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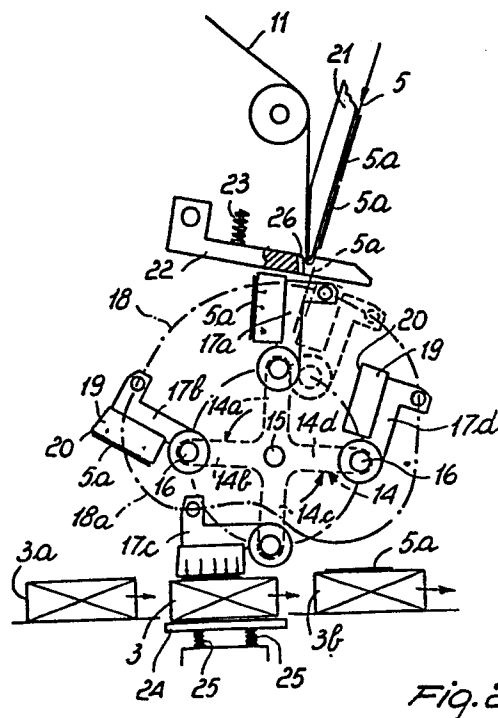
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64 An automatic labelling machine for incorporation to case packaging machines for pharmaceutical, cosmetic, and the like products, both of the continuous and intermittent feed types.

57 An automatic labelling machine for incorporation to case packaging machines in general, of both the continuous and intermittent feed types using pushers, and including a printer head (9) and a wedge element (21) operative to break labels (5a) away from a carrier web (11) being paid out from a web storage reel, and a carrier web take-up reel, comprising a feeder (14) mounted rotatable about a parallel axis to the case feed plane and, hingedly connected peripherally thereto, oscillating arms (17a, 17b, 17c, 17d) which are guided at the opposed ends thereof by an annular guide (18) having a cam profile (18a) and carry a box-like body (19) alternately subjected to a vacuum and adapted to receive one label (5a) from said label detaching wedge element (21), transfer it to an area of application thereof to a case moving along a case transport line, and apply it by pressure to said case; also provided being a means of rotating said feeder (14) and driving said carrier web forward, as well as sensor and timer means effective to synchronise the rotation speed of said feeder to the case feed rate and determine start-up and stop times for the web feeding means and means of providing said vacuum.



- 1 -

"AN AUTOMATIC LABELLING MACHINE FOR INCORPORATION CASE PACKAGING MACHINES FOR PHARMACEUTICAL, COSMETIC AND THE LIKE PRODUCTS, BOTH OF THE CONTINUOUS AND INTERMITTENT FEED TYPES".

This invention relates to an automatic labelling machine for incorporation to case packaging machines for pharmaceutical, cosmetic, and the like products, both of the continuous and intermittent, or alternating, feed types.

5 More precisely, the invention relates to an essential modular apparatus adapted for automatic application of self-sticking labels to packaging cases or cartons, both as filled or empty and flattened, on conventional packaging machines of the continuous and intermittent
10 feed types.

As is known, the techniques for applying self-sticking labels to cases of the pharmaceutical and the like types have been evolved and improved as a consequence of the occurrence of frequent price changes due,
15 in some cases, to directions from regulatory bodies, and in other cases, to a number of contingent factors known to the general consumer. As a rule, on the occurrence of a price change, the price indication originally marked on the packages is updated by the application
20 of a self-adhesive price label, which is normally transparent and laid over the previous price. This operation, where involving, as is sometimes the case, already stored packages, is carried out either manually or by means of automatic or semiautomatic labelling machines
25 of the off-the-line type, often purposely set up at the warehouse area.

Such off-the-line machines do not lend themselves

for use at the product packaging station, because,
like all labelling machines, they are based on the
principle of concurrent delivery of a label to the
exact point of application to a packaging case or
5 carton, through the use of light detectors or the like,
and quite unreliable in actual practice owing to the
occurrence of light reflection phenomena or other
effects hindering proper centering thereof; furthermore,
the varied selection of the areas where a label or
10 punch may be applied, which are left for the discretion
of the manufacturers, has heretofore prevented full use
of the off-the-line labelling machine capabilities.
Thus, the techniques employed in the past have failed
to make rational provisions for the automatic application
15 of labels directly at continuous cycle packaging lines
and for securing such obvious advantages as a reduction
in space requirements and labor cost, the faculty of
utilising a common transport system for both the packages
and labels, and a significant saving in time.

20 Accordingly, it is an object of this invention to
provide an automatic labelling apparatus in the form
of a compact labelling head adapted for convenient
incorporation to packaging machines of the continuous
type and to apply conventional labels perfectly centered
25 on a packaging case or carton even where speed variations
are experienced with the packaging machine during the
production cycle, and hence independently of the
packaging machine rate of operation and of whether this
happens to be of the continuous or intermittent type,
30 as well as an apparatus adapted for out-of-line
installation on alternating packaging machines.

A further object of the invention is to provide a labelling head of the modular type, which can use large capacity label rolls, employ conventional printer assemblies, and cut off lengths or segments of a self-sticking module (label) from a continuous web which are overprinted at the moment of their application, thus bringing about a significant economical advantage resulting from the absence of waste material.

These and other objects, such as will be more clearly apparent from the ensuing description, are achieved by an automatic labelling machine for incorporation to a case packaging machine, of the type providing for continuous or intermittent feed of packaging cases by means of pushers or the like, and provided with a printer head and a wedge element for breaking labels away from a carrier web being paid out from a storage reel, which labelling machine comprises, in accordance with this invention, a feeder stand mounted rotatable about a parallel axis to the packaging case forward feed plane and having hinged peripherally thereto, at angularly spaced locations, oscillating arms guided at the opposed ends along a cam-like profile annular guide and each carrying a box-like body alternately subjected to a vacuum and adapted to receive a label from said label detaching wedge element and apply it onto a case moving along the transport line under pressure horizontally thereon, means being also provided of rotating said arm carrying stand and advancing said label carrying web, as well as sensor and timer means for synchronising

the rotational speed of said rotatable arm carrying stand with the case feed rate, as well as determining the start-up and stop times of the label carrying web means of advancement to allow application of the labels
5 at a centered location on the moving cases without requiring stopping thereof.

More particularly, said oscillating arms are guided, at the remote ends thereof to the ends hinged to the rotatable stand, along a closed profile guide
10 so configured as to impart to each oscillating arm a substantially vertical attitude at the area of detachment and pick-up of a label and a horizontal attitude at the area of application of the label to a packaging case, said profile of said cam being effective to
15 enable the label carrying box-like body to move horizontally over a short distance in order to ensure that the label is applied to the moving packaging case.

According to a further aspect of the invention, provided at the corner edge of the label detaching
20 wedge element is a fixed blade forming the anvil blade for a cutting edge associated with each label pick-up box-like body, said anvil blade and cutting edge forming a cutter means for cutting off lengths of continuous (label-forming) self-sticking web laminated onto a
25 silicone coated transfer web.

Further constructional and functional features of the labelling machine according to the invention will be better understood by making reference to the detailed description that follows, in conjunction with the
30 accompanying illustrative drawings, where:

Figure 1 shows a schematic side view of the end portion of a conventional packaging machine, and precisely, the portion thereof located downstream of the packaging area, where the inventive labelling machine would be installed most conveniently;

Figure 2 is a schematic side view of a labelling machine according to the invention; and

Figure 3 is a perspective detail view of label forming modules being detached from a continuous self-sticking web adapted for use with the labelling machine of the preceding figures.

Making reference to the drawing views, and in particular to Figure 1, that portion of a packaging machine to which the labelling machine or head of this invention may be attached comprises essentially the end portion 1 of a case or package continuous feeder 2; the feeder 1 includes a chain conveyor provided with pusher toes 3, which are spaced apart at equal distances and operative to push, in the direction of the arrow F each case or carton at a constant preset speed. The affected machine portion further includes a reel 4 for a self-sticking label carrier web 5, of a type known per se, a set of guide, deflector and tension rollers 6,7,8,, a printer head 9 operative to overprint the labels with a desired inscription, a device 10 for adjusting the tension on the web 5 and being hand operated, and a driven take-up roller 12 for taking up the silicone coated web 11 after the labels have been detached therefrom.

Schematically indicated at 13 are a pair of side-

by-side prismatic supports, in between which supports is an automatic labelling head as shown in Figures 2 and 3.

5 With reference to Figure 2, the automatic labelling head of this invention comprises a spider element 14, set for rotation about its barycentric axis 15, which axis extends horizontally and parallelly to the plane of the conveyor 1 for the cases 3, 3a, 3b, The spider element 14 has four identical
10 spokes 14a, 14b, 14c and 14d, orthogonal to one another; it is driven in a counterclockwise direction by a specially provided motor (not shown).

Hinged to the ends of the spokes 14a, ..., as at 16, are oscillating arms 17a, 17b, 17c, 17d the opposed
15 ends whereof are guided, by means of rollers or the like, within a fixed camming guide, generally indicated at 18 and having a special profile explained hereinafter.

Each oscillating arm 17a, carries on one side
20 a respective box-like body 19, all the bodies being identical to one another and alternately formed with a vacuum therein by means of a suitable vacuum pump, not shown. The front face 19a of each box-like body 19 is flat, perforated, and dimensioned to receive and
25 retain, by the action of the inside vacuum, a label picked up from the label carrier web 5, as explained hereinafter; furthermore, the corner edge 20 of each box-like body 19 is configured to provide a cutting edge for separating, substantially with a guillotine
30 motion, cuttings of self-sticking module as shown in

Figure 3 and further discussed hereinafter.

5 Located above the spider 14 is a wedge element 21, of a type known per se, which defines a terminal of separation of the labels 5a from their respective
silicone coated carrier web 11. Across the separating
element 21 there extends a blade 22 which is hingedly
connected to a fixed support or stand and can swing
in a vertical plane against the bias force of springs
23. The blade 22 forms the fixed anvil blade for the
10 cutting edge 20 of each box-like body 19. Below the
assembly formed by the spider 14 and cam 18, is a flat
section 24 of the conveying surface for the cases 3a,
3 , 3b which is mounted yieldably and oscillably
against the bias of springs 25. The section 24 is in
15 essence an oscillating plate arranged to receive a case
at the precise position for centered application under
a pressure of a label, as effected by the cited box-like
bodies 19.

20 The cam 18 has, as mentioned, a special profile,
the peculiar aspect whereof resides in the provision
of a bottom profile section 18a lying substantially
parallel to the plane of advancement 1 of the cases
to allow (as explained hereinafter) each arm 17 and
respective label-carrying box-like body 19 to follow,
25 during the label application step and over a certain
distance, the case movement while holding the label
pressed onto the case, as is required to cause the
self-sticking label to adhere on the case body without
shifting from its centered position. Furthermore, the
30 profile of the cam 18 is such that the four oscillating

arms 17a, 17b, , being forced to rotate with the spider 14 with one end held along a constant radius circle, can be oriented, because obliged by their other ends to follow a shaped path different from a circle, to assume vertical positions at the label separation area, inclined intermediate positions, and a substantially horizontal position, and over a certain distance, at the lower area of application of the label to the cases.

Also according to the invention, the above-described labelling head is adapted to cut self-sticking labels (i.e., segments thereof) off a continuous self-sticking web laminated onto a continuous carrier web.

In fact, as shown in Figure 3, a web 5b is fed onto the separating wedge 21 which carries a continuous self-sticking web 5c. In this instance, the cutting edge 20 of the box-like body 19, on reaching the separating wedge 21, will cut off a segment 5d of self-sticking web by acting against the fixed anvil blade 22, the cut being effected substantially guillotine-fashion. The fixed anvil blade 22 is preferably configured yoke-like, 26, to provide two limited edge portions 26 rather than a continuous edge spanning the full width of the web 5c. This particular configuration of the anvil blade, by allowing formation of a slight bend line in the web against the edges 27 at the time of cutting, ensures a perfectly regular cut to be achieved.

The labelling machine of this invention is further provided with sensors or feelers, of an electric or

mechanical or the like type, positioned on the case conveyor, as well as with timers and electric actuating circuits, cooperating to synchronise the case advancement rate with the angular velocity of the spider carrying the oscillating arms and to start and stop the forward movement of the label carrier web, as well as to start and stop the vacuum pump for generating the vacuum within the box-like bodies 19. All these elements are of a known type, and hence no further discussed herein.

The labelling machine of this invention, as described above, operates essentially as follows.

After placing the label carrier web around the separating wedge 21 and activating the printer head 9, the labelling head is ready for use. With the continuous packaging machine in operation, cases 3a, 3, 3b, are caused to move forward at a constant speed by the toes 3. As a case 3a approaches the oscillating plate 24, as exemplified by the view of Figure 2, since the spider 14 has already been set into rotation at the selected speed, a sensor activated by the oncoming case 3b will supply a signal to the starting means of the take-up roller 12 for the silicone coated web 11, thereby the label carrier web 5 will move forward past the separating wedge 21 and release one label 5a (Figure 2). On completion of the separation of the label from the carrier web 11, the perforated surface of the box-like body will contact the label and hold it back owing to the vacuum condition prevailing within the box-like body; the

label, as so held back, is transferred by the oscillating arm toward the application area, and along this path, the oscillating arm moves gradually into an inclined position until it reaches the horizontal position at the application area. The distance from the surface receiving the case 3a (which in the meantime has been delivered onto the oscillating plate and is indicated at 3 in Figure 2) to the label carrying face of the box-like body is such that the latter will press the case to stably apply the self-sticking label, and that pressure is maintained over a certain distance (thanks to the horizontal profile section 18a of the cam 18). Then, air is admitted into the box-like body and the label detached from the perforated face of the box-like body. Thus, the cycle may be repeated by the operation of other oscillating arms, which pick up one label and apply it to successive cases being moved forward at a constant rate.

The drawing figures depict an embodiment wherein the inventive labelling head is incorporated to a packaging machine of the continuous feed type. However, this labelling head could also be installed out of the packaging line, where case feeders and collectors/rearrangers for cases already packaged on other machines would have to be provided. Finally, it would be possible to install this labelling head on intermittent feed packaging machines, by suitably adjusting the coming into operation of the labelling head components.

Of course, in practicing the invention, the labelling head described hereinabove may be subject

for construction-wise and functionally equivalent modifications and changes, without departing from the purview of the invention.

CLAIMS:

1 1. An automatic labelling machine for incorporation
2 to case packaging machines, of the type providing for
3 continuous or intermittent feed of packaging cases (2)
4 by means of pushers (3) or the like, comprising a
5 printer head (9) and a wedge element (21) for breaking
6 labels (5a) away from a carrier web (11) being paid
7 out from a storage reel, as well as a carrier web (11)
8 take-up reel, characterised in that it comprises a
9 feeder stand (14) mounted rotatable about a parallel
10 axis to the packaging case forward feed plane and
11 having hinged peripherally thereto, at angularly spaced
12 locations, oscillating arms (17a,17b,17c,17d) guided at
13 the opposed ends along a cam-like profile (18a) annular
14 guide (18) and each carrying a box-like body (19)
15 alternately subjected to a vacuum and adapted to
16 receive a label (5a) from said label detaching wedge
17 element (21) and take it to an area for its application
18 to a case moving along the transport line and apply it
19 under pressure horizontally thereon, means being also
20 provided of rotating said arm carrying stand and for
21 advancing said label carrier web, as well as sensor
22 and timer means for synchronising the rotational speed
23 of said oscillating arm carrying stand (14) with the
24 case feed rate, as well as determining the start-up
25 and stop times of the web means of advancement and
26 times of formation of said vacuum.

1 2. An apparatus according to Claim 1, characterised
2 in that said rotatable stand (14) comprises preferably
3 a spider with equispaced spokes having said

4 oscillating arms (17a,17b,17c,17d) hingedly connected
5 to the ends thereof.

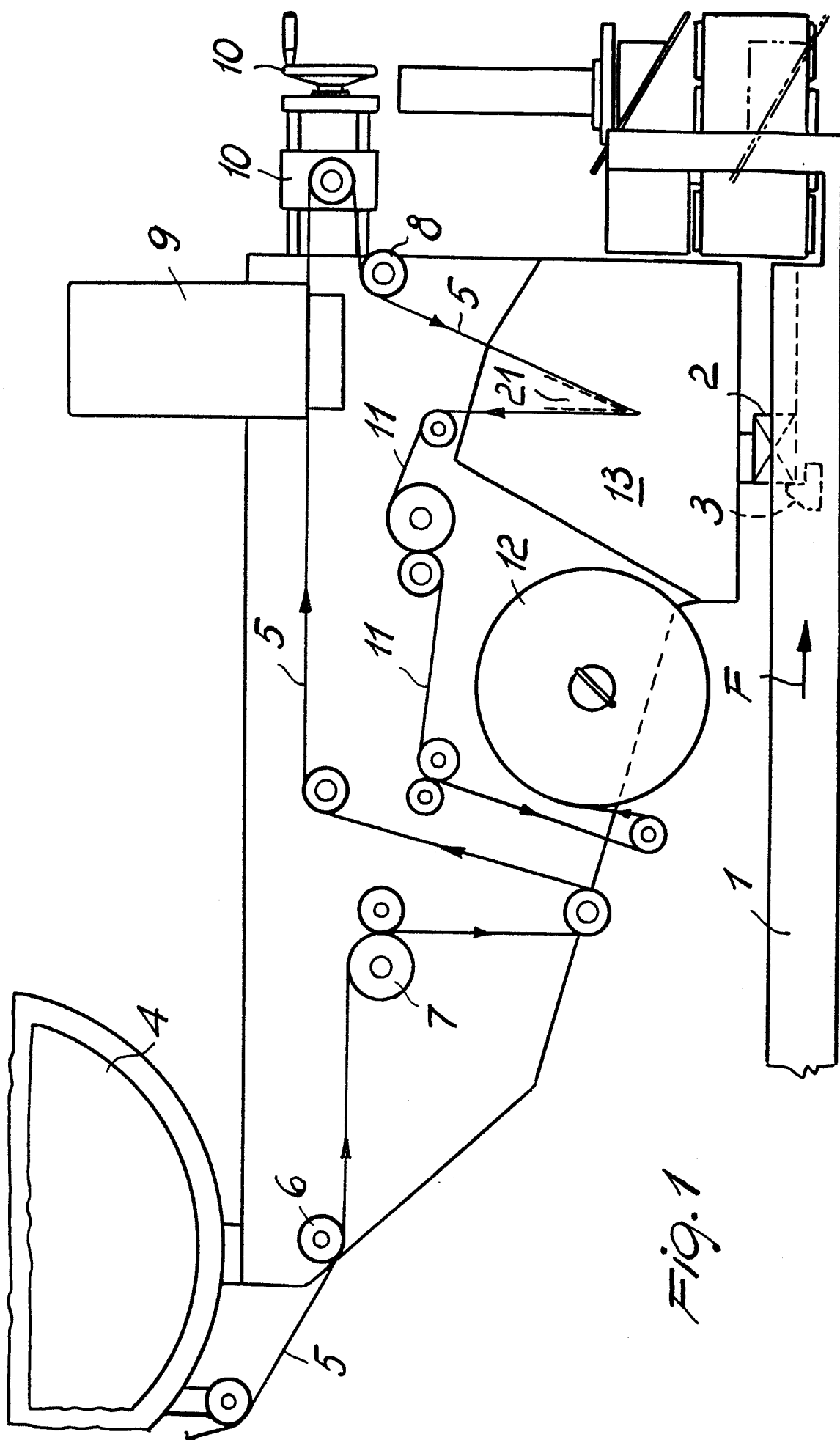
1 3. An apparatus according to Claims 1 and 2,
2 characterised in that provided at said wedge element
3 (21) for breaking the labels away from the carrier web
4 (11) is a fixed anvil blade (22) being biased by springs
5 (23) and configured as a yoke (26) or the like, adapted
6 to permit guillotine cutting of continuous self-sticking
7 label segments associated with the carrier web.

1 4. An apparatus according to the preceding claims,
2 characterised in that it employs labels of the
3 thermally adhesive, or glued, or the like types, fed
4 to the labelling head (9) in accordance with
5 conventional methods.

1 5. An apparatus according to the preceding claims,
2 characterised in that it comprises, located at the
3 case conveyor area selected for label application, an
4 oscillating plate (24) or the like, adapted to react
5 to the pressure exerted on the cases by said label
6 carrying box-like bodies during the label pressure
7 application step.

1 6. An apparatus according to the preceding claims,
2 characterised in that it is provided for the above-
3 specified objects in accordance with what has been
4 described and illustrated in the accompanying drawings.

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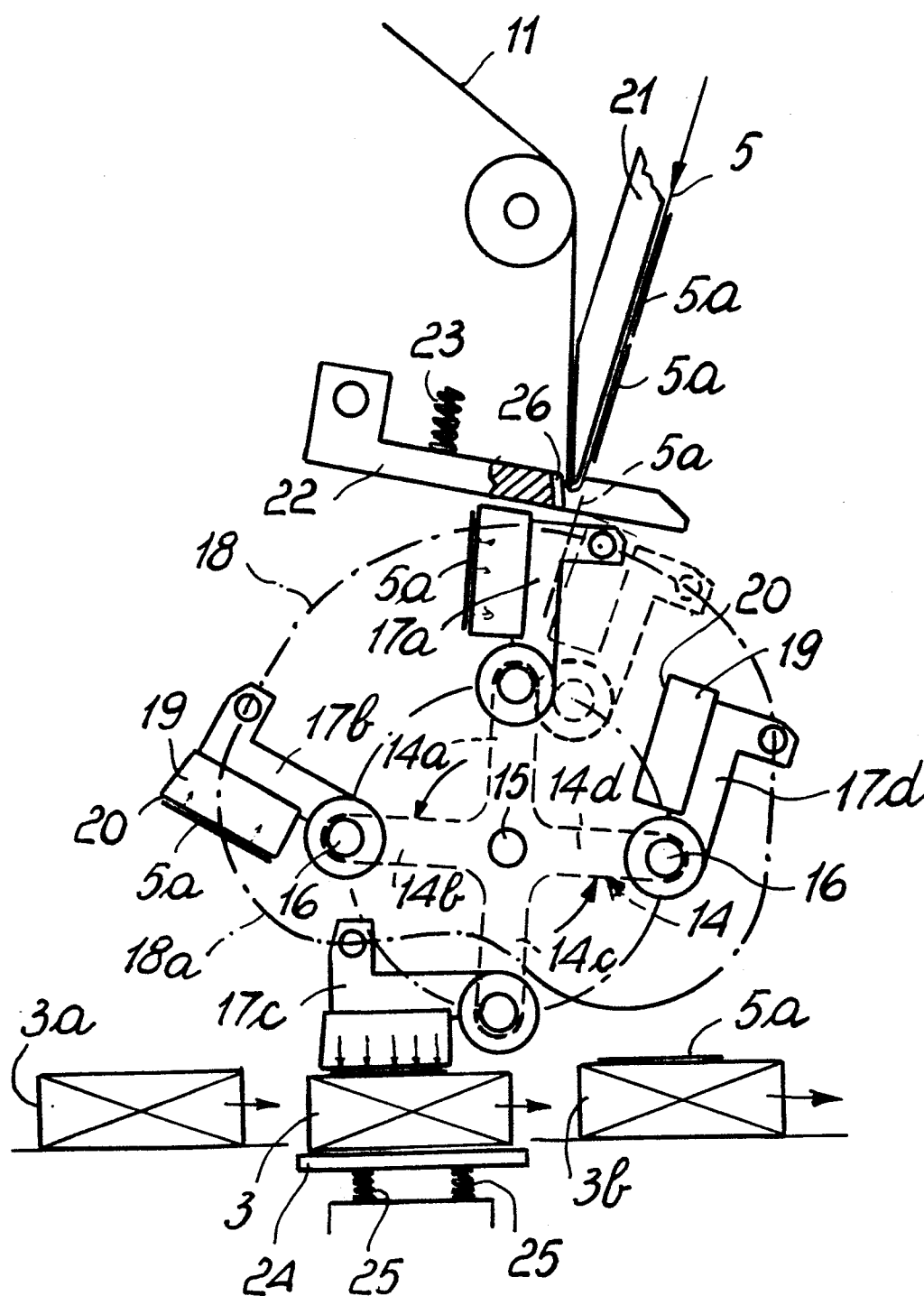


Fig. 2

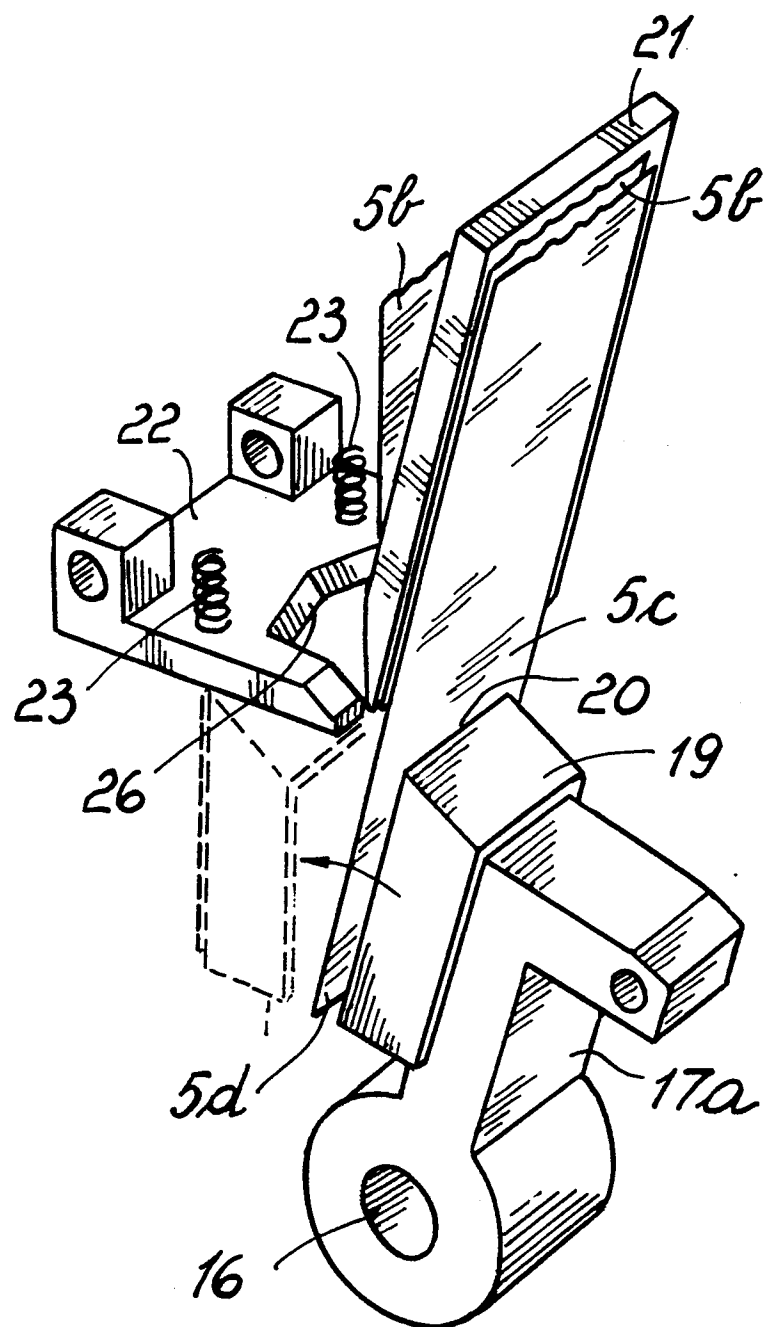


Fig. 3