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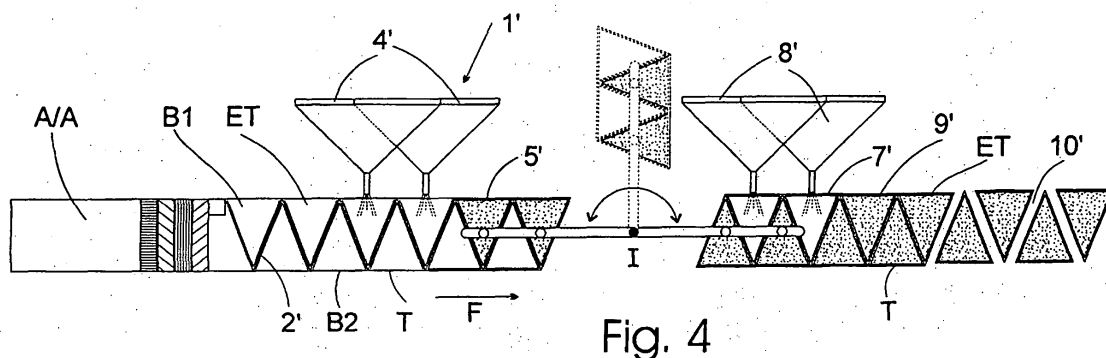
(54) **MACHINE AND METHOD FOR THE HERMETIC PACKAGING OF POWDER, GRANULAR, VISCIOUS AND SIMILAR PRODUCTS**

(57) The invention relates to a packaging machine employing a double strip of sheet material issuing from one or two rolls.

The machine consists in an arrangement comprising an oscillating filler assembly being made up of an associated filler tube being arranged within a double strip in which the triangular packages are formed at its end, these latter being filled with the product to be packaged and being thereupon closed, said machine according to another arrangement comprising a double strip being

formed out of a sheet issuing from one roll, said sheet being folded and cut along the fold line, or out of two adorsed sheets, a succession of weld lines being made along said double strip, said weld lines having mutually opposite inclinations and forming an angle with the longitudinal axis of the double strip and thus forming V-shaped weld lines defining the succession of triangular packages that are filled with the product and ulteriorly closed.

Respective methods are also described.



**Description****OBJECT OF THE INVENTION**

[0001] The present invention has as its object a machine and method for hermetically packaging powder, granular, viscous and similar products of any type and nature in packages having a triangular, preferentially isosceles configuration.

**BACKGROUND OF THE INVENTION**

[0002] Many types of machines are commercially available which are fit to carry out a hermetic packaging of different products in square or rectangular packages, said machines comprising a roll of sheet material for this type of packages, from a guide roller and by means of downstream guides said sheet material being centrally and longitudinally folded into a folded strip, this latter at successive stages being submitted to welding operations forming a weld of the folded, lower edge and vertical welds forming the successive packages being open at the upper side, said packages being sucked at their opposite surfaces in order to thus have their open top opened, the corresponding filling operation being then upperly carried out through said open top by means of a by way of funnel or the like, said open top being finally welded, the package with the product packaged in its inside being thus obtained.

[0003] The known machines having been mentioned above use normally square or rectangular packages and have the drawback that in order to form them they require an excessive consumption of said sheet material.

**SUMMARY OF THE INVENTION**

[0004] The aforementioned drawbacks have now been obviated by means of the present invention allowing to carry out the packages with the lowest consumption of sheet material by carrying out triangular, preferentially isosceles packages, this bringing about a cost reduction and providing an innovative, triangular package having a preferentially isosceles configuration and during its use facilitating its emptying by the user, said package having been protected for the owner by means of the Spanish Utility Model No. U 200300692.

[0005] According to what has been set forth above the invention provides that the welding means carry out the weld lines forming the succession of packages in such a way that said lines are arranged at an angle with respect to the principal axis of the strip and as per mutually opposite inclinations.

[0006] According to a preferred embodiment of the present invention the machine is essentially characterised in that it comprises in combination a filler tube being arranged within the folded strip and in association with it, said filler tube thus forming together with said folded strip a filler assembly, and in that downstream of the

aforementioned guide roller said filler assembly is made to oscillate as per an angle  $\alpha$  in correspondence with the angle being formed by two adjacent sides of the triangular package in question of a succession of triangular packages being mutually adjacent at the sides defining said angle  $\alpha$  along the length of the folded strip, in such a way that at the end of each oscillation one side of the package makes up the open top allowing to fill the package through it and at such a stage being arranged in a horizontal filling position, the filling of the next package being carried out during each following oscillation in the opposite sense, after said filling and at the end of said oscillation the package being submitted to the aforementioned operation with the sealing and/or cutting/punching and/or sealing means in order to thus define the filled, just finished and sealed package, and in the next oscillation it is the next adjacent side the one that makes up the open top being arranged in a horizontal position and allowing to fill the next package, this latter being thereupon submitted to the aforementioned operation with the sealing and/or cutting/punching and/or sealing means, the cycle being thus repeated, in such a way that in the filler assembly the filler tube is maintained in a fixed but oscillating position and the folded strip is made to oscillate and is also made to advance with respect to said filler tube by conventional advancer means, the mutually opposite, lateral edges of the strip being welded together at the end of each oscillation.

[0007] According to the aforementioned embodiment of the present invention the oscillation of the filler assembly comprising the folded strip and the filler tube can be carried out in a plane being orthogonal to the guide roller and with the oscillation centre at the lower end pertaining to the last package having been formed in the folded strip and the lower end of the filler tube being associated to the strip, the aforementioned, upperly positioned guide roller thereby oscillating together with the folded strip and the associated filler tube as per the aforesaid angle  $\alpha$ , between the roll and the aforementioned guide roller for such a purpose there being a sheet material storing mechanism that according to the oscillation of the guide roller stores said material by means of several storing rollers in one sense of the oscillation, and supplies the stored material at the oscillation in the opposite sense, said oscillation at each of its ends arranging an adjacent side of the triangular package in such a way that it forms the horizontally arranged open top of each successive package before proceeding to carry out the corresponding sealing/cutting-punching/sealing operations.

[0008] According to said embodiment the oscillation of the filler assembly comprising the folded strip and the filler tube being associated to it is carried out in a plane being orthogonal to the guide roller and with the oscillation centre at the aforementioned guide roller making up the upper point of the oscillation as per the aforementioned angle  $\alpha$ , at the end of each oscillation an adjacent side of the package making up the horizontal open top of the respective package while this latter is being filled,

the corresponding sealing/cutting-punching/sealing operations being thereupon carried out.

**[0009]** For the case of an isosceles triangular package wherein the long sides make up its successive open tops the oscillation angle  $\alpha$  is of about 45°.

**[0010]** During the time of one oscillation the package is filled with product by the filler tube, this latter being maintained in a fixed but oscillating position and possibly being reciprocatingly shifted along a short travel in a back-and-forth motion during the filling operation while the folded strip is made to advance with respect to the filler tube.

**[0011]** The folded strip is made to advance during a simple swing of said folded strip with respect to each end of the side acting as the open top, the swinging motion at each consecutive oscillation being carried out in an opposite sense, said folded strip and the packages being made to advance during the swinging motion and through conventional advancer means.

**[0012]** The machine of said embodiment of the invention can incorporate means for printing the exposed surface of the sheet material upstream of the guide roller with advertising and the identification of the packaged product.

**[0013]** The invention provides a multiple machine comprising a plurality of said machines being arranged in a juxtaposed arrangement.

**[0014]** The invention comprises a method for carrying out a hermetic packaging in triangular packages by means of the machine of the cited embodiment having been described above, wherein from a roll of sheet material being specially designed for the packaging of various powder, granular, liquid, viscous and similar products and by means of a guide roller said material is correspondingly folded into a centrally and longitudinally folded strip making up a succession of packages that are closed by means of the corresponding sealing/cutting and/or punched line punching/sealing operations; characterised in that the product is fed to the folded strip in order to thus fill the successive packages by means of a filler tube being associated and innerly adjacent to the strip next to the longitudinal fold line from the vicinity of the guide roller up to the strip end corresponding to the last package to be filled; in that the filling of the succession of packages is made while making the folded strip and the filler tube being innerly associated to it to oscillate as per an angle  $\alpha$  being in correspondence with the angle being formed by the adjacent sides of the triangle which form the open tops of the successive packages at each oscillation; and by carrying out the corresponding sealing/cutting-punching/sealing operations while at all times correspondingly driving the folded strip, and simultaneously welding the mutually opposite lateral edges of the folded strip at the end of each oscillation.

**[0015]** According to said method the folded strip and the associated filler tube are made to oscillate through an angle  $\alpha$  with centre at the upper guide roller.

**[0016]** The folded strip and the associated filler tube

are made to oscillate through an angle  $\alpha$  with centre at the strip's and the tube's end point corresponding to the last package, said oscillation being made by oscillatingly shifting the strip, the associated tube and the upper guide roller through the arc corresponding to said angle  $\alpha$  in combination with sheet material storing means being provided upstream of the aforementioned guide roller in order to store/supply material when the guide roller is made to oscillate.

**[0017]** In the case of an isosceles triangular package wherein the long sides make up its successive open tops the oscillation angle  $\alpha$  is of about 45°.

**[0018]** Means can be provided for printing the sheet material upstream of the guide roller with advertising and the identification of the packaged product.

**[0019]** According to another preferred embodiment of the present invention the machine is essentially characterised in that it comprises:

- a plurality of main welding means being arranged in succession and positioned in such a way as to form an angle with the longitudinal axis of the double strip and with opposite inclinations, said welding means being operable to make successive, V-shaped, continuous and/or discontinuous welds forming the common sides of each pair of successive and adjacent triangular packages, the third side of the triangular package remaining open and thus making up the respective open top of the package for the introduction of the product, said open tops being located along both longitudinal edges of the strip;
- first means being operable for opening the open tops of the successive triangular packages, said open tops being located at a first longitudinal edge of the strip, in order to successively proceed to fill the packages;
- first means being operable for filling the successive triangular packages through the open tops being located at the first of the longitudinal edges of the double strip;
- first welding means being operable for closing the open tops of the successive triangular packages by means of sealing and/or cutting/punching operations;
- first means being operable for cutting/punching the double strip into sections forming groups of triangular packages;
- means being provided for inverting the position of the double strip, said inverting means being operable for positioning the second of the longitudinal edges of the double strip in the position having been initially assumed by the first longitudinal edge;
- second means being operable for opening the opposite open tops of the successive triangular packages, said opposite open tops being located at the second longitudinal edge of the strip, in order to thus fill said packages;
- second means being operable for filling the succes-

sion of triangular packages through the open tops of the second longitudinal edge;

- second welding means being operable for closing the open tops of the packages by means of sealing and/or cutting/punching operations;
- second means being operable for cutting/punching the double strip so as to thus individualise it into groups of several successive triangular packages and/or individual packages.

**[0020]** According to the invention the double strip of this second machine embodiment consists in two separate, addorsed sheets issuing from respective rolls, or in a sheet that after having issued from one roll has been folded and cut along the fold line.

**[0021]** Said machine comprises means being operable for advancing and gripping the double strip.

**[0022]** This machine also comprises means being operable for turning the empty triangular packages of the double strip either individually and/or in groups of several packages from a strip advancing direction as per an essentially vertical plane to a strip advancing direction as per an essentially horizontal plane, for the ulterior filling and individualisation of the triangular packages.

**[0023]** The aforementioned advancer means vertically shift the double strip in an upwards/downwards direction up to the turning point where the turning means proceed to turn the successive triangular packages so that they can be made to advance in a horizontal direction with upperly positioned open tops in order to later on proceed to fill said successive triangular packages and submit them to the corresponding cutting/punching operations.

**[0024]** Said means being provided for advancing the double strip can shift it vertically as per a vertical plane during its downwardly/upwardly directed shifting motion, and they can shift it horizontally after its having been turned.

**[0025]** According to the invention the machine of the second embodiment allows to only make up a succession of empty triangular packages along the double strip being made up of two sheets by means of the plurality of means being provided for carrying out the main welds in a succession, said welding means being positioned in such a way that they form an angle with respect to the longitudinal axis of the double strip and have opposite inclinations, said welding means being operable to make successive, V-shaped, continuous and/or discontinuous welds forming the common sides of each pair of successive, adjacent, triangular packages, the third side of the triangular package being left open and thus making up the respective open top of the package for introducing the product, said open tops being located along both longitudinal edges of the strip in order to later on proceed to fill the packages and by means of sealing and/or cutting/punching operations individualise them into groups of packages and/or separate packages in the same and/or a different machine.

**[0026]** According to the invention the machine of the

second embodiment allows to only carry out the filling operation and the ulterior individualisation of a succession of triangular packages having been previously formed in another machine, said present machine receiving a series of empty triangular packages having been formed along a double strip being made up of two sheets in order to fill said packages and to thereupon proceed to individualise them into groups of packages or separate packages, said present machine comprising:

- first means being operable for opening the open tops of the series of triangular packages which as such open tops are located at a first edge of the longitudinal edges of the double strip;
- first means being operable for filling the series of triangular packages;
- first welding means being operable for closing the open tops of the series of triangular packages;
- first means being operable for cutting/punching the double strip into sections forming groups of triangular packages;
- means being operable for inverting the position of the double strip thereby positioning the second of the longitudinal edges of the double strip in the position having been initially assumed by the first edge;
- second means being operable for opening the opposite open tops of the series of triangular packages which as such open tops are positioned at the second longitudinal edge of the strip in order to then proceed to fill the packages;
- second means being operable for filling the series of triangular packages;
- second welding means being operable for closing the opposite open tops of the triangular packages which as such open tops are located at the second edge of the strip;
- second means being operable for cutting/punching the double strip thereby individualising groups of several successive triangular packages and/or individual packages.

The present invention has as well as its object a method for carrying out a hermetic packaging in triangular packages by means of a machine of the second embodiment having been described above from a double strip being made up of two separate sheets issuing from at least one roll of flexible sheet material, said method comprising the stages of: carrying out a series of successive, V-shaped welds forming the common sides of each pair of successive, adjacent, triangular packages, the third open side making up the open top of a triangular package; filling the triangular packages whose open top is located at a first longitudinal edge of the double strip; closing the open tops; inverting the position of the double strip in order to fill the triangular packages whose open top is located at the second, opposite, longitudinal edge of the strip; filling said triangular packages; closing said open tops by means of sealing/punching operations;

and proceeding to the individualisation of the succession of triangular packages into groups of triangular packages and/or individual packages.

Said method allows to only carry out the formation of the triangular packages, the first filling operation, the inversion of the double strip, the second filling operation, and the individualisation of the succession of triangular packages in a horizontal direction and as per a preferentially vertical plane.

Said method does also carry out the triangular packages as per two essentially perpendicular directions in a preferentially vertical plane, said directions essentially being a vertical one before the turning operation and an essentially horizontal one after the turning operation before the filling operation.

The method of the invention likewise allows to only carry out the formation of the triangular packages, with no regard for their filling and/or individualisation, or else it allows to only carry out the filling and/or individualisation of previously formed triangular packages.

These and other features will be best made apparent by the accompanying drawings showing the preferred embodiment of the invention.

## DESCRIPTION OF THE DRAWINGS

[0027] In said drawings:

Fig. 1 is a diagrammatic view illustrating the machine of the first embodiment, and thereby the method of a preferred embodiment of the present invention.

Fig. 2 is a general, diagrammatic view of two variations of the preferential embodiment of the machine and method being illustrated in Fig. 1.

Fig. 3 is a fragmentary view illustrating the folded strip with the filler tube in its inside and showing the silhouettes of successive packages next to the end of the strip and the tube.

Fig. 4 is a diagrammatic, elevational view illustrating the machine of the second embodiment, with the corresponding method, with the strip being formed with the material issuing from two rolls.

Fig. 5 is a diagrammatic plan-view of Fig. 4.

Fig. 6 is a diagrammatic front view of a variation of the machine with the method being illustrated in Figs. 4 and 5, before proceeding to fill the triangular packages being formed along the double strip.

Fig. 6A illustrates one way for turning the triangular packages before the filling operation.

Fig. 7 is a diagrammatic, elevational view of the machine of the second embodiment as per an embodiment with the strip being formed from one only roll, said only sheet being cut at the start along the fold line.

Fig. 8 is a diagrammatic, elevational view of a portion of the machine of Figs. 4 and 5 allowing only to form the triangular packages.

Fig. 9 is a diagrammatic plan-view of Fig. 8.

Fig. 10 is a diagrammatic, elevational view of a portion of the machine of Figs. 4 and 5 being operable to receive a strip of triangular packages having already been formed and allowing to fill them and to also possibly carry out an inverting operation, and to thereupon proceed to their individualisation.

## DETAILED DESCRIPTION OF AN EMBODIMENT

[0028] According to Figs. 1 through 3 of the drawings a first preferred embodiment of the packaging machine of the invention comprises a roll -1- of sheet material for this type of packages, through one or more rollers -2-, -3-, -4- said roll feeding the sheet material -M- as per arrow -F1- towards a guide roller -RG- from which the sheet material -M- starts being centrally and longitudinally folded by means of the guides -5- being positioned at a downstream location, said sheet material thus forming a strip -TM- of folded sheet material for making up the succession of triangular packages -E-, said strip of folded sheet material being inferiorly shifted by advancer means -M1- (not shown) as per a plane being orthogonal to the aforementioned guide roller -RG-, in combination with a filler tube -TL- being operable to feed the product to be packaged, said filler tube being arranged from the start of the folding of the sheet material in the vicinity of the aforementioned guide roller -RG- up to the free end of the aforementioned strip of folded sheet material -M- forming the triangular packages -E-, the assembly being made up of the strip -TM- of folded sheet material forming the packages with the product feeding filler tube -TL- being innerly associated to said strip and adjacent to the centrally arranged, longitudinal fold line -L- from the start of the folding up to the last package having been formed in order to be filled oscillating in said plane being perpendicular to the guide roller -RG- with centre at the lower point -PI- (Fig. 2) corresponding to the end of the strip -TM- and the filler tube -TL- (shown with a dash line in said Fig. 2) being adjacent to the last package -E-, or else with centre at the upper point -PS- (Figs. 1 and 2) corresponding to the location of the guide roller -RG- at the start of the folding of the strip, as per an angle  $\alpha$  corresponding to the angle being formed between the two adjacent sides -E1-, -E2- of the triangle making up the package -E- (see Figs. 1 and 3), said sides at each oscillation -01-, -02- making up the open top of the package to be filled in a horizontal position -H-, said open top being closed after the filling by means of the corresponding sealing/cutting and/or punched line punching/sealing device -SCS- (-SCS1- for the oscillation end -01-, and -SCS2- for the oscillation end -02-) being illustrated with dash-and-dot lines in Fig. 2.

[0029] According to the present invention the embodiment being illustrated with dash-and-dot lines in Fig. 2 with oscillation centre at the lower point -PI- is the preferred embodiment.

[0030] The oscillation of the folded strip -TM- of pack-

aging material and the product feeding filler tube - TL- being associated to it takes place in the aforementioned plane being orthogonal to the guide roller -RG-, at said oscillation as per the aforesaid angle  $\alpha$  at each end of it the open top of each successive package assuming the horizontal filling position before proceeding to carry out the corresponding sealing/cutting-punching/sealing operations.

**[0031]** During each oscillation of the folded strip in one or the other sense the package is filled by the filler tube, this latter being in a position to be shifted in a forwards/backwards direction during the filling in order to thus facilitate the sealing/cutting/sealing of the successive packages.

**[0032]** The oscillation of the folded strip -TM- of packaging material and the product feeding filler tube - TL- being associated to it takes place in the aforementioned plane being orthogonal to the guide roller -RG-, with oscillation centre at the lower end pertaining to the last package -E- having been formed with the folded strip and the lower end of the filler tube being associated to the strip, the aforementioned guide roller -RG- thus oscillating together with the folded strip and the associated filler tube as per the aforesaid angle  $\alpha$ , between the roll -1- and the rollers -2-, -3- and -4- and the aforementioned guide roller -RG- there being for such a purpose a sheet material storing mechanism -MA- that according to the oscillation of the guide roller stores said material by means of several storing rollers -5-, -6-, -7- and -8- in one sense of the oscillation -OA-, and supplies the material in the opposite sense -OB-, said oscillation arranging at each of its ends the open top of each successive package in a horizontal filling position before proceeding to carry out the corresponding sealing/cutting-punching/sealing operations as has been said before.

**[0033]** In the case of an isosceles triangular package -E- wherein the long sides make up the successive open tops of said package the oscillation angle  $\alpha$  is of 45°.

**[0034]** The machine is provided with means -MI- (shown with solid line) for printing the sheet material -M- upstream of the guide roller with advertising and the identification of the packaged product.

**[0035]** The present invention provides for the juxtaposition of a plurality of machines like those being described in Figs. 1 through 3.

**[0036]** The invention also has as its object a method for carrying out a packaging in triangular packages by means of the machine of the first embodiment having been described above, said method consisting in feeding the product to the strip -TM- in order to thus fill the successive packages by means of the filler tube -TL- being innerly adjacent to the strip next to the longitudinal fold line -L- from the vicinity of the guide roller -RG- up to the end of the strip corresponding to the last package to be filled; carrying out the filling of the succession of packages while making the folded strip and the filler tube being innerly associated to it to oscillate -O1-/-O2- or -OA-/-OB- as per an angle  $\alpha$  being in correspondence with the angle

being formed by the adjacent sides -E1-, -E2- of the triangle which as such adjacent sides form the open tops of the successive packages -E- at each oscillation; and carrying out the corresponding sealing/cutting-punching/sealing operations while at all times correspondingly driving -M1- the folded sheet.

**[0037]** According to said method the folded strip -TM- and the associated filler tube -TL- are made to oscillate through an angle with centre at the upper guide roller -RG- or upper point -PS-.

**[0038]** Said method also makes the folded strip and the associated filler tube to oscillate through an angle  $\alpha$  with centre at the end point -PI- of the strip and the tube corresponding to the last package and oscillatingly shifts the strip, the associated tube and the upper guide roller along the arc corresponding to said angle  $\alpha$  in combination with sheet material storing means -MA- being located upstream of the aforementioned guide roller -RG- in order to store/supply material at the oscillation of the guide roller.

**[0039]** In the case of an isosceles triangular package wherein the long sides make up the successive open tops of said package the oscillation angle  $\alpha$  is of 45°.

**[0040]** According to the invention when the oscillation is carried out with oscillation centre at the guide roller the advance of the folded strip -TM- with respect to the filler tube -TL- is carried out during a simple swinging motion of the folded strip at each end of the oscillation with respect to an end of the side acting as the open top for the filling operation, and at the opposite oscillation the advance is carried out during an opposite swinging motion with respect to the end of the side acting as the open top.

**[0041]** According to the invention the triangular package is filled during the time of each oscillation.

**[0042]** In short, the invention allows to make the most of the special sheet material serving to make up the resulting triangular packages and optimises the filling time and hence results in material and time savings being thus obtained.

**[0043]** Said method provides for arranging means -MI- for printing the sheet material upstream of the guide roller with advertising and the identification of the packaged product.

**[0044]** According to Figs. 4 through 10 of the drawings a second preferred embodiment of the hermetically packaging machine of the invention corresponds to the type wherein the triangular packages are formed by means of at least one roll of flexible sheet material providing a double strip making up the walls of a succession of triangular packages out of a sheet having been folded and cut along the fold line or out of two separate and addorsed sheets being mutually joined by weld lines forming the triangular packages to be later on filled and submitted to the conventional closing, sealing and/or cutting/punching operations in order to thereupon proceed to separate the packages having been filled with product into groups of said filled packages or into individual packages in said filled condition.

**[0045]** The machine of the second embodiment of the invention being generally designated at -1'- comprises (see Figs. 4 and 5) a plurality of main welding means -2'- being arranged in succession and positioned in such a way as to form an angle with the longitudinal axis of the double strip -T- being made up of two sheets, said main welding means having opposite inclinations and being operable to make successive V-shaped welds being continuous and/or discontinuous and forming the common sides of each pair of successive and adjacent, triangular packages -ET-, the third side of the triangular package remaining open and thus making up the respective open top -E'- of the package -ET- for introducing the product, said open tops -E'- being located along both longitudinal edges -B1-, -B2- of the double strip -T-, first means -3'- being operable for opening the open tops -E'- of the succession of triangular packages -ET- being as such open tops located at a first longitudinal edge -B1- of the strip -T- in order to successively fill the packages, first means -4'- being operable for filling the succession of triangular packages -ET- through the open tops -E'- being located at the first -B1- of the longitudinal edges of the double strip -T-, first welding means -5'- being operable for closing the open tops -E'- of the succession of triangular packages -ET- by means of the corresponding sealing and/or cutting/punching operations, first means -6'- being operable for cutting/punching the double strip into sections forming groups of triangular packages, means -I- being provided for inverting the position of the double strip -T-, said inverting means being operable for positioning the second -B2- of the longitudinal edges of the double strip -T- in the position having been initially assumed by the first longitudinal edge -B1-, second means -7'- being operable for opening the opposite open tops -E'- of the succession of triangular packages -ET- being as such open tops located at the second longitudinal edge -B2- of the strip -T- in order to fill these packages, second means -8'- being operable for filling the succession of triangular packages -ET- through the open tops -E'- of the second longitudinal edge -B2-, second welding means -9'- being operable for closing the open tops -E'- of the packages -ET- by means of the corresponding sealing and/or cutting/punching operations, and second means -10'- being operable for cutting/punching the double strip -T- thereby individualising it into groups of several successive triangular packages and/or into individual packages.

**[0046]** The double strip -T- being used with the machine of the second embodiment of the present invention consists in two separate and addorsed sheets issuing from respective rolls -A- and -A- as shown in Figs. 4 and 5, or in one sheet issuing from the roll -A'- and being folded and cut along the longitudinal fold line by means of mutually opposed cutting elements -CO-, -CO- as shown in Fig. 7.

**[0047]** The packaging machine does of course comprise means being operable for advancing (arrow F) and gripping the double strip -T- being made up of two sep-

arate sheets.

**[0048]** As shown in Figs. 6 and 6A the packaging machine of the second embodiment of the invention comprises means -G- being operable for turning the empty triangular packages -ET- of the double strip -T- either individually and/or in groups of several packages from an advancing direction -F- of the strip -T- as per an essentially vertical plane to an advancing direction -F'- of the strip -T- as per an essentially horizontal plane, for the ulterior filling and individualisation of the triangular packages -ET-.

**[0049]** As shown in the aforementioned Figs. 6 and 6A, the packaging machine of the second embodiment comprises means being operable for advancing -F- the double strip -T- thereby vertically shifting it in a downwards -F1-/upwards -F2- direction up to the turning point -G-, where the turning means proceed to turn the successive triangular packages -ET-, these latter thereupon being made to advance in a horizontal direction and with upperly positioned open tops -E'- in order to be ulteriorly filled and submitted to the corresponding cutting/punching operations.

**[0050]** The aforementioned means being operable for advancing -F- the double strip -T- shift it as per a vertical plane during its vertical travel in a downwards/upwards direction, and after the turning motion they shift said double strip in a horizontal direction towards one or the other side (see Figs. 6 and 6A).

**[0051]** The packaging machine of this embodiment allows to only carry out the triangular packages along the strip, the plurality of main welding means -2'- in succession for such a purpose being positioned in such a way as to form an angle with the longitudinal axis of the double strip -T- and with opposite inclinations, said welding means being operable to make successive, continuous and/or discontinuous, V-shaped welds forming the common sides of each pair of successive, adjacent, triangular packages -ET-, the third side of the triangular package remaining open and thus making up the respective open top -E'- of the package for introducing the product, said open tops -E'- being located along both longitudinal edges -B1-, -B2- of the strip -T- in order to later on carry out the filling and individualisation into groups of packages and/or separate packages by means of the corresponding sealing and/or cutting/punching operations in the same machine and/or in a different one.

**[0052]** The machine of this second embodiment likewise can fill triangular packages having been formed along a double strip outside the present machine, this latter for such a purpose (see Fig. 10) receiving a series of empty triangular packages -ET- being formed along a double strip -T- in order to fill them and to later on have them individualised into groups of packages or separate packages, said machine comprising: first means being operable for opening the open tops -E'- of the series of triangular packages which as such open tops are located at a first edge -B1- of the longitudinal edges of the double strip -T-, first means -4'- being operable for filling the se-

ries of triangular packages, first welding means being operable for closing the open top -E'- of the series of triangular packages, first means -10'- being operable for cutting/punching the double strip -T- into sections forming groups of triangular packages, means -I- for inverting the position of the double strip -T- thereby positioning the second edge -B2- of the longitudinal edges of the strip -T- in the position having been initially assumed by the first, second means being operable for opening the opposite open tops -E'- of the series of triangular packages which as such open tops are positioned at the second longitudinal edge -B2- of the strip in order to fill said packages, second means -8'- being operable for filling the series of triangular packages, second welding means being operable for closing the opposite open tops -E'- of the triangular packages which as such open tops are located at the second edge of the strip, and second means -10'- being operable for cutting/punching the double strip -T- thereby individualising it into groups of several successive, triangular packages and/or into individual packages.

**[0053]** The present invention does as well comprise a method for carrying out a hermetic packaging in triangular packages by means of the machine of the second preferred embodiment having been described above with reference to Figs. 4 through 10 from a double strip -T- issuing from at least one roll of flexible sheet material, said method comprising the stages of: making a series of successive, V-shaped welds forming the common sides of each pair of successive, adjacent, triangular packages -ET-, the third open side making up the open top of a triangular package; filling the triangular packages whose open top -E'- is located at a first longitudinal edge -B1- of the double strip -T-; closing the open tops; inverting -I- the position of the double strip -T- in order to fill the triangular packages whose open top is located at the second and opposite, longitudinal edge -B2- of the strip; filling said triangular packages; closing said open tops by means of the corresponding sealing/punching operations; and proceeding to individualise the succession of triangular packages into groups of triangular packages and/or into individual packages.

**[0054]** Said method allows to carry out the formation of the triangular packages, the first filling, the inversion of the double strip, the second filling and the individualisation of the succession of triangular packages in a horizontal direction and as per a preferentially vertical plane.

**[0055]** The triangular packages are made to advance in two directions being essentially perpendicular by means of a turning motion -G-, both directions being contained in a preferentially vertical plane, said directions being essentially vertical before the turning motion and essentially horizontal after the turning motion taking place before the filling operation.

**[0056]** The aforementioned method allows to only form the triangular packages, with no regard for their filling and/or individualisation, or else to carry out the filling and/or individualisation of previously formed triangular

packages.

**[0057]** In the case of the double strip being made up of one sheet issuing from one only roll, said sheet being folded in order to thus form the double strip being made up of two separate sheets, as shown in Fig. 7, said folded strip is cut in the longitudinal direction along the fold line by means of the mutually opposed cutting elements -CO-, -CO- before making the V-shaped welds forming the triangular packages.

## Claims

1. A machine for hermetically packaging powder, granular, liquid, viscous and similar products in triangular packages, said machine comprising means being operable for advancing (M1, F) a strip (TM, T) of flexible sheet material (M) issuing from at least one roll (1, A, A'), said strip of flexible sheet material making up the mutually opposite walls of a succession of triangular packages (E, ET), welding means (SCS, 2') being operable for forming the successive packages with the respective open tops (E1, E') in order to later on fill said packages, to thereafter close them by means of the corresponding sealing and/or cutting/punching operations (10) and to finally have them individualised; said machine being **characterised in that** the weld lines being made by the welding means along the strip in order to thus form the succession of triangular packages form an angle with the main axis of the strip as per opposite inclinations.
2. A hermetically packaging machine as per claim 1 consisting in a roll (1) of sheet material (M) that when being unwound is passed around a guide roller (RG) and when being made to advance is submitted to the start of the central and longitudinal folding of said sheet material (M) thus forming a folded strip (TM) that is made to advance by conventional advancer means (M1) in order to thus make up the successive packages through the use of conventional means being operable for sealing and/or cutting/punching and/or sealing the successive packages (E) after having filled them with the product in question, the packages having the product packaged in them being thereupon separated into individual packages and/or groups of packages; said machine being **characterised in that** it comprises in combination a filler tube (TL) being arranged within the folded strip (TM) and in association with it, said filler tube thus forming with said folded strip a filler assembly, and **in that** downstream of the aforementioned guide roller (RG) said filler assembly is made to oscillate as per an angle  $\alpha$  in correspondence with the angle being formed by two adjacent sides (E1, E2) of the triangular package (E) in question of a succession of triangular packages being mutually adjacent at the sides defining said angle  $\alpha$  along the length of



- the folded strip (TM), in such a way that at the end of each oscillation one side of the package makes up the open top (E1) allowing to fill the package through it and at such a stage being arranged in a horizontal filling position (H), the filling of the next package (E) being carried out during each following oscillation in the opposite sense, after said filling and at the end of said oscillation the package (E) being submitted to the aforementioned operation with the sealing and/or cutting/punching and/or sealing means (SCS) in order to thus define the filled, just finished and sealed package, and in the next oscillation it is the next adjacent side the one that makes up the open top (E1) being arranged in a horizontal position (H) and allowing to fill the next package, this latter being thereupon submitted to the aforementioned operation with the sealing and/or cutting/punching and/or sealing means (SCS1/SCS2), the cycle being thus repeated, in such a way that in the filler assembly the filler tube (TL) is maintained in a fixed but oscillating position and the folded strip (TM) is made to oscillate and is also made to advance with respect to said filler tube (TL) by conventional advancer means (M1), the mutually opposite, lateral edges of the strip being welded together at the end of each oscillation.
3. A machine as per claim 2, **characterised in that** the oscillation of the filler assembly comprising the folded strip (TM) and the filler tube (TL) is carried out in a plane being orthogonal to the guide roller (RG) and with the oscillation centre at the lower end (PI) pertaining to the last package (E) having been formed in the folded strip (TM) and the lower end of the filler tube (TL) being associated to the strip, the aforementioned, upperly positioned guide roller (RG) thereby oscillating together with the folded strip (TM) and the associated filler tube (TL) as per the aforesaid angle  $\alpha$ , between the roll (1) and the aforementioned guide roller (RG) for such a purpose there being a sheet material storing mechanism (MA) that according to the oscillation of the guide roller (RG) stores said material by means of several storing rollers (5, 6, 7, 8) in one sense of the oscillation, and supplies the stored material at the oscillation in the opposite sense, said oscillation at each of its ends arranging an adjacent side (E1) of the triangular package (E) in such a way that it forms the horizontally arranged open top (E1) of each successive package before proceeding to carry out the corresponding sealing/cutting-punching/sealing operations (SCS).
4. A machine as per claim 2, **characterised in that** the oscillation of the filler assembly comprising the folded strip (TM) and the filler tube (TL) being associated to it is carried out in a plane being orthogonal to the guide roller (RG) and with the oscillation centre at the aforementioned guide roller (RG) making up the upper point (PS) of the oscillation as per the aforementioned angle  $\alpha$ , at the end of each oscillation an adjacent side (E1) of the package (E) making up the horizontal open top (E1) of the respective package (E) while this latter is being filled, the corresponding sealing/cutting-punching/sealing operations (SCS) being thereupon carried out.
5. A machine as per claims 2 through 4, **characterised in that** in the case of an isosceles triangular package wherein the long sides make up its successive open tops (E1) the oscillation angle  $\alpha$  is of  $45^\circ$ .
6. A machine as per claims 2 through 5, **characterised in that** during the time of one oscillation the package is filled with product by the filler tube (TL), this latter being maintained in a fixed but oscillating position and possibly being reciprocatingly shifted along a short travel in a back-and-forth motion during the filling operation while the folded strip (TM) is made to advance with respect to the filler tube (TL).
7. A machine as per claim 6 as related with claim 3, **characterised in that** the folded strip (TM) is made to advance during a simple swing of said folded strip with respect to each end of the side (E1) acting as the open top, said folded strip/packages being made to advance by conventional advancer means (M1), the swinging motion at each consecutive oscillation being carried out in an opposite sense.
8. A machine as per claims 2 through 7, **characterised in that** it is provided with means (MI) for printing the exposed surface of the sheet material (M) upstream of the guide roller (RG) with advertising and the identification of the packaged product.
9. A machine as per claims 2 through 8, **characterised in that** it comprises a plurality of machines like the one having been described above, said machines being arranged in a juxtaposed arrangement and possibly being operated in synchronism.
10. A method for carrying out a hermetic packaging in triangular packages by means of the machine of claims 2 through 9, wherein from a roll (1) of sheet material (M) for the packaging of various powder, granular, liquid, viscous and similar products and by means of a guide roller (RG) said material is correspondingly folded into a centrally and longitudinally folded strip (TM) making up a succession of packages (E) that are closed by means of the corresponding sealing/cutting and/or punched line punching/sealing operations (SCS); **characterised in that** the product is fed to the folded strip (TM) in order to thus fill the successive packages (E) by means of a filler tube (TL) being associated and innerly adjacent to

the strip (TM) next to the longitudinal fold line from the vicinity of the guide roller (RG) up to the end of the strip (TM) which as such an end corresponds to the last package (E) to be filled; **in that** the filling of the succession of packages (E) is made while making the folded strip (TM) and the filler tube (TL) being innerly associated to it to oscillate as per an angle  $\alpha$  being in correspondence with the angle being formed by the adjacent sides (E1, E2) of the triangle which form the open tops (E1) of the successive packages (E) at each oscillation; and by carrying out the corresponding sealing/cutting-punching/sealing operations (SCS) while at all times correspondingly driving the folded strip (TM), and simultaneously welding the mutually opposite lateral edges of the folded strip (TM) at the end of each oscillation.

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11. A method as per claim 10, **characterised in that** the folded strip (TM) and the associated filler tube (TL) are made to oscillate through an angle  $\alpha$  with centre at the upper guide roller (RG).
  12. A method as per claim 10, **characterised in that** the folded strip (TM) and the associated filler tube (TL) are made to oscillate through an angle  $\alpha$  with centre at the end point (PI) of the strip (TM) and the tube corresponding to the last package (E), said oscillation being made by oscillatingly shifting the strip (TM), the associated tube (TL) and the upper guide roller (RG) through the arc corresponding to said angle  $\alpha$  in combination with storing means (MA) being provided for storing the sheet material (M) upstream of the aforementioned guide roller (RG) in order to store/supply material (M) when the guide roller (RG) is made to oscillate.
  13. A method as per claims 10 through 12, **characterised in that** in the case of an isosceles triangular package wherein the long sides (E1, E2) make up its successive open tops (E1) the oscillation angle  $\alpha$  is of 45°.
  14. A method as per claims 10 through 13, **characterised by** providing means (MI) for printing the sheet material (M) upstream of the guide roller (RG) with advertising and the identification of the packaged product.
  15. A hermetically packaging machine as per claim 1, consisting in at least one roll (A, A, A') of flexible sheet material providing a double strip (T) making up the walls of a succession of triangular packages (ET) out of a sheet (A') having been folded and cut along the fold line or out of two separate and ad-dorsed sheets (A, A) being mutually joined by weld lines forming the triangular packages (ET) to be later on filled and submitted to the conventional closing, sealing and/or cutting/punching operations in order

to thereupon proceed to separate the packages having been filled with product into groups of said filled packages or into individual packages in said filled condition;

**characterised in that** it comprises:

- a plurality of main welding means (2') being arranged in succession and positioned in such a way as to form an angle with the longitudinal axis of the double strip (T) and with opposite inclinations, said welding means being operable to make successive, V-shaped, continuous and/or discontinuous welds forming the common sides of each pair of successive and adjacent triangular packages (ET), the third side of the triangular package remaining open and thus making up the respective open top (E') of the package for the introduction of the product, said open tops (E') being located along both longitudinal edges (B1, B2) of the strip (T);
- first means (3') being operable for opening the open tops (E') of the successive triangular packages (ET), said open tops being located at a first longitudinal edge (B1) of the strip (T), in order to successively proceed to fill the packages;
- first means (4') being operable for filling the successive triangular packages (ET) through the open tops (E') being located at the first (B1) of the longitudinal edges of the double strip (T);
- first welding means (5') being operable for closing the open tops (E') of the successive triangular packages (ET) by means of sealing and/or cutting/punching operations;
- first means (6') being operable for cutting/punching the double strip (T) into sections forming groups of triangular packages;
- means (I) being provided for inverting the position of the double strip (T), said inverting means being operable for positioning the second (B2) of the longitudinal edges of the double strip (T) in the position having been initially assumed by the first longitudinal edge (B1);
- second means (7') being operable for opening the opposite open tops (E') of the successive triangular packages (ET), said opposite open tops being located at the second longitudinal edge (B2) of the strip (T), in order to thus fill said packages;
- second means (8') being operable for filling the succession of triangular packages (ET) through the open tops (E') of the second longitudinal edge (B2);
- second welding means (9') being operable for closing the open tops (E') of the packages by means of sealing and/or cutting/punching operations;
- second means (10') being operable for cutting/punching the double strip (T) so as to thus indi-

visualise it into groups of several successive triangular packages and/or individual packages.

16. A packaging machine as per claim 15, **characterised in that** the double strip (T) consists in two separate, adorsed sheets (A, A) issuing from respective rolls. 5
17. A packaging machine as per claim 15, **characterised in that** the double strip (T) consists in a sheet (A') that after having issued from one roll has been folded and cut along the fold line. 10
18. A packaging machine as per claim 15, **characterised in that** it comprises means being operable for advancing (F) and gripping the double strip (T). 15
19. A packaging machine as per claim 15, **characterised in that** it comprises means (G) being operable for turning the empty triangular packages (ET) of the double strip (T) either individually and/or in groups of several packages from an advancing direction (F) of the strip (T) as per an essentially vertical plane to an advancing direction (F') of the strip (T) as per an essentially horizontal plane, for the ulterior filling and individualisation of the triangular packages (ET). 20 25
20. A packaging machine as per claim 19, **characterised in that** the advancer means (F) vertically shift the double strip (T) in an upwards (F2)/downwards (F1') direction up to the turning point (G) where the turning means (G) proceed to turn the successive triangular packages (ET) so that they can be made to advance in a horizontal direction with upperly positioned open tops (E') in order to later on proceed to fill said successive triangular packages and submit them to the corresponding cutting/punching operations. 30 35
21. A packaging machine as per claims 19 and 20, **characterised in that** the means being provided for advancing (F) the double strip (T) are operable for vertically shifting it as per a vertical plane during its downwardly/upwardly directed shifting motion, and for horizontally shifting it after its having been turned. 40 45
22. A packaging machine as per claim 15, **characterised in that** the plurality of means (2') being provided for carrying out the main welds in a succession are positioned in such a way that they form an angle with respect to the longitudinal axis of the double strip (T) and have opposite inclinations, said welding means being operable to make successive, V-shaped, continuous and/or discontinuous welds forming the common sides of each pair of successive, adjacent, triangular packages (ET), the third side of the triangular package being left open and thus making up the respective open top (E') of the package for introducing 50 55

the product, said open tops (E') being located along both longitudinal edges (B1) (B2) of the strip in order to later on proceed to fill the packages and by means of sealing and/or cutting/punching operations individualise them into groups of packages and/or separate packages in the same and/or a different machine.

23. A packaging machine as per claim 15, said machine receiving a series of empty triangular packages (ET) having been formed along a double strip (T) in order to fill said packages and to thereupon proceed to individualise them into groups of packages or separate packages; said packaging machine being **characterised in that** it comprises:

- first means being operable for opening the open tops (E') of the series of triangular packages (ET) which as such open tops are located at a first edge (B1) of the longitudinal edges of the double strip (T);
- first means (4') being operable for filling the series of triangular packages;
- first welding means being operable for closing the open tops (E') of the series of triangular packages;
- first means (10') being operable for cutting/punching the double strip (T) into sections forming groups of triangular packages;
- means (I) being operable for inverting the position of the double strip (T) thereby positioning the second (B2) of the longitudinal edges of the double strip (T) in the position having been initially assumed by the first edge;
- second means being operable for opening the opposite open tops (E') of the series of triangular packages (ET) which as such open tops are positioned at the second longitudinal edge (B2) of the strip in order to then proceed to fill the packages;
- second means (8') being operable for filling the series of triangular packages;
- second welding means being operable for closing the opposite open tops (E') of the triangular packages which as such open tops are located at the second edge (B2) of the strip;
- second means (10') being operable for cutting/punching the double strip (T) thereby individualising groups of several successive triangular packages and/or individual packages.

24. A method for carrying out a hermetic packaging in triangular packages by means of the machine of claims 15 through 23 from a double strip (T) issuing from at least one roll (A, A, A') of flexible sheet material; said method being **characterised by** the stages of: making a series of successive, V-shaped welds forming the common sides of each pair of suc-

cessive, adjacent, triangular packages (ET), the third open side making up the open top (E') of the triangular package (ET); filling the triangular packages whose open top (E') is located at a first longitudinal edge (B1) of the double strip (T); closing the open tops; inverting (I) the position of the double strip (T) in order to fill the triangular packages whose open top is located at the second and opposite, longitudinal edge (B2) of the strip; filling said triangular packages; closing said open tops (E') by means of the corresponding sealing/punching operations; and proceeding to individualise the succession of triangular packages into groups of triangular packages and/or into individual packages.

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**25.** A method as per claim 24, **characterised by** carrying out the formation of the triangular packages, the first filling, the inversion (I) of the double strip, the second filling and the individualisation of the succession of triangular packages in a horizontal direction and as per a preferentially vertical plane.

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**26.** A method as per claim 24, **characterised by** carrying out the triangular packages as per two directions being essentially perpendicular by means of a turning motion (G), both directions (F, F') being contained in a preferentially vertical plane, said directions being essentially vertical before the turning motion (G) and essentially horizontal after the turning motion taking place before the filling operation.

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**27.** A method as per claim 24, **characterised in that** it allows to only form the triangular packages (ET), with no regard for their filling and/or individualisation.

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**28.** A method as per claim 24, **characterised in that** it allows to carry out the filling and/or individualisation of previously formed triangular packages (ET).

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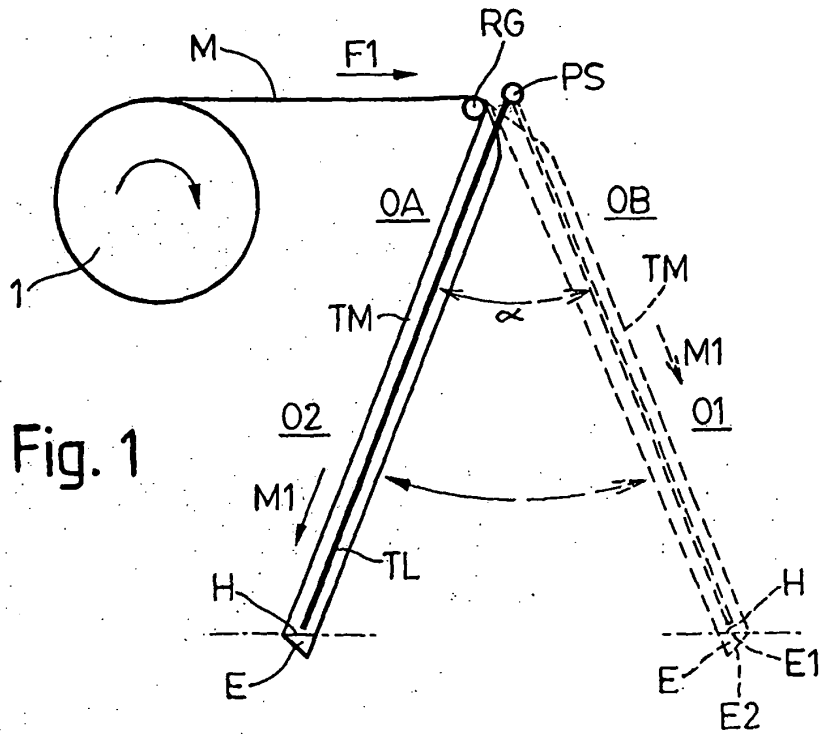


Fig. 1

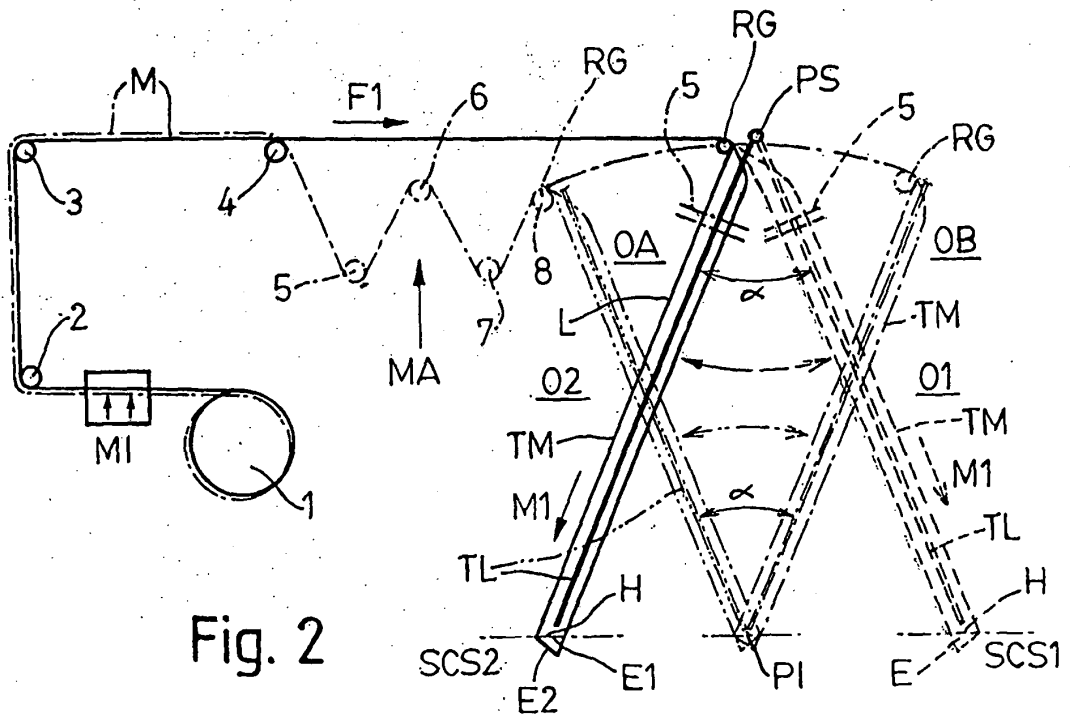


Fig. 2

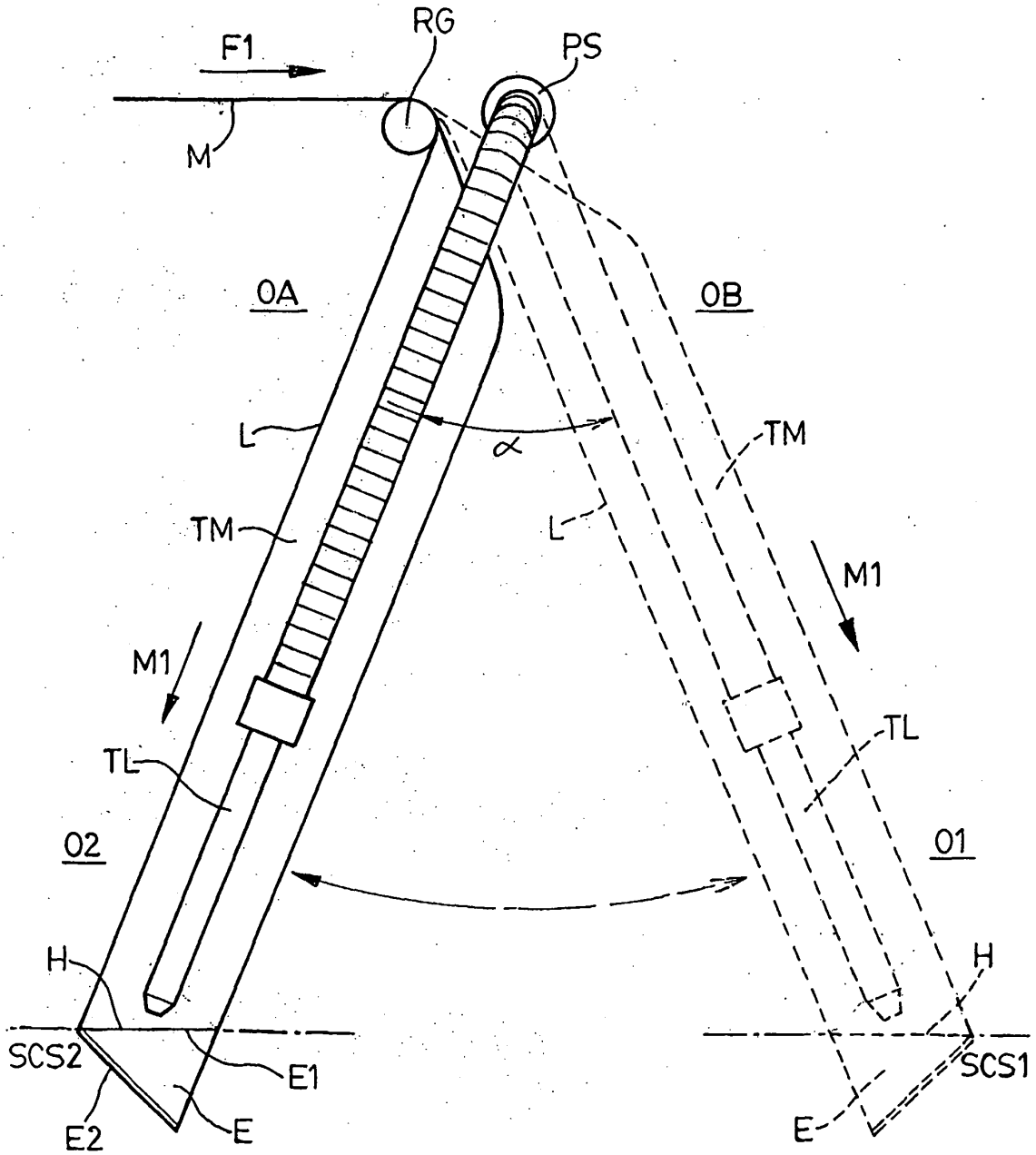


Fig. 3

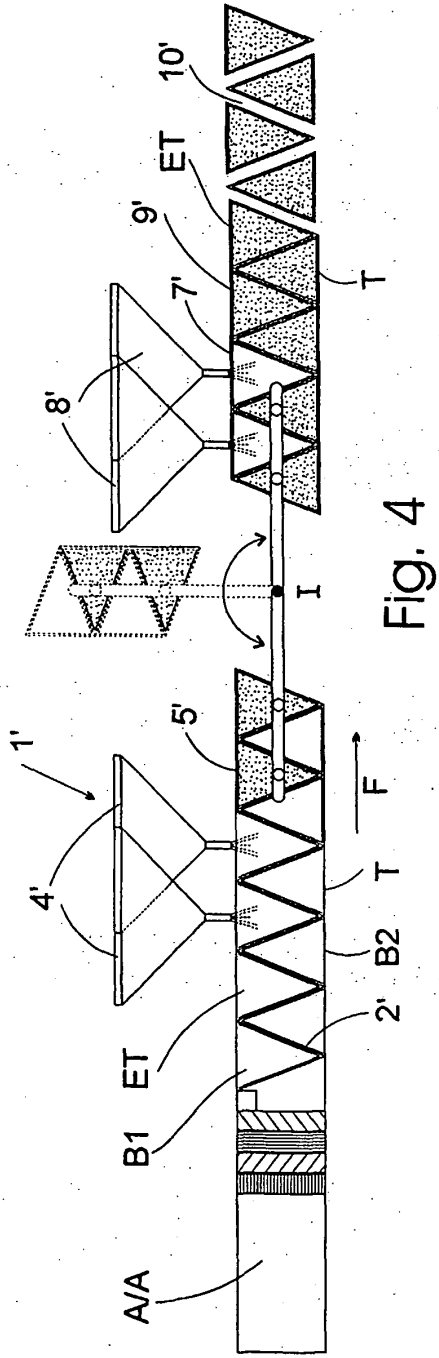


Fig. 4

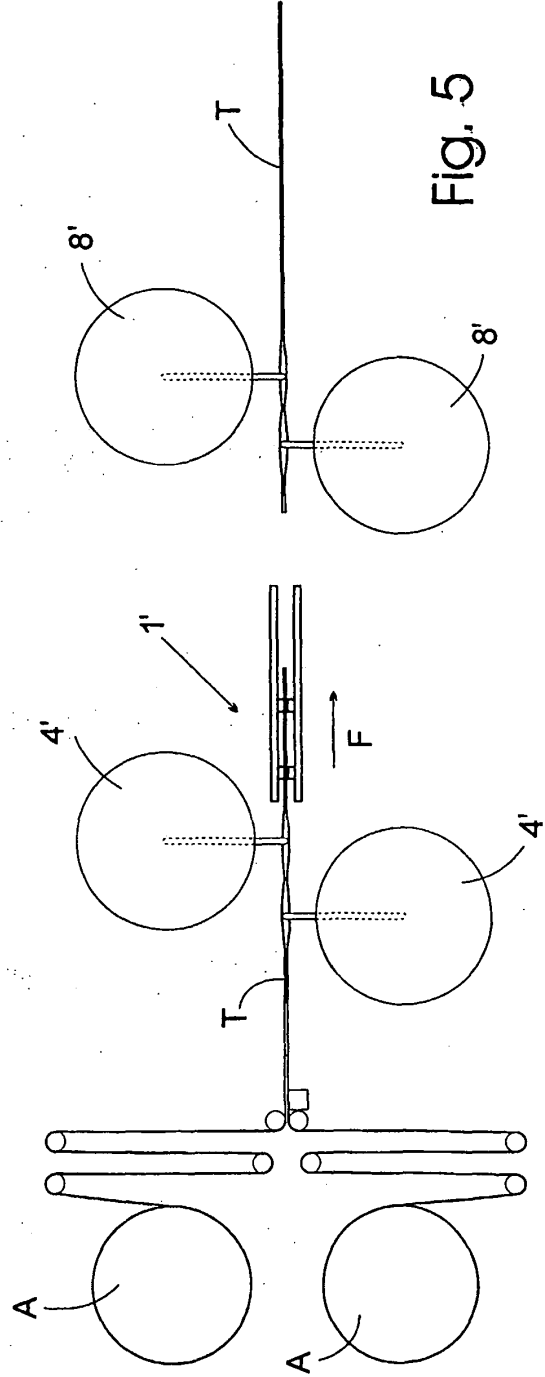


Fig. 5

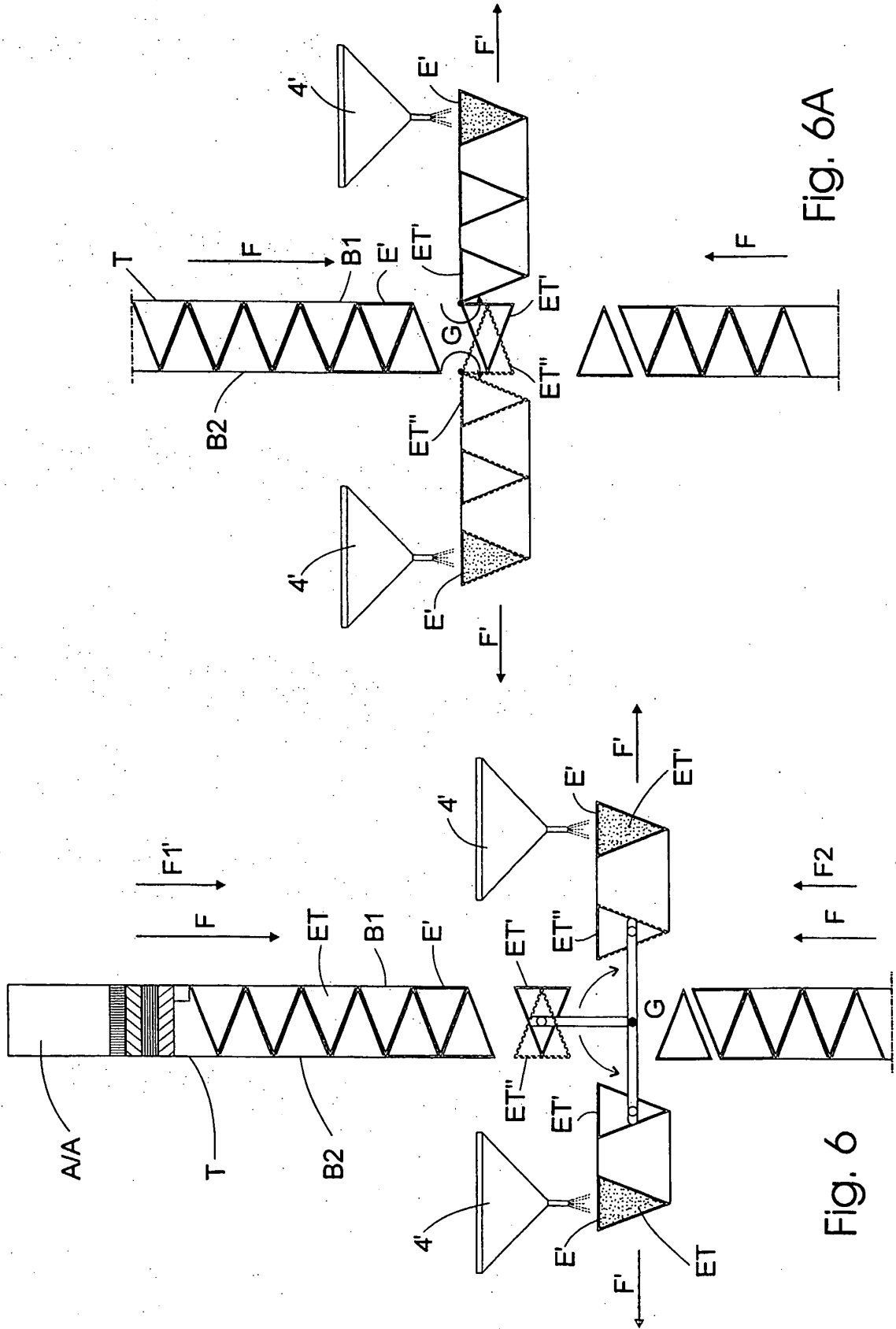


Fig. 6A

Fig. 6



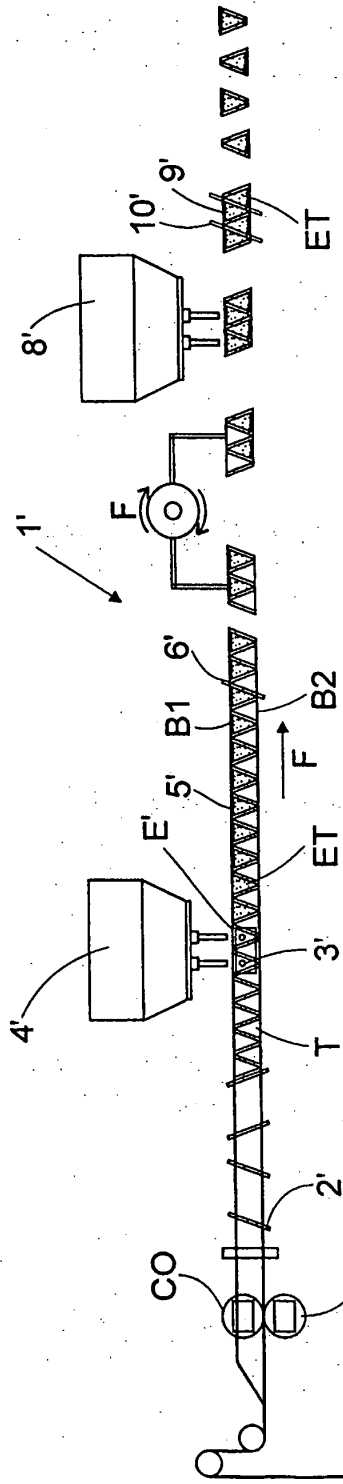


Fig. 7

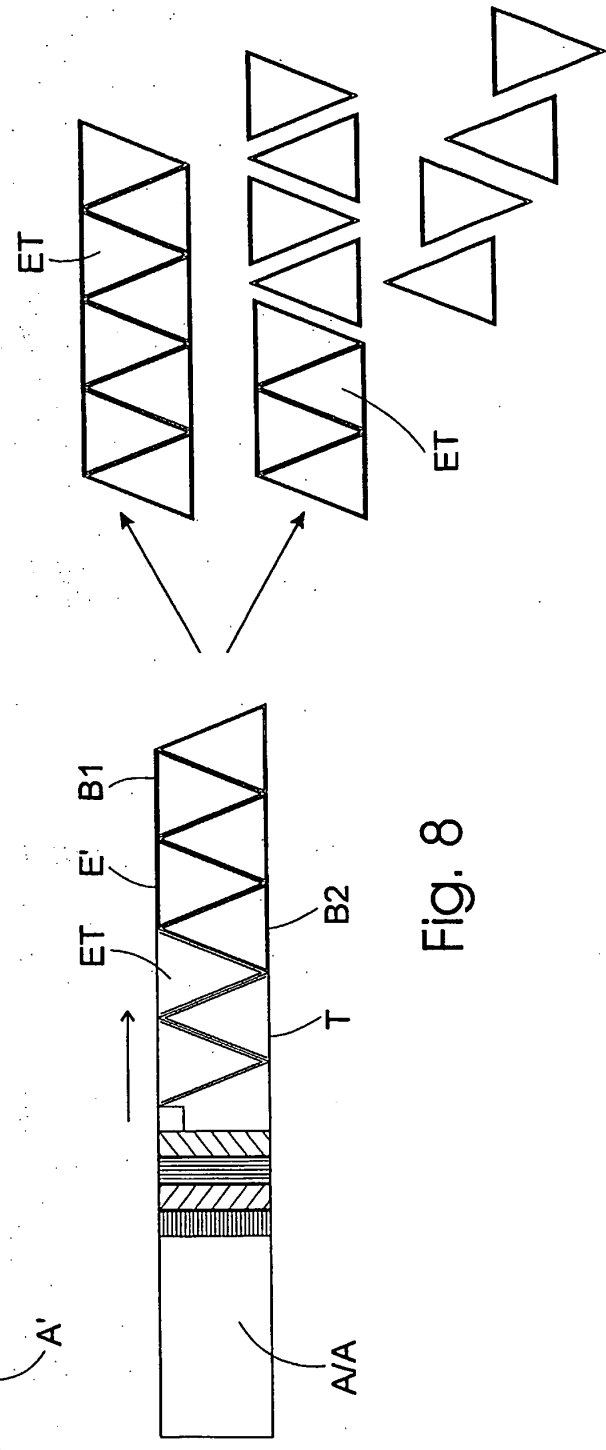


Fig. 8

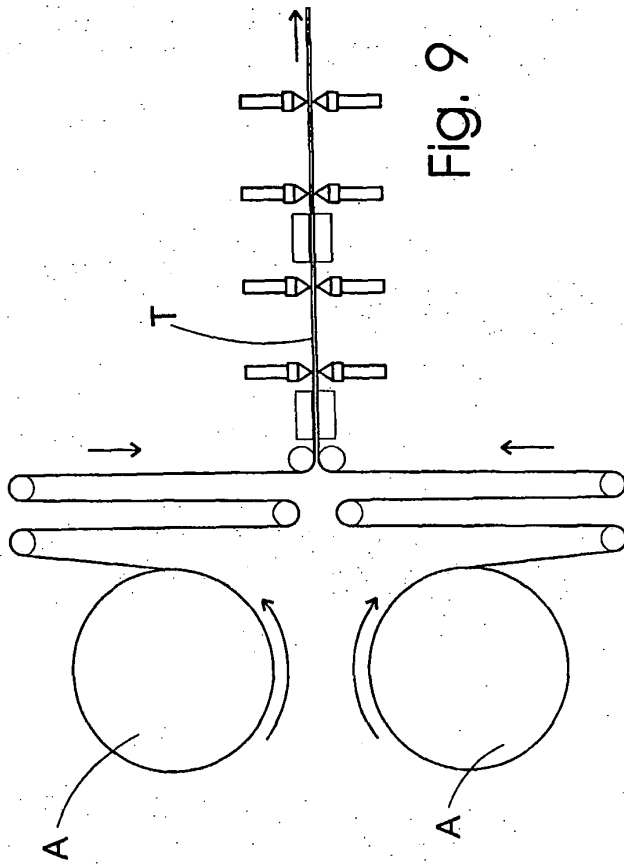


Fig. 9

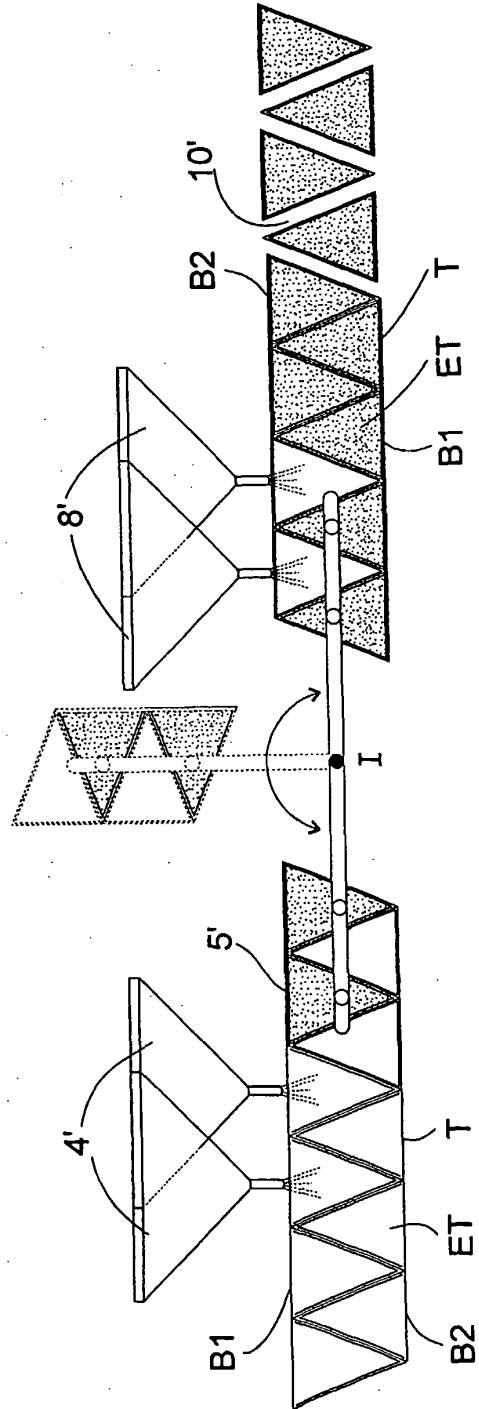


Fig. 10

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/ ES 2004/000401

A. CLASSIFICATION OF SUBJECT MATTER		
<b>IPC 7 B65B9/08, B31B25/00</b>		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols)		
<b>IPC 7 B65B, B31B</b>		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
<b>EPODOC, CIBEPAT, WPI</b>		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	JP-55055849-A (DAINIPPON PRINTING) 24.04.1980 <b>Figures</b>	1 2, 15
A	DE-3922236-A1 (LEHMACHER & SOHN) 17.01.1991 <b>the abstract; figure 2</b>	1, 2, 15
A	WO-0222448-A3 (LAURSEN ASSOCIATES) 21.03.2002 <b>page 7, paragraphs 2 and 3; figure 6</b>	1
A	EP-0765807-A1 (BOSSAR) 02.04.1997 <b>the whole document</b>	1, 2, 15
A	US-2004025476-A1 (OLIVERIO et al.) 12.02.2004 <b>the whole document</b>	1, 2, 15
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search		Date of mailing of the international search report
<b>13 December 2004 (13.12.04)</b>		<b>23 December 2004 (23.12.04)</b>
Name and mailing address of the ISA/ <b>S.P.T.O.</b>		Authorized officer
Facsimile No.		Telephone No.

Form PCT/ISA/210 (second sheet) (July 1992)

**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

International Application No  
PCT/ ES 2004/000401

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DE - 3922236 - A1	17.01.1991	NONE	
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EP - 0765807- A1	02.04.1997	WO - 9633094- A ES - 2117929- A US - 5862653- A	24.10.1996 16.08.1998 26.01.1999
US - 2004025476 - A1	12.02.2004	WO - 03086867- A US - 5862653- A	23.10.2003 26.01.1999