)
D,A	GB - A - 2 127 860 (JAMES MACKIE & SONS) * Totality * --	1,5	B 65 H 54/28
A	GB - A - 720 212 (BRITISH INSULATED) * Totality * --		
A	US - A - 3 257 087 (KRIETE et al.) * Totality * --		
A	US - A - 3 498 567 (BAKER et al.) * Totality * --		
A	US - A - 3 997 128 (HARA et al.) * Totality * --		TECHNICAL FIELDS SEARCHED (Int. Cl.4) B 65 H 54/00 B 65 H 57/00
A	US - A - 4 179 083 (HARA et al.) * Totality * ----		

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
VIENNA	11-09-1986	SCHATEK

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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