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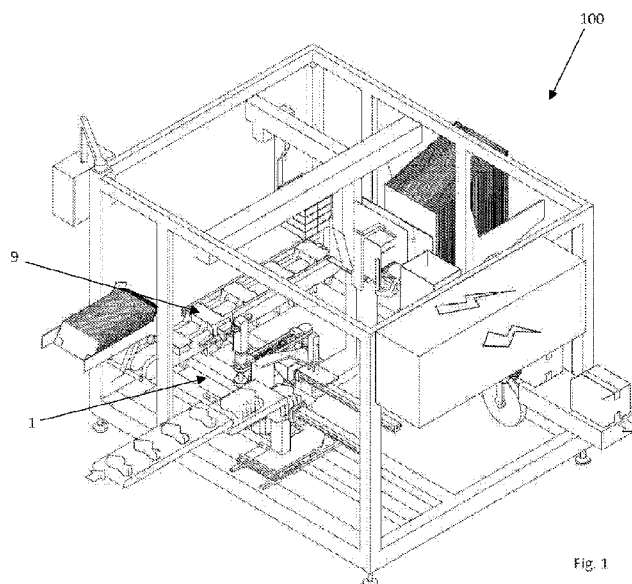


Fig. 1

(57) Abstract: A method for packaging surgical gloves in a box (9) comprising the steps of: -positioning the gloves (10) in a housing (60) defined by a case (6); -preparing said box (9) which identifies an internal compartment (90) for housing the gloves (10); -introducing together the case (6) and the gloves (10) present in the case (6) into said compartment (90) through an opening (91) of the box (9); -extracting the case (6) from the box (9) through said opening (91) leaving the gloves (10) inside the box (9); -closing said opening (91) of the box (9).

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DESCRIPTION

System and method for packaging surgical gloves

Technical field

The present invention relates to a system and method for packaging surgical gloves in a box.

5 Prior art

Surgical gloves are typically marketed in cardboard boxes each of which houses several dozen gloves (usually a hundred units, but there are several sizes housing a different number of gloves).

10 Surgical gloves are usually sterile. They have a low thickness both to allow maximum sensitivity and because they are single-use.

Disclosure of the invention

To date, manual packaging of these gloves inside a cardboard box is known. Groups of gloves are thus prepared that the operator takes manually and inserts them into the cardboard box. This solution has a
15 drawback connected to the fact that the operator handling objects that must have a certain degree of sterility is not optimal as it exposes them to a potential risk of contamination. In addition, the cardboard box in order to contain the overall dimensions is quite small and therefore the positioning is not easy.

20 Solutions are known in which the packaging takes place by means of an apparatus that by means of a pusher forces a group of gloves previously prepared (and of known quantity) inside an opening of a cardboard box. This solution has a drawback connected to the fact that the action of the pusher and the reduced dimensions of the cardboard box could in some
25 cases damage one or more gloves.

In this context, the technical task underlying the present invention is to propose a packaging system and method that allow optimising quality, hygiene and speed.

The defined technical task and the specified aims are substantially achieved by a packaging system and method comprising the technical characteristics set forth in one or more of the appended claims.

Brief description of the drawings

- 5 Further characteristics and advantages of the present invention will become more apparent from the indicative and thus non-limiting description of a preferred but non-exclusive embodiment of a packaging system and method, as illustrated in the attached drawings, in which:
- figure 1 shows a perspective view of a packaging system according to
 - 10 the present invention;
 - figures 2, 4, 6, 7, 8, 9 show a succession of steps of the method for packaging surgical gloves according to the present invention;
 - figure 3 shows an enlarged view of a portion of the packaging system in an intermediate step between those of figures 2 and 4;
 - 15 - figure 5 shows an enlarged view of a portion of the packaging system in the configuration of figure 4;
 - figures 10, 11, 12 respectively show a plan, side and rear view of an alternative solution of a packaging system according to the present invention.

20 **Detailed description of the preferred embodiments of the invention**

A system for packaging surgical gloves has been indicated in the accompanying figures with reference number 100. These are typically nitrile gloves. Typically there is no difference between right-hand and left-hand gloves. Appropriately, the gloves processed in the same production

25 process have the same size.

The system 100 comprises a box 9 in which to package the gloves. This is typically a cardboard box.

The box 9 identifies an internal glove compartment 90.

The system 100 also comprises an apparatus 1 for packaging surgical

30 gloves.

The apparatus 1 comprises means for unfolding the box 9. The apparatus

1 suitably also comprises means 81 for positioning a plurality of boxes 9 in the same container (this occurs only after the boxes 9 have been filled with gloves). Such a container can be, for example, an American type case. In this regard, the apparatus 1 may also comprise means for unfolding the
5 container. This container is larger in size than the boxes 9 since it can contain a plurality of them.

In this regard, the system 100 comprises a container magazine mounted at the side of the apparatus 1; an arm provided with suction cups picks up the container and deposits it in a filling station.

10 The magazine is complete with alarm sensors (running out containers), plus machine stop (lack of containers).

An electronic stacker system stacks the glove boxes 9 according to the required configuration inside the container.

The collection of glove boxes is then inserted laterally inside the American
15 cardboard.

After the case is filled, the case is turned.

Subsequently, the container displaces itself onto a racetrack where a special system closes the upper and lower flaps using self-adhesive tape: this system is provided with two automatic tape dispensing units, each
20 complete with alarm sensors (damaged tape, plus running out tape reel). The completed container is then unloaded.

The apparatus 1 comprises a feeder 20 capable of positioning the gloves on a support 4.

The feeder 20 is suitably a drop feeder. It thus progressively unloads the
25 gloves by gravity. For example, as exemplified in Figures 1, 2, 4, the feeder 20 comprises a conveyor belt that unloads the gloves onto the support 4 below. In the preferred solution, the feeder 20 comprises a timing belt (so as to space the incoming glove stacks). The gloves arrive at the machine inlet already stacked in the respective "piles" and counted.

30 In a particular solution, exemplified in Figures 10-12, the feeder 20 comprises rotatable gripping and release means 201 for gripping and

releasing a group of gloves. The gripping and release means 201 for gripping and releasing a group of gloves comprise a gripper 202 that picks up the group of gloves from a conveyor 203 and unloads it onto the support 4.

- 5 The rotatable means 201 comprise a plurality of gripping and release stations 204 for gripping and releasing a corresponding group of gloves. Such stations 204 follow one another. Suitably, each station 204 comprises a gripper 202 that picks up the group of gloves from a conveyor 203 and unloads it onto the support 4. Suitably, the rotatable means 201
- 10 comprise a wheel 205 or an element that is movable and extending in a closed line (for example a belt). The gripping and release stations 204 are distributed along the perimeter of the wheel 205 or along the longitudinal extension of the movable element. The wheel 205 advantageously rotates about a horizontal axis. If there is a movable element (for example a belt
- 15 along which the gripping and release stations 204 are arranged) it moves along a closed trajectory that surrounds a horizontal axis. The stations 204 then intervene in succession to pick up a corresponding group of gloves from the conveyor 203 and unload it onto the support 4. The conveyor 203 is driven by a brushless motor. In this way it is possible to adjust the
- 20 movement speed of the conveyor 203 and (in combination with a sensor 206 for detecting the groups of gloves placed thereon) synchronize it with the rotatable gripping means 201. Suitably, the rotatable means 201 are located above the conveyor 203. The conveyor 203 comprises a group of belts 207 side by side and spaced apart from each other. The gripping and
- 25 release stations 204 (or in any case the gripper 202) comprise teeth intended to fit in the spaces interposed between the belts 207. This facilitates the picking from above. Suitably, each gripping and release station 201 is driven by actuators. Such actuators may be mechanical actuators, for example cam actuators. For example, each gripping and
- 30 release station 204 may comprise:
- a first cam that allows the station to follow the vertical height of the group

of gloves;

-a second cam that drives an arm 208 of said station 204; said arm at one end supports the gripper 202 for gripping the gloves; the second cam drives (e.g. rotatably) the arm 208 so that the horizontal component of the speed of the gripper 202 is substantially zero when the group of gloves is released;

-a third cam that allows the opening and closing of the gripper 202 for gripping the group of gloves.

Advantageously, the apparatus 1 comprises means 209 for distributing the groups of gloves 10 on the support 4. Such distribution means 209 comprise a movement device of the support 4. For example, the support 4 is movable along at least one line. Typically alternately. In the preferred solution, the support 4 is movable along two transverse directions, typically orthogonal. The support 4 is then moved below a release zone of the group of gloves by the means 201.

In this way, the groups of falling gloves are distributed on the support 4. This step is advantageous for subsequent packaging.

Suitably, the apparatus 1 also comprises a compactor 400 of the gloves placed on the support 4. In this regard, the compactor 400 may comprise a cover 43 of the support 4. The compactor 400 may comprise lateral compaction means 401. In this regard, the lateral compaction means 401 comprises a first compaction flap 41. Suitably, the lateral compaction means 401 comprises a second compaction flap 42 that cooperates with the first flap 41 to compress the interposed gloves. In a particular solution, the first and second flaps 41, 42 are constrained (e.g. hinged) to the support 4. In this way, the first and second flaps 41, 42 are part of the support 4. It defines a V-tray. In particular, it has a flat intermediate part and the two flaps 41, 42 that can extend by diverging. Suitably, the first and second flaps 41, 42 are driven by corresponding brushless motors (or by the same motor). If necessary, they could be driven by fluid-dynamic means. The support 4 and the compactor 400 together define a

compacting chamber 40. This compacting chamber 40 is important for compacting the gloves and reducing the volume linked to the presence of air.

The apparatus 1 comprises a case 6 defining a housing 60 for the gloves.

5 In particular, the case 6 comprises a side wall 61 which defines the housing 60 for the gloves. The side wall 61 surrounds the housing 60. This case 6 is suitably made of metallic material, for example steel. However, it could also be made of other material such as non-stick material like teflon. Advantageously, the case 6 is of variable geometry (in particular
10 adjustable). For example, the case 6 may comprise two half-shells 611, 612 defining the housing 60 (e.g., the two half-shells are two angular profiles). The concavities defined by each of the two half-shells face each other. The half-shells may engage to a greater or lesser extent in one another. Appropriately, each angular profile comprises two plates. The
15 reciprocal position of the two half-shells is adjustable. This makes it possible to adjust the volume of the housing 60, for example as a function of the size of the box 9 to be filled (if 50-glove boxes 9 are to be filled, the volume of the housing 60 will be less than if 100-glove boxes 9 were to be filled). In particular, the case 6 is movable between an expanded
20 configuration (see figure 6 or 7) and a compressed configuration (see figure 8 or 9). In the compressed configuration the volume of the housing 60 is smaller than in the expanded configuration. In this regard, the apparatus 1 comprises means for varying the volume of the housing 60. For example, it comprises means for the relative movement of the two
25 half-shells (in this way they can move closer or further away or in any case engage in one another to a lesser or greater extent).

Suitably the support 4 and advantageously also the compactor 400 are movable between a first and a second position. In the first position (see figure 2) the support 4 is located below the feeder 20. In the second
30 position (see figure 4) the support 4 is located along a line 72 for introducing the gloves into the case 6.

Suitably, the support 4 receives the groups of gloves in the first position of the apparatus 1. The apparatus 1 comprises means 210 for displacing the support 4 from the first position to the second position or in any case from the first to the second position (see figure 10). The apparatus 1 also
5 comprises an additional support 211 for supporting the gloves. The additional support 211 has one or more of the features already indicated for the support 4. The apparatus 1 also comprises means 212 for positioning the additional support 211 in said first position. In this way the production cycle is speeded up and the dosing of the groups of gloves on
10 the support 4 and on the additional support 211 is made more continuous. In fact, while the additional support 211 is in the first position to receive the gloves, the support 4 will be placed in a second position to process the previously loaded gloves. Similarly while the support 4 is in the first position to receive the gloves, the additional support 211 will be placed in
15 a second position to process the previously loaded gloves.

The compacting chamber 40 advantageously comprises a first and a second mutually opposed opening 44, 45.

Suitably, the apparatus 1 comprises thrust means 71 for pushing into the case 6 the gloves placed in the compacting chamber 40. The thrust means
20 71 comprises, for example, a piston. The thrust means 71 advantageously is movable horizontally. Suitably, the thrust means 71 is adapted to extend internally to the compacting chamber 40 through the first opening 44 and to cross it exiting the second opening 45 (together with the gloves). A convergent 5 is advantageously present downstream of the compacting
25 chamber 40 (evaluated along the thrust direction identified by the thrust means 71). The convergent 5 is interposed between the compacting chamber 40 and the case 6. The convergent 5 facilitates the insertion of the gloves into the case 6.

The apparatus 1 suitably comprises a mouth 50 separated from said case
30 6 and interposable between the case 6 and the box 9. This mouth 50 can be positioned along the line 72 for introducing the gloves into the case 6.

Such a line 72 is advantageously a straight line. The case 6 is intended to transit internally to the mouth 50 during an introduction or extraction stroke with respect to the box 9.

Suitably, the mouth 50 is a convergent. It allows guiding the insertion of the case 6 inside the box 9. Suitably, in an operating configuration, the mouth 50 is partially introduced into the box 9 (thereby allowing the entry of the case 6 to be facilitated).

The apparatus 1 comprises means 62 for introducing and extracting said case 6 with respect to the box 9. Possibly the means 62 could be means for partial introduction of the case 6 into the box 9. In particular, it allows the introduction and extraction of the case 6 with respect to the box 9 through a first opening 91 of the box 9. The box 9 is in fact opened and has a side surface that wraps (surrounding it) a glove housing compartment 90, but it has at least a first end opening 91. Suitably the side surface is the side surface of a prism, preferably with a quadrilateral base. The first opening 91 is located at one of the two bases identified by said side surface. The box 9 comprises an (suitably foldable) edge for closing the first opening 91.

The apparatus 1 comprises means 2 for loading the gloves into the box 9. Suitably, the apparatus 1 or in any case the loading means 2 comprise a pusher 73. The pusher 73 compresses the gloves internally to the box 9 at least one or two centimetres more internally than the first opening 91.

The apparatus 1 comprises means 70 for retaining the gloves in said box 9. The action of the retaining means 70 is temporary. The retaining means 70 comprises a pad 7 which is movable independently from the case 6 and is able to partially obstruct a section of said housing 60 evaluated transversely to a direction 620 for introducing the case 6 into the box 9. Suitably, this pad 7 is integrated into the pusher 73. It is therefore the pusher 73 which, in addition to pushing the gloves towards one end of the box 9, retains them inside the box 9 while the case 6 is being extracted from the box 9. The retaining means 70 therefore makes it possible to

ensure that the gloves remain inside the box 9 and are not dragged by the case 6 during the extraction thereof from the box 9. Even when the pusher 73 is removed the gloves being placed a few centimetres further inside the box 9 than the first opening 91 do not hinder the operation for closing the box 9.

The apparatus 1 in fact comprises means for closing the box 9. The closing means for the box 9 suitably comprises folding means for folding the closing edge of the first opening 91.

Suitably, the means 81 for positioning a plurality of boxes 9 in the same container are placed downstream of the closing means of the box 9.

The object of the present invention is also a method for packaging surgical gloves in a box 9. Appropriately the surgical gloves 10 are made of latex. Appropriately, they are sterile.

Advantageously, the method is implemented by means of an apparatus 1 having one or more of the features described above.

The method comprises the step of positioning the gloves 10 in a housing 60 defined by a side wall of a case 6 (typically made of rigid material, preferably metallic). See, for example, Figure 2. Appropriately, a predetermined amount of gloves 10, for example one hundred, are placed in the housing 60. These are the gloves to be transferred in the box 9. In fact, a predetermined number of gloves must be inserted in each box 9 (which, for the same size of the box 9, preferably remains unchanged).

The step of positioning the gloves 10 in a housing 60 advantageously envisages a series of intermediate steps that are suitably described below.

In this regard, the method comprises the steps of positioning the gloves 10 on a support 4.

As exemplified in Figures 10-12, the step of positioning the gloves 10 on the support 4 comprises the steps of:

- picking up a group of gloves 10 from a conveyor 203 by means of rotatable gripping and release means 201 for gripping and releasing a group of gloves 10; preferably the step of picking up a group of gloves 10

comprises the sub-steps of bringing a gripper 202 from above closer to a conveyor 203 on which the group of gloves 10 is placed and gripping the group of gloves 10 by means of the gripper 202;

-releasing the group of gloves 10 on the support 4 below.

- 5 Between the step of picking up a group of gloves 10 and that of releasing the group of gloves 10 there is included the step of moving the group of gloves 10 by the rotatable means 201 to position them above the support 4. Furthermore, during the step of releasing the group of gloves 10, the gripper 202 is moved in the direction opposite to the rotatable means 201;
- 10 in this way the step of releasing the group of gloves 10 takes place with the gloves 10 having a substantially zero horizontal component of the speed (or in any case reduced compared to that which would have occurred in the absence of such a measure). This allows the gloves 10 to be released on the vertical of the support 4.

- 15 Preferably, the step of positioning the gloves 10 on the support 4 comprises the steps of:

-picking up in succession groups of gloves 10 by means of corresponding gripping and release stations 204; these groups of gloves 10 are advantageously picked up while they are being placed on a conveyor 203;

- 20 the conveyor 203 comprises a group of belts 207 side by side and spaced apart from each other; the gripping and release stations 204 (or in any case the gripper 202) comprise teeth that fit into the spaces between the belts 207;

-releasing in succession the groups of gloves 10 on the support 4.

- 25 The gripping and release stations 204 rotate cyclically above the conveyor 203. For example, they are arranged along the perimeter of a wheel 205 with horizontal axis.

- The step of picking up in succession groups of gloves 10 envisages gripping the groups by means of corresponding grippers 202 (placed in
- 30 each gripping and release station 204).

Suitably, the method comprises the step of distributing at various points of

the support 4 the groups of gloves 10 falling on the support 4 itself. In this regard, the step of distributing the groups of gloves 10 envisages moving the support 4 below so that the groups of gloves 10 do not all fall at the same point of the support 4.

- 5 The gloves 10 will then be transferred from the support 4 to the housing 60 of the case.

Advantageously, the step of positioning the gloves 10 in a support 4 takes place by dropping them from a feeder 20 of gloves 10 that can be positioned above the support 4. As exemplified in Figures 1, 2, 4, suitably

10 the feeder 20 is a conveyor belt and advantageously at one end it allows the gloves to be unloaded by gravity on the support 4 below. In an alternative solution it could envisage a hopper or other system.

- Suitably, the method comprises compressing/compacting the gloves 10 placed on the support 4 at the side and/or at the top. This is done by
- 15 means of a compactor 400. Appropriately this allows air to be removed from the set of gloves by compacting the volume thereof. See, for example, Figure 3. Suitably, the step of compressing the gloves 10 at the side (see figure 3) and/or at the top (see figure 4 and 5) takes place in subsequent steps or in any case not too suddenly. This is to prevent air
- 20 pockets from being trapped inside the group of gloves 10 and then becoming a threat to the integrity of the product since it is subjected to compression.

The step of compressing the gloves 10 at the side takes place by means of at least one first tiltable flap 41 of the support 4.

- 25 The step of compressing the gloves 10 at the top takes place by means of a cover 43. The support 4 and the cover 43 define a compacting chamber 40 for compacting the gloves 10 which is open on two opposite base ends 44, 45. Suitably the two base ends 44, 45 lie on a horizontal directrix.

- The step of positioning the gloves 10 in the housing 60 comprises in fact
- 30 the step of transferring the gloves 10 from the support 4 to the housing 60. This happens after compressing/compacting the gloves placed on the

support 4.

The step of transferring the gloves 10 from the support 4 to the housing 60 comprises the step of aligning said compacting chamber 40 and said case 6. Appropriately, this alignment envisages displacing the support 4 with the gloves placed thereon (suitably together with the compactor 400). Such displacement is for example visible by comparing figures 2 and 4. The support 4 is then displaced from a first position located below the feeder 20 to a second position where it is aligned with the case 6. Suitably, the above-mentioned step of compressing the gloves 10 placed on the support 4 at the side and/or at the top also occurs during the step of displacing the support 4. This is to prevent that after removing air this can be reintroduced. Suitably, the method envisages positioning an additional support 211 below the feeder 20 (in the first position) after the support 4 has been displaced to the second position. In this way the additional support 211 can receive additional gloves from the feeder 20 increasing productivity.

Suitably, the step of transferring the gloves 10 from the support 4 to the housing 60 comprises the step of pushing the gloves from said compacting chamber 40 into the housing 60 by thrust means 71 (see figure 7). In this regard, the thrust means 71 passes through the two base ends 44, 45. In particular, the thrust means 71 passes through the two base ends 44, 45 with the compactor 400 which keeps the gloves 10 placed in the compacting chamber 40 compressed. Suitably, the step of transferring the gloves 10 from the support 4 to the housing 60 (by pushing them with the thrust means 71) envisages the transit through a convergent 5 that is preferably partially inserted in the case 6.

Suitably, the method comprises the step of compressing the gloves present in the case 6. In this regard, the cross section of the housing 60 is reduced (by suitably approaching the opposite walls of the case 6). During this operation advantageously the convergent 5 is no longer inside the case 6.

Suitably, the method comprises the step of preparing the box 9 which identifies an internal compartment 90 for housing the gloves 10. In this regard, appropriately, the method envisages unfolding the box 9. For example, the unfolding allows the cardboard to be opened for the
5 positioning of the gloves.

The method also comprises the step of introducing the case 6 and the gloves 10 present in the case 6 into said compartment 90 through an opening 91 of the box 9 (see Figure 9). The case 6 and the gloves 10 are introduced together into the compartment 90.

10 The case 6 is moved by translation means.

The at least partial insertion of the case 6 into the box 9 leads to the insertion of the gloves 10 present in the case 6 inside the box 9. Suitably, the method comprises the step of pushing the gloves 10 by means of a pusher 73 towards an end of the box 9 opposite to that for inserting the
15 case 6 into the box itself. Appropriately in order to introduce the case 6 and the gloves 10 into the compartment 90 they pass through a convergent mouth 50. Advantageously, this convergent mouth 50 is partially introduced into the box 9.

The method also comprises the step of extracting the case 6 from the box
20 9 through said opening 91 leaving the gloves 10 inside the box 9.

The extraction of the case 6 always takes place by means of the translation means.

The step of leaving the gloves 10 present in the case 6 inside the box 9 comprises the step of retaining the gloves 10 inside the box 9 during the
25 step of extracting the case 6 from the box 9.

The step of retaining the gloves 10 present in the case 6 inside the box 9 takes place by means of a pad 7 that at least partially obstructs a section of said housing 60 evaluated transversely to a direction 620 for introducing the case 6 into the box 9. The step of extracting the case 6 from the box 9
30 takes place by moving the case 6 with respect to said pad 7. There is therefore a relative movement between the two. Suitably the pad 7 is part

of the pusher 73. Suitably, the pusher 73 moves along the direction 620 for introducing the case 6 into the box 9.

The step of extracting the case 6 from the box 9 takes place by keeping the pad 7 in position at least partially inside the box 9.

- 5 At the end of the step of introducing the case 6 and the gloves 10 present in the case 6 into the box 9, the pad 7 obstructs a cross section of the housing 60. The cross section of said housing 60 is placed inside the box 9 and is more than 10 millimetres (or rather more than 15 millimetres) away from said opening 91, preferably between 10 and 30 millimetres
10 away from the opening 91, even more preferably between 15 and 25 millimetres away from the opening 91. The space between the cross section and the opening 91 allows to compensate for any expansion of the gloves once the pad 7 has been removed.

- The method further comprises the step of removing the retaining means
15 70. Suitably in the course of the present disclosure the retaining means 70 may be replaced by the expression pad 7 and vice versa.

Therefore, after inserting the gloves into the box 9 and removing the retaining means 70 and the case 6 from the box 9, the method comprises the step of completing the formation of the box.

- 20 In this regard, the method suitably provides for closing the opening 91 of the box 9. The closure of the opening 91 must be carried out in a suitable time to prevent the possible expansion of the gloves 10 from hindering this operation.

Suitably, the method is repeated iteratively to make a plurality of boxes 9.

- 25 Such boxes in turn can be inserted in a larger container (preferably made of cardboard). Suitably, this container is in turn closed. This makes it possible to optimise the shipment.

The present invention achieves important advantages.

- First of all it allows to optimise the quality of the process by minimising the
30 gloves or boxes that are damaged (the surgical gloves have reduced thickness and therefore are easily subject to damages; likewise the box is

made of cardboard and therefore it can be broken if an inappropriate force is applied during packaging). It also allows to optimise the hygiene of the process since the operation is not performed by human operators and therefore the risk of external contamination is minimised.

- 5 Furthermore, the apparatus according to the present invention makes it possible to speed up the operation. For example, in an operating configuration it can pack 8 boxes 9 per minute.

The monobloc apparatus 1 is also able to minimise the encumbrances.

- 10 The invention as it is conceived is susceptible to numerous modifications and variants, all falling within the scope of the inventive concept characterised thereby. Furthermore, all the details can be replaced with other technically equivalent elements. In practice, all the materials used, as well as the dimensions, can be any whatsoever, according to need.

CLAIMS

1. A method for packaging surgical gloves in a box (9) comprising the steps of:

-positioning the gloves (10) in a housing (60) of a case (6);

5 -preparing said box (9) which identifies an internal compartment (90) for housing the gloves (10);

-introducing together the case (6) and the gloves (10) present in the case (6) into said compartment (90) through an opening (91) of the box (9);

10 -removing the case (6) from the box (9) through said opening (91) leaving the gloves (10) inside the box (9);

-closing said opening (91) of the box (9).

2. The method according to claim 1 characterised in that the step of leaving the gloves (10) present in the case (6) inside the box (9) comprises the step of retaining the gloves (10) inside the box (9) during the step of
15 removing the case (6) from the box (9).

3. The method according to claim 1 or 2, characterised in that the step of retaining the gloves (10) present in the case (6) inside the box (9) takes place by means of a pad (7) which obstructs at least partially a section of said housing (60) evaluated transversally to an introduction direction (62)
20 for introducing the case (6) into the box (9); the step of removing the case (6) from the box (9) taking place by moving said case (6) with respect to said pad (7).

4. The method according to claim 3 characterised in that the step of removing the case (6) from the box (9) takes place by keeping the pad (7)
25 at least partially in position inside the box (9).

5. The method according to claim 3 or 4, characterised in that at the end of the step of introducing the case (6) and the gloves (10) present in the case (6) into the box (9) said pad (7) obstructs a cross section of said housing (60), said cross section of said housing (60) being placed inside the box
30 (9) and being more than 10 millimetres away from said opening (91).

6. The method according to any one of the preceding claims,

characterised in that the gloves (10) placed in the case (6) are pushed towards one end of the box (9) opposite the insertion end of the case (6) into the box (9); the step of pushing the gloves (10) placed in the case (6) towards an end of the box (9) being subsequent or at least partially
5 simultaneous to the step of introducing together the case (6) and the gloves (10) present in the case (6) into said compartment (90).

7. The method according to any one of the preceding claims, characterised in that it comprises the steps of positioning the gloves (10) in a support (4) and compressing them at the side and at the top; the step of
10 positioning the gloves (10) in said housing (60) comprises the step of transferring the gloves (10) from the support (4) to the housing (60).

8. The method according to claim 7, characterised in that the step of positioning the gloves (10) in a support (4) takes place by dropping them from a feeder (20) of gloves (10) which can be positioned above the
15 support (4).

9. The method according to claim 7 or 8, characterised in that the step of laterally compressing the gloves (10) takes place by means of at least a first tiltable flap (41) of the support (4); the step of compressing the gloves (10) at the top takes place by means of a cover (43); said support (4) and
20 said cover (43) defining a chamber (40) for compacting the gloves (10) which is open on two opposite base ends;

the step of transferring the gloves (10) from the support (4) to the housing (60) comprises the steps of:

-aligning said compacting chamber (40) and said case (6);
25 -pushing the gloves using a thrust means (71) from said compacting chamber into the housing (60).

10. A system for packaging surgical gloves comprising:

- i) at least one box (9) in which to package the gloves, said box (9) identifying an internal compartment (90) for housing the gloves;
- 30 ii) a packaging apparatus (1) comprising:
 - a case (6) comprising a side wall (61) which defines a housing (60) in

which to position the gloves;

- a means (2) for loading the gloves into said case (6);

- a means (62) for introducing and removing said case with respect to said box;

- 5 - a means (70) for retaining gloves in said box (9); said retaining means (7) comprising a pad (7) which is movable independently from the case (6) and is able to partially obstruct a section of said housing (60) evaluated transversally to a direction (62) for introducing the case (6) into the box (9).

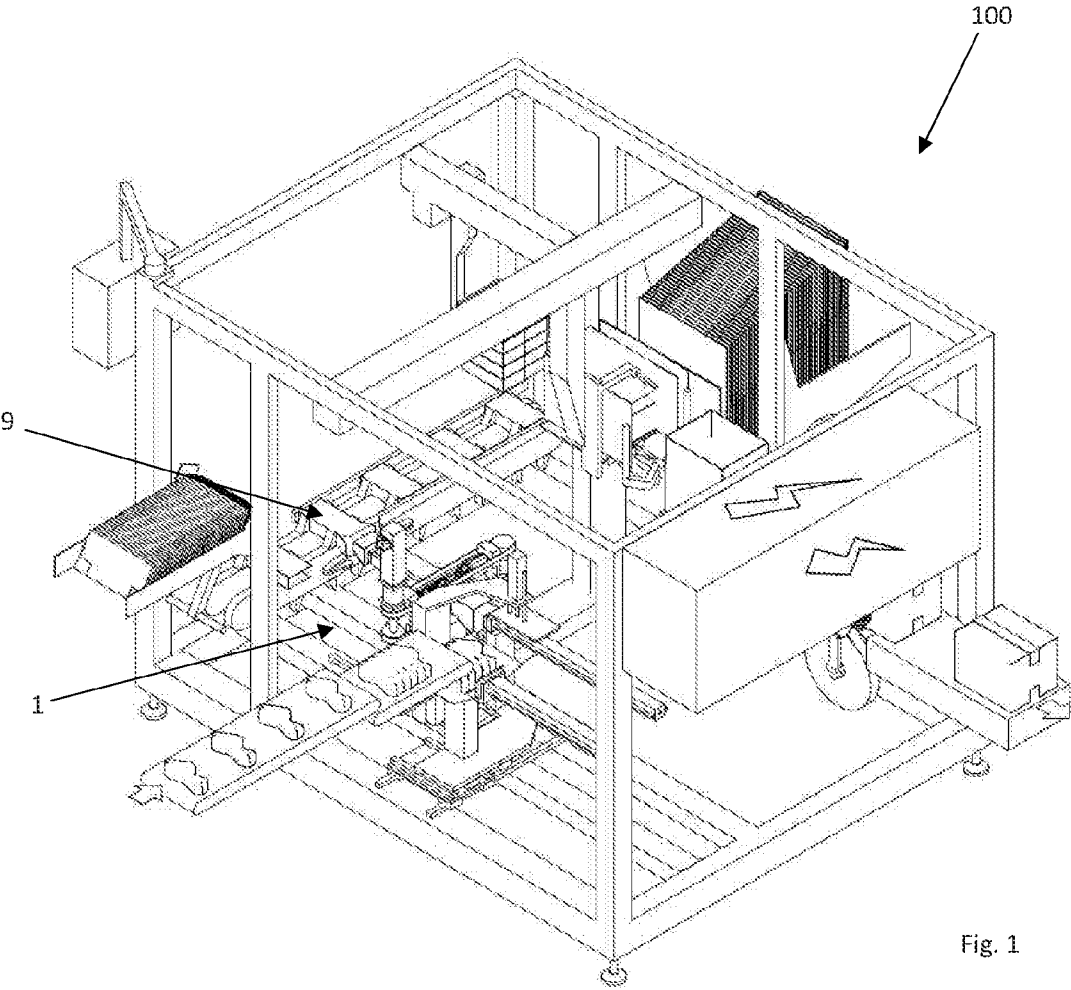


Fig. 1

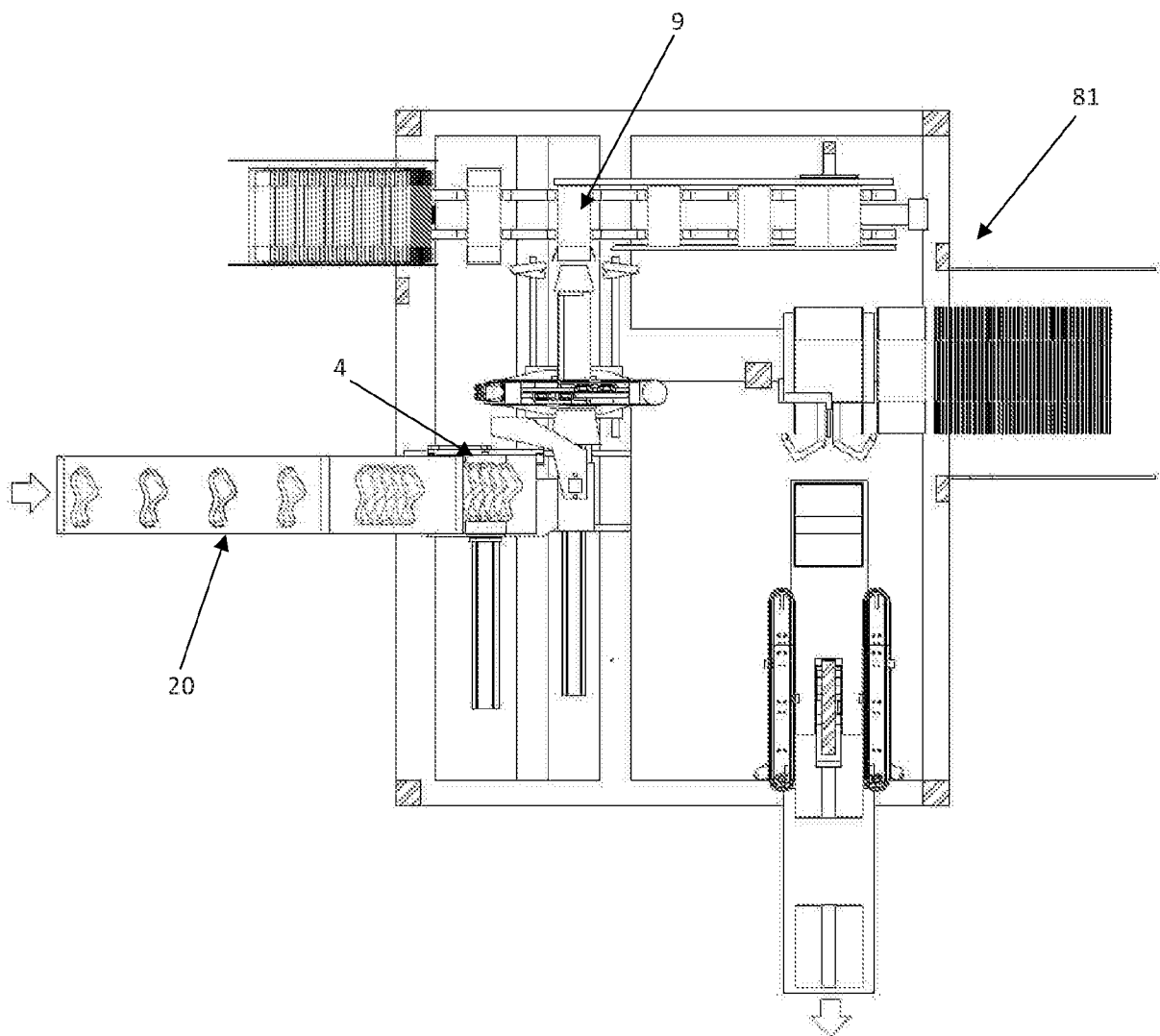


Fig. 2

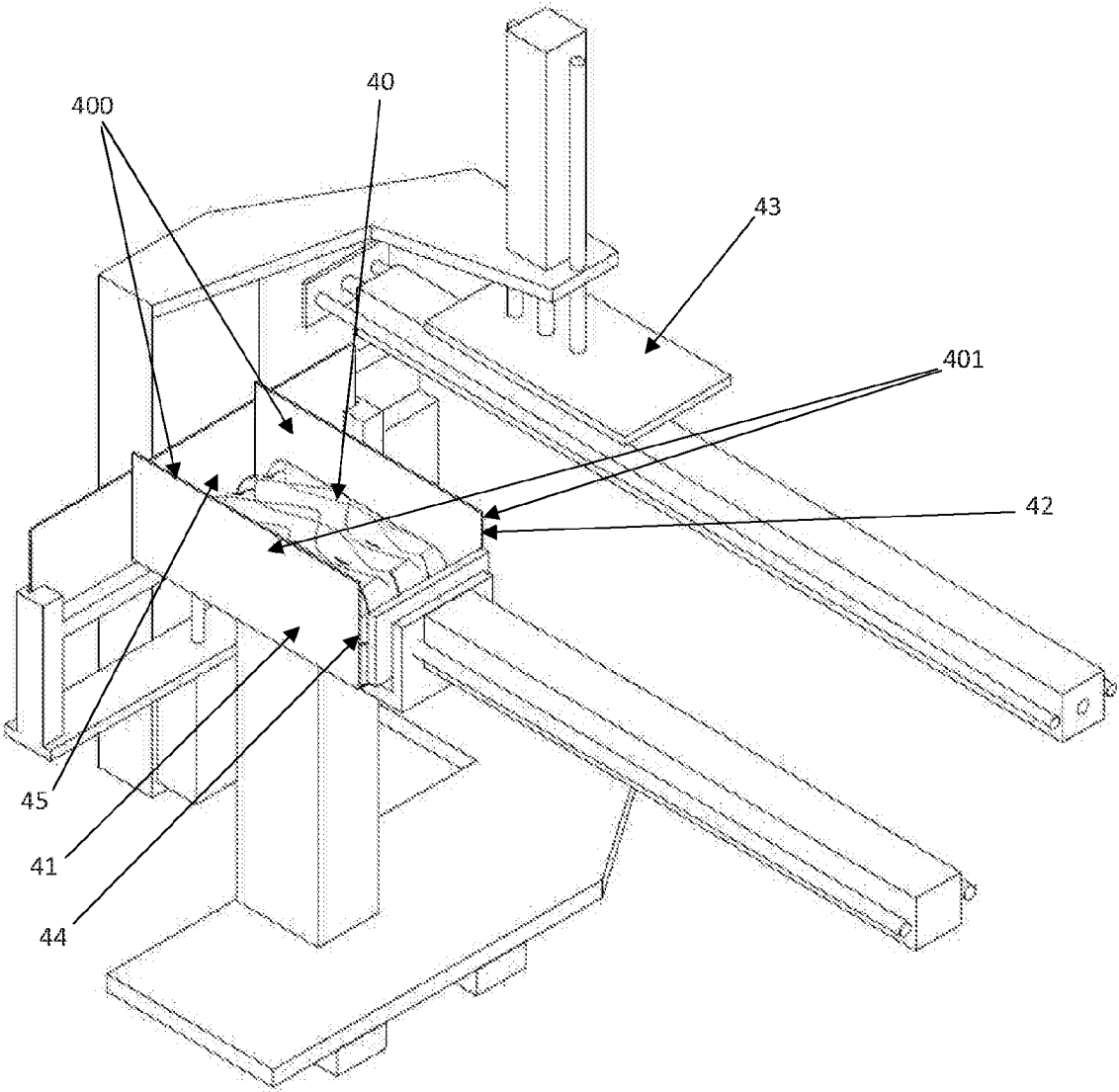
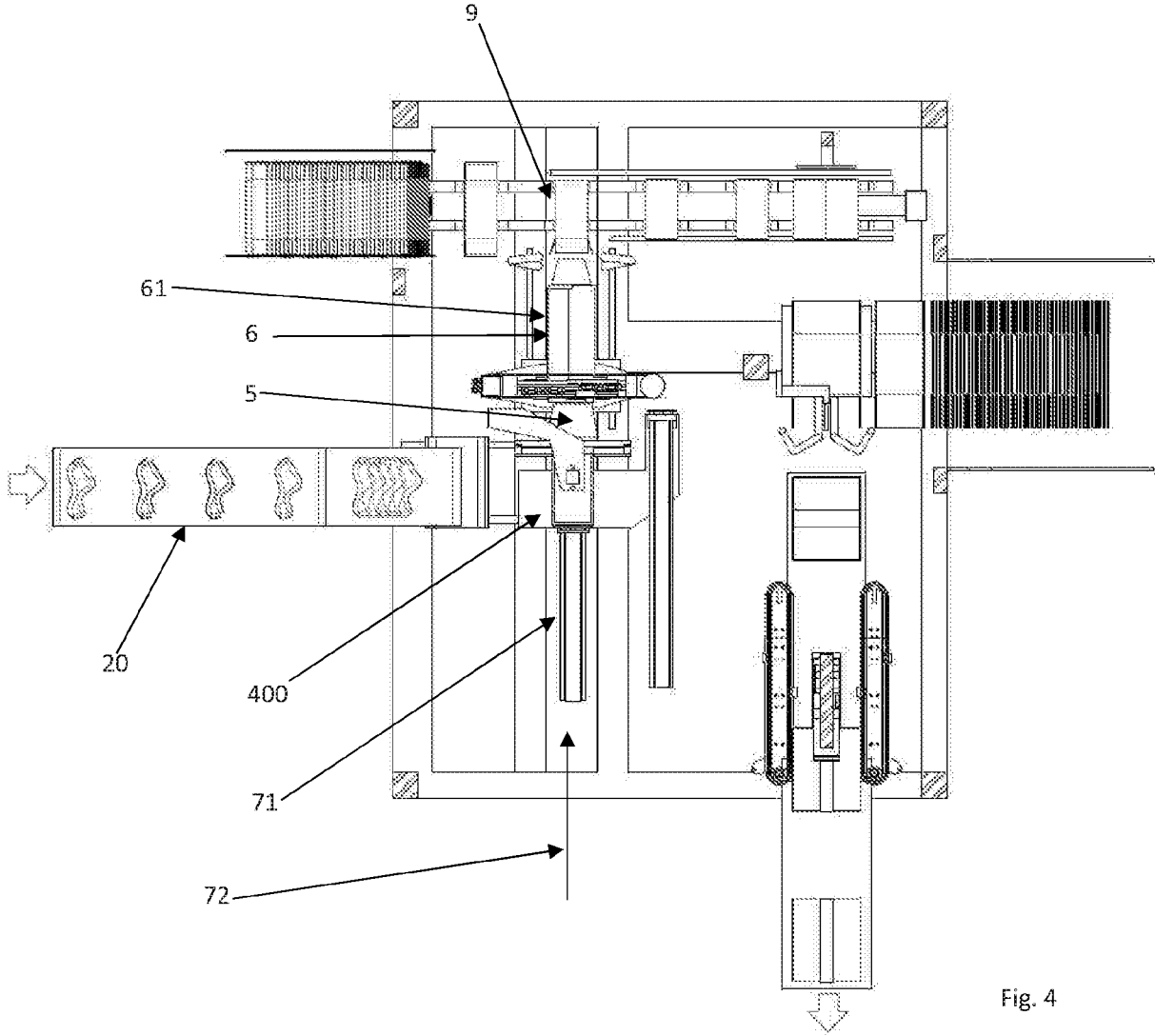


Fig. 3



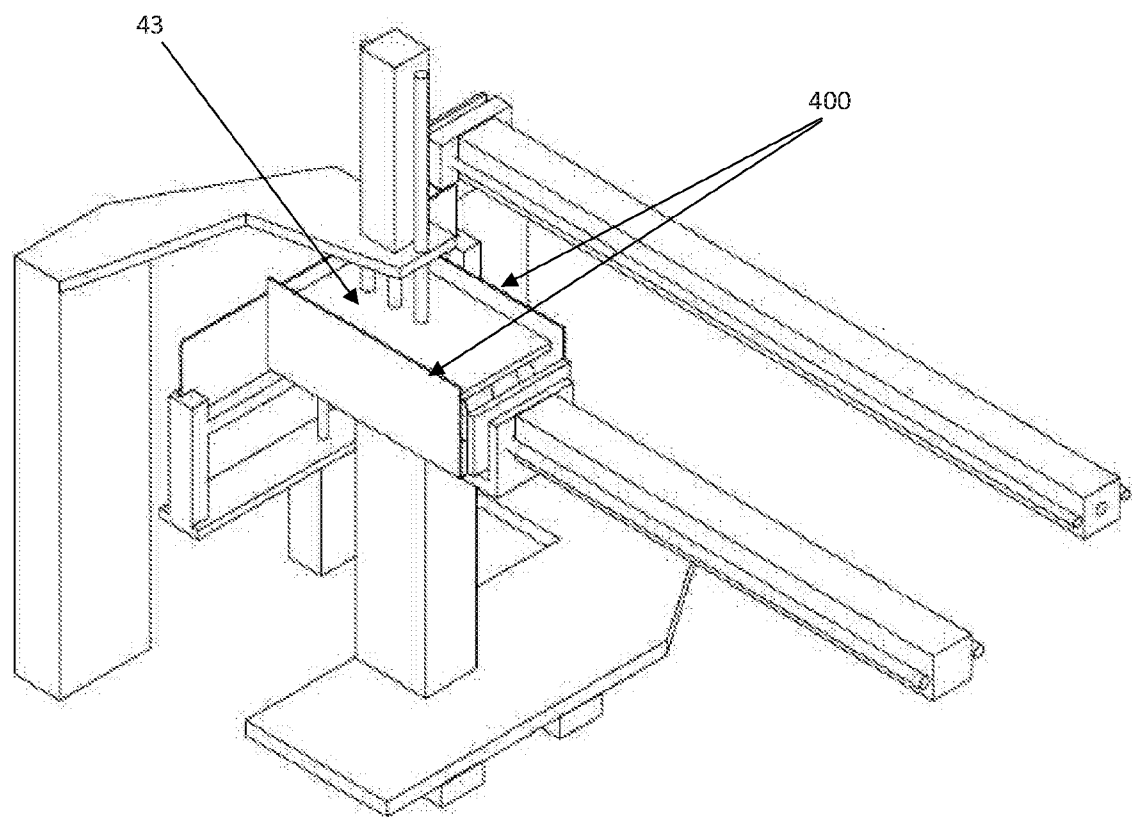


Fig. 5

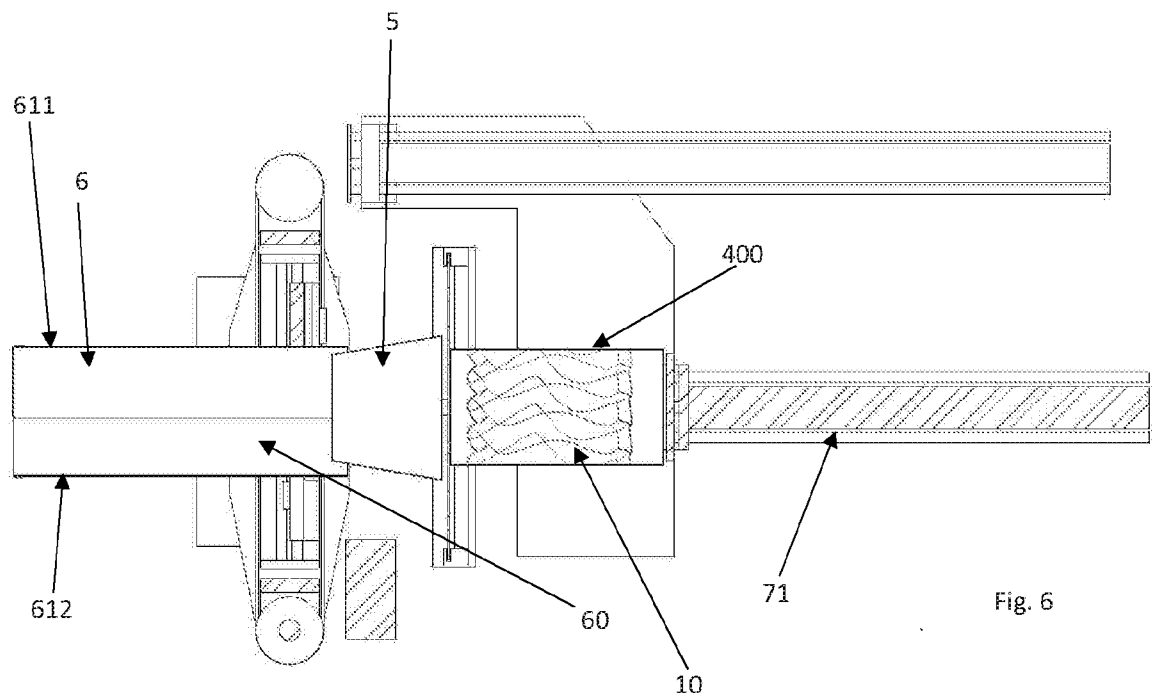


Fig. 6

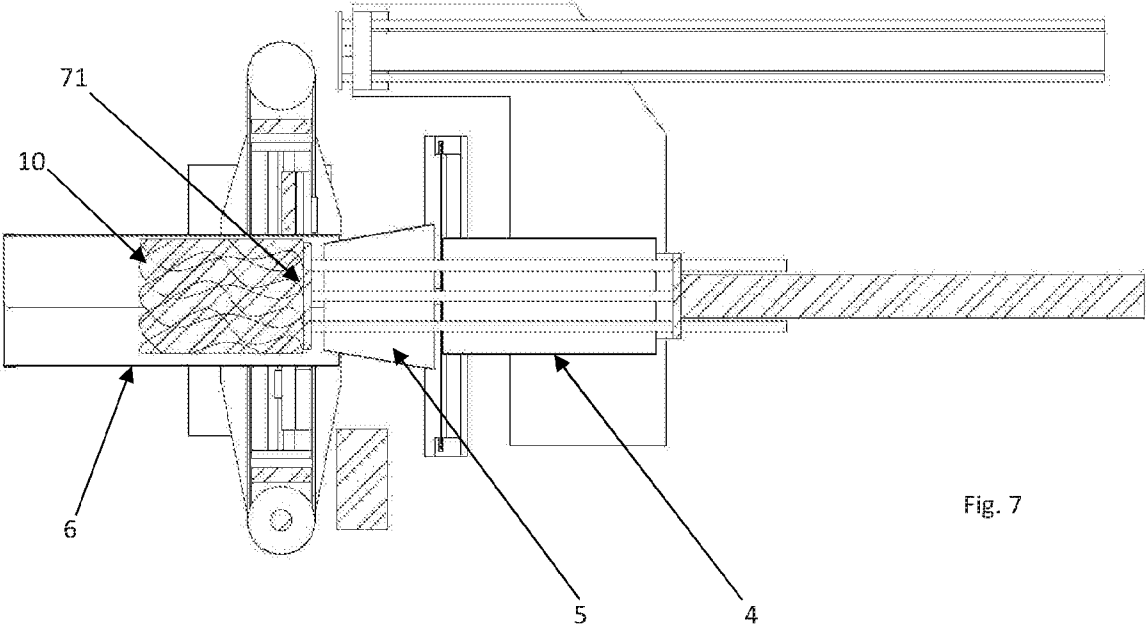


Fig. 7

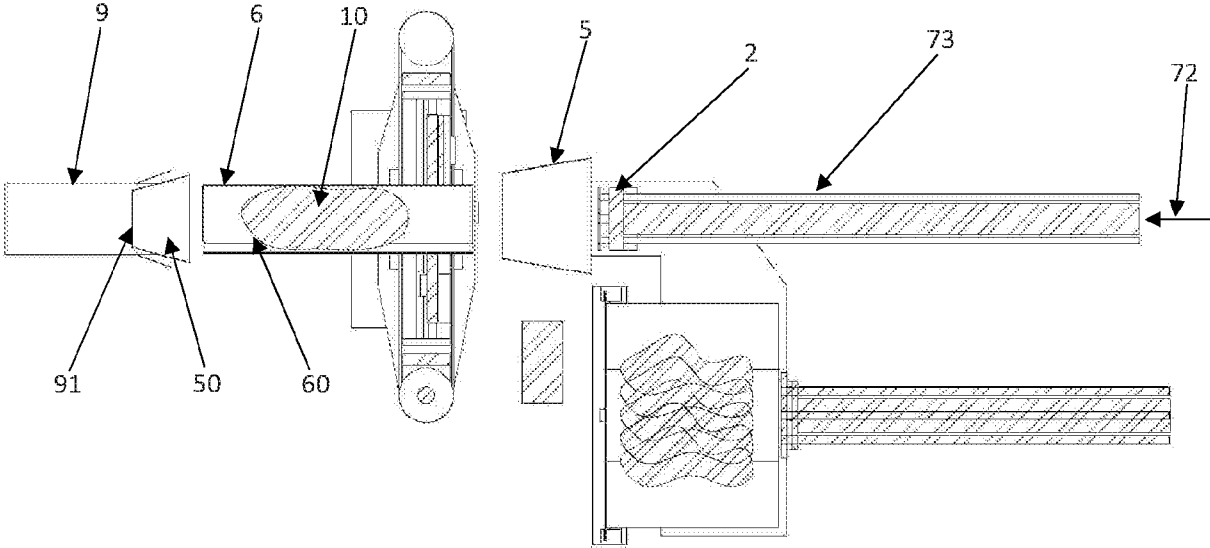


Fig. 8

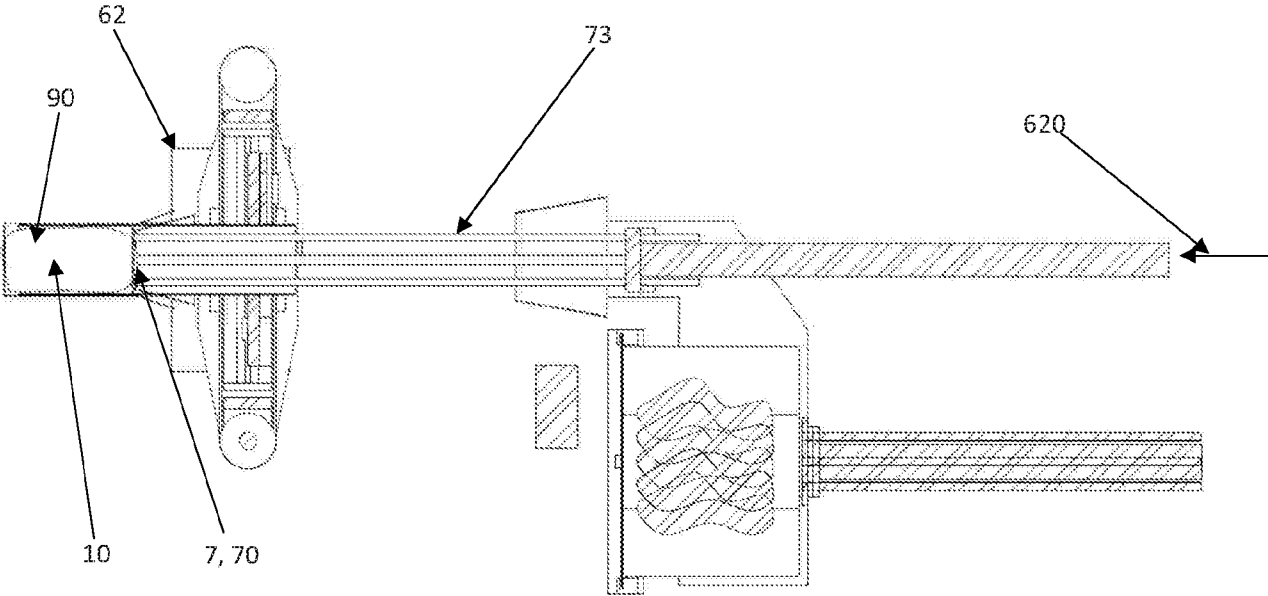
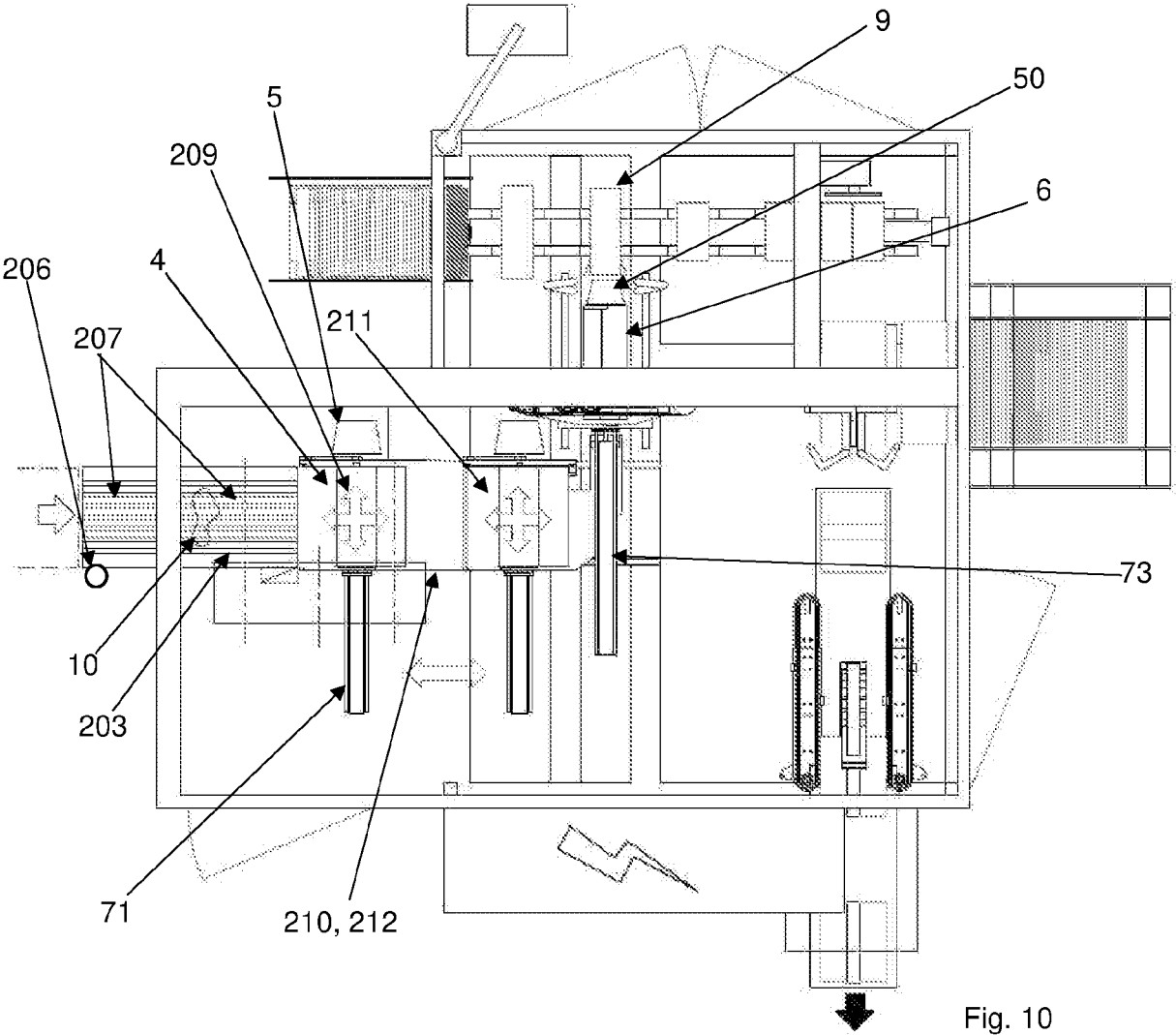


Fig. 9



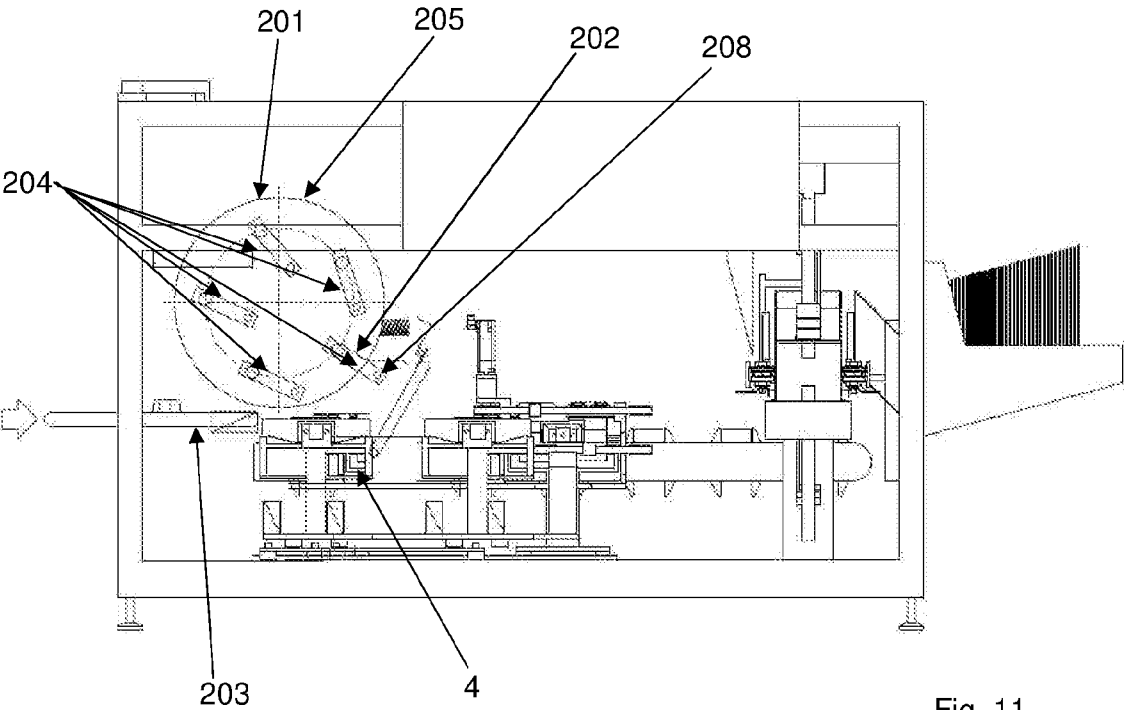


Fig. 11

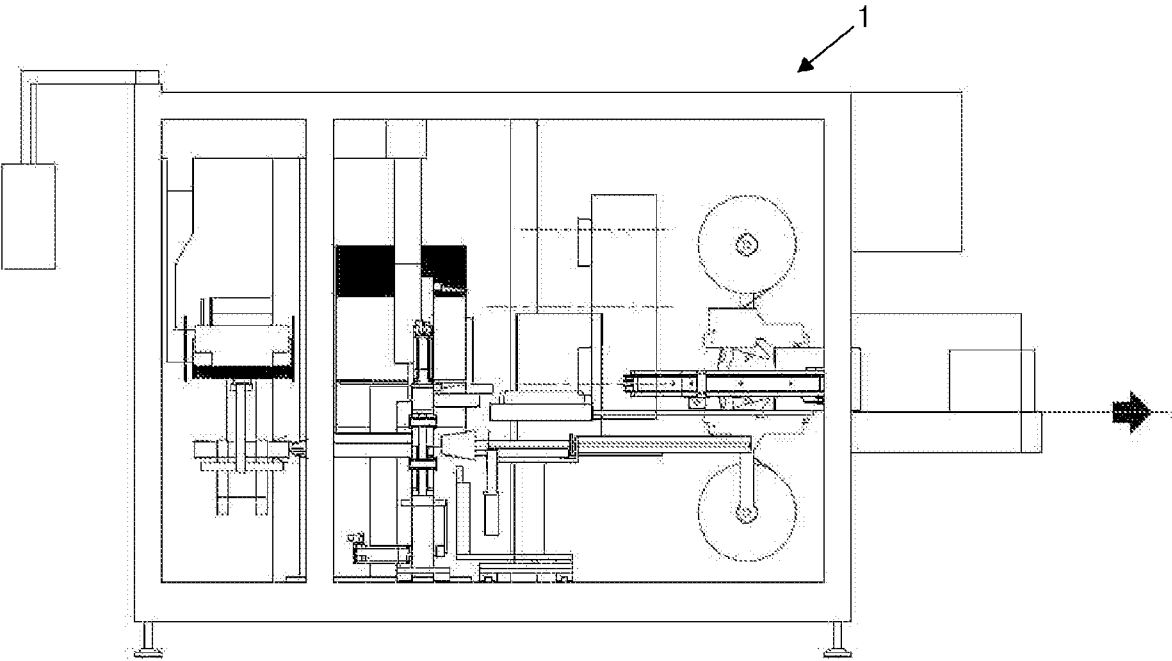


Fig. 12

INTERNATIONAL SEARCH REPORT

International application No

PCT/IB2022/060722

A. CLASSIFICATION OF SUBJECT MATTER

INV. B65B63/04 B65B35/40 B65B25/00

ADD.

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)

B65B

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)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 202 728 596 U (XIAOGAN SANJIANG HONGFENG ELECTROMECHANICAL EQUIPMENT CO LTD) 13 February 2013 (2013-02-13) figures 1,2 -----	1-10
A	US 6 840 025 B1 (CHAPMAN PETER MILES [AU]) 11 January 2005 (2005-01-11) figures 1-6 -----	7-9
A	US 9 090 427 B2 (STOLLERY JONATHAN WILLIAM [GB]; STOLLERY KIM MARIE [GB] ET AL.) 28 July 2015 (2015-07-28) figures 13-15 -----	7-9



Further documents are listed in the continuation of Box C.



See patent family annex.

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"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

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"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

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Date of the actual completion of the international search

31 January 2023

Date of mailing of the international search report

10/02/2023

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Dick, Birgit

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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