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(12) # EUROPEAN PATENT APPLICATION

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(54) **Deblistering machine.**

(57) This invention relates to an apparatus for extracting articles such as pharmaceutical tablets from faulty blister packs. Previous devices for performing this task could only accommodate one size of blister pack or could not easily be adjusted to cater for different sizes. By feeding blister packs between two cooperating rotating rollers (23 and 33), however, one of which (23) is provided with slideably adjustable dogs (53 and 55), blister packs of varying sizes may readily be deblistered.

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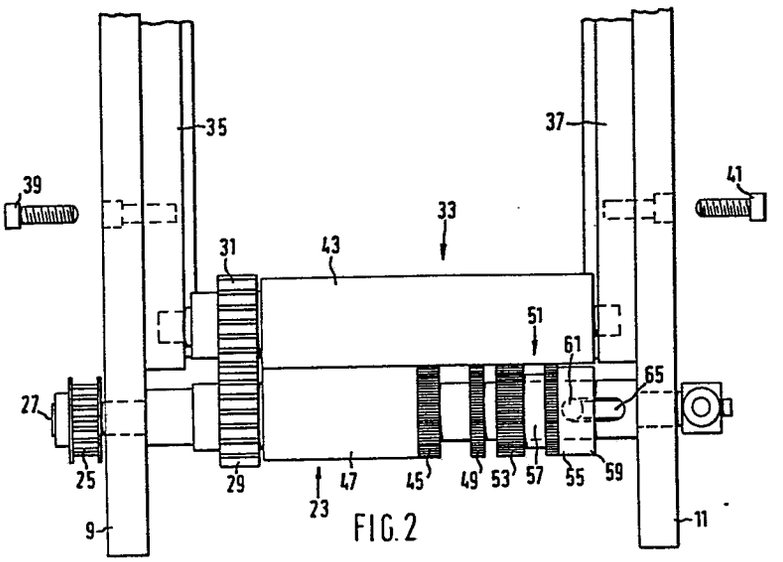

FIG. 2

DEBLISTERING MACHINE

The present invention relates to an apparatus for extracting articles, especially pharmaceutical tablets, from blister packs.

Blister packs are a very common means of packaging pharmaceutical tablets. Such packs generally comprise a sheet of initially flat clear plastics material in which are formed a series of wells. A tablet is inserted into each of the wells, the open ends of which are sealed by means of a sheet of aluminium foil which is attached to the plastics material sheet. Each tablet is thus sealed in its own well until use, when the clear plastics blister is depressed by finger pressure and the tablet is forced out through the foil backing.

Although deblistering would normally only be done by the consumer, there are reasons why some faulty packs have to be deblistered on a pharmaceutical tablet blister pack production line. First, occasional tablets may be lost on tracks or because of malformed blisters or leaks. Secondly, it is necessary to deblister a calender pack if the tablets are found to be out of registration with dates marked on the pack. Thirdly, the well-forming station (which is usually a punching station) and sealing station may be out of register - it may be that nothing is wrong with the tablets themselves in such a case, but the appearance of the pack would be less than desirable. Fourthly, the batch number, which is applied after the packs are sealed, may be unclear. Fifthly, it may occasionally be found useful or necessary to reclaim old stock.

Deblistering a large number of packs by hand is both time consuming and costly. A number of machines have therefore been devised for this task, but have suffered from several disadvantages. One such machine, for instance, tends to crush the tablets on extraction; another tends to remove a portion of foil from the back of each blister when a tablet is removed; and it appears to be a general failing of such machines that they are not adjustable to take differently sized blister packs without the use of a spanner. Because of work safety regulations in force in some countries, this operation can require a fitter.

According to the present invention, there is provided an apparatus suitable for extracting articles from a blister pack, which apparatus comprises a first member having a recess defined by a first recess defining portion and a second recess defining portion, the first recess defining portion being translationally movable with respect to the second recess defining portion, and a second member, the first and second members being adapted to hold a blister pack and the second member being adapted to bear on one or more blisters of a blister pack when so held so as to displace an article, when enclosed by one of said blisters, out of the blister pack towards the recess.

The first and/or second member(s) may be plates, but it is preferred that the first and second members both be parallel rollers. In such a case, the recess defining portions, which may be serrated, are desirably formed from one or more dogs or collars of the first roller and it is preferred that the position of at least one of the recess defining portions be movable, with respect to the second roller, in a direction parallel with axes of rotation of the rollers. Means may therefore be provided for moving the or a recess defining portion. The moving means may comprise an electromagnetically operable device but preferably comprises a manually operable lever, the lever conveniently being provided with locking means for locking it in one of a plurality of positions

and advantageously being operable against and/or with the action of spring biasing means.

In a preferred embodiment, means for collecting de-blistered blister packs and/or articles extracted from blister packs is provided. The collecting means may comprise an outlet in a casing for the apparatus and/or one or more receptacles. Sorting means, such as an appropriate sieve, may also be provided for sorting articles extracted from blister packs from de-blistered blister packs.

The apparatus may comprise guide-means for guiding a blister pack to a position where the blister pack can be gripped by the first and second rollers. The guide-means may enable a blister pack to be guided to different positions along a line parallel with the axis of rotation of the first roller.

So that an appropriate force may be exerted on the blisters by the second member to displace an article enclosed by a blister, it is preferred that the first and second members be spring biased towards one another.

For a better understanding of the present invention, and to show how it may be put into effect, reference will now be made, by way of example, to the accompanying drawings, in which:

Figure 1 shows a perspective view of an apparatus in accordance with the present invention;

Figure 2 shows a plan view of part of the apparatus shown in Figure 1;

Figure 3 shows an exploded front elevational view of part of the apparatus shown in Figure 1; and

Figure 4 shows an exploded front elevational view of another part of the apparatus shown in Figure 1.

Referring first of all to Figure 1, there can be seen an apparatus 1 in accordance with the present invention, which comprises a base 3, and an essentially cubic housing 5 having a front wall 7, a back wall (not shown), a left-hand side wall 9, a right-hand side wall 11 and an upper surface 13. The upper surface 13 comprises an opaque, metal rear portion, 13a, covering approximately the rear three quarters of the upper surface, and a transparent plastics material front portion 13b, covering the front quarter of the upper surface. Between the front portion 13b and the rear portion 13a is a transverse slit 15 through which a blister pack to be deblistered can be inserted. Located approximately centrally on the upper surface 13 is a guide means 17 for guiding the feeding of a blister pack through the slit. The guide means 17 is generally similar to a lathe turret feed and comprises a cuboid structure 19 rotatable about a centrally located vertical axis in such a way that any of the four lateral sides of the cuboid may lie along the slit between the front portion 13b and the rear portion 13a of the upper surface. On top of the cuboid structure 19 is located a locking screw 21 on the axis of rotation of the guide means 17. The locking screw 21 can be loosened manually for the guide means 17 to be rotated, and then tightened, also by hand, when the guide means 17 is in the desired orientation. It will become apparent later why it is desirable to have different lateral faces of the guide means 17 adjacent the slit 15.

Through the clear front portion 13b of the upper surface can be seen a first member in the form of a first roller 23, which is shown in greater detail in Figures 2 and 3. The first roller 23 has a horizontal axis of rotation and is journalled into the left and right hand side walls 9 and 11 of the housing 5. The first roller 23 may be caused to rotate by rotating a belt gear 25 located outside the left hand side wall on a shaft 27 which is formed as an extension of the first roller 23.

To the left hand end of the first roller 23, but inside the left hand side wall 9, there is mounted a first gear wheel 29, which meshes with a second gear wheel 31 mounted on a second roller 33 lying adjacent the first roller 23 and journalled in a left hand mounting block 35 and a right hand mounting block 37 affixed to the inside of the left and right hand side walls 9 and 11 respectively by means of respective bolts 39 and 41.

The second roller 33 constitutes a second member. The journalling of the second roller 33 may be such as to spring-bias the second roller 33 against the first roller 31 but, whether this feature is present or not, the second roller 33 will, in use of the apparatus 1, route in an opposite sense to that of the first roller 23.

Apart from the second gear wheel 31, the second roller 33 has a smooth surface 43 and is of uniform diameter. The left hand half of the first roller 23, that is the portion adjacent the first gear wheel 29, is the same diameter as the second roller 33, and, apart from a radial serrated band 45 at the right hand end of this half of the first roller 23, has a smooth surface 47. The right hand half of the first roller 23 has only about two thirds the diameter of the left hand half. A fixed dog 49 is mounted on the right hand half of the first roller 23 a short distance from the centre of the roller. The radius of the fixed dog 49 is the same as the radius of the left hand half of the roller, and the edge is serrated. To the right of the fixed dog 49 a slidable collar 51 is mounted. The slidable collar 51 comprises two serrated radial dogs 53 and 55 having the same diameter as the left hand half of the first roller 23 and a neck 57 joining these two dogs. The neck 57 has a wider bore, of course, than the diameter of the right hand half of the first roller 23 (so as to be able to fit over it), but a narrower diameter than the left hand half. The right hand end of the slidable collar 51 is a smooth-surfaced anchoring portion 59, which

has a diameter the same as the diameter of the left hand end of the first roller 47. The left hand end of the slidable collar 51 is serrated. The anchoring portion 59 has a radial circular hole 61 spanning its entire diameter for accomodating a plug 63 (Figure 3). The plug 63 is located in a diametrical slot 65 in the first roller 23, by virtue of which the plug 63, and hence the entire slidable collar 51, can move axially with respect to the remainder of the first roller 23.

In use of the apparatus 1, a blister pack is fed between the first and second rollers 23 and 33 with the blisters directed towards the second roller 33, which has a smooth surface along its entirity, the blister pack being so positioned that articles contained within the blisters can be pushed out of the blisters through the back of the blister pack into the recess defined by two dogs of the first roller 23 or by a wide diameter portion of the first roller 23 and a dog which thereby constitute recess-defining portions of the first roller. It will be understood that by varying the axial position along the rollers at which the blister pack is fed into the apparatus, differently sized blister packs may be accomodated and de-blistered. Similarly, by moving the slidable collar 51 axially along the first roller 23 blister packs of differing sizes may be deblistered by the apparatus. Articles forced out of a blister pack being deblistered are collected in a drawer 67 (Figure 1) which slides on the base 3 into the front of the apparatus 1 through an appropriately shaped hole in the front surface 7 of the housing 5.

The position of the slidable collar 51 is determined by a selector mechanism 69, details of which are apparent from Figures 3 and 4. The slideable collar 51 is, as has already been described, mounted on the right hand half of the first roller 23, that is, the half with the narrower diameter. A bore 71 is formed along the axis of the first roller 23 from the right hand end and terminates in the slot 65 within which the plug 63 may move axially along the first roller

23. A rod 73 is inserted into the bore 71 and terminates within the plug 63, which is also provided with a bore 75, where it is retained by a pin 77. The other end of the rod 73 is jouralled in a bearing 79, where it is fastened by a nut 81 and bolt 83 to a selector arm 85 extending upwardly at right angles to the axis of the first roller 23. The free end of the selector arm 85 is provided with a handle 87 for ease of manual manipulation and extends through a casing 89 for the selector mechanism 69. Lateral movement of the selector arm 85 causes the rod 73 to move axially with respect of the first roller 23 and will cause the position of the slidable collar 51 to be altered with respect to the first roller 23. A gate may be provided in the casing 89 of the selector mechanism 69 so that the selector arm 85 can be locked in one of a plurality of axial positions by appropriate rotary movement of the selector arm 85 about the axis of the first roller 23. The selector mechanism 69 may incorporate a spring so that the slidable collar 51 is spring-biased to the left hand end of the first roller 23.

It will be appreciated that differently sized blister packs may be deblistered with relative ease. The position of the recesses and recess-defining dogs of the first roller 23 may be altered by means of the selector mechanism 69, and, in addition, the blister packs themselves may be fed to the apparatus at different axial positions by means of the guide means 17 comprising the lathe type turret feed. The arrangement in Figure 1 shows two faces of the turret feed, there being a channel for accommodating the blisters of a blister pack at a different relative position on each face. This enables blister packs to be fed between the first and second rollers 23 and 33 at different axial positions along the first roller. A clear plastics material sheet covers each channel, the better to guide the blister packs between the first and second rollers 23 and 33.

CLAIMS.

1. An apparatus (1) suitable for extracting articles from a blister pack, which apparatus comprises a first member (23) having a recess defining by a first recess defining portion (53) and a second recess defining portion (49) and a second member (33), the first and second members (23 and 33) being adapted to hold a blister pack and the second member (33) being adapted to bear on one or more blisters of a blister pack when so held so as to displace an article, when enclosed by one of said blisters, out of the blister pack towards the recess, characterised in that the first recess defining portion (53) is translationally movable with respect to the second recess defining portion (49).

2. An apparatus according to claim 1 characterised in that the first and second members (23 and 33) are both parallel rollers.

3. An apparatus according to claim 1 or 2 characterised in that the recess defining portions (53 and 49) are formed from one or more serrated dogs or collars of the first roller.

4. An apparatus according to claim 1 or 2 characterised in that at least one of the recess, defining portions (53) is movable, with respect to the second roller (33), in a direction parallel with axes of rotation of the rollers (23 and 33).

5. An apparatus according to any one of claim 1 to 4 characterised in that the apparatus comprises means (69) for moving the or a recess defining portion.

6. An apparatus according to claim 5 characterised in that the moving means (69) comprises a manually operable lever (85, 87) provided with locking means for locking the lever in one of a plurality of positions and being operable against and/or with the action of spring biasing means.

AGS/fr/22nd February, 1982.

7. An apparatus according to any one of the claims 1 to 6 characterised in that the apparatus comprises means (67) for collecting de-blistered blister packs and/or articles extracted from blister packs.

8. An apparatus according to any one of claims 1 to 7 characterised in that the apparatus comprises means for sorting articles extracted from blister packs from de-blistered blister packs.

9. An apparatus according to any one of claims 1 to 8 characterised in that the apparatus comprises means (17) for guiding a blisterpack to a position where the blister pack can be gripped by the first and second (members 23 and 33).

10. An apparatus according to any one of claims 1 to 9 characterised in that the first and second members (23 and 33) are spring biased towards one another.

AGS/fr/22nd February, 1982.

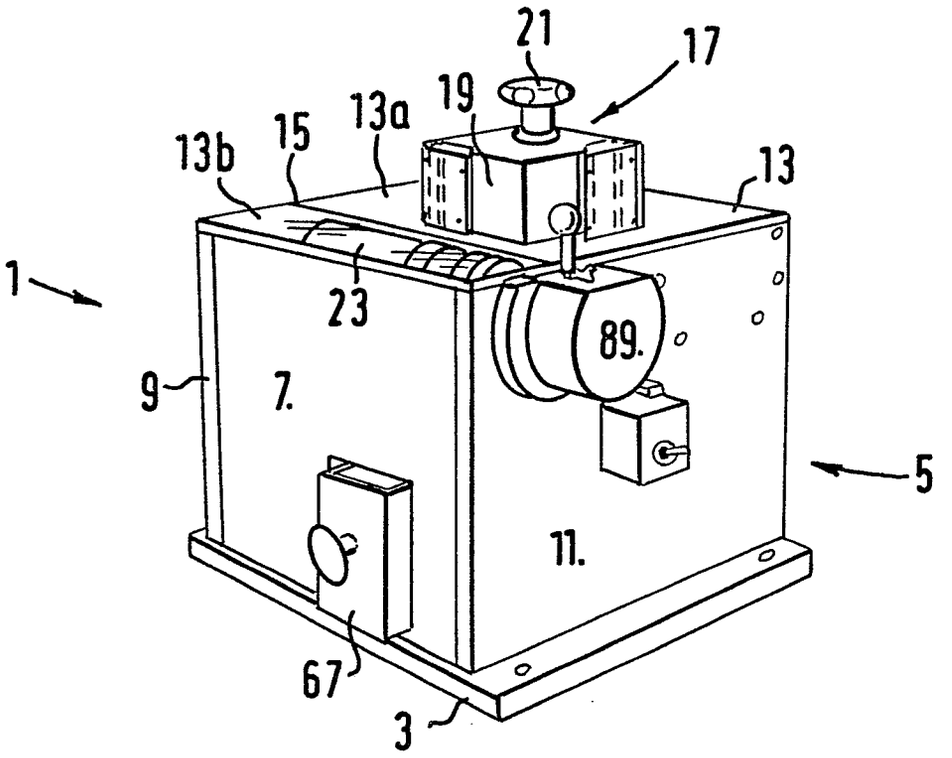

FIG.1

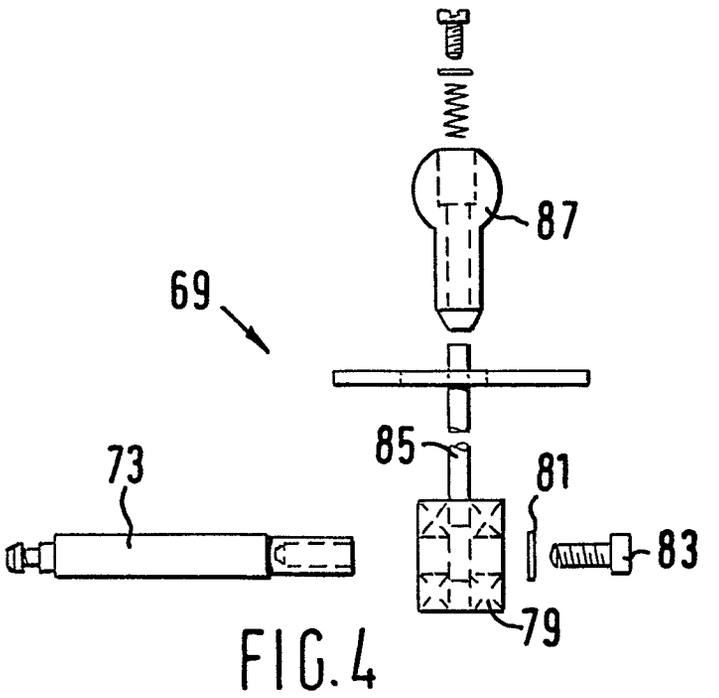

FIG.4

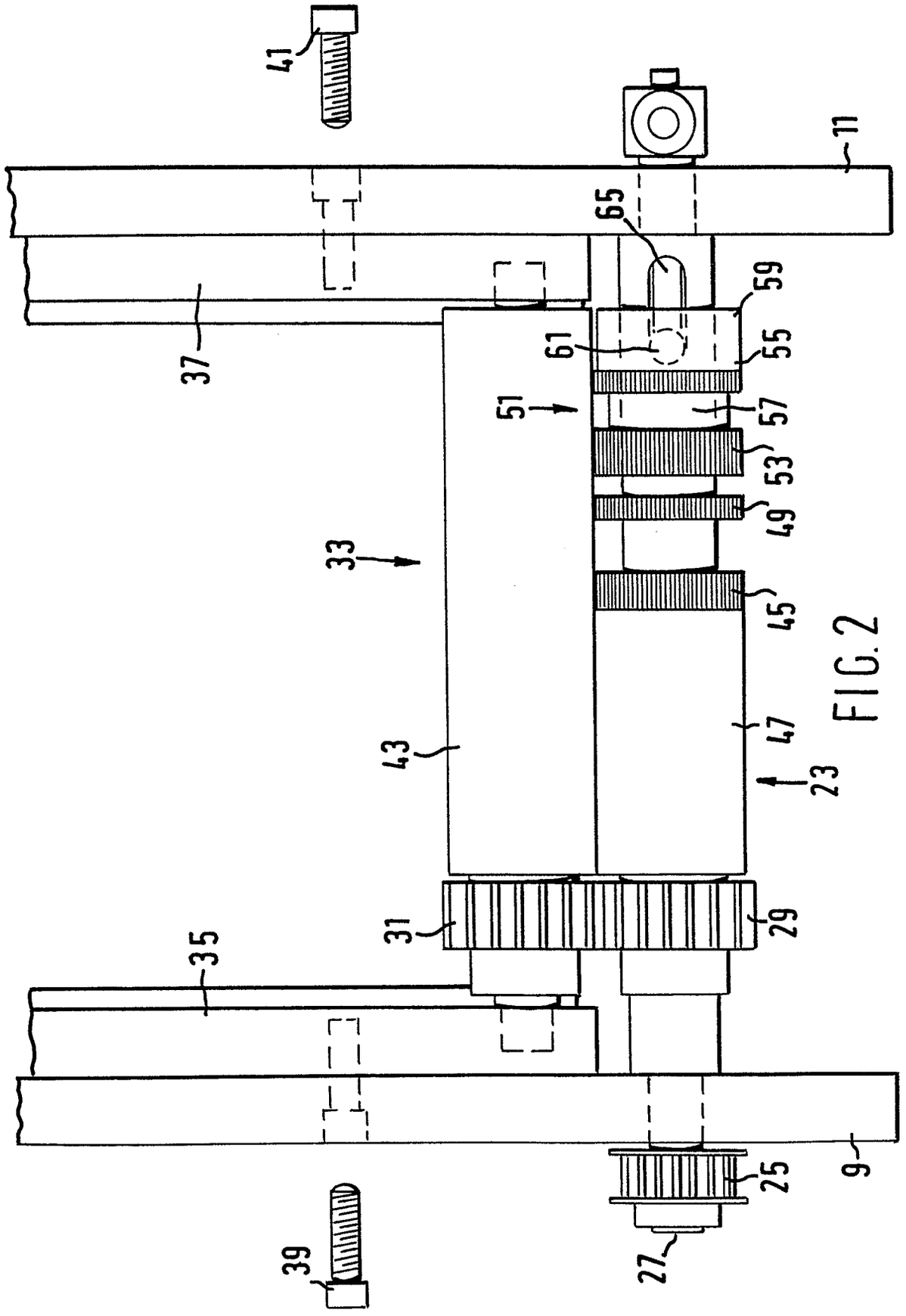

FIG. 2

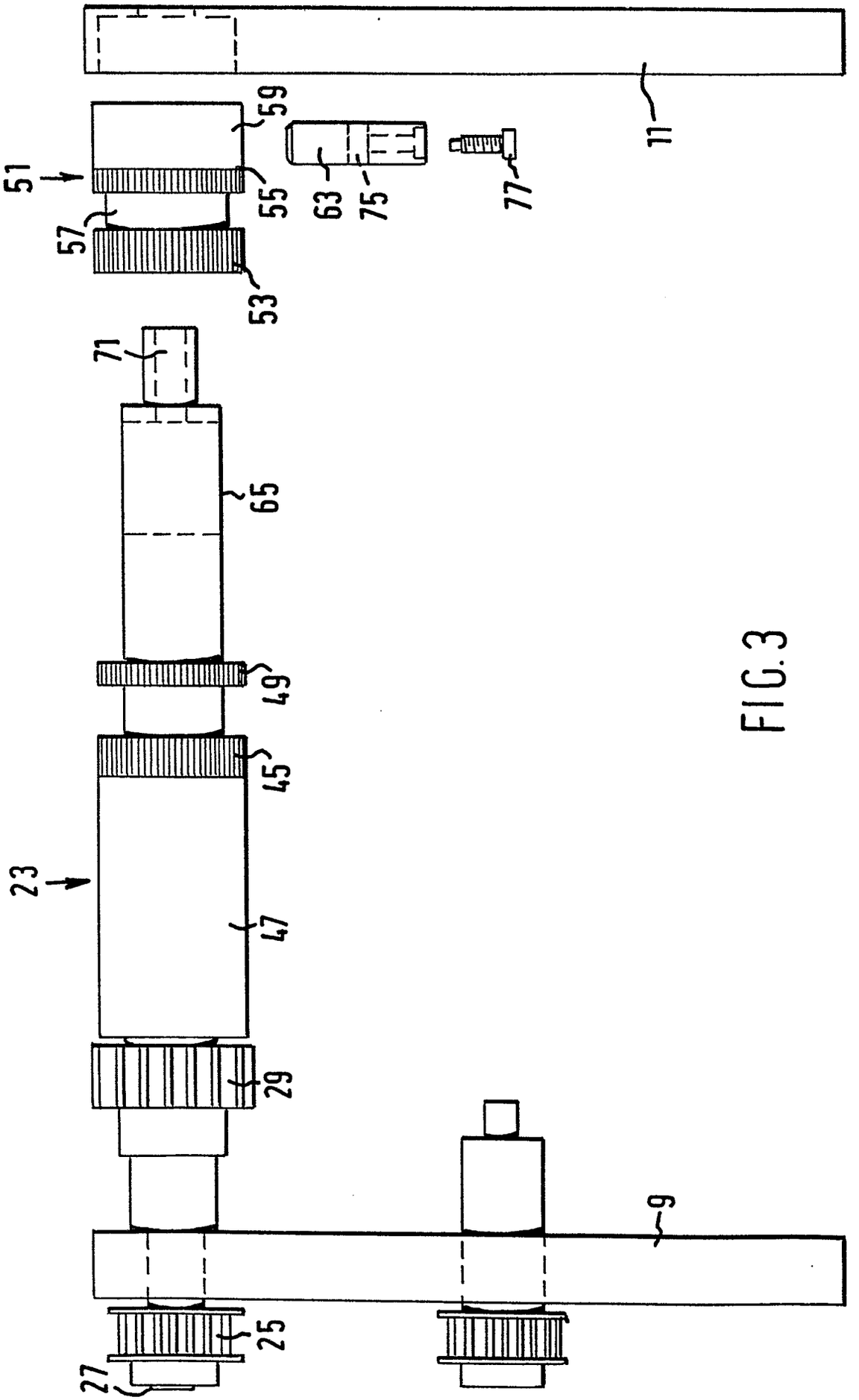

FIG.3

European Patent Office

EUROPEAN SEARCH REPORT

0059638
Application number

EP 82301039.2

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
A	EP - A1 - 0 009 538 (DZSIDA)	
P	GB - A - 2 067 155 (BALL et al.)	
A	US - A - 3 744 214 (DOLCE et al.)	

CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)

B 65 B 69/00

TECHNICAL FIELDS SEARCHED (Int.Cl. 3)

B 65 B 59/00
B 65 B 69/00

CATEGORY OF CITED DOCUMENTS

X: particularly relevant if taken alone
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A: technological background
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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

X The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
VIENNA	08-06-1982	MELZER

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