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(54) **AN IDENTIFYING AND ACCUMULATING DEVICE OF ARTICLES**

VORRICHTUNG ZUR IDENTIFIZIERUNG UND ANSAMMLUNG VON GEGENSTÄNDEN
DISPOSITIF D'IDENTIFICATION ET D'ACCUMULATION D'ARTICLES

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Description

FIELD OF THE INVENTION

[0001] The present invention relates to the technical sector of packing articles; more in particular, the invention concerns an identifying and accumulating device of articles.

DESCRIPTION OF THE PRIOR ART

[0002] A device of known type for identifying and accumulating articles is usually present in a machine for packing articles, for example a boxing machine.

[0003] The known device (D) mentioned above, illustrated by way of example in figure 1, comprises:

- a detecting region (3) which receives a stack of articles (A) (for example cases) each provided with an identifying code; the articles (A) are arranged in such a way that the relative identifying code is at a side (L) of the stack;
- a television camera (4) arranged in proximity of the detecting region (3) and which detects the identifying code of each article (A) in the detecting region (3);
- illuminating means (41) associated to the television camera (4) so as to facilitate the detecting of the identifying code by the television camera (4);
- an accumulating region (5) in which the articles (A) must be accumulated in order to be successively packed.

[0004] In particular, the detecting region (3) is interposed between the accumulating region (5) and the television camera (4) is aligned to the accumulating region (5) and to the television camera (4).

[0005] The device (D) further comprises:

- a linear guide (6) fixed to the frame (2);
- a carriage (7) movable along the linear guide (6);
- a pusher (8) borne by the carriage (7), comprising an L-shaped connecting arm (80) fixed to the carriage (7) and a pushing plate (81) which is made of a transparent material and is fixed to the connecting arm (80).

[0006] The pushing plate (81), made of a transparent material, is drawn by the carriage (7) along a straight advancement pathway from a retracted position (the situation in figure 1), in which the pushing plate (81) is interposed between the detecting region (3) and the television camera (4), to an advanced position in which the pushing plate (81) is located in the accumulating region

(5).

[0007] In detail, once a stack of articles (A) is in the detecting region (3), the television camera (4) (with the aid of the illuminating means (41)) detects the identifying code of each article (A) which forms the stack. This is enabled by the fact that the pushing plate (81) is made of a transparent material (for example Plexiglass).

[0008] Thus, the pushing plate (81) is moved along the straight advancement pathway, so as to push the stack of articles (A) from the detecting region (3) into the accumulating region (5).

[0009] These operations are repeated until a certain predetermined number of stacks of articles (A) is arranged in the accumulating region (5); in the accumulating region (5) two guide and containing walls (50) can be present, between which the stack of articles (A) is accumulated prior to packaging. The articles (A) can be transferred from the accumulating region (5) into, for example, a box (C), arranged for example with the relative opening facing towards the accumulating region (5).

[0010] The above-described device exhibits however some drawbacks.

[0011] In fact, though the pushing plate is made of a transparent material, correct detecting of the identifying codes of the articles by the television cameras is not guaranteed.

[0012] Primarily, this is due to the fact that the pushing plate made of transparent material (for example Plexiglass) can be subject over time to damage (such as scratching, splintering, etc.).

[0013] Secondly, the fact of using a transparent material can cause undesired light reflections, aggravated by the presence of the illuminating means.

[0014] The presence of damage to the pushing plate and/or light reflections can even significantly obstruct the detection of the identifying codes of the articles by the television camera.

[0015] EP 0 959 002 A1 discloses a packing machine having a pushing plate for pushing stacks of products.

SUMMARY OF THE INVENTION

[0016] The aim of the present invention is to obviate the above-mentioned drawbacks.

[0017] This aim is attained by an identifying and accumulating device of articles according to claim 1 and claim 5.

[0018] The device of the invention advantageously enables, in any situation, a correct detection of the identifying codes of the articles, differently to the prior art. With the invention, even in the presence of damage to the pushing plates (such as splintering or scratches) and/or of light reflections, excellent detection of the identifying codes of the articles is still guaranteed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] Specific embodiments and further advanta-

geous characteristics of the invention will become evident in the following description, with the aid of the appended figure, in which:

- figure 1 is a perspective view of an identifying and accumulating device of articles of the prior art;
- figure 2 is a perspective view of an identifying and accumulating device of articles according to the invention, in a first embodiment, in which some parts have been removed better to evidence others;
- figure 3 illustrates a perspective view of an identifying and accumulating device of articles according to the invention in an alternative embodiment of figure 2;
- figure 4 is a perspective view of an identifying and accumulating device of articles according to the invention in a further variant with respect to figure 3, wherein some parts have been removed better to evidence others;
- figure 5 is a perspective view of an identifying and accumulating device of articles according to the invention in a further variant with respect to the preceding ones, in which some parts have been removed better to evidence others;
- figures 6 and 7 illustrate two perspective views of an identifying and accumulating device according to the present invention, in two different operating situations of a second embodiment;
- figures 6A, 7A, respectively illustrate details H and K of figure 6 and figure 7, according to further larger-scale views;
- figure 8 is a perspective view of an identifying and accumulating device of the present invention, in a third embodiment;
- figure 8A illustrates detail J of figure 8, according to a larger-scale view.

DESCRIPTION OF PREFERRED EMBODIMENTS

[0020] Note that in the following description the same reference numerals will be used for elements alike to figure 1, in which a device of known type is illustrated.

[0021] In the following three embodiments of the invention will be described (and any eventual variants), which are connected to one another by a single inventive concept, and possess corresponding technical characteristics. The three embodiments obviate, in an alternative way, the same technical problem, as will be made clear in the following.

[0022] With reference to figures 2-8A, numerals 1, 10 and 100 denote an identifying and accumulating device of articles (A) according to different embodiments of the

present invention. In particular, the articles (A) are provided with an identifying code (for example a standardized GS1 code, such as Barcode, Datamatrix, etc.).

[0023] In a first embodiment, illustrated in figures 2-5, the device (1) comprises: a frame (2); a detecting region (3), in which the articles (A) are positioned in a row in such a way that the relative identifying code is arranged at a side (L) of the row; optical detecting means (4) arranged in proximity of the detecting region (3) for detecting the identifying code of the articles (A) when the articles (A) are arranged in the detecting region (3).

[0024] The device (1) further comprises: an accumulating region (5) in which the articles (A) coming from the detecting region (3) are accumulated so as to be subsequently packed; in particular, the detecting region (3) is interposed between the accumulating region (5) and the optical detecting means (4) and is aligned to the accumulating region (5) and the optical detecting means (4). In other terms, the detecting region (3), the accumulating region (5) and the optical detecting means (4) are arranged along a line.

[0025] Further, the device (1) comprises a linear guide (6, 60, 61) fixed to the frame (2), a carriage (7) that is mobile along the linear guide (6, 60, 61); and a pusher (8) borne by the carriage (7), comprising a connecting arm (80) constrained to the carriage (7) and a pushing plate (81) which is borne by the connecting arm (80). In detail, the pushing plate (81) is dimensioned so as to push the articles (A) from the detecting region (3) to the accumulating region (5).

[0026] The pushing plate (81) is drawn by the carriage (7) along a straight advancing pathway from a retracted position, in which the pushing plate (81) is interposed between the detecting region (3) and the optical detecting means (4) and wherein the pushing plate (81) is aligned with the detecting region (3) and the optical detecting means (4), to an advanced position in which the pushing plate (81) is at the accumulating region (5).

[0027] In particular, the pusher (8) further comprises movement means (900) for moving the connecting arm (80) and the pushing plate (81) with respect to the carriage (7), which movement means (900) enable displacing the pushing plate (81) out of the straight advancement pathway in order that the optical detecting means (4) face the articles (A) arranged in a row in the detecting region (3) so as to detect the relative identifying code (this situation is illustrated in figure 2-5).

[0028] With the device (1), correct detecting of the identifying code of the articles (A) is advantageously guaranteed. In fact, because of the presence of the movement means (900), the pushing plate (81) is brought out of the straight pathway, thus enabling the optical means (which for example comprise a television camera (4) or a photographic camera) to optimally and completely detect the identifying codes of the articles (A) in the detecting region (3).

[0029] In the prior art the pushing plate was made of a transparent material and was constrained to carry out

only the straight advancement path described above: in fact, the connecting arm was unremovably fixed to the carriage. During the identifying operation of the articles, therefore, the pushing plate was aligned to the articles and to the optical detecting means and interposed between the articles and the optical detecting means.

[0030] In the prior art, therefore, the presence of any damage to the pushing plate which might take place over time (such as scratches, small splinters) and/or light reflection, were causes of an incorrect detecting of the identifying codes of the articles, or in any case a non-optimal detecting.

[0031] Further, account must be taken of the fact that in the prior art even the presence of the connecting arm obstructed the detection of the identifying codes by the television camera. In fact, the connecting arm was not made of a transparent material and thus at least partly encroached upon the field of vision of the television camera. In this way the detecting of the identifying codes was only partial.

[0032] Differently, with the device (1) the fact that the connecting arm (80) is mobile with respect to the carriage (7) enables taking the connecting arm (80) out of the field of vision of the optical detecting means (4), and thus enabling a complete detecting of the identifying codes of the articles (A) by the optical detecting means (4).

[0033] As the pushing plate (81) of the device (1) is taken out of the straight advancement pathway during the detecting of the identifying codes by the optical detecting means (4), there is no requirement for it to be made of a transparent material, i.e. it can be made of an opaque material.

[0034] In particular, the articles (A) can be positioned in the detecting region (3) in a stack (i.e. in a plurality of rows) as in the case illustrated in the accompanying figures.

[0035] In detail, once the articles (A) arranged in a row are positioned in the detecting region (3), the pushing plate (81) is brought out of the straight advancing pathway and the optical detecting means (4) can detect the identifying code of the articles (A), directly facing the side (L) of the row of articles (A). In other words, with the device (1) there is no operating element or group which is interposed between the optical detecting means (5) and the side (L) of the row of articles (A) so as to obstruct the detecting of the identifying codes.

[0036] Therefore the pushing plate (81) is moved along the straight advancement pathway, so as to push the articles (A) from the detecting region (3) into the accumulating region (5).

[0037] The accumulating region (5) can comprise, for example, two guide and containing walls (50), facing one another, as in the illustrated case, between which the articles (A) are arranged, pushed by the pusher (8), before being packed. For example, still with reference to figures 2-5, a carton (C) can be present, with the opening thereof facing and turned towards the accumulating region (5). When a certain number of articles (A) is arranged

in the accumulating region (5), the articles (A) can be pushed into the carton (C) by the pusher (8) (this situation is not illustrated).

[0038] In a preferred embodiment, illustrated in figure 2, the connecting arm (80) comprises a portion (82) that is transversal to the straight advancement pathway; further, in this variant, the movement means (900) comprise: a motor mounted on-board the carriage (7); a pinion (91) activated in rotation by the motor; and a rack (92) which is fixed to the portion (82) of the connecting arm (80) and which engages with the pinion (91) so that the connecting arm (80) and the pushing plate (81) are further mobile in a direction that is transversal to the straight advancement pathway.

[0039] The variant is advantageously particularly compact. In fact the movement of the connecting arm (80) and pushing plate (81) in a transversal direction with respect to the straight advancement pathway in no way interferes with the identifying and accumulating operations of the articles (A).

[0040] In particular, the portion (82) of the connecting arm (80) can be perpendicular to the straight advancement pathway (as in the case of figure 2). In this case, the overall size of the device (1) is further reduced. In fact, the displacement of the connecting arm (80) and the pushing plate (81) is vertical, vastly reducing the space required for moving the connecting arm (80) and the pushing plate (81).

[0041] In a further variant, illustrated in figures 3 and 4, the movement means (900) comprise a motor (901) (visible in figure 4) mounted on-board the carriage (7), the output shaft (93) (also visible in figure 4) of which commands rotation of the connecting arm (80) and the pushing plate (81). In other terms, the connecting arm (80) is hinged to the carriage (7).

[0042] In detail, the motor (901) is fixed to the carriage (7) and the output shaft (93) of the motor (901) can be arranged such as to be parallel to the straight pathway (this is the case of figure 3). Alternatively, the output shaft (93) of the motor (901) can be arranged such as to be transversal (for example perpendicular) to the straight pathway (the case of figure 4). In a further variant, illustrated in figure 5, the device (1) comprises two linear guides (60, 61), first (60) and second (61), parallel to one another to which the carriage (7) is constrained and along which the carriage (7) can slide. In this embodiment the carriage (7) comprises a transversal portion (70) (for example perpendicular) to the linear guides (60, 61) along which the connecting arm (80) can slide. During the straight advancement pathway, the connecting arm (80) is constrained by the carriage (7) and is arranged in a first position at the first linear guide (60). The movement means in this case enable translation of the connecting arm (80) (and consequently of the pushing plate (81) along the transversal portion (70) of the carriage (7) into a second position at the second linear guide (61) (the situation illustrated in figure 5), enabling the optical detecting means (4) to detect the identifying codes of the

articles (A).

[0043] With reference to accompanying figures 2-5, the connecting arm (80) has an L-shaped configuration, i.e. it exhibits a first portion (82) that is perpendicular to the straight advancement pathway and a second portion that is perpendicular to the first portion (i.e. parallel to the straight advancement pathway) and connected to the first portion (see for example figure 2).

[0044] In a second embodiment of the invention, illustrated in figures 6, 6A, 7 and 7A, the device comprises: a detecting region (3) in which the articles (A) are positioned in a row such that the relative identifying code is arranged at a side (L) of the row; optical detecting means (4) (which for example comprise a television camera or a photographic camera) for detecting the identifying code of the articles (A) when the articles (A) are arranged in the detecting region (3).

[0045] The device (100) further comprises: an accumulating region (5) in which the articles (A) coming from the detecting region (3) are to be accumulated in order to be successively packed; the detecting region (3) is interposed between the accumulating region (5) and the optical detecting means (4) and is aligned to the accumulating region (5) and to the optical detecting means (4).

[0046] The device (100) further comprises a pusher (8) for pushing the articles (A) from the detecting region (3) to the accumulating region (5), comprising a pushing plate (81) which is mobile along a straight pathway from a retracted position (see figures 7 and 7A), in which the pushing plate (81) is aligned with the optical detecting means (4) and faces a side (L) of the row of articles (A) arranged in the detecting region (3), to an advanced position in which the pushing plate (81) is at the accumulating region (5), and vice versa.

[0047] In particular, the pushing plate (81) comprises a through-opening (9), and the pusher (8) comprises a closing element (90) dimensioned such as to close the through-opening (9) of the pushing plate (81).

[0048] The closing element (90) is constrained to the pushing plate (81) so as to be mobile between two configurations: a first configuration in which it is arranged in the through-opening (9), closes the through-opening (9) and defines, with the pushing plate (81), a pushing surface (S) for pushing the articles (A) from the detecting region (3) to the accumulating region (5) when the pushing plate (81) is moved into the advanced position (see figures 6, 6A); and a second configuration in which it makes the through-opening (9) accessible (see figures 7, 7A).

[0049] In detail, the through-opening (9) is arranged and dimensioned such that, when the pushing plate is in the retracted position and the closing element (90) is moved into the second configuration, the optical detecting means (4) are facing towards the through-opening (9) and, through the through-opening (9), face the articles (A) arranged in the detecting region (3), in such a way as to detect the relative identifying code thereof (see figures 7, 7A).

[0050] In this case too the optical detecting means (4) are advantageously in no way obstructed in detecting the identifying code of the articles (A), as the presence of the through-opening (9) of the pushing plate (81) enables completely freeing the visual field of the optical detecting means (4).

[0051] In a preferred variant, illustrated in figures 6, 6A, 7 and 7A, when the pushing plate (81) is in the retracted position and the closing element (90) is in the second configuration, the optical detecting means (4) are at the through-opening (9) (i.e. into the through-opening (9), see the detail of figures 7, 7A). In other terms, in this variant, the retracted position of the pusher plate (81) is at the optical detecting means (4).

[0052] Alternatively the retracted position of the pushing plate (81) can be interposed between the optical detecting means (4) and the detecting region (3): clearly the through-opening (9) will be adequately dimensioned so as to enable the optical detecting means (4) to detect the identifying code of the articles (A) through the through-opening (9). In any case, the through-opening (9) is clearly aligned with the optical detecting means (4).

[0053] Once more with reference to the variant of figures 7, 7A, the device (100) further comprises a frame (2) and movement means (94, 95) of the closing element (90). In detail, the movement means (94, 95) comprise a fixed part (94) solidly constrained to the frame (2), and a mobile part (95) borne by the pushing plate (81), connected to the closing element (90) and movable with respect to the pushing plate (81) so as to bring the closing element (90) into the relative second configuration. The fixed part (94) and the mobile part (95) are reciprocally arranged and conformed such that when the pushing plate (81) is moved into the relative retracted position, the fixed part (94) contacts and moves the mobile part (95), determining the movement of the closing element (90) into the relative second configuration (and thus making the through-opening (9) accessible).

[0054] In this way, while the pushing plate (81) is brought into the relative retracted position, there is, in perfect phase relation, an advantageous movement of the closing element (90) into the relative second configuration, thanks to the fact that the fixed part (94) pushes the mobile part (95) and moves it.

[0055] The closed element (90) when it is in the second configuration for example extends towards the side (L) of the row of articles (A).

[0056] Clearly, when the pushing plate (81) is moved by the relative retracted position to the relative advanced position, the closing element (90) is newly moved into the relative first configuration.

[0057] The optical detecting means (4) can be solidly constrained to the frame (2); for example, the fixed part (94) can be fixed to the optical detecting means (4) (as in the case illustrated in figures 7, 7A).

[0058] In the above-described variant, the fixed part (94) of the movement means (94, 95) comprises an abutting element (94), and the mobile part (95) of the move-

ment means (94, 95) comprises a cam mechanism (95) connected to the closing element (90), rotatable with respect to an axis passing through the pushing plate (81).

[0059] The abutting element (94) has for example a prevalently longitudinal shape and can exhibit an inclined edge, i.e. a shape which tapers towards an end of the abutting element itself (see figures 6A, 7A). This variant is particularly simple from the constructional point of view, effective in functioning and bears modest costs.

[0060] Clearly the fixed part (94) and the mobile part (95) will be adequately dimensioned according to the dimension of the through-opening (9) and the retracted position of the pushing plate (81). Obviously, other variants are possible for the movement of the closing element (90).

[0061] In the variant of figures 6, 6A, the closing element (90) is hinged to an edge of the through-opening (9).

[0062] The through-opening (9) can have, for example, a shape such that the relative edges define a parallelogram; the closing element (90) in this case can be hinged to any one of the four edges which each constitute a side of the parallelogram.

[0063] In other words, the closing element (90) is movable such that when it is in the second configuration thereof it develops, with respect to the through-opening (9), to the right or the left, or up or down.

[0064] The pushing plate (81) can be fixed to a connecting arm (80) (for example L-shaped) which is also a part of the pusher (8), as in the illustrated case.

[0065] In the above-cited variant, the device (100) further comprises a linear guide (6) fixed to the frame (2); and a carriage (not visible) mobile along the linear guide (6) to which the connecting arm (80) is fixed.

[0066] In a third embodiment, illustrated in figures 8 and 8A, the device (10) comprises: a detecting region (3) in which the articles (A) are positioned in a row such that the relative identifying code is arranged at a side (L) of the row; optical detecting means (4) (which for example comprise a television camera or a photographic camera) for detecting the identifying code of the articles (A) when the articles (A) are arranged in the detecting region (3).

[0067] The device (10) further comprises: an accumulating region (5) in which the articles (A) coming from the detecting region (3) are to be accumulated in order to be successively packed; in particular, the detecting region (3) is interposed between the accumulating region (5) and the optical detecting means (4) and being aligned to the accumulating region (5) and to the optical detecting means (4).

[0068] The device (10) further comprises a pusher (8) for pushing the articles (A) from the detecting region (3) to the accumulating region (5), comprising: a connecting arm (80); a pushing plate (81) constrained to the connecting arm (80), which pushing plate (81) is mobile along from a retracted position, in which the pushing plate (81) is aligned with the optical detecting means (4) and faces a side (L) of the row of articles (A) arranged in the detecting region (3), to an advanced position in which the

pushing plate (81) is at the accumulating region (5); and vice versa.

[0069] In particular, the pushing plate (81) is further mobile with respect to the connecting arm (80) such as to move externally of the straight pathway and thus enable the optical detecting means (4) to face the articles (A) arranged in the detecting region (3), such as to detect the identifying code thereof.

[0070] In other terms, the pushing plate (81) is constrained to the connecting arm (80) so as to be mobile (for example rotatable) between two extreme configurations, an operative configuration in which it is aligned to the optical detecting means (4) and can push the articles (A) from the detecting region (3) to the accumulating region (5), and a non-operative configuration (illustrated in figures 8, 8A), in which it is not aligned to the optical detecting means (4) and enables the means (4) to detect the identifying code of the articles (A).

[0071] For this reason, the third embodiment has the same advantages as the first and second above-described embodiments.

[0072] The device (10) can further comprise motorisation means, for enabling movement of the pushing plate (81) out of the straight pathway, for example in order to enable rotation with respect to the connecting arm (80).

[0073] The motorisation means (not illustrated) can move the pushing plate (81) when the plate (81) is brought into the relative retracted position, in any case so as not to interfere with the optical detecting means (4).

[0074] In particular, the pushing plate (81) can be moved in various orientations so as to be, with respect to the connecting arm (80), to the right or the left or above or below (as in the illustrated case).

[0075] In this case too the illustrated device (10) can comprise a frame (2), a linear guide (6) fixed to the frame (2); and a carriage (not visible) mobile along the linear guide (6) which the connecting arm (80) is fixed (which is for example L-shaped).

[0076] The device (1, 10, 100) of one of the illustrated embodiments can comprise illuminating means, associated to the optical detecting means (4) and predisposed to illuminate the detecting region (3), for facilitating detection of the identifying codes by the optical detecting means (4).

[0077] The invention further relates to a machine (M) for packing articles (A) provided with an identifying code, comprising an identifying and accumulating device (1, 10, 100) for identifying and accumulating the articles (A) according to any one of the described embodiments.

Claims

1. An identifying and accumulating device (1, 10) of articles (A) provided with an identifying code, comprising:

a frame (2);

a detecting region (3), where the articles (A) are positioned in a row in such a way that the relative identifying code is arranged at a side (L) of the row;

optical detecting means (4) arranged in proximity of the detecting region (3) for detecting the identifying code of the articles (A) when the articles (A) are arranged in the detecting region (3);

an accumulating region (5) in which the articles (A) coming from the detecting region (3) are accumulated so as to be subsequently packed; the detecting region (3) being interposed between the accumulating region (5) and the optical detecting means (4) and being aligned to the accumulating region (5) and the optical detecting means (4);

a linear guide (6, 60, 61) fixed to the frame (2); a carriage (7) that is mobile along the linear guide (6, 60, 61);

a pusher (8) borne by the carriage (7), comprising a connecting arm (80) constrained to the carriage (7) and a pushing plate (81) which is borne by the connecting arm (80), which pushing plate (81) is dimensioned so as to push the articles (A) from the detecting region (3) to the accumulating region (5);

the pushing plate (81) being drawn by the carriage (7) along a straight advancing pathway from a retracted position, in which the pushing plate (81) is interposed between the detecting region (3) and the optical detecting means (4) and wherein the pushing plate (81) is aligned with the detecting region (3) and the optical detecting means (4), to an advanced position in which the pushing plate (81) is at the accumulating region (5);

the device (1, 10) being **characterised in that** the pusher (8) further comprises movement means (900) for moving the connecting arm (80) and the pushing plate (81) with respect to the carriage (7), which movement means (900) enable displacing the pushing plate (81) out of the straight advancement pathway in order that the optical detecting means (4) face the articles (A) arranged in a row in the detecting region (3) so as to detect the relative identifying code.

2. The device (1) of claim 1, wherein the connecting arm (80) comprises a portion (82) that is transversal to the straight advancement pathway; and wherein the movement means (900) comprise: a motor mounted on-board the carriage (7); a pinion (91) activated in rotation by the motor; and a rack (92) which is fixed to the portion (82) of the connecting arm (80) and which engages with the pinion (91) so that the connecting arm (80) and the pushing plate (81) are further mobile in a direction that is transversal to the

straight advancement pathway.

3. The device (1) of the preceding claim, wherein the portion of the connecting arm (80) is perpendicular to the straight advancement pathway.
4. The device (1) of claim 1, wherein the movement means (900) comprise a motor (901) mounted on-board the carriage (7), the output shaft (93) of which commands rotation of the connecting arm (80) and the pushing plate (81).
5. An identifying and accumulating device (100) of articles (A) provided with an identifying code, comprising:

- a detecting region (3) in which the articles (A) are positioned in a row such that the relative identifying code is arranged at a side (L) of the row;

- optical detecting means (4) for detecting the identifying code of the articles (A) when the articles (A) are arranged in the detecting region (3);

- an accumulating region (5) in which the articles (A) coming from the detecting region (3) are to be accumulated in order to be successively packed; the detecting region (3) being interposed between the accumulating region (5) and the optical detecting means (4) and being aligned to the accumulating region (5) and to the optical detecting means (4);

- a pusher (8) for pushing the articles (A) from the detecting region (3) to the accumulating region (5), comprising a pushing plate (81) which is mobile along a straight pathway from a retracted position, in which the pushing plate (81) is aligned with the optical detecting means (4) and faces a side (L) of the row of articles (A) arranged in the detecting region (3), to an advanced position in which the pushing plate (81) is at the accumulating region (5); and vice versa;

the device (100) is **characterised in that**:

- the pushing plate (81) comprises a through-opening (9);

- the pusher (8) further comprises a closing element (90) dimensioned such as to close the through-opening (9) of the pushing plate (81) and constrained to the pushing plate (81) so as to be mobile between two configurations: a first configuration in which it is arranged in the through-opening (9), closes the through-opening (9) and defines, with the pushing plate (81), a pushing surface (S) for pushing the articles (A) from the detecting region (3) to the accumulating region (5) when the pushing plate (81) is moved

into the advanced position; and a second configuration in which it makes the through-opening (9) accessible;

the through-opening (9) is arranged and dimensioned such that, when the pushing plate is in the retracted position and the closing element (90) is moved into the second configuration, the optical detecting means (4) are facing towards the through-opening (9) and, through the through-opening (9), face the articles (A) arranged in the detecting region (3), in such a way as to detect the relative identifying code thereof.

6. The device (100) of the preceding claim, wherein, when the pushing plate (81) is in the retracted position and the closing element (90) is in the second configuration, the optical detecting means (4) are at the through-opening (9).

7. The device (100) of claim 5 or 6, further comprising a frame (2) and movement means (94, 95) of the closing element (90); wherein the movement means (94, 95) comprise a fixed part (94) solidly constrained to the frame (2), and a mobile part (95) borne by the pushing plate (81), connected to the closing element (90) and movable with respect to the pushing plate (81) so as to bring the closing element (90) into the relative second configuration; the fixed part (94) and the mobile part (95) being reciprocally arranged and conformed such that when the pushing plate (81) is moved into the relative retracted position, the fixed part (94) contacts and moves the mobile part (95), determining the movement of the closing element (90) into the relative second configuration.

8. The device (100) of the preceding claim, wherein the fixed part (94) of the movement means (94, 95) comprises an abutting element, and the mobile part (95) of the movement means (94, 95) comprises a cam mechanism.

9. The device (100) of any one of the preceding claims from 5 to 8, wherein the closing element (90) is hinged to an edge of the through-opening (9).

10. The device (10) of claim 1, in which the pushing plate (81) is constrained to the connecting arm (80), and in which the pushing plate (81) is further mobile with respect to the connecting arm (80) such as to move externally of the straight pathway and thus enable the optical detecting means (4) to face the articles (A) arranged in the detecting region (3), such as to detect the identifying code thereof.

11. The device (10) of the preceding claim, wherein the pushing plate (81) is rotatable with respect to the connecting arm (80).

12. The device (10) of claim 10 or 11, further comprising motorisation means, for enabling movement of the pushing plate (81) out of the straight pathway.

13. A machine (M) for packing articles (A) provided with an identifying code, comprising an identifying and accumulating device (1, 10, 100) for identifying and accumulating the articles (A) according to any one of the preceding claims.

Patentansprüche

1. Vorrichtung (1, 10) zur Identifizierung und Ansammlung von Gegenständen (A), die mit einem Erkennungscode versehen sind, Folgendes beinhaltend:

einen Rahmen (2);
einen Erkennungsbereich (3), in dem die Gegenstände (A) derart in einer Reihe angeordnet werden, dass sich der jeweilige Erkennungscode auf einer Seite (L) der Reihe befindet;
optische Erkennungsmittel (4), die in der Nähe des Erkennungsbereichs (3) angeordnet sind und dazu dienen, den Erkennungscode der Gegenstände (A) zu erfassen, wenn die Gegenstände (A) im Erkennungsbereich (3) angeordnet sind;
einen Sammelbereich (5), in dem die vom Erkennungsbereich (3) ankommenden Gegenstände (A) angesammelt werden, um anschließend verpackt zu werden; wobei der Erkennungsbereich (3) zwischen dem Sammelbereich (5) und den optischen Erkennungsmitteln (4) angeordnet und mit dem Sammelbereich (5) und den optischen Erkennungsmitteln (4) ausgerichtet ist;
eine Linearführung (6, 60, 61), die am Rahmen (2) befestigt ist;
einen Wagen (7), der entlang der Linearführung (6, 60, 61) beweglich ist;
einen Schieber (8), der von dem Wagen (7) getragen wird und der einen an dem Wagen (7) festgelegten Verbindungsarm (80) sowie eine von dem Verbindungsarm (80) getragene Schubplatte (81) beinhaltet, wobei die Schubplatte (81) so bemessen ist, dass sie die Gegenstände (A) von dem Erkennungsbereich (3) zu dem Sammelbereich (5) schiebt;
wobei die Schubplatte (81) von dem Wagen (7) entlang einer gerade verlaufenden Bewegungsbahn mitgenommen wird aus einer zurückgezogenen Stellung, in der die Schubplatte (81) zwischen dem Erkennungsbereich (3) und den optischen Erkennungsmitteln (4) angeordnet ist und worin die Schubplatte (81) mit dem Erkennungsbereich (3) und den optischen Erkennungsmitteln (4) ausgerichtet ist, in eine vorge-

- schobene Stellung, in der die Schubplatte (81) im Sammelbereich (5) angeordnet ist; wobei die Vorrichtung (1) **dadurch gekennzeichnet ist, dass** der Schieber (8) ferner Antriebsmittel (900) zum Bewegen des Verbindungsarms (80) und der Schubplatte (81) relativ zu dem Wagen (7) beinhaltet, wobei es die Antriebsmittel (900) ermöglichen, die Schubplatte (81) aus der gerade verlaufenden Bewegungsbahn heraus zu verschieben, so dass die optischen Erkennungsmittel (4) den in einer Reihe in dem Erkennungsbereich (3) angeordneten Gegenständen (A) zugewandt sind, um den entsprechenden Erkennungscode zu erfassen.
2. Vorrichtung (1) nach Anspruch 1, worin der Verbindungsarm (80) einen Abschnitt (82) beinhaltet, der zu der gerade verlaufenden Bewegungsbahn quergerichtet ist; und worin die Antriebsmittel (900) Folgendes beinhalten: einen Motor, der an Bord des Wagens (7) montiert ist; ein Ritzel (91), das durch den Motor in eine Drehbewegung versetzt wird; und eine Zahnstange (92), die an dem Abschnitt (82) des Verbindungsarms (80) befestigt ist und mit dem Ritzel (91) so in Eingriff tritt, dass der Verbindungsarm (80) und die Schubplatte (81) ferner in einer Richtung beweglich sind, die zu der gerade verlaufenden Bewegungsbahn quergerichtet ist.
3. Vorrichtung (1) nach dem vorhergehenden Anspruch, worin der Abschnitt des Verbindungsarms (80) orthogonal zu der gerade verlaufenden Bewegungsbahn ist.
4. Vorrichtung (1) nach Anspruch 1, worin die Antriebsmittel (900) einen Motor (901) beinhalten, der an Bord des Wagens (7) montiert ist und dessen Abtriebswelle (93) die Drehbewegung des Verbindungsarms (80) und der Schubplatte (81) ansteuert.
5. Vorrichtung (100) zur Identifizierung und Ansammlung von Gegenständen (A), die mit einem Erkennungscode versehen sind, Folgendes beinhaltend:
- einen Erkennungsbereich (3), in dem die Gegenstände (A) derart in einer Reihe angeordnet werden, dass sich der jeweilige Erkennungscode auf einer Seite (L) der Reihe befindet;
 - optische Erkennungsmittel (4), die dazu dienen, den Erkennungscode der Gegenstände (A) zu erfassen, wenn die Gegenstände (A) im Erkennungsbereich (3) angeordnet sind;
 - einen Sammelbereich (5), in dem die vom Erkennungsbereich (3) ankommenden Gegenstände (A) angesammelt werden müssen, um anschließend verpackt zu werden; wobei der Erkennungsbereich (3) zwischen dem Sammelbereich (5) und den optischen Erkennungsmitteln (4) angeordnet und mit dem Sammelbereich (5) und den optischen Erkennungsmitteln (4) ausgerichtet ist;
 - einen Schieber (8) zum Schieben der Gegenstände (A) von dem Erkennungsbereich (3) zu dem Sammelbereich (5), beinhaltend eine Schubplatte (81), die entlang einer gerade verlaufenden Bewegungsbahn beweglich ist aus einer zurückgezogenen Stellung, in der die Schubplatte (81) mit den optischen Erkennungsmitteln (4) ausgerichtet und einer Seite (L) der Reihe von Gegenständen (A) zugewandt ist, die im Erkennungsbereich (3) angeordnet sind, in eine vorgeschobene Stellung, in der die Schubplatte (81) im Sammelbereich (5) angeordnet ist; und umgekehrt;
- wobei die Vorrichtung (100) **dadurch gekennzeichnet ist, dass:**
- die Schubplatte (81) eine Durchgangsöffnung (9) beinhaltet;
 - der Schieber (8) ferner ein Verschlusselement (90) beinhaltet, das derart bemessen ist, dass es die Durchgangsöffnung (9) der Schubplatte (81) verschließt, und das an der Schubplatte (81) festgelegt ist, so dass es zwischen zwei Konfigurationen beweglich ist: einer ersten Konfiguration, in der es in der Durchgangsöffnung (9) angeordnet ist, die Durchgangsöffnung (9) verschließt und, zusammen mit der Schubplatte (81), eine Schuboberfläche (S) bildet, um die Gegenstände (A) von dem Erkennungsbereich (3) zu dem Sammelbereich (5) zu schieben, wenn die Schubplatte (81) in die vorgeschobene Stellung bewegt wird; und einer zweiten Konfiguration, in der es den Zugang zur Durchgangsöffnung (9) freigibt;
 - wobei die Durchgangsöffnung (9) so angeordnet und bemessen ist, dass, wenn sich die Schubplatte in der zurückgezogenen Stellung befindet und das Verschlusselement (90) in die zweite Konfiguration bewegt wird, die optischen Erkennungsmittel (4) der Durchgangsöffnung (9) zugewandt sind und, durch die Durchgangsöffnung (9) hindurch, den im Erkennungsbereich (3) angeordneten Gegenständen (A) zugewandt sind, so dass sie deren jeweiligen Erkennungscode erfassen können.
6. Vorrichtung (100) nach dem vorhergehenden Anspruch, worin, wenn sich die Schubplatte (81) in der zurückgezogenen Stellung befindet und das Verschlusselement (90) die zweite Konfiguration einnimmt, die optischen Erkennungsmittel (4) an der Durchgangsöffnung (9) angeordnet sind.
7. Vorrichtung (100) nach Anspruch 5 oder 6, ferner

beinhaltend einen Rahmen (2) und Antriebsmittel (94, 95) des Verschlusselements (90); worin die Antriebsmittel (94, 95) einen feststehenden Teil (94) beinhalten, der an dem Rahmen (2) festgelegt ist, und einen beweglichen Teil (95), der von der Schubplatte (81) getragen wird und der mit dem Verschlusselement (90) verbunden ist und relativ zu der Schubplatte (81) so beweglich ist, dass er das Verschlusselement (90) in die entsprechende zweite Konfiguration bringen kann; wobei der feststehende Teil (94) und der bewegliche Teil (95) derart zueinander angeordnet und beschaffen sind, dass, wenn die Schubplatte (81) in die entsprechende zurückgezogene Stellung bewegt wird, der feststehende Teil (94) den beweglichen Teil (95) berührt und in Bewegung versetzt, und somit die Bewegung des Verschlusselements (90) in die entsprechende zweite Konfiguration bewirkt.

8. Vorrichtung (100) nach dem vorhergehenden Anspruch, worin der feststehende Teil (94) der Antriebsmittel (94, 95) ein Anschlagelement beinhaltet, und der bewegliche Teil (95) der Antriebsmittel (94, 95) einen Nockenmechanismus beinhaltet.

9. Vorrichtung (100) nach einem der vorhergehenden Ansprüche von 5 bis 8, worin das Verschlusselement (90) scharnierbeweglich an einer Kante der Durchgangsöffnung (9) angelenkt ist.

10. Vorrichtung (10) nach Anspruch 1, wobei die Schubplatte (81) an dem Verbindungsarm (80) festgelegt ist, und wobei die Schubplatte (81) ferner relativ zu dem Verbindungsarm (80) derart beweglich ist, dass sie sich außerhalb der gerade verlaufenden Bewegungsbahn bewegen kann, und es somit ermöglicht, dass die optischen Erkennungsmittel (4) den im Erkennungsbereich (3) angeordneten Gegenständen (A) so zugewandt werden, dass sie deren Erkennungscode erfassen können.

11. Vorrichtung (10) nach dem vorhergehenden Anspruch, worin die Schubplatte (81) relativ zu dem Verbindungsarm (80) drehbeweglich ist.

12. Vorrichtung (10) nach Anspruch 10 oder 11, ferner Motorisierungsmittel beinhaltend, um die Bewegung der Schubplatte (81) aus der gerade verlaufenden Bewegungsbahn heraus zu ermöglichen.

13. Maschine (M) zur Verpackung von Gegenständen (A), die mit einem Erkennungscode versehen sind, beinhaltend eine Identifizierungs- und Ansammlungsvorrichtung (1, 10, 100) zur Identifizierung und Ansammlung der Gegenstände (A) nach einem beliebigen der vorhergehenden Ansprüche.

Revendications

1. Dispositif d'identification et d'accumulation (1) d'articles (A) dotés d'un code d'identification, comprenant :

un bâti (2),
une zone de détection (3) où les articles (A) sont positionnés en ligne de telle manière que le code d'identification respectif est disposé à un côté (L) de la ligne,
des moyens de détection optique (4) disposés à proximité de la zone de détection pour détecter le code d'identification des articles (A) lorsque les articles sont disposés dans la zone de détection (3),
une zone d'accumulation (5) dans laquelle les articles (A) arrivant de la zone de détection (3) sont accumulés de façon à être emballés ensuite, la zone de détection étant interposée entre la zone d'accumulation (5) et les moyens de détection optique (4) et étant alignée avec la zone d'accumulation (5) et les moyens de détection optique (4),
un guidage linéaire (6 ; 60, 61) fixé au bâti (2),
un chariot (7) qui est mobile le long du guidage linéaire (6, 60, 61),
un poussoir (8) porté par le chariot (7), comprenant un bras de liaison (80) bridé au chariot (7) et une plaque de poussée (81) qui est portée par le bras de liaison (80), laquelle plaque de poussée est dimensionnée de façon à pousser les articles (A) de la zone de détection (3) vers la zone d'accumulation (5),
la plaque de poussée (81) étant tirée par le chariot (7) le long d'une voie d'avancée droite depuis une position rentrée, dans laquelle la plaque de poussée (81) est interposée entre la zone de détection (3) et les moyens de détection optique (4) et dans laquelle la plaque de poussée (81) est alignée avec la zone de détection (3) et les moyens de détection optique (4), vers une position avancée dans laquelle la plaque de poussée est au niveau de la zone d'accumulation (5),
le dispositif (1, 10) étant **caractérisé en ce que** le poussoir (8) comprend en plus des moyens de déplacement (900) pour déplacer le bras de liaison (80) et la plaque de poussée (81) par rapport au chariot (7), lesquels moyens de déplacement (900) permettent le déplacement de la plaque de poussée (81) en dehors de la voie d'avancée droite afin que les moyens de détection optique (4) soient orientés vers les articles (A) disposés en ligne dans la zone de détection (3) de façon à détecter le code d'identification respectif.

2. Dispositif (1) selon la revendication 1, dans lequel le bras de liaison (80) comprend une partie (82) qui est transversale à la voie d'avancée droite, et dans lequel les moyens de déplacement (900) comprennent : un moteur embarqué sur le chariot (7), un pignon (91) actionné en rotation par le moteur, et une crémaillère (92) qui est fixée à la partie (82) du bras de liaison (80) et qui engrène le pignon (91) de façon à ce que le bras de liaison (80) et la plaque de poussée (81) soient mobiles en plus dans une direction qui est transversale à la voie d'avancée droite.
3. Dispositif (1) selon la revendication précédente, dans lequel la partie du bras de liaison (80) est perpendiculaire à la voie d'avancée droite.
4. Dispositif (1) selon la revendication 1, dans lequel les moyens de déplacement (900) comprennent un moteur embarqué sur le chariot (7), dont l'arbre de sortie (93) commande la rotation du bras de liaison (80) et de la plaque de poussée (81).
5. Dispositif d'identification et d'accumulation (1, 10) d'articles (A) dotés d'un code d'identification, comprenant :

une zone de détection (3) où les articles (A) sont positionnés en ligne de telle manière que le code d'identification respectif est disposé à un côté (L) de la ligne,

des moyens de détection optique (4) pour détecter le code d'identification des articles (A) lorsque les articles sont disposés dans la zone de détection (3),

une zone d'accumulation (5) dans laquelle les articles (A) arrivant de la zone de détection (3) s'accumulent de façon à être emballés successivement, la zone de détection étant interposée entre la zone d'accumulation (5) et les moyens de détection optique (4) et étant alignée avec la zone d'accumulation (5) et les moyens de détection optique (4),

un poussoir (8) pour pousser les articles (A) de la zone de détection (3) vers la zone d'accumulation (5), comprenant une plaque de poussée (81) qui est mobile le long d'une trajectoire droite depuis une position rentrée, dans laquelle la plaque de poussée (81) est alignée avec les moyens de détection optique (4) et fait face à un côté (L) de la rangée d'articles (A) disposés dans la zone de détection (3), jusqu'à une position avancée dans laquelle la plaque de poussée (81) est au niveau de la zone d'accumulation (5), et vice-versa,

le dispositif (100) étant **caractérisé en ce que :**

la plaque de poussée (81) comprend un ori-

fice traversant (9),

le poussoir comprend en plus un élément de fermeture (90) dimensionné de façon à fermer l'orifice traversant (9) de la plaque de poussée (81) et fixé à la plaque de poussée (81) de façon à être mobile entre deux configurations : une première configuration dans laquelle il est disposé dans l'orifice traversant (9), ferme l'orifice traversant (9) et définit, avec la plaque de poussée (81), une surface de poussée (S) pour pousser les articles (A) depuis la zone de détection (3) jusqu'à la zone d'accumulation (5) lorsque la plaque de poussée (81) est déplacée dans la position avancée, et une seconde configuration où elle rend accessible l'orifice traversant (9), et

l'orifice traversant (9) est disposé et dimensionné de manière à ce que, lorsque la plaque de poussée (81) est dans la position rentrée et l'élément de fermeture (90) est déplacé dans la seconde configuration, les moyens de détection optique (4) font face à l'orifice traversant (9) et par l'orifice traversant (9), font face aux articles (A) disposés dans la zone de détection (3) de manière à détecter le code d'identification respectif de ceux-ci.

6. Dispositif (100) selon la revendication précédente, dans lequel, lorsque la plaque de poussée (81) est dans la position rentrée et l'élément de fermeture (90) est dans la seconde configuration, les moyens de détection optique (4) sont au niveau de l'orifice traversant (9).
7. Dispositif (100) selon la revendication 5 ou 6, comprenant en plus un bâti (2) et des moyens de déplacement (94, 95) de l'élément de fermeture (90), dans lequel les moyens de déplacement (94, 95) comprennent une partie fixe (94) solidement fixée au bâti (2) et une partie mobile (95) supportée par la plaque de poussée (81), reliée à l'élément de fermeture (90) et mobile par rapport à la plaque de poussée (81) de manière à positionner l'élément de fermeture (90) dans la seconde configuration respective, la partie fixe (94) et la partie mobile (95) étant agencées et adaptées mutuellement de manière à ce que, lorsque la plaque de poussée (81) est déplacée dans la position rentrée respective, la partie fixe (94) est en contact avec et déplace la partie mobile (95), en instaurant le déplacement de l'élément de fermeture (90) dans la seconde configuration respective.
8. Dispositif (100) selon la revendication précédente, dans lequel la partie fixe (94) des moyens de déplacement (94, 95) comprend un élément de butée et la partie mobile (95) des moyens de déplacement

(94, 95) comprend un mécanisme de came.

9. Dispositif (100) selon l'une quelconque des revendications 5 à 8, dans lequel l'élément de fermeture (90) est articulé à un bord de l'orifice traversant (9). 5
10. Dispositif (10) selon la revendication 1, dans lequel la plaque de poussée est bridée sur le bras de liaison (80) et la plaque de poussée (81) est en plus mobile par rapport au bras de liaison (80) de manière à se déplacer en dehors de la voie droite et permettre ainsi aux moyens de détection optique (4) de faire face aux articles (A) disposés dans la zone de détection (3) de manière à détecter le code d'identification de ceux-ci. 10 15
11. Dispositif (10) selon la revendication précédente, dans lequel la plaque de poussée (81) peut tourner par rapport au bras de liaison (80). 20
12. Dispositif (10) selon la revendication 10 ou 11, comprenant en plus des moyens de motorisation pour permettre le déplacement de la plaque de poussée en dehors de la voie droite. 25
13. Machine (M) pour emballer des articles (A) dotés d'un code d'identification, comprenant un dispositif d'identification et d'accumulation (1, 10, 100) pour identifier et accumuler les articles (A) selon l'une quelconque des revendications précédentes. 30

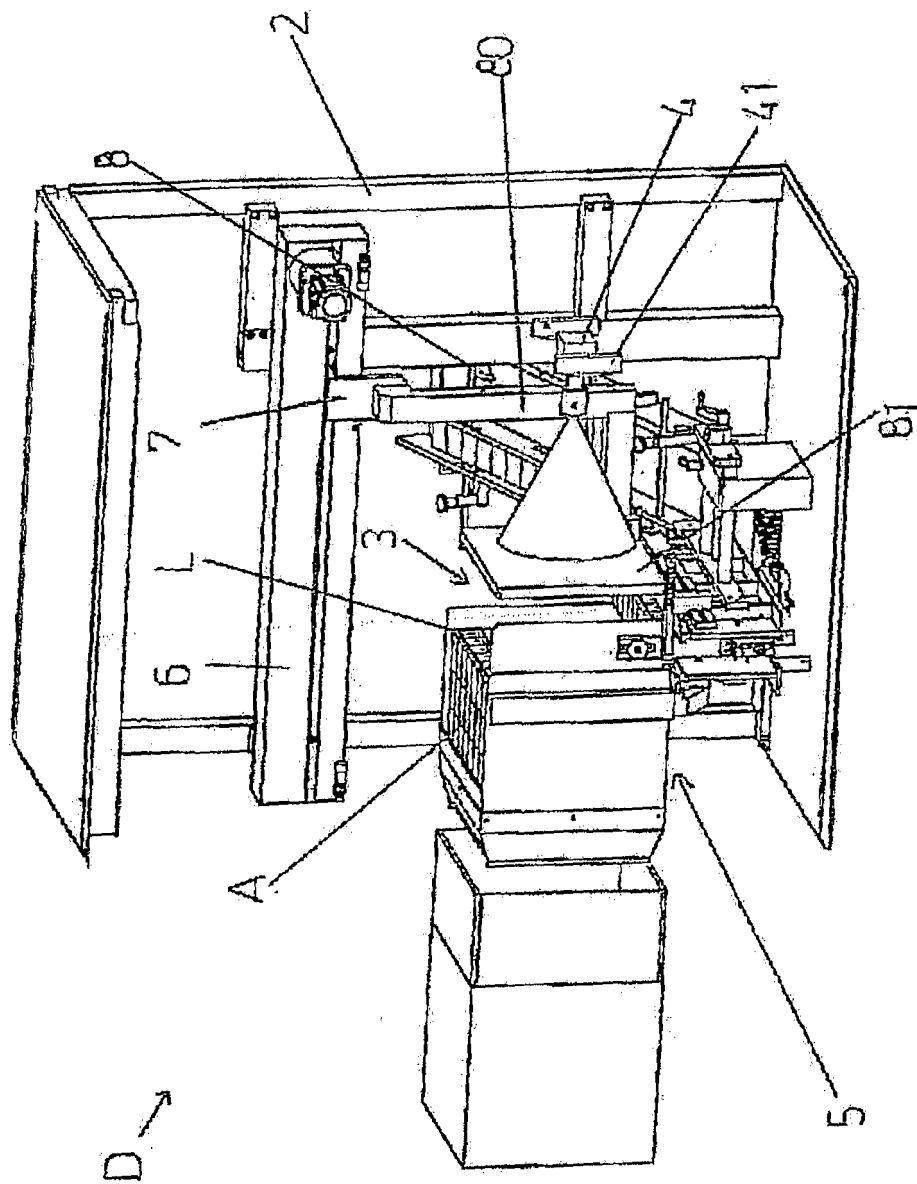
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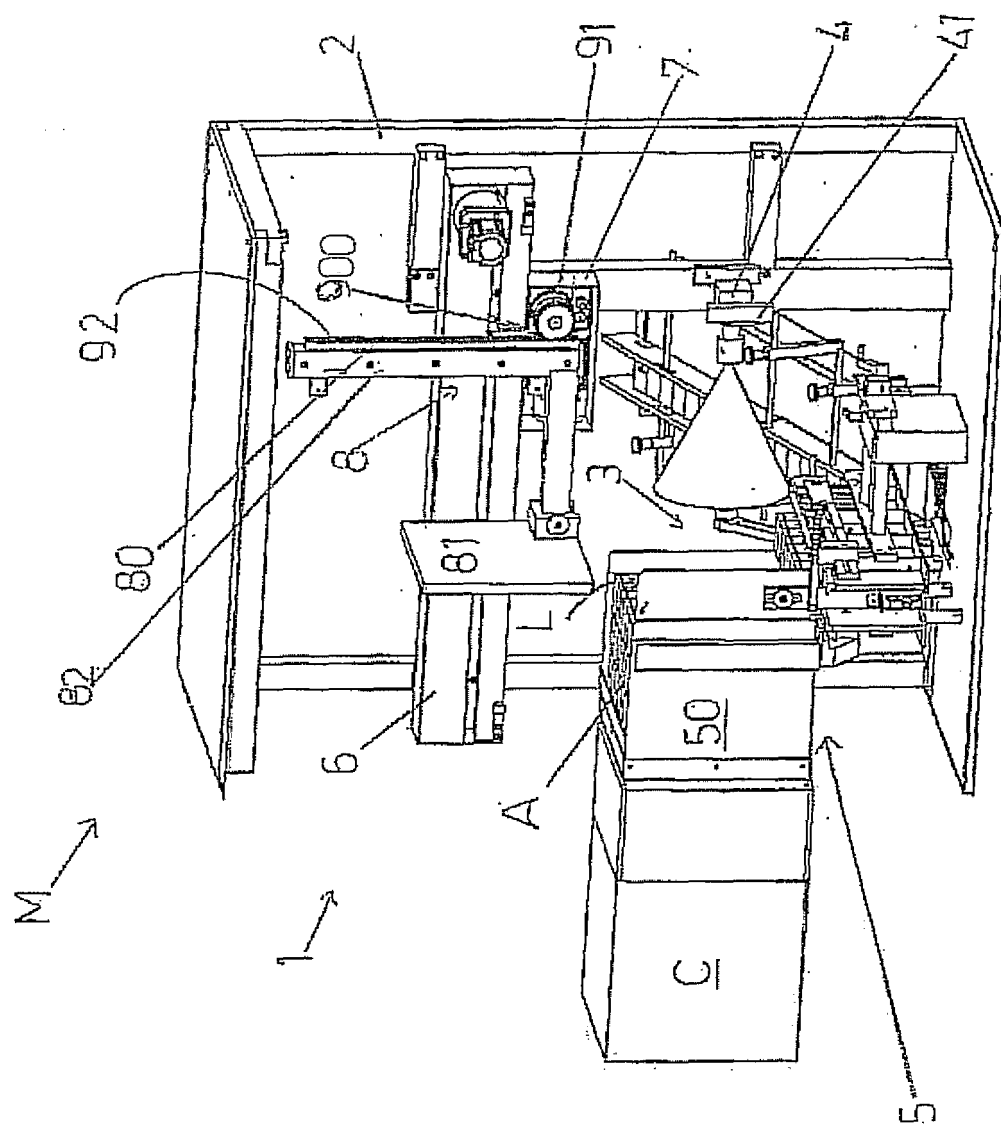
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ELG2

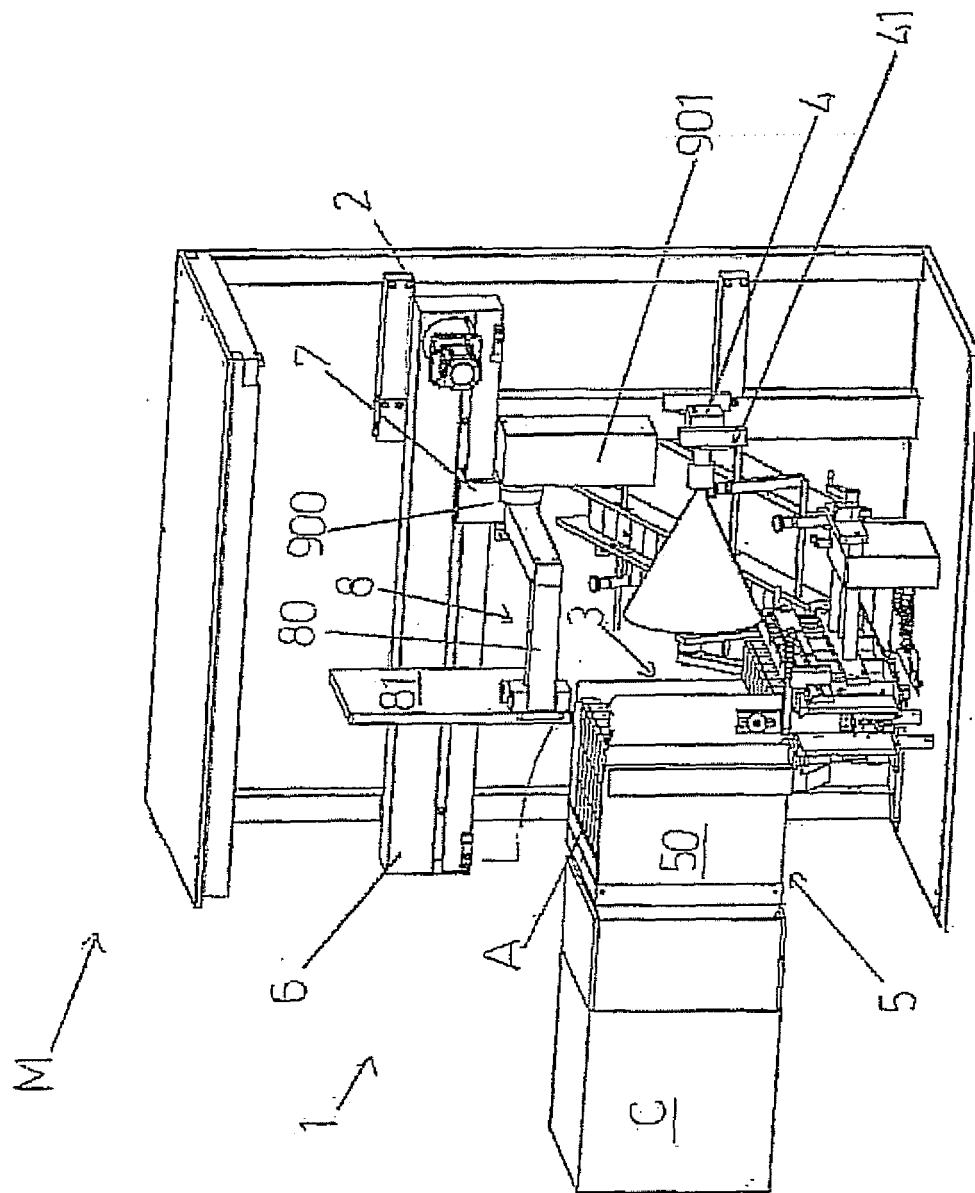


FIG. 3

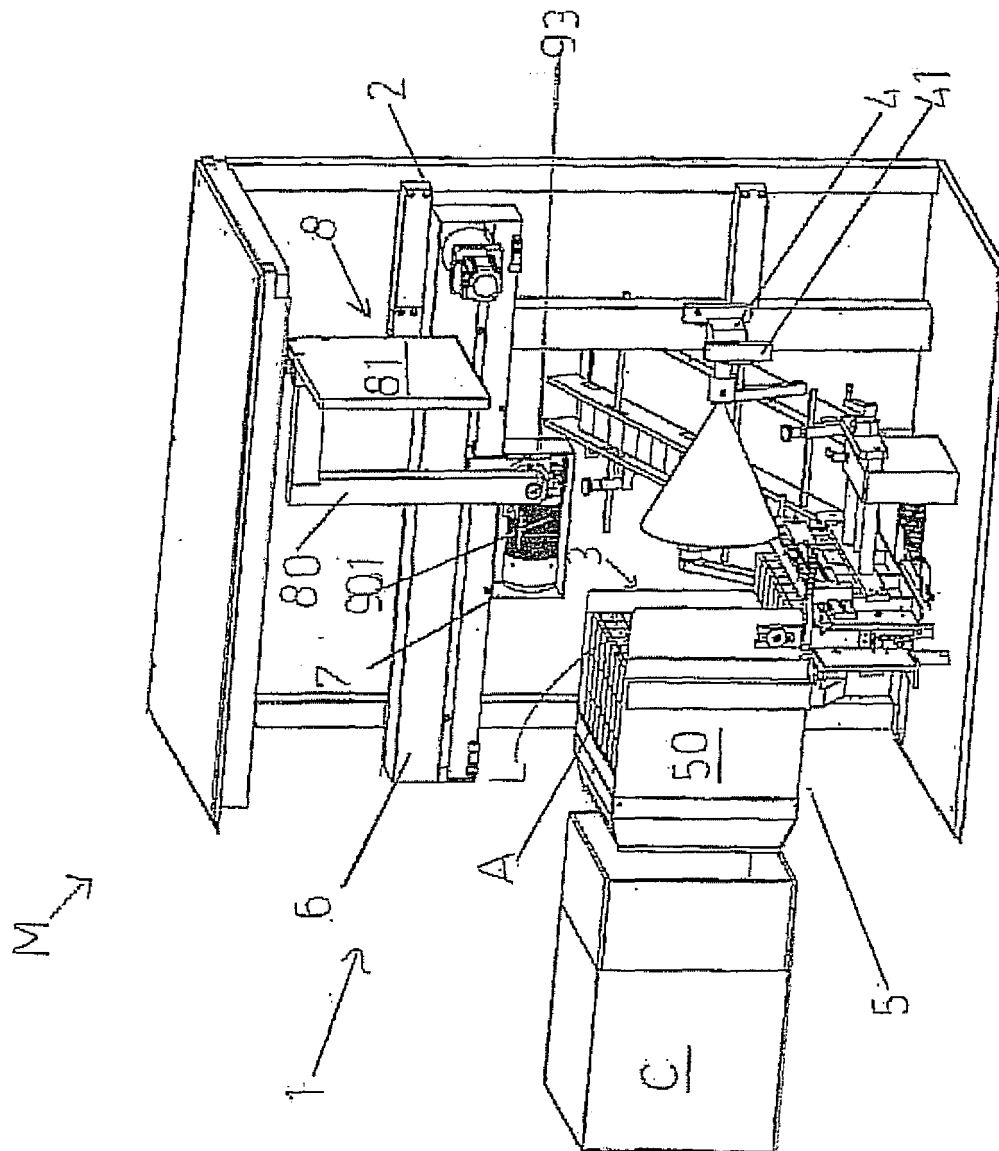


FIG. 4

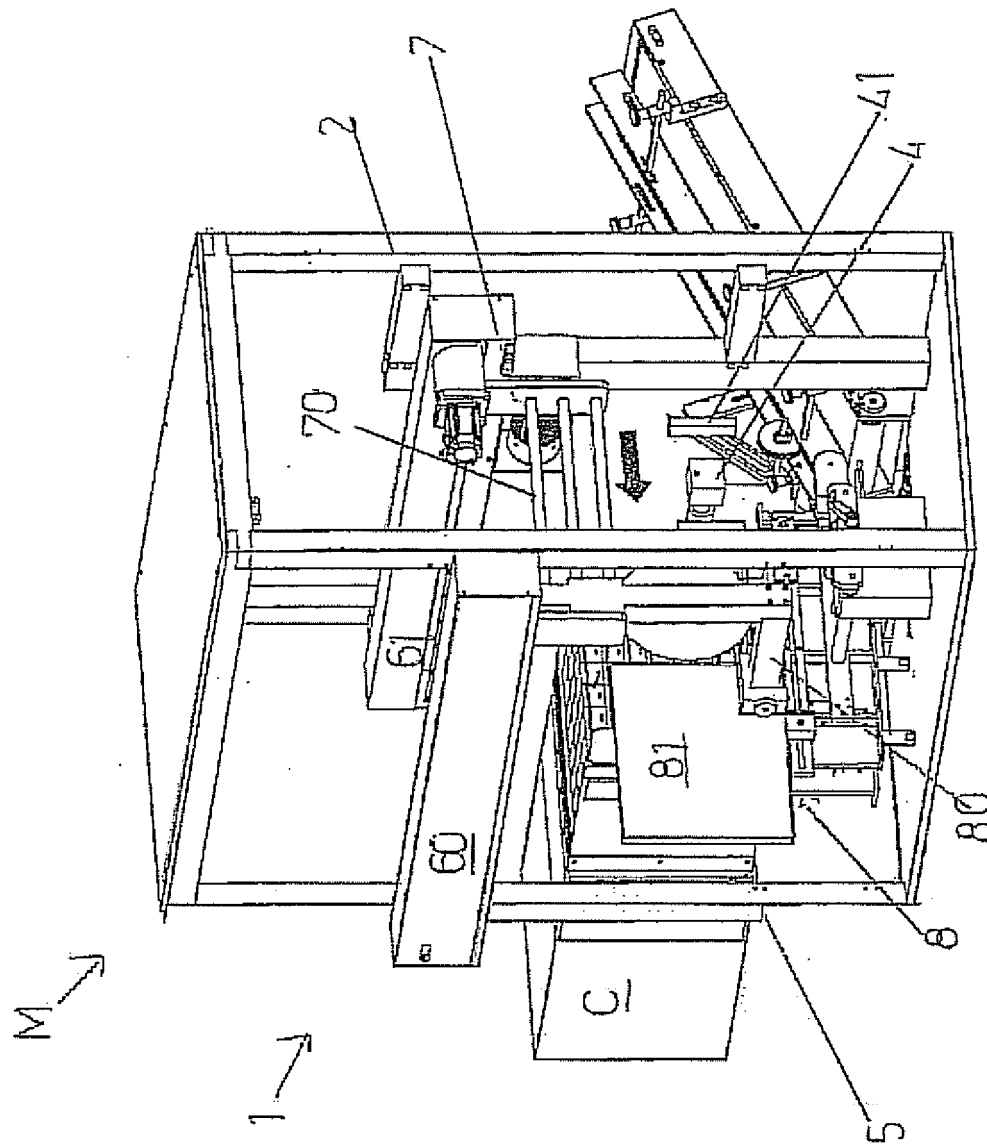
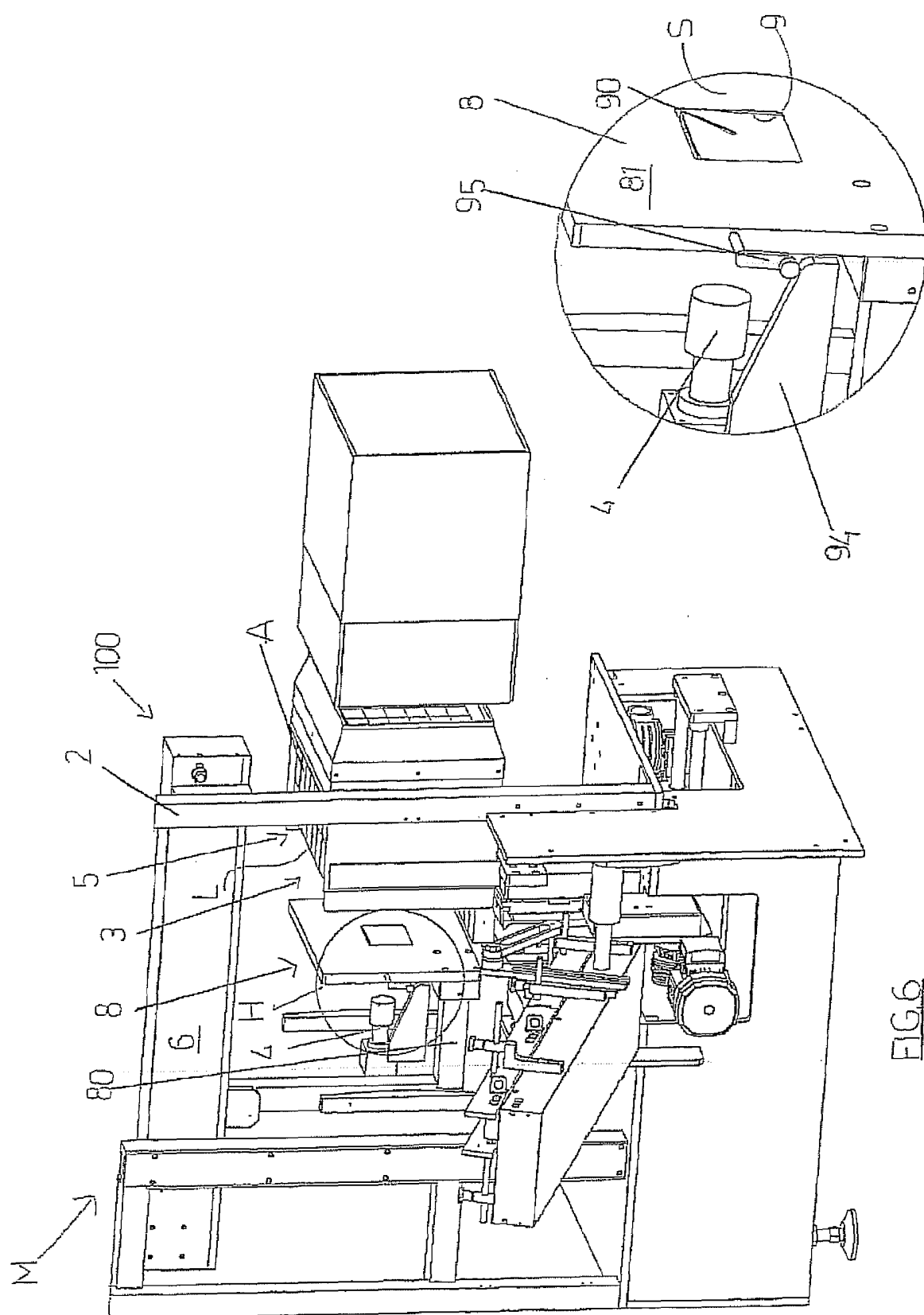
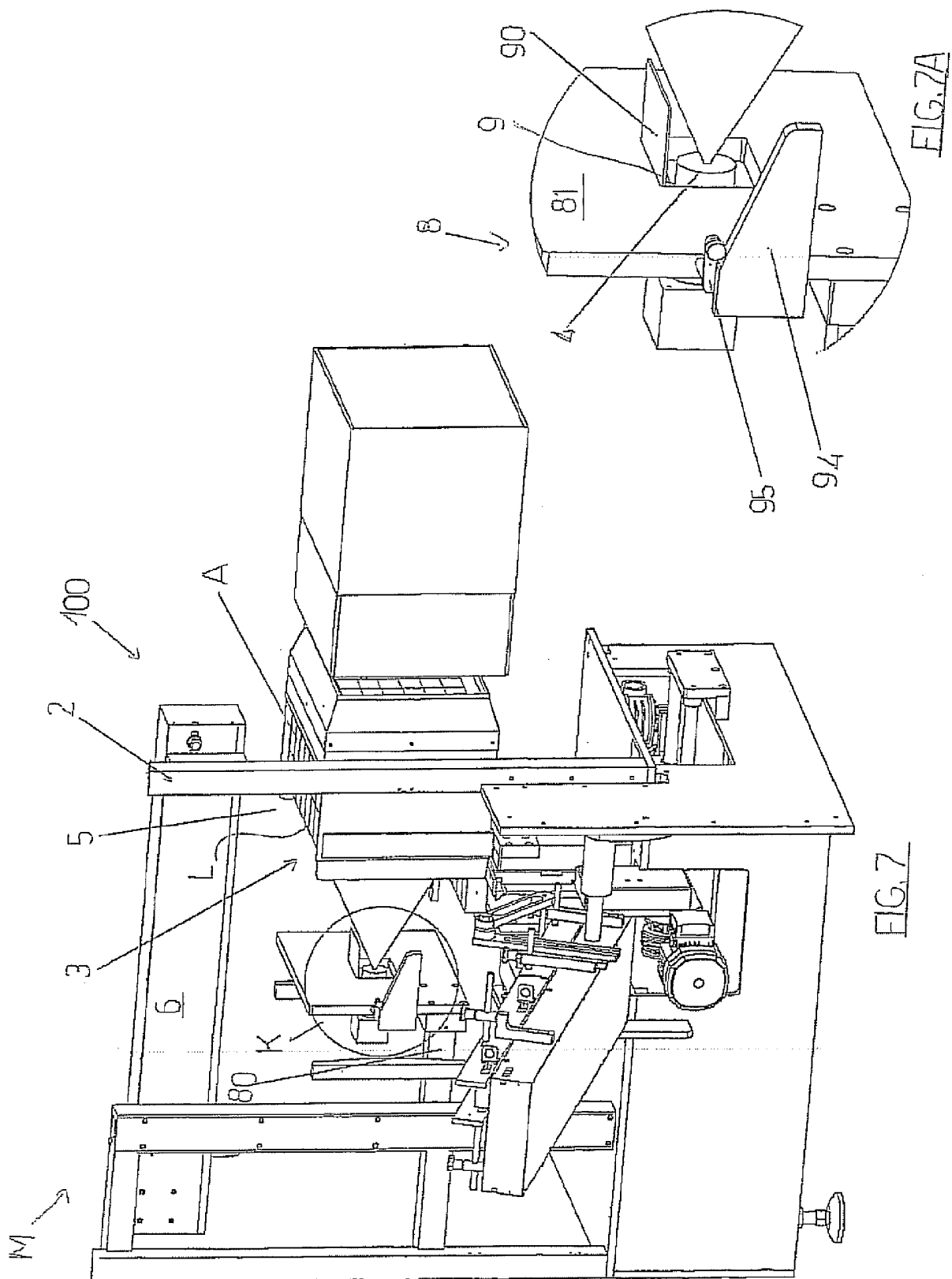
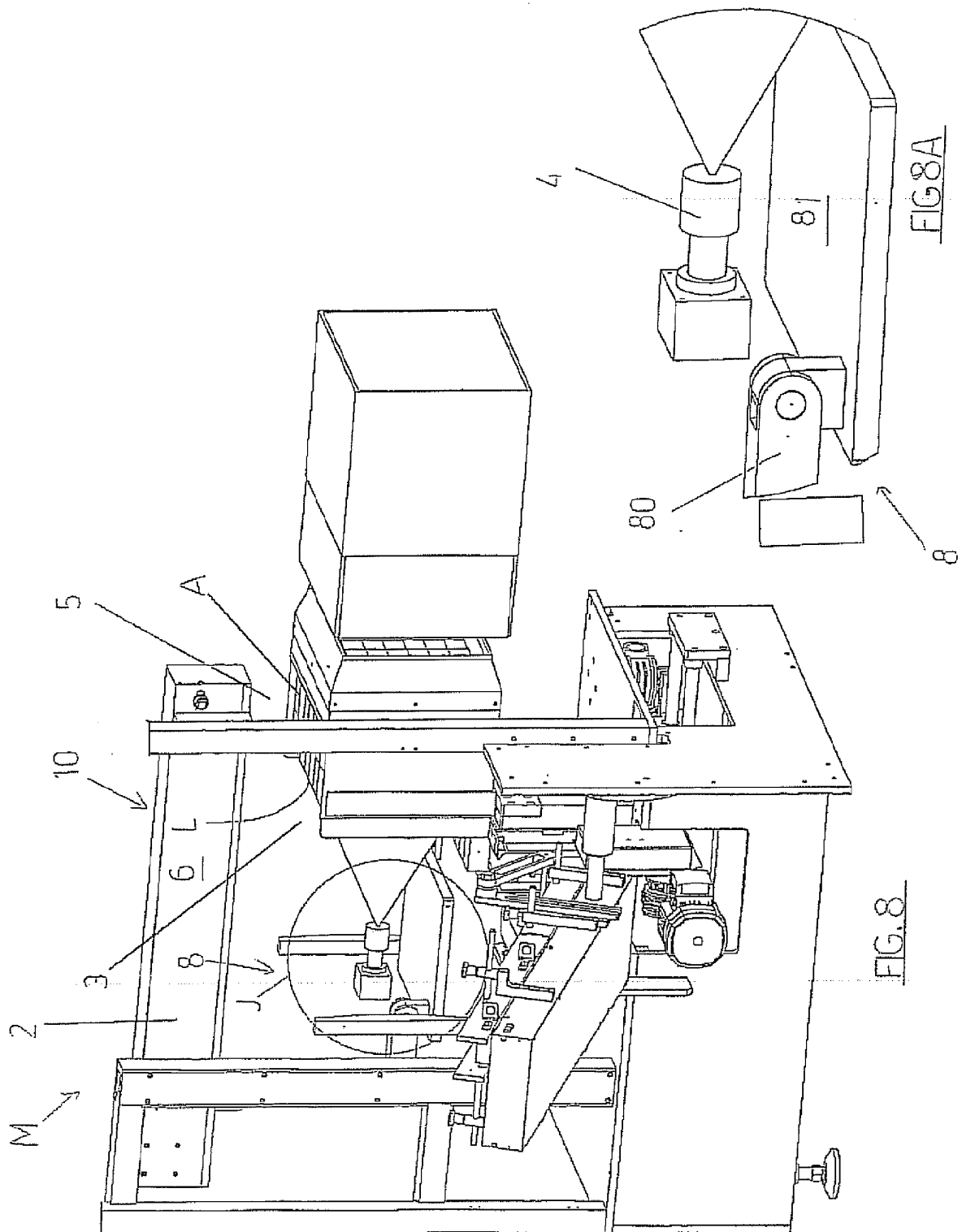


FIG. 5

FIG. 6A





REFERENCES CITED IN THE DESCRIPTION

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