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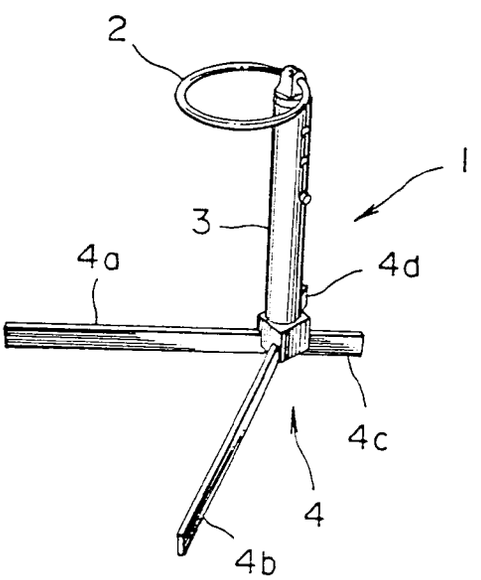
(54) Packing assist instrument

(57) The invention provides a packing assist instrument comprising a packing bag holding frame 2 having a through hole which articles to be packed can pass through and, a support column 3 and base 4 for supporting an opening of the through hole of holding frame 2 virtually horizontally, a bag H made of a synthetic resin film, with its bottom up, is put on said holding frame 2, articles to be packed N from over bag H are forced toward within holding frame 2, the articles N are inserted into bag H meantime it is reversed, before packing is completed. Insertion is smoothly carried out even for fruits or vegetables having smooth surface and apt to adhere to the bag, whereby efficient packing is achieved. Constructed simple and compact, tne instrument can easily be introduced in smaller facilities as well.

FIG. 1



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Description

BACKGROUND OF INVENTION

The present invention relates to a packing assist instrument for use in packing vegetables, fruits or flowers such as egg-apples, cucumbers, spinach, or the like (hereinafter referred to as articles) are packed in a packing bog.

Many articles are sold in a supermarket, or the like while a suitable number of them are packed in a bag of synthetic resin film, such as polyethylene, containing a suitable number of or a certain amount by weight of them. Packing of these articles are normally performed daring the course they are collected from producers and until delivered to supermarket, or the like.

Generally, three to five egg-apples or cucumbers, three to six pimentos, potatoes or onions, three to four apples or persimmons are received in bags of synthetic resin film or a certain amount by weight of articles are scaled and then put in such bags before binding with an adhesive tape or thermal fusing.

Such packing work is carried out in facilities of local agricultural organizations, or the like. by using automatic packing machines where these products are dealt in quite a large amount or by hand where they are dealt in smaller amount.

In the case of manual packing, an efficiency in packing operation remarkably varies depending on the type of articles to be packed. For example, in the case that articles each having a smooth surface such as egg-apples, pimentos, apples, or persimmons, when several of them are put in a bag of synthetic resin film, present difficulty in going down to the bottom thereof because they adhere to the inner surface of the film and do not slide well. While, if they are put in the bag one by one, it will ease adhesion to the film surface, but efficiency of packing work will remarkably be degraded.

Thus, there read; by arises an occasion that an egg-apple to be put in the bag, later can not move back and forth not only due to its lose contact with if surface of the bag film but also due to close contact with the surface of the articles previously put in the bag.

To cope with the foregoing malfunction, a funnel-shaped assist tool is customarily used so that the surface of the articles to be packed will not contact the interior of the bag, but it poses another problem of taking additional manhours for detaching this tool from each bag.

While automatic packing machines will resolve such a problem, but they can not readily be introduced in smaller facilities wherein various restrictions are imposed. Further, automatic machines will not immediately adapt themselves for articles which differ in size or type, nor they can not readily deal with more than two sizes or types of articles in parallel at the same time.

Further, some vegetables, e.g., spinach, have fragile leaves which are broader toward tips finding difficulty in going into bags, and apt to be damaged as their leaves or stalks are broken or bent, thus posing another problem of reduced value as merchandise.

Furthermore, when a certain amount of them are to be packed, a certain amount by weight of articles are scaled before they are packed in bags of synthetic resin film, requiring much more manhours in scaling for one thing and packing for another, which is a great disadvantage.

SUMMARY OF THE INVENTION

The present invention has been made in consideration of the aforementioned background. Therefore, a first object of the present invention is to provide an packing assist instrument which can enable efficient packing work without having the surfaces of the articles to be packed adhere to the film of the bags. It is a second object of this invention to provide such assist instrument which can improve the efficiency of packing work for dealing with more than two articles which differ in size or type. Further, it is a third object of the invention to provide such assist instrument which can help scale a certain amount of articles and pack them quite efficiently.

In order to resolve said first object, the packing assist instrument of this invention is provided with a packing bag holding frame(hereinafter referred to as the holding frame) having a through hole for allowing articles and a packing bag to pass therethrough, said frame being shaped in such a manner that a packing bag for packing said articles is put on said frame with the bottom of the bag facing an opening of said through hole, and a stand for supporting said holding frame with an opening and thereof positioned virtually upright and horizontally.

In the packing assist instrument of the present invention, a packing bag with its bottom up is put on an opening of the holding frame, articles to be packed are forced into the through hole of the holding frame from over the bag, which bag is reversed meantime wrapping the articles to be packed, passes through the holding frame together with the articles, whereby insertion of the articles into the packing bag is completed.

In the course of the insertion of the articles to be packed into said bag, surfaces of the articles to be packed are contacted with the inner surface of the bag without relative movement taking place there between, but they move together at the same time as so contacted so that the insertion of the articles into the bag is done smoothly even for articles having smooth surface and apt to adhere to the film surface of the bag.

In such packing assist instrument, the holding frame holds the bag as put thereon before the articles to be packed are inserted in the bag, and in the meantime the articles are inserted, the holding frame helps the bag be reversed and goes downward together with the articles inserted. The dimension and shape of the holding frame

are in accordance with those of the packing bag. Further, the holding frame preferably be ring-shaped or cylindrical, and for a ring-shaped holding frame, the stand for supporting it can comprise a support column for supporting the holding frame virtually horizontally and a base member. By providing the support column extensible, the height of the holding frame can be adjusted to a height suited for the packing work. Further for a cylindrical holding frame, such a stand can be provided in the form of a platform for supporting the holding frame as erected thereupon. For example, such a platform can be box-shaped for receiving and taking out the articles falling down the through hole of the holding frame, its top plate is provided with an opening communicating with the other opening of the through hole of the holding frame which is attached to the former opening, a portion of the side walls is removed to provide an outlet for taking the articles out, or in other arrangements suited for the respective packing work.

Further, in order to achieve said first and second objects, the packing assist instrument of the present invention is provided with a first and second holding frames respectively having a through hole for permitting articles to be packed to pass through, each of said frames being shaped in such a manner that a packing bag for packing said articles is put on said frames with the bottom of the bag facing an opening of said through hole, a main support column, the top end of which being attached with said first holding frame, a base member for supporting the bottom end of said main support column and positioning an opening of said first holding frame virtually upright and horizontally, a secondary support column, the bottom end of which being supported by said main support column or base member, the top end of which being attached with said second holding frame, said secondary support column positioning an opening of said second holding frame virtually upright and horizontally.

In the packing assist instrument of the present invention, a packing bag with its bottom up is put on an opening of the first or second holding frame, the articles to be packed are forced into the through hole of the holding frame from over the bag, which bag is reversed meantime wrapping the articles to be packed, passes through the holding frame together with the articles, whereby insertion of the articles into the packing bag is completed.

In the course of the insertion of the articles to be packed into said bag, surfaces of the articles to be packed are contacted with the inner surface of the bag without relative movement taking place there between, but they move together at the same time as so contacted so that the insertion of the articles into the bag is done smoothly even for articles which are apt to adhere to the film surface of the bag.

In this instance, by varying the size of the first and second holding frames each other, more than two packing works can be run parallel for packing, for example, more than two sets of articles which differ in size or type.

Further, by providing the main support column with engaging means for supporting the secondary support column to be connected and which could be disconnected easily, if not in use, the secondary holding frame and secondary support column, can be removed from the main support column.

Furthermore, a plurality of sets of such engaging means can be positioned in axial or peripheral directions of said main support column so that the position for attaching the second holding frame can conveniently be varied. Thus, the packing assist instrument can variably be adjusted its height from the surface it stands to the position of the holding frame, which position can suitably be decided according to the various conditions for the packing work including the place for setting the instrument or workers' height so that they can work in comfortable posture.

While said holding frame is characterized in that it is contoured such that a lower outer peripheral surface extends in parallel with the direction of extension of an axis of the holding frame, an upper outer peripheral surface extending in continuation from the lower outer peripheral surface is designed in the form of an inclined surface slantwise extending toward the axis, and the upper inner peripheral surface is designed in the form of a curved convex surface the downward direction. Here, the "curved convex surface" means such a curved convex surface that continuously extends without any inflection point. Further, the "axial direction" of the holding frame means the direction of a phantom line extending through the substantial center of the through hole of the holding frame.

Since the lower outer peripheral surface is designed in the form of a surface extending in parallel with the axial direction of the holding frame and the upper outer peripheral surface is designed in the form of an inclined surface slantwise extending toward the holding frame generally assumes such a contour that is tapered in the upward direction. Thus, when the packing bag is put on the holding frame at the time when a putting operation is started, the placing operation can easily be performed.

In the packing operation, the film surface of the packing bag moves as follows. First, it is first raised up while sliding along the lower outer peripheral surface of the holding frame extending in continuation from the latter, and the inclined surface, then it is reversed of the upper edge of the holding frame in the downward direction and thereafter, it is lowered from the upper edge along the curved convex surface of the holding frame smoothly extending in the downward direction.

When an inserting operation is started to insert the articles, the film surface of the packing bag suspends in the downward direction to assume a state in substantial parallel with the axis of the holding frame, and since the lower outer peripheral surface of the holding frame extends in parallel with the axial direction, the film surface

of the packing bag suspends in the substantial parallel state with the lower outer peripheral surface. Thus, when the inserting operation is started and the film surface is raised up, displacement of the film surface is smoothly achieved along the lower outer peripheral surface of the holding frame.

Additionally, since the inclined surface extending in continuation from the lower outer peripheral surface is inclined toward the upper part of the axis, the film surface is inclined at an angle suitable for reversing the film surface at the upper edge of the holding frame as the film surface is raised up along the inclined surface.

In other words, if the film surface of the packing bag is reversed in parallel with the axis, i. e., it is reversed from the state that it is vertically raised up in the upward direction to the state that it is lowered in the downward direction as it is, it is required that the film surface is turned by an angle of 180 degrees but when the film surface is raised up along the inclined surface and then it is reversed, it is only required that the film surface is turned by the remaining angle having the inclined angle of the inclined surface subtracted from 180 degrees. Thus, the film surface can easily be reversed. Namely, since the film surface is ready to be reversed by raising up along the inclined surface, the reversing of the film surface at the upper edge of holding frame is performed very smoothly.

When the film surface is reversed at the upper edge of the holding frame, an adequate gap appears between the reversed part of the film surface and the upper edge of the holding frame since the film surface is displaced first along the inclined surface and then along the curved convex surface smoothly curved from the upper edge in the downward direction. Owing to the foregoing gap, tight contact between the film surface and the holding frame is prevented and reversing of the film surface is smoothly conducted. In addition, since the curved convex surface is designed in the form of a curved surface smoothly curved without any inflection point, subsequent slippage of the film surface along the lowering path is achieved very excellently.

Next, the holding frame is characterized in that an inner peripheral surface of the holding frame extending from the curved convex surface to the lower end of the holding frame is recessed in such a direction that an inner diameter of the holding frame is increased. Therefore, since a cavity is formed along the whole inner peripheral of the holding frame, and the packing bag with the articles inserted therein is lowered below the position of the lower edge of the curved convex surface, no restriction to the packing bag disappears, causing the packing bag to be smoothly lowered.

In addition, the inclined surface of the holding frame is characterized in that an inclined angle of the inclined surface relative to the axial direction of the holding frame is set to the range of 30 to 45 degrees, and the position of a boundary between the inclined surface and the lower outer peripheral surface and the position of a lower edge of the curved concave surface are located higher than about a half of the height from the lower end to the upper end of the holding frame. As mentioned above, if the film surface of the packing bag is reversed downwardly from the state that the film surface is raised up as it is, it is required that the film surface is turned by an angle of 180 degrees but when the inclined angle of the inclined surface is set to the range of 30 to 45 degrees, it is only required that the inclined surface of the packing bag is turned by the remaining angle, viz, 150 to 135 degrees. Thus, the reversing of the film surface is achieved very smoothly.

In such manner, when the inclined angle of the inclined surface is set to 30 to 45 degrees relative to the axis of the holding frame, the state of slippage and reversing of the film surface of the packing bag can be optimized. In the case that the inclined angle is set to less than 30 degrees, the reversing of the film surface of the packing bag is not performed smoothly because that angle provides a weak function to the film surface of the packing bag, and in the case that it is set to more than 45 degrees, the frictional resistance appearing between the inclined surface and the film surface becomes large. Thus, the slippage of the film surface is not conducted smoothly.

On the other hand, when the position of the boundary between the inclined surface and the lower outer peripheral surface and that of the lower edge of the curved convex surface are located higher than a half of the height from the upper end of the holding frame to the lower end of the same, the length of the outer lower peripheral surface and the length of the hollow space as measured in the upward direction are relatively elongated. Consequently, the function of guiding of the packing bag in the vertical direction is improved, and moreover, the reversing and slippage of the packing bag are achieved smoothly.

Next, the holding frame is characterized in that each of the holding frames assumes a circular or elliptic ring-shaped contour. In the case that the holding frame is designed in the circular ring-shaped contour, the articles are inserted in the state that they are collectively received in the central part of the packing bag and they are uniformly packed in the packing bag viewed from all directions. Thus, a packing operation can be performed regardless of the direction of insertion of the articles.

On the other hand, in the case that the holding frame is designed in the elliptic ring-shaped contour, the article are not collectively received in the central part of the packing bag but are packed in the flattened state in the side-by-side relationship, and therefore they are readily recognized from the outside after they are packed in the packing bag. This provides a merit that the packing bag with the articles received therein exhibits excellent aesthetic appearance when it is put on a display case or shelf. In such manner, since the packing state can be changed by designing the holding frame in the circular or elliptic ring-shaped contour, a packing op-

eration can adequately be performed depending on the kind, shape or nature of the articles.

Since the articles can smoothly be inserted into the packing bag regardless of the contour of the circular or elliptic ring-shaped holding frame, each packing operation can effectively be performed.

Next, the packing assist apparatus is characterized in that a guard member is disposed between the holding frame and the arm. When the packing bag does not straightforwardly fall but falls in the inclined state after the articles are inserted into the packing bag put on the holding frame and they pass past the holding frame, the packing bag comes in contact with the guard member for preventing it from being inclined relative to the axial direction of the holding frame, whereby the lowering of the packing bag is guided straightforwardly in the downward direction. Thus, the packing bag smoothly passes through the holding frame. Aesthetic appearance of the packing bag is not degraded after completion of each packing operation because the inserted state of the articles is not worsened with such inclination of the packing bag prevented.

Further, said holding frame is made of an expansible material so that the dimension of the through hole of said holding frame can be changed depend on the kind, shape or nature of the articles.

By forming the holding frame of an expansible material, the through hole, which the articles to be packed pass through, is rendered expansible so that the holding frame is adjusted to suitable dimension in accordance with the dimension of the articles to be packed. Any material of any construction which can vary the size of the opening as above will do as means for making the holding frame expansible. Among the commercially available materials, for example, flexible metallic conduit for passing gas or steam, etc. can be used for this purpose. Similar construction can be formed by utilizing reinforced plastics.

Further, as to the holding frame, there is provided with a break in part of the ring-shaped holding frame.

Such a break is used in packing articles whose volume is larger upwards and smaller downwards including flowers and by, during the course of packing work, releasing the articles to be packed together with the bag in the direction of said break, packing can be carried out without causing damage to the articles to be packed, for example, flowers.

This break is preferably provided in a side of the holding frame, in case, for example, the frame stretches in its front portion or longitudinal direction, and the break preferably extends ranging from one eighth to one fourth of the entire inner circumference of the holding frame. If it is less than one eighth of said circumference, it only makes a poor relief space, while if more than one fourth, it may cause trouble in the turning of the packing bag.

Further, the stand is formed by firing a first and second base frames, the support column is supported by said stand with the base end of said column being inserted into a through hole formed in a portion where said first and second base frames are superposed as they are lapped.

The stand is built by fixing a plurality of base frames and the packing assist instrument is provided as knock-down so that the assist instrument can be compactly provided for making it handy in carrying or storing. Further, the packing assist instrument can be assembled simply by fixing the first and second base frames, inserting the support column in a hole formed in a portion the base frames are superposed. For making the hole for inserting the support column, there may be considered circular or polygonal members, into which the bottom of the support column can be inserted, with their longitudinal section being in conformity with the cross section of the support column. From the viewpoint of avoiding shakiness or preventing undesired rotation of the holding frame in the packing work, polygonal members are preferable. As for the base frames, some heavy material is desirable in view of the safety during the packing work.

Further, the base frames can be provided in a pair of frame members having rectangular section the base ends portion of which are cross-lapped for the sake of supporting the holding frame steadily so that it will not fall under the load of the articles to be packed during the packing work. The frame members are provided with a groove respectively formed at their base end portions, by means of which they are assembled crosswise.

Further, the first and second base frames may be formed in an identical shape for saving production cost.

Further, in order to achieve said first and third objects, the packing assist instrument according to the invention can be provided with a holding frame having a through hole for passing articles to be packed to pass through, said frame being shaped in such a manner that the packing bag for packing said articles is put on said frame with the bottom of the bag facing an opening of said through hole, a support column, the top end of which being attached with said holding frame, the base end of said support column being attached to a weighing stand with an opening of said holding frame being positioned virtually upright and horizontally, and a scale for measuring the weight of the articles to be packed carried by the packing bag, which bag being put on said holding frame.

In the packing assist instrument of this invention, a bag with its bottom up is put on an opening of the holding frame, the articles to be packed are from over the bag forced into said holding frame, which articles are inserted into the bag meantime said bag is reversed, which bag pass through said holding frame together with the articles, upon which insertion of the articles to be packed into said bag is completed.

Further, by providing the instrument with a scale for weighing the load applied to the holding frame, insertion of the articles to be packed into said packing bag and weighing of the articles to be packed can be carried at the same time.

BRIEF DESCRIPTION OF DRAWINGS

Fig. 1 is a perspective view showing the first embodiment of the packing assist instrument in accordance with this invention.

Fig. 2 is an illustration of the support column of the instrument of Fig. 1 being adjusted in height.

Fig. 3 is an illustration of a packing process.

Fig. 4 is a perspective view showing a second embodiment of the packing assist instrument according to this invention.

Fig. 5 is a vertical sectional view of the packing assist instruments of Fig. 4.

Fig. 6 is an illustration of a packing process.

Fig. 7 is a perspective view showing a third embodiment of the packing assist instrument according to this invention.

Fig. 8 is a perspective view showing a fourth embodiment of the packing assist instrument according to this invention.

Fig. 9 is an illustration of the manner the packing bags are set on the packing assist instrument of Fig. 8.

Fig. 10 is an illustration of a packing process.

Fig. 11 is a perspective view showing a fifth embodiment of the packing assist instrument according to this invention.

Fig. 12 is a top view of the packing assist instrument of Fig. 11.

Fig. 13(a) is a sectional view taken along the line X-X of Fig. 12, (b) is an enlarged view of an important portion of (a).

Fig. 14 is a partial sectional view of a fragment of a holding frame.

Fig. 15(a) is a partial side view of a fragment of a support column showing the vicinity of engaging recesses, (b) is a sectional view taken along the line A-A of (a).

Fig. 16 is an illustration of a packing process.

Fig. 17 is a partial side view of a fragment of a support column showing the vicinity of a different sets of engaging recesses.

Fig. 18 is a perspective view showing a sixth embodiment of the packing assist instrument according to this invention.

Fig. 19 is a top view of the packing assist instrument of Fig. 18.

Fig. 20 is a perspective view showing a seventh embodiment of the packing assist instrument according to this invention.

Fig. 21 is a perspective view showing an eighth embodiment of the packing assist instrument according to this invention.

Fig. 22 is a perspective view showing a ninth embodiment of the packing assist instrument according to this invention.

Fig. 23 is a top view of the packing assist instrument of Fig. 22.

Fig. 24 is an illustration of expansion of a holding frame.

Fig. 25 is an illustration showing use of the packing assist instrument of Fig. 22.

Fig. 26 is a perspective view showing a tenth embodiment of the packing assist instrument according to this invention.

Fig. 27 is a top view of the packing assist instrument of Fig. 26.

Fig. 28 is an illustration showing use of the packing assist instrument of Fig. 26.

Fig. 29 is a perspective view showing a eleventh embodiment of the packing assist instrument according to this invention.

Fig. 30 is a perspective view of a base trame, parts unassembled, of the packing assist instrument of Fig. 29.

Fig. 31 is a perspective view of the packing assist instrument, parts unassembled, of Fig. 29.

Fig. 32 is a sectional view taken along the line D-D of Fig. 29.

Fig. 33 is an illustration showing use of the packing assist instrument of Fig. 29.

Fig. 34 is a perspective view showing a twelfth embodiment of the packing assist instrument according to this invention.

Fig. 35 is an illustration showing use of the packing assist instrument of Fig. 34.

Fig. 36 is a perspective view showing a process of packing.

Fig. 37 is Vertical sectional partial views of the holding frame in the vicinity of its upper edge.

Fig. 38 is a perspective view showing a thirteenth embodiment of the packing assist instrument according to this invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention will be described in detail hereinafter with reference to the accompanying drawings 1 to 38 with illustrates preferred embodiments thereof.

Fig. 1 is a perspective view showing the first embodiment of the packing assist instrument of the present invention. Fig. 2 illustrates the support column of the instrument of Fig. 1 being adjusted in height and Fig. 3 shows by way of perspective views a procedure of packing by operation the packing assist instrument.

A packing assist instrument 1 of this embodiment comprises a ring-shaped packing bag holding frame 2, a support column 3 and a base 4. Support column 3 and base 4 form a stand by which holding frame 2 is supported.

Holding frame 2 is provided by shaping a stainless steel rod in the form of a ring to form a through hole through which articles to be packed pass, with an opening of said through hole positioned upward and horizontally and holding frame 2 supported by support column 3. Holding frame 2 is of a size, as shown in Fig. 3(a),

sufficient to put a packing bag H thereon with the bottom of bag H facing said opening of the through hole as shown in Fig. 3(a). This holding frame 2 made of a round rod helps bag H slide smoothly upon contact with said frame 2 when the bag H is reversed and moved.

Support column 3, as shown in Fig. 2, comprises an outer cylinder 5 and an inner cylinder 6, with the top end of inner cylinder 6 attached with holding frame 2. Cylinder 6 is vertically movable relative to cylinder 6 and support column 3 is adjustable in height by moving an engaging piece 6a on inner cylinder 6 vertically along a slit 5a of outer cylinder 5 and letting said engaging piece engaged with any of recesses 5b, 5c or 5d for engagement, thereby allowing to adjust holding frame 2 in height in accordance with the length of the articles to be packed.

Base 4 is so designed, as further described latter, that among its four feet 4a to 4d, feet 4a and 4b on the side under holding frame 2 are longer than the other two feet on the opposite side thereby allowing the entire assist instrument 1 to be supported in the stable state even under an unbalanced load when it is in use.

In order to pack egg-apples N using the aforesaid packing assist instrument 1, the instrument is placed on a suitable worktable and bag H with its bottom up is put on holding frame 2 as shown in Fig. 3(a). Then, several egg-apples N are held by hand and at the same time contacted with the bottom of bag H, subsequently forced into holding frame 2 together with bag H (Fig. 3(b)). Thus, the bottom of bag H is forced downward under the holding frame under the pressure of egg-apples N which are wrapped in bag H while it is reversed and goes through holding frame 2 together with egg-apples N down onto the worktable, upon which insertion of the egg-apples into bag H is completed.

As described above, since bag H with its bottom up is put on holding frame 2, egg-apples N over bag H are forced into holding frame 2, and bag H is reversed meantime egg-apples N are inserted into bag H, egg-apples N and bag H are contacted with each other, but at the same time move as so contacted in the course of the steps (a) to (c) of Fig. 3, insertion of egg-apples N into bag H is carried out quite smoothly, thereby enabling efficient packing operation, although the egg-apples N are apt to adhere, due to the smoothness of their skin, on the inner surface of bag H.

Subsequently, the upper portion of bag H inserted with the egg-apples is closed in such customary manner as by being tied up with adhesive tape or by thermal fusing, whereupon packing is completed. Although not shown, the inside of the bag H is printed as required before it is put on holding frame 2 and once the bag is reversed, the printed surface of bag H comes out, thus the articles when packing is completed are ready for shipment.

Fig. 4 is a perspective view showing a second embodiment of the packing assist instrument of the present invention, Fig. 5 is a vertical sectional view of the packing assist instrument of Fig. 4, and Fig. 6 illustrates by way of the procedures of packing.

In this embodiment, a packing assist instrument 10 comprises a holding frame 11 in cylindrical form, said frame having a through hole, and a box-shaped support platform 12.

Holding frame 11 is made of a synthetic resin cylindrically formed as shown in Fig. 4 with an opening of said through hole positioned upward and horizontally and holding frame 11 attached onto a top plate 12a of support platform 12. Holding frame 11 has a size enough to put a packing bag H thereon with the bottom of bag H facing said opening of the through hole, and the top end of holding frame 11 forms an upwardly widened tapered portion 11a with the edge thereof provided with a beveling 11b. In place of beveling 11b, the edge may be equipped with a stainless steel rod shaped in the form of a ring.

Support platform 12 is made of a synthetic resin shaped in the form of a box with top plate 12a provided with an opening 12b onto which holding frame 11 is attached, and one of the side walls of the box is removed to provide an outlet 12c for taking out the packed articles. Within support platform 12, a slope 12d is provided extending from opening 12b towards outlet 12c for ease of taking out the packed articles which come down through holding frame 11.

In order to pack egg-apples N using the aforesaid packing assist instrument 10, the instrument is placed on a suitable worktable and a bag H is put on the holding frame 11 with the bottom of the bag facing upward as shown in Fig. 4. Then, several egg-apples N are held by hand and at the same time contacted with the bottom of bag H (Fig. 6(a)), subsequently forced into the holding frame (Fig. 6(b)). Thus, the bottom of bag H is forced downward holding frame 11 under the pressure of egg-apples N which are wrapped in bag H while it is reversed and goes through holding frame 11 and insertion of egg-apples N into bag H is finished (Fig. 6(c)).

Bag H packed with the egg-apples N falls within support platform 12 (Fig. 6(d)). Within platform 12, slope 12d is provided directed towards outlet 12c, and fallen bag H is moved near to outlet 12c so that bag H is easily taken out by putting the hand from outlet 12c in the box 12.

Likewise as in the first embodiment, during the steps (a) to (c) of Fig. 6, egg-apples N and bag H are contacted with each other, but at the same time moved meantime as so contacted, insertion of egg-apples N into bag H is carried out quite smoothly although the egg-apples are apt to adhere on the inner surface of bag H, thereby enabling efficient packing operation.

After bag H is taken out, the upper portion of bag H packed with the egg-apples N is closed in such customary manner as by being tied up with adhesive tape or by thermal fusing, whereupon packing is completed. Again, the inside of bag H is printed as required before it is put on holding frame 11 and once the bag is reversed, the

printed surface comes out, thus the articles when packing is completed are ready for shipment.

Fig. 7 is a perspective view showing a third embodiment of the packing assist instrument of the present invention.

In this embodiment, a packing assist instrument 20 comprises a cylindrical-shaped holding frame 21 and a box-shaped support platform 22.

Holding frame 21 is, likewise holding frame 11 of the second embodiment, made of a synthetic resin and attached to a top plate 22a of support platform 22. Support platform 22 is again made of a synthetic resin shaped in the form of a box provided with an opening in top plate 22a, and one of the side walls of the box is removed to provide an outlet 22b for taking out the packed articles. In this embodiment, support platform 22 is greater in its height than support platform 12 of the second embodiment to have a larger inner space in order to facilitate the falling of the packed articles through holding frame 21 and the work in taking out the packed articles from outlet 22b.

The process of packing with packing assist instrument 20 is basically same as with the instrument 10 of the second embodiment. In this embodiment, support platform 22 is greater in height and free from any obstacle in its interior so that the packed articles coming through holding frame 21 will not be blocked at the bottom of support platform 22 and assured of going down in the interior thereof.

Fig. 8 is a perspective view showing a fourth embodiment of the packing assist instrument according to the invention, Fig. 9 illustrates the manner in which the packing bags are set on the packing assist instrument of Fig. 8, and Fig. 10 illustrates a process of packing.

In this embodiment, a plurality of holding frames are fitted to a support column to be rotated in a vertical plane so that the packing bags are automatically put on the holding frames by virtue of the rotation of the holding frames.

A packing assist instrument 30 in this embodiment comprises four L-shaped arms 31a to 31d accompanying by holding frames 32a to 32d, a gate-shaped support column 33 on a base 35, and a blower 36. Arms 31a to 31d are L-shaped pipe of a synthetic resin which have at the far ends thereof ring-shaped holding frames 32a to 32d, respectively, with their base ends abutted crosswise and supported to a beam atop of support column 33 via a joint 34, said arms being rotated only in the direction of R via a ratchet mechanism (not shown).

Holding frames 32a to 32d are stainless steel rod shaped in the form of a ring and secured to the far ends of arms 31a to 31d in such a manner that each opening of the through hole of holding frames 32a to 32d faces upward and kept virtually horizontally when the far ends of arms 31a to 31d are positioned upright and further rings 32a to 32d are adjustable in their angles relative to arms 31a to 31d as shown in the partial enlarged view in Fig. 8. Likewise in the first embodiment, holding frames 32a to 32d are of a dimension enough to put on packing bags H as shown in Fig. 10(e). Support column 33 is a synthetic resin piping shaped in the form of a gate for supporting to the beam atop thereof the base ends of arms 31a to 31d via joint 34 to be rotated, the feet of the column being fixed on base 35.

Base 35 is a flat base so that the entire assist instrument 30 is supported in stable state when in use and, as described later, a pile of packing bags H can be set thereon.

Blower 36 is provided for opening and blowing up the packing bags on base 35 one by one. It is set at one end of base 35 with its air outlet being directed over base 35. In order to pack egg-apples N using said packing assist instrument, a pile of oriented bags H in 30 to 50 pieces are placed on base 35 with their ends to be opened facing blower 36 as shown in Fig. 9. Each of bags H has an protruded end part Hb, which extended end is provided with a couple of holes Ha in advance into which a U-shaped staple 37 is inserted for setting the pile of bags H in place on base 35.

Then, as shown in Fig. 10(a), when any one of the holding frames, for instance, holding frame 32a, is positioned between bags H on base 35 and blower 36, blower 36 is switched on so that a topmost bag H1 of the pile is opened and blown up by the air blowing from blower 36 as shown in Fig. 10(b). In this position, by advancing arms 31a, 31d forward for rotation as shown in Fig. 10(c), holding frame 32a comes into blown bag H1, and by further advancing the rotation as shown in Fig. 10(d), holding frame 32a hits the bottom of bag H1 which is pulled diagonally upward by holding frame 32a, whereby protruded end part Hb is torn at the portion of holes Ha to release the protruded end part Hb from the staple 37 and bag H1 as being put on holding frame 32a is lifted together with holding frame 32a.

At this moment, as shown in Fig. 10(e), several egg-apples N are forced into holding frame 32a, then, likewise as in the first embodiment, the bottom of bag H1 is forced downward holding frame 32a under the pressure of egg-apples N which are, as shown in Fig. 10(f), wrapped in the bag while it is reversed and goes through holding frame 32a together with egg-apples N, and the insertion of the egg-apples N into bag H1 is finished. In the same manner, by rotating arms 31a to 31d further, bringing holding frames 32b, 32d in turn in position and inserting egg-apples N into another bag H, and by repeating this process, insertion of egg-apples N into bags H can be carried out in succession.

Thus in packing assist instrument 30 of this embodiment, a pile of bags H on base 35 are blown up in succession from the one on the top by the air blown from blower 36 and can automatically be put on holding frames 32a to 32d by rotating arms 31a to 31d. Although not shown, a switch can be incorporated with support column 33 with an electrical wiring provided to connect support column 33, base 35 and blower 36 for automatic switching on-off of blower 36 in association with the ro-

tation of arms 31a to 31d.

As shown in the foregoing embodiments, the packing assist instrument of the presents invention is generally simple in construction and smaller in size, thus adapted for introduction even in small production facilities and most suited for carrying out packing on worktables and the like. The above embodiments are shown for packing egg-apples for example and other vegetables, fruits, flowers or else can be packed in same manner. Further, the dimension and shape of the holding frame, support platform and other parts of the instrument can be designed anyway in accordance with the types and number of the articles to be packed, sizes of the packing bag, etc.

Figs. 11 to 13 show a fifth embodiment of the present invention, in which Fig. 11 is a perspective view of the packing assist instrument, Fig. 12 is a top view thereof, Fig. 13(a) is a sectional view along the line X-X of Fig. 12, Fig. 13(b) is a partial enlarged view of Fig. 13(a).

A packing assist instrument 40 in this embodiment, as shown in Figs. 11 and 12, comprises a first and second holding frames 42, 43 made of a synthetic resin or else shaped in the form of circular rings, a main support column 44, a secondary support column 45, and a base 46. First holding frame 42 is attached atop of main support column 44 which supports said frame in such a manner that an (upper) opening of the through hole of holding frame 42 faces upward and remains virtually horizontally.

As shown in Fig. 13, a lower outer peripheral surface 48 of first holding frame 42 is disposed in a plane parallel with the direction of extension of an axis passing through center of the through hole of first holding frame 42, in addition to which over upon outer peripheral surface 48, a curved convex surface 51 is provided smoothly extending from the upper edge 50 in the downward direction. Further, a lower inner peripheral surface 52, which surface extending from a lower edge 51a of curved convex surface 51 to a bottom end 42a of holding frame 42, is depressed towards the direction in which the radius of holding frame 42 extends, whereby a cavity 53 is formed in full circumference over the lower inner portion of holding frame 42.

As obviously shown in Fig. 13(b), a lower edge 49a of a 49 inclined surface is positioned as high as about half the height h of holding frame 42, the angle θ of the inclined surface 49 is set at 33 degrees relative to the axis C, and lower edge 51a of curved convex surface 51 is positioned slightly higher than half the height h of holding frame 42.

Since the appearance and shape of second holding frame 43 is generally similar to those of the first holding frame 42, description thereof is omitted with same reference numerals being assigned to the same elements as those of the first holding frame 42.

As described above, since the outer peripheral surface of the holding frame 42 is provided with lower outer peripheral surface 48 which is in parallel with the axis C and inclined surface 49 which is tapering towards over the axis C, the outline of the entire outer peripheral surface of holding frame 42 appears tapered upwards. This will ease the work of putting packing bag H with its bottom up on holding frame 42 when starting the packing process.

In the actual packing operation, the movement of a film surface H_F of the packing bag H put on holding frame 42 follows a course 55 as illustrated in Fig. 13(a). First, it raises up sliding along lower outer peripheral surface 48 of holding frame 42 and inclined surface 49 extending in continuation from the lower outer peripheral surface 48, then it turns downward near upper edge 50 of the inclined surface 49 and descends sliding along curved convex surface 51 curving smoothly downward from upper edge 50.

Prior to starting packing, film surface H_F of packing bag H put on holding frame 42 is suspended downward generally in parallel with axis C, while lower outer peripheral surface 48 is also in parallel therewith, thus the film surface H_F is suspended generally in parallel with lower outer peripheral surface 48. Therefore, in the instance film surface H_F raises up as packing process is started, film surface HF moves smoothly along lower outer peripheral surface 48.

Further, since inclined surface 49 extending in continuation from lower outer peripheral surface 48 is tapered upward to axis C, film surface H_F, when raising up along slope 49, is tapered in an angle most suited for its turning near upper edge 50.

In other words, if film surface HF is to be turned as it is going up in parallel with axis C, film surface H_F must instantly be reversed 180 degrees. Instead, when film surface H_F raises up along inclined surface 49 angled 33 degrees until it turns, it should turn only 147 degrees, which is the remainder left after 33 degrees subtracted from 180 degrees, resulting in the ease in the turn of film surface HF. That is, film surface HF is ready for such turning meantime it goes up along inclined surface 49, and it turns quite smoothly near upper edge 50.

Further, when film surface H_F turns near upper edge 50, as it moves via inclined surface 49 downward from upper edge 50 along curved convex surface 51 curved smoothly, a clearance 56 is conveniently formed between the portion where film surface H_F turns and upper edge 50. This will prevent close contact of film surface H_F with holding frame 42 in advance resulting in the smooth turn of film surface H_F. Further, since curved convex surface 51 is a smoothly curving curvature without point of inflection or any interruption, it provides quite satisfactory sliding of film surface HF in the subsequent course of its descent.

Furthermore, lower inner peripheral surface 52, which surface extending from a lower edge 51a of curved convex surface 51 to a bottom end 42a of holding frame 42, is depressed towards the direction in which the radius of holding frame 42 extends, whereby cavity

53 is formed in full circumference over the lower inner portion of holding frame 42. Thus, as packing bag H inserted with articles to be packed descends lower than the position of the lower edge 51a of curved convex surface 51, packing bag H is released from restriction resulting in quite smooth descent of packing bag H.

As obviously shown in Fig. 13(b), lower edge 49a of inclined surface 49 positioned higher than half the height h of holding frame 42 and the angle θ of inclined surface 49 set at 33 degrees relative to axis C has resulted in a best sliding of the film of packing bag H. Further, lower edge 51a of curved convex surface 51 positioned slightly higher than half the height h of holding frame 42 has resulted in quite smooth and steady passage of packing bag H inserted with egg-apples N as the articles to be packed. The foregoing performance and effects are quite same as for holding frame 43 as well.

Further as shown in Fig. 14, position of inclined surface 49 and lower edge 51a of curved convex surface 51 can be shifted much higher than half the height h of holding frame 42. Such a configuration will provide lower outer peripheral surface 48 and cavity 53 in relatively greater vertical length, thereby much steady and smooth turning and passage of the packing bag can be achieved.

In this embodiment, packing assist instrument 40 has packing bag holding frames 42, 43 in circular ring-shape so that the inserted egg-apples N are assembled in and around the center of packing bag H and packed evenly as observed in any direction, thus it has an advantage that packing can be carried out without regard to the orientation of egg-apples N.

Whereas, Fig. 15(a) is a partial side view of a fragment of support column 44 showing engaging recesses, Fig. 15(b) is a sectional view along the line A-A of Fig. 15(a). As shown in Fig. 15, second holding frame 43 is supported in such a manner that it remains horizontally positioned as a hook 57 provided at the bottom of secondary support column 45 is engaged with engaging recesses 58 provided for main support column 44. Since any one of the plurality of engaging recesses 58 can be selected and hook 57 is detachable with regard to engaging recesses 58, the secondary support column can be removed by disengaging hook 57 from engaging recess 58 when only holding frame 42 is used but second holding frame 43 is not in use or stored.

Further, in packing assist instrument 40, first and second holding frames 42, 43 are provided in different sizes each other so that, as shown in Fig. 16(a), packing work can be carried out in parallel for egg-apples N1, N2, for example, which differ in size each other by furnishing packing bags H1, H2 of different sizes, respectively.

Now, with reference to Fig. 16, packing process using packing assist instrument 40 is described in detail. First, as shown in Fig. 16(a), bags H1, H2 with their bottoms up are put on first and second holding frames 42, 43, respectively. Then, several egg-apples N1, N2 are held by hand and contacted with the bottoms of bags H1, H2. Subsequently egg-apples N1, N2 are forced into holding frames 42, 43 together with bags H1, H2 (Fig. 16(b)). Thus, the bottoms of bags H1, H2 are forced downward under holding frames 42, 43 under the pressure of egg-apples Nl, N2, while bags H1, H2 are reversed and pass through holding frames 42, 43 together with egg-apples N1, N2 and fall down near the base 46, upon which insertion of egg-apples N1, N2 into bags H1, H2 is finished (Fig. 16(c)).

As described above, since bags H1, H2 with their bottoms up are put on holding frames 42, 43, egg-apples N1, N2 over bags H1, H2 are forced into holding frames 42, 43 and bags H1, H2 are reversed meantime egg-apples N1, N2 are inserted into bags H1, H2, egg-apples N1, N2 and bags H1, H2 are contacted with each other, but at the same time move as so contacted in the course of the steps (a) to (c) of Fig. 16, insertion of egg-apples N1, N2 into bags H1, H2 is carried out quite smoothly, thereby enabling efficient packing operation, although the egg-apples N are apt to adhere, due to the smoothness of their skin, on the inner surface of bags H1, H2.

Heretofore discussed is the case where holding frames 42, 43 are used at the same time, but either one of them alone can of course be used. Packing assist instrument 40 is provided with two holding frames 42, 43 of different sizes for receiving egg-apples N1, N2 of different sizes, but two or more holding frames of same size can also be used. Depending on cases, holding frame 42 alone can again be used.

As discussed above, packing assist instrument 40, being provided with two holding frames 42, 43 of different sizes, allows packing processes for two sizes of egg-apples N1, N2 run in parallel. Thus it can achieve substantial improvement in operating effectiveness for packing articles which differ especially in size or type. Further, since two holding frames 42, 43 are disposed virtually in opposing relationship, the main support column is subjected to balanced weight, it has the effect of resulting in the improvement in stability of the packing assist instrument in packing operation.

Further, as regards engaging recesses 58, they can also be provided in a plurality of symmetrical positions, as shown in Fig. 17, in which case four engaging recesses 58 on main support column 44 will allow second holding frame 43 to be adjusted in longitudinal as well as vertical positions. Naturally the position of holding frame 43 can be selected in accordance with the size or type of the articles to be packed, and further the position of second holding frame 43 can be decided in order to avoid intervention of the mutual packing operation in first and second holding frames 42, 43 or for the ease of packing operation.

With reference to Figs. 18 and 19, a sixth embodiment of this invention will be described. Fig. 18 is a perspective view of a packing assist instrument and Fig. 19 is a top view thereof.

A packing assist instrument 60 comprises, as shown in Figs. 18 and 19, three holding frames 61, 62, 63 of a circular ring-shape, a main support column 64, secondary support columns 65, 66 and a base 67. First holding frame 61 is supported by main support column 64 so that it remains virtually horizontally. Means provided for secondary support columns 65, 66 for engaging them with main support column 64 to hold second holding frames 62, 63 are as same as those for packing assist instrument 40. Packing assist instrument 60 has three holding frames 61, 62, 63 of different sizes for efficiency in packing three kinds of articles to be packed differing in size, type, or else.

In the embodiments heretofore described, holding frames 2, 11, 21, 32a to 32d, 42, 43, 61, 62, 63 are provided in circular ring-shape so that inserted egg-apples N are assembled in the central portion of packing bag H and packed evenly as observed in any direction, thus it has an advantage that packing can be carried out without regard to the orientation of egg-apples N.

However, the holding frame is not limited to such shape and it could, for example, be oval ring-shaped or else. An oval ring-shaped holding frame will deliver the articles packed side by side in a row without being assembled in the central portion of the bag and its advantage is that the articles so packed are easy to see and good for display. Therefore, the holding frame of oval ring-shape is suitable for packing fragile vegetables, for instance, spinach, or the like. Incidentally, whether the frame is circular or oval ring-shaped, insertion of the articles into the packing bag can be carried out smoothly.

Fig. 20 illustrates a seventh embodiment of this invention. A packing assist instrument 70, as shown, has an oval ring-shaped frame 71 for holding the packing bag. This oval ring-shaped holding frame 71 will deliver the articles packed side by side in a row without being assembled in the central portion of the bag and its advantage is that the articles so packed are easy to see and good for display. Therefore, packing assist instrument 70 is suitable for packing fragile vegetables, for instance, spinach, or the like. In packing assist instrument 70, likewise in the preceding embodiment, insertion of the articles into the packing bag can be carried out smoothly.

With reference to Fig. 21, an eighth embodiment of this invention is described. In a packing assist instrument 75, as shown, provided between a holding frame 76 and a support column 77 is a guard element 78 for preventing inclination of the packing bag. If the bag inserted with the articles has passed through holding frame 76 but is inclined without going right downward, it hits guard element 78 and is directed to avoid inclination so that the bag passes smoothly without disturbing the articles inserted.

Furthermore, in every packing assist instrument as described, it can be constructed in such a manner that the holding frame is variably positioned when it is attached to the support column or that the support column can flexibly adjust its height. Thus, the packing assist instrument can variably be adjusted its height from the surface it stands to the position of the holding frame, which position can properly be decided according to the length of the articles to be packed. Also, the position of the holding frame can be adjusted in accordance with the various conditions for operation including the place for setting the instrument or workers' height so that they can work in comfortable posture.

Fig. 22 is a perspective view showing a ninth embodiment of the packing assist instrument according to the present invention, and Fig. 23 is a top view of the packing assist instrument of Fig. 22.

A packing assist instrument 80 in this embodiment comprises a ring-shaped holding frame 81, a support column 82 for supporting holding frame 81, and a base 83 to which support column 82 is attached with its bottom end inserted thereinto, holding frame 81 provided with a fastener 84 into which the top end of support column 82 is inserted.

Holding frame 81 is made of an expansible and flexible tube of synthetic resin material. As shown in Fig. 24, this flexible tube is constructed of thin sheets formed in a special shape and assembled in helical form so that it is expansible. Fig. 24(a) shows the flexible tube in its shortest length and Fig. 24(b) the longest length. Therefore, holding frame 81 is, as shown in Figs. 22 and 23, expansible to the extent represented in Figs. 24 (a) and (b).

Support column 82 is secured to holding frame 81 with the top end of the column inserted into an opening of fastener 84, while its height should vary in accordance with the size or type of the articles to be packed. Preferably, its height should be such that the bottom of the packing bag inserted with articles does not touch the surface where the instrument stands in order to keep the articles free from damage, and, for instance, 30 to 50 cm is appropriate for egg-apples.

Base 83 is attached with support column 82 where a first and second base frames 83a, 83b having a rectangular section so that the entire instrument is supported in stable state even when holding frame 81 is subjected to unbalanced load.

Now with reference to Fig. 25, packing process using said assist instrument will be described. The passing assist instrument is placed on a suitable worktable. First, a bag H with its bottom up is put on holding frame 81 as shown in Fig. 25(a). Then, several egg-apples N are held by hand and kept standing on the bottom of bag H, subsequently egg-apples N are forced into holding frame 81 together with bag H (Fig. 25(b)). Thus, the bottom of bag H is forced downward under holding frame 81 under the pressure of egg-apples N which are wrapped in bag H while it is reversed and goes through holding frame 81 together with egg-apples N down onto the worktable, upon which insertion of egg-apples N into bag H is finished (Fig. 25(c)).

As described above, bag H with its bottom up is put

on holding frame 81, egg-apples N over bag H are forced into holding frame 81, and bag H is reversed meantime egg-apples N are inserted into bag H. In the course of the steps (a) to (c) of Fig. 25, egg-apples N and bag H are contacted with each other without relative movement of the egg-apples N and the bag H, but at the same time move as so contacted, insertion of egg-apples N into bag H is carried out quite smoothly, thereby enabling efficient packing operation, although the egg-apples N are apt to adhere, due to the smoothness of their skin, on the inner surface of bag H.

Subsequently, the upper portion of bag H packed with the egg-apples is closed in such customary manner as by being tied up with adhesive tape or thermal fusing, whereupon packing is completed. The inside of bag H is printed as required before it is put on holding frame 81 and once the bag is reversed, the printed surface comes out, thus the articles as packing is completed are ready for shipment.

For inserting a greater number of egg-apples N or packing larger articles, a larger packing bag is used accordingly and holding frame 81 is expanded as shown by chain lines in Fig. 22 so that the articles as packed are prevented from contacting the inner surface of holding frame 81 and packing is carried out without damaging the articles.

Fig. 26 is a perspective view showing a tenth embodiment of the packing assist instrument of the present invention, Fig. 27 is a top view of the packing assist instrument of Fig. 26. In this embodiment, elements corresponding to those in the ninth embodiment are assigned with the same reference numerals as in that embodiment.

In a packing assist instrument 85 of this embodiment, the main component of a holding frame 86 is an oval metal ring 86a, a side of which is provided with a break 86b. Elements 86c are end covers made of resin and ball-shaped to prevent damage to packing bags and articles to be packed. In this embodiment, the break 86b extends to one fifth of the entire inner circumference of holding frame 86. This break provides a space for relief in packing operation and also facilitates smooth reversion of the packing bags.

With reference to Fig. 28, packing process using packing assist instrument 85 is described, wherein the reference code F represents a bunch of flowers which volume is larger upwards and smaller downwards.

Likewise the process in Fig. 25, assist instrument 85 is placed on a suitable worktable, and a bag H with its bottom up is put on holding frame 86 as shown in Fig. 28(a). Then, several flowers F are picked up by hand, placed on the bottom of bag H, and the stalks are forced into holding frame 86 together with bag H (Fig. 28(b)). Thus, the bottom of bag H is forced downward under holding frame 86 under the pressure of flower F and bag H is reversed meantime flowers F are wrapped up. Then, the flowers together with bag H are pulled toward break 86b (in the direction B) so that the petals of flowers F are packed without being contacted with the inner circumference of holding frame 86 (Fig. 28(c)).

Besides oval holding frame 86 described above, circular and other shapes are also possible. Again, the break can possibly be positioned in the front of the frame without limited to a side thereof.

Now an eleventh embodiment of the invention is described with reference to Figs. 29 to 33, wherein Fig. 29 is a perspective view of a packing assist instrument, Fig. 30 is a perspective view of the base, parts unassembled, of the packing assist instrument of Fig. 29, Fig. 31 is a perspective view of the packing assist instrument, parts unassembled of Fig. 29, Fig. 32 is a sectional view along the line D-D of Fig. 29, Fig. 33 illustrates a process using the packing assist instrument of Fig. 29.

A packing assist instrument 90 in this embodiment comprises a ring-shaped, holding frame 91, a support column 92 for supporting atop thereof holding frame 91, and a base 93 for supporting the support column at its bottom.

Holding frame 91 comprises a circular ring 91a made of a synthetic resin, a cylindrical fastener 91b secured to an end of ring 91a and its bottom opened. As described latter, the packing bag is put on ring 91a and the articles to be packed over ring 91a pass therethrough together with the bag. The top surface of ring 91a, on which the packing bag moves when packing is carried on, is in smooth curvature for assuring a smooth sliding.

The top end of support column 92 is inserted into the opening of fastener 91b and secured to holding frame 91. The height of the support column varies according to the size or type of the articles to be packed, and 30 to 50 cm is preferable for egg-apples.

Base 93 consists of a first and second base frames 94, 95 of rectangular section cross-lapped at the mutual base end sides, and support column 92 is secured near the crossing thereof.

First and second base frames 94, 95 are identical in shape, made of relatively heavy wood, and provided with grooves 94a, 95a for lap joint at the base end thereof. These grooves 94a, 95a are formed inclined to the axes of the base frames 94, 95, and cut half the thickness of base frames 94, 95 so that, as shown in Fig. 30, base frames 94, 95, when lapped via grooves 94a, 95a, just fit each other and crossed at an acute angle.

References 94b, 95b represent triangle superpose plates, a side each thereof being secured to base frames 94, 95, respectively, and provided at the center thereof with vertical through holes 94c, 95c for inserting the support column therethrough. One face each of these superpose plates 94b, 95b are on the same plane with the top or bottom surface of base frames 94, 95, and each plate is half as thick as base frames 94, 95. Thus, when superposed each other, as obviously shown in Fig. 32, a side each of plates 94b, 95b contacts a side each other of the base frames 94, 95, and holes 94c, 95c make a vertical through hole for inserting the sup-

port column. When base frames are to be made of a resin, they are preferably integral molded with the respective superpose plates for saving cost.

In the described construction, grooves 94a, 95a of base frames 94, 95 are lapped each other to set up base 93, the bottom of support column 92 is inserted into the holes 94c, 95c to stand support column 92 on base 93, further the top of support column 92 is inserted into fastener 91b of holding frame 91 to get packing assist instrument 90 of Fig. 29 ready for use. Thus, in this embodiment, since packing bag holding frame 91, support column 92, and base 93 are provided as knockdowns, they are convenient especially for bringing them to the workplace and, when not in use, they can be disassembled for storage.

Further, since first and second base frames 94, 95 are elements of an identical shape, they can save cost of production. A pair of knockdown base frames 94, 95, provided with holes 94c, 95c which can be superposed for inserting the support column therethrough, assures combination of base frames 94, 95 and enables steady operation.

Now the packing process using said assist instrument 90 will be described with reference to Fig. 33. Assist instrument 90 is placed on a suitable worktable and a bag H with its bottom up is put on holding frame 91 as shown in Fig. 33(a). Then, a plurality of egg-apples N are held by hand and at the same time contacted with the bottom of bag H, subsequently forced into holding frame 91 together with bag H (Fig. 33(b)). Thus, the bottom of bag H is forced down under holding frame 91 under the pressure of egg-apples N which are wrapped in bag H while it is reversed and goes through holding frame 91 together with egg-apples N down onto the worktable, upon which insertion of egg-apples N into bag H is finished (Fig. 33(c)).

As described above, since bag H with its bottom up is put on holding frame 91, egg-apples N over bag H are forced into holding frame 91, and bag H is reversed meantime egg-apples N are inserted into bag H, the egg-apples N and bag H are contacted with each other without relative movement of the egg-apples and bag H, but at the same time move as so contacted in the course of the steps (a) to (c) of Fig. 33, insertion of egg-apples N into bag H is carried out quite smoothly, thereby enabling efficient packing operation, although the egg-apples are apt to adhere, due to the smoothness of their skin, on the inner surface of the bag H.

Subsequently, the upper portion of bag H packed with the egg-apples is closed in such customary manner as by being tied up with adhesive tape or thermal fusing, whereupon packing is completed. The inside of bag H is printed as required before it is put on holding frame 91 and once the bag is reversed, the printed surface comes out, thus the articles when packing is completed are ready for shipment.

In this embodiment, holding frame 91 is provided circular ring-shaped so that inserted egg-apples N are assembled in the central portion of packing bag H and packed evenly as observed in any direction, thus it has an advantage that packing can be carried out without regard to the orientation of egg-apples N.

While, the holding frame is not limited to such shape and, for example, it can be a oval ring-shaped. An oval ring-shaped holding frame will deliver the articles packed side by side in a row without being assembled in the central portion of the bag and its advantage is that the articles so packed are easy to see and good for display. Incidentally, whether the frame is circular or oval ring-shape, insertion of the articles into the packing bag can be carried out smoothly.

Now a twelfth embodiment of the present invention will be described referring to Figs. 34 to 37, wherein Fig. 34 is a perspective view of a packing assist instrument, Fig. 35 shows measuring with a packing bag and articles to be measured inserted into the packing assist instrument, Fig. 36 illustrates a process of packing, and Fig. 37 is a sectional view of the holding frame.

In these drawings, a packing assist instrument 100 is made of material including synthetic resin, which instrument comprises a ring-shaped holding frame 101, through which articles to be packed M together with a packing bag H can pass, a support column 102 for supporting the holding frame virtually horizontal, a scale 103 attached to support column 102, and a base 104 which is under scale 103. Support column 102 stands on scale 103 with the support column's bottom end fixed to a weighing table 105.

As shown in Fig. 35, the weight of packing bag H put on holding frame 101 and articles M inserted into the bag is known by reading a pointer 107 of scale 103. That is, packing assist instrument 100 enables to weigh articles M and insert them into packing bag H at a time, which greatly improves the efficiency of packing work. Further, in this embodiment, base 104, equipped with scale 103 for holding support column 102, is provided for stabilizing the assist instrument.

Now, the process of packing using packing assist instrument 100 is described referring to Fig. 36(a) to (c). First, as shown in Fig. 36(a), a bag H with its bottom up is put on holding frame 101 of packing assist instrument 100. Then, from over bag H, articles M is forced into holding frame 101 and rested as shown in Fig. 36(b). Then, pointer 107 of scale 103 is read to determine the weight of articles M, which weight is adjusted to prescribed amount by adding or reducing the articles as required.

As weighing is finished, the bottom of bag H is further forced down under holding frame 101 by forcing articles M into holding frame 101, thus bag H is reversed meantime wrapping articles M and goes through holding frame 101 together with articles M, and eventually as shown in Fig. 36(c), articles M as inserted into bag H fall down under the holding frame 101, and the packing of articles M is completed.

In the course of said packing process, although the

surfaces of articles M and the inner surface of the bag's film contact each other, no relative movement is required between them, and the surfaces of articles M and the inner surface of the bag's film move at the same time as they are so contacted, packing work can easily smoothly be carried out even if the surfaces of articles M are apt to adhere to the inner surface of the bag's film or if articles M are weak and is subject to bend.

Further, base 104 of packing assist instrument 100 is triangle-shaped, thus free from bumpiness and excellent in stability. Therefore, support column 102 or holding frame 101 will not be shaky or fall meantime articles M are weighted or packed. If scale 103 alone is sufficient for supporting support column 102, etc., scale 103 need not be equipped with base 104.

Now, shape and function of holding frame 101 of packing assist instrument 100 will be explained. As shown in Fig. 37, concerning the shape of holding frame 101, its outer circumference comprises a lower outer peripheral surface 109 which is in parallel with axis C and a inclined surface 110 which is extending in continuation with lower outer peripheral surface 109 and inclined surface 110 upward axis C, in addition to which in the upper portion of inner peripheral surface 113, a curved convex surface 112 is provided smoothly curving downward from an upper edge 111. Further, a lower inner peripheral surface 113, which surface extending from a lower edge 112a of curved convex surface 112 to a bottom end 101a of holding frame 101, is depressed towards the direction in which the radius of holding frame 101 extends, whereby a cavity 114 is created in lower inner surface of holding frame 101.

In this manner, the outer peripheral surface of holding frame 101 is provided with lower outer peripheral surface 109 and inclined surface 110 so that the entire outer circumference of holding frame 101 is generally shaped tapered and broader in the lower portion. This facilitates the work of putting bag H with its bottom up on holding frame 101 when starting the packing process.

As the bag is put on holding frame 101, the film surface of packing bag H is suspended downward generally in parallel with axis C, that is, generally in parallel with lower outer peripheral surface 109. Therefore, in the instance the film surface of bag H goes up as articles M is forced into bag H, the film surface moves smoothly along lower peripheral surface 109.

Further, since inclined surface 110 next to lower outer peripheral surface 109 is tapered upward to axis C, the film surface of bag H, when going up along inclined surface 110, is tapered in an angle suited for its turning near upper edge 111.

In other words, if the film surface of bag H is to be turned downward as it is just going up in parallel with axis C, the film surface must instantly be turned 180 degrees. Instead, when the film surface raises up along slope 110 angled 30 to 45 degrees until it turns, it should turn only 150 to 135 degrees, which is left after 30 to 45 degrees subtracted from 180 degrees, resulting in the ease in the turn of the film surface. That is, the film surface of bag H is ready for such turning meantime it goes up along inclined surface 110, and it turns quite smoothly near upper edge 111.

Further, in the course where the film surface of bag H turns near upper edge 111, as it moves via inclined surface 110 up to the upper edge, a clearance 116 is conveniently created between the portion where the film surface turns and upper edge 111. This will prevent close contact of the film surface with holding frame 101 in advance resulting in the smooth turn of the film surface. Further, since curved convex surface 112 is a smoothly curving curvature without point of inflection or any interruption, it provides quite satisfactory sliding of the film surface in the subsequent course of its descent.

Furthermore, a lower inner peripheral surface 113, which surface extending from a lower edge 112a of curved convex surface 112 to a bottom end 101a of holding frame 101, is expanded in the direction of the outer circumference, whereby cavity 114 is formed in full circumference over the lower inner portion of the holding frame 101. Thus, as packing bag H inserted with articles M descends lower than the position of lower edge 112a of curved convex surface 112, packing bag H is released from restriction resulting in quite smooth descent of packing bag H inserted with articles M.

As described above, in the actual packing work, the film surface of the bag H put on holding frame 101 follows the course 118 shown in the partial enlarged drawing of Fig. 37, resulting in quite smooth packing work.

In this instance, the angle θ of inclined surface 110 set in the range of 30 to 45 degrees, particularly 33 degrees relative to axis C has resulted in a best sliding and turn of the film of bag H. However, in case the angle θ is less than 30 degrees, the film surface of bag H does not turn smoothly due to the poor action of inclined surface 110, nor the film surface smoothly slides in case the angle is larger than 45 degrees where frictional resistance between inclined surface 110 and film surface is increased.

While, as shown in the partial enlarged drawing of Fig. 37, by positioning a boundary 110a between inclined surface 110 and lower outer peripheral surface 109 half as high as the height h from bottom end 101a of holding frame 101 to upper edge 111, the friction resistance of the film surface of bag H against slope 110 and lower outer peripheral surface 109 will be nearly evened up and the film surface slides smoothly.

Further, by positioning lower edge 112a of curved convex surface 112 half as high as the height h from bottom end 101a of holding frame 101 to upper edge 111, the restriction to bag H can be minimized without losing the expected function of curved convex surface 112, that is, to smooth the turning of the film surface so that bag H inserted with articles M passes quite smoothly.

The material or size of holding frame 101 and sup-

port column 102 of the packing assist instrument are not limited anyway and efficient weighing and packing work is achieved by deciding material or size according to the type of the articles to be packed.

Nor the type or shape of scale 103 is limited anyway so that suitable ones can be employed depending on the types of the articles to be packed, or conditions for weighing and packing work. For example, in a packing assist instrument 120 shown in Fig. 38 as a thirteen embodiment of the present invention, a digital display scale 121 is adopted for improved precision in weighing. Further, in packing assist instrument 120, a circular base 123 is used for securing stability on the surface where the instrument stands and for compact design. The use, function and effect of the main elements, etc. are as same as in packing assist instrument 100.

In packing assist instrument 100, 120 as described above, holding frame 101 is provided in a circular ring-shape so that articles M are inserted as assembled in the central portion of packing bag H and packed evenly as observed in any direction, thus it has an advantage that packing can be carried out without regard to the orientation of articles M.

While, holding frame 101 is not limited to such shape and, for example, it can be oval ring-shape. An oval ring-shaped holding frame will deliver the articles packed side by side in a row without being assembled in the central portion of the bag and its advantage is that the articles so packed are easy to see and good for display. Thus, oval ring-shaped holding frame is suited for packing fragile vegetables or like such as spinach. Incidentally, whether the frame is circular or oval ring-shape, insertion of the articles into the packing bag can be carried out smoothly.

According to the present invention, the following advantageous effects are provided.

(1) In the packing assist instrument according to this invention, a holding frame has a through hole which allows articles to be packed to pass through, an opening of said holding frame is supported upward and virtually horizontal so that a bag made of a synthetic resin film, with its bottom up, is put on said holding frame, articles to be packed are from over the bag forced toward the holding frame, the bag is reversed meantime the articles to be packed are inserted within said bag, whereby even vegetables or else having smooth skin and apt to adhere to the film of the bag can smoothly be inserted into the bag and packed efficiently. Further, since the entire instrument is compact and available in smaller size, it can easily be introduced in small enterprises as well and improves efficiency in manual packing work.

In such packing assist instrument, a base for supporting said holding frame comprises a support column and a base member, said support column can be made expansible in order to adjust the height of the holding frame to a height good for packing work.

(2) Further, in a packing assist instrument having a support column for supporting a first holding frame and a secondary support column for supporting a second holding frame, a plurality of holding frames allow more than two packing works run parallel for packing, for example, more than two sets of articles which differ in size or type, resulting in substantial improvement in efficiency.

Further, a bag made of a synthetic resin film, with its bottom up in advance, is put on said holding frame supported virtually horizontal, the articles to be packed are from over the bag forced toward the holding frame, which articles are inserted into the bag meantime said bag is reversed, whereby even articles having smooth surface and apt to adhere to the film of the bag can smoothly be inserted into the bag and packed efficiently.

In such packing assist instrument, by providing the main support column with a plurality of engaging means for supporting the secondary support column to be connected and disconnected, the height of the second holding frame can conveniently be adjusted to a height good for the workers who carry out the packing work.

Further, in the said respective packing assist instrument, the outer peripheral of the holding frame is provided with an lower outer peripheral surface in parallel with an axis and a inclined surface extending in continuation with said lower outer peripheral surface, the inner peripheral surface is provided with a curved convex surface, a cavity is formed thereunder resulting in the ease of putting the packing bag on its holding frame, as well as quite smooth turning of the packing bag during the packing work, and better sliding between the packing bag and its holding frame, and substantial improvement in the effect of packing work.

Further, type or manner of packing can vary by providing the holding frame in circular or oval ring-shape or cylindrical shape for suitable packing according to the type, form or shape, or nature of the articles to be packed.

Further, a guard element can be provided between the holding frame and support column to guide the packing bag inserted with articles right downward without inclination after passing through the holding frame so as to ensure smooth passage and satisfactory packing of the articles.

Further, a radially expansible through hole of the holding frame allows use thereof adapted for the size or volume of the articles to be packed.

Furthermore, a partial break in the holding frame permits to release the articles together with the bag away through said break for packing without causing damage to the articles, e.g., flowers.

Further, in said packing assist instrument, a base comprises a plurality of base frames for lap joint. They can easily be carried to workplaces and conveniently stored when not in use.

In such packing assist instrument, a plurality of base frames in identical shape will help save production cost.

Further, two base frames superposed and each provided with a hole to make a common through hole for

inserting a support column ensures combination of said two base frames and stability in use of the knockdown instrument.

(3) In a packing assist instrument equipped with a scale for weighing the weight born by the holding frame, weighing and insertion of the articles to be packed can be done at a time so that the efficiency of the entire packing work is greatly improved.

Further, in said packing assist instrument, a bag made of a synthetic resin film, with its bottom up in advance, is put on said holding frame, the articles to be packed are from over the bag forced toward said holding frame, which articles are inserted into the bag meantime said bag is reversed, with packing done without relative movement between the bag and the articles, whereby even articles having smooth surface and apt to adhere to the film of the bag or articles which are weak and subject to bend can smoothly be inserted into the bag and packed efficiently.

Claims

1. A packing assist instrument comprising;

   a holding frame having a through hole for allowing articles to be packed to pass through, each of said frame being shaped in such a manner that a packing bag for packing said articles is put on said frame with the bottom of the bag facing an opening of said through hole, and
   a stand for supporting said holding frame with an opening thereof positioned virtually upright and horizontally.

2. A packing assist instrument as defined in claim 1, wherein said stand is provided with a support column, the top end of which being attached with said holding frame, and a base member for supporting the bottom end of said support column.

3. A packing assist instrument as defined in claim 2, wherein said support column is extensible.

4. A packing assist instrument comprising;

   a first and second holding frames respectively having a through hole for permitting articles to be packed to pass through, each of said frame being shaped in such a manner that a packing bag for packing said articles is put on said frame with the bottom of the bag facing an opening of said through hole,
   a main support column, the top end of which being attached with said first holding frame,
   a base member for supporting the bottom end of said main support column and positioning an opening of said first holding frame virtually upright and horizontally,
   a secondary support column, the bottom end of which being supported by said main support column or base member, the top end of which being attached with said second holding frame, said secondary support column positioning an opening of said second holding frame virtually upright and horizontally.

5. A packing assist instrument as defined in claim 4, wherein said first and second holding frames differ in their sizes.

6. A packing assist instrument as defined in claim 4, wherein said main support column is provided with engaging means for engaging the bottom of said secondary support column to be connected and disconnected.

7. A packing assist instrument as defined in claim 6, wherein a plurality of sets of said engaging means are provided and variably positioned in axial or peripheral directions of said main support column.

8. A packing assist instrument as defined in claim 1 or 4, wherein said packing bag holding frame is provided with a lower outer peripheral surface extending on parallel with the axial direction of said packing bag holding frame and a inclined surface which is an upper outer peripheral surface extending in continuation with the said the lower outer peripheral surface, said inclined surface slantwise extending toward the axis of the packing bag holding frame, and the upper inner peripheral surface is forming of a curved convex surface in downward direction extending from a upper edge of said inclined surface.

9. A packing assist instrument as defined in claim 8, wherein the inner peripheral surface of said holding frame extending from a lower edge of said curved convex surface to the bottom end of said holding frame is radially outwardly depressed.

10. A packing assist instrument as defined in claim 8, wherein said inclined surface is inclined 30 to 45 degrees relative to the axis of said holding frame, the boundary between said inclined surface and said lower outer peripheral surface and the lower edge of said curved convex surface are positioned over nearly half the height between the bottom and top ends of said holding frame.

11. A packing assist instrument as defined in claim 1 or 4, wherein said packing bag holding frame is circular or oval ring-shaped, or circular or oval cylindrically shaped.

12. A packing assist instrument as defined in claim 1 or

4, wherein, between said holding frame and said support column, a guard element is provided for preventing the bag put on said holding frame from being inclined toward the axis of said holding frame.

13. A packing assist instrument as defined in claim 1 or 4, wherein said packing bag holding frame is made of an expansible material so that the size of the through hole of said holding frame can vary.

14. A packing assist instrument as defined in claim 13, wherein said packing bag holding frame is made of a metallic or plastic flexible conduit.

15. A packing assist instrument as defined in claim 1 or 4, wherein said packing bag holding frame has a break in part thereof.

16. A packing assist instrument as defined in claim 15, wherein said break extends ranging from one eighth to one fourth of the entire inner circumference of said holding frame.

17. A packing assist instrument as defined in claim 1 or 4, wherein said base member is formed by lapping a first and second base frames, said support column is supported by said base member with the base end of said column being inserted into a through hole formed in a portion where said first and second base frames are superposed as the base frames are lapped.

18. A packing assist instrument as defined in claim 17, wherein said first and second base frames are identical in shape with each other.

19. A packing assist instrument having a through hole for permitting articles to be packed to pass through, and provided with a scale for measuring the weight of the articles to be packed, which articles being carried by said packing bag put on an opening of said through hole with the bottom of the bag facing an opening of said through hole.

FIG. 1

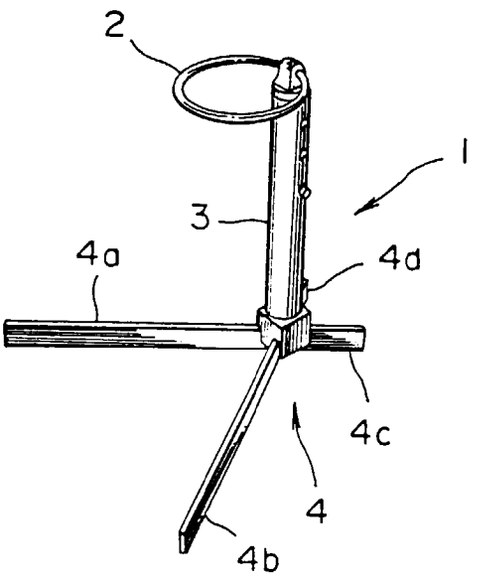


FIG. 2

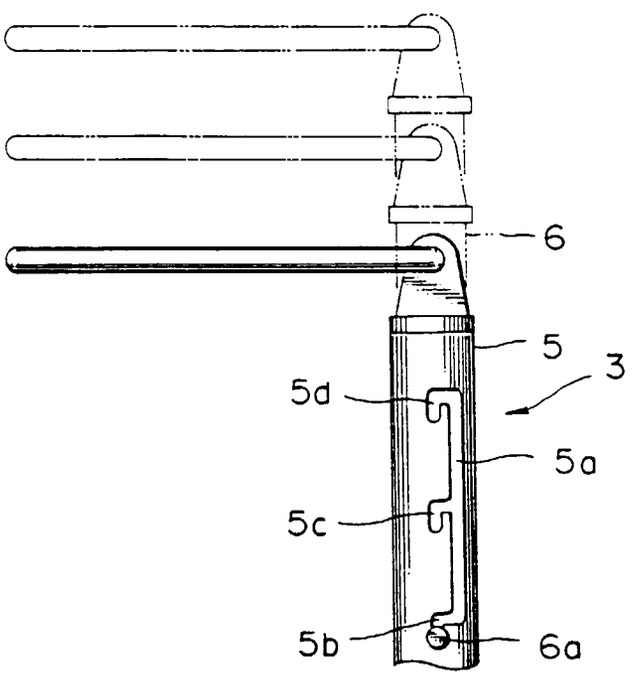


FIG.3(c)

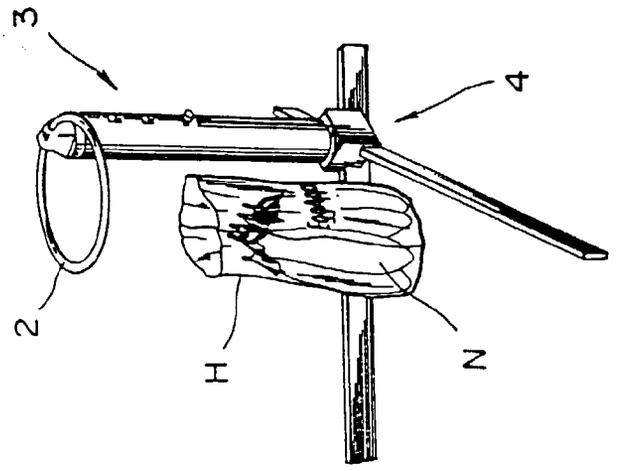


FIG.3(b)

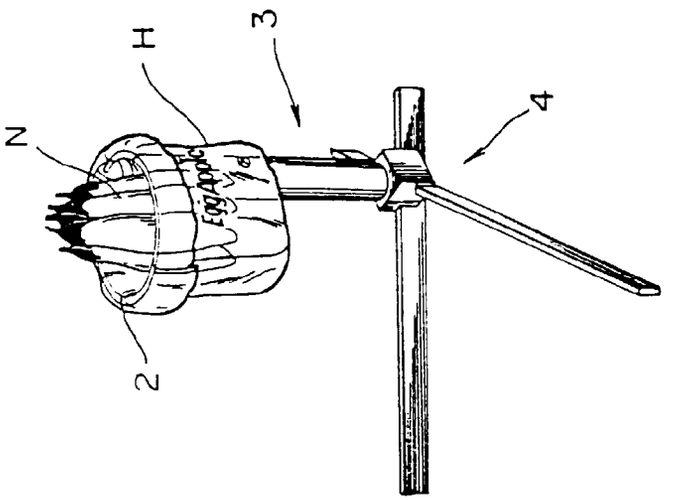


FIG.3(a)

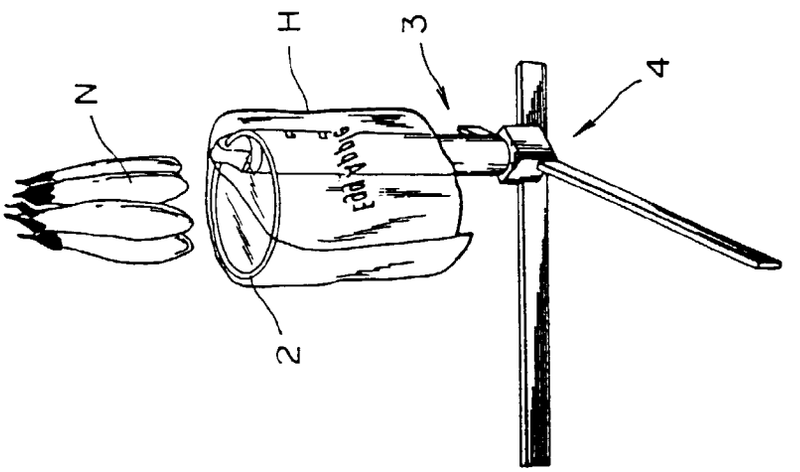


FIG. 4

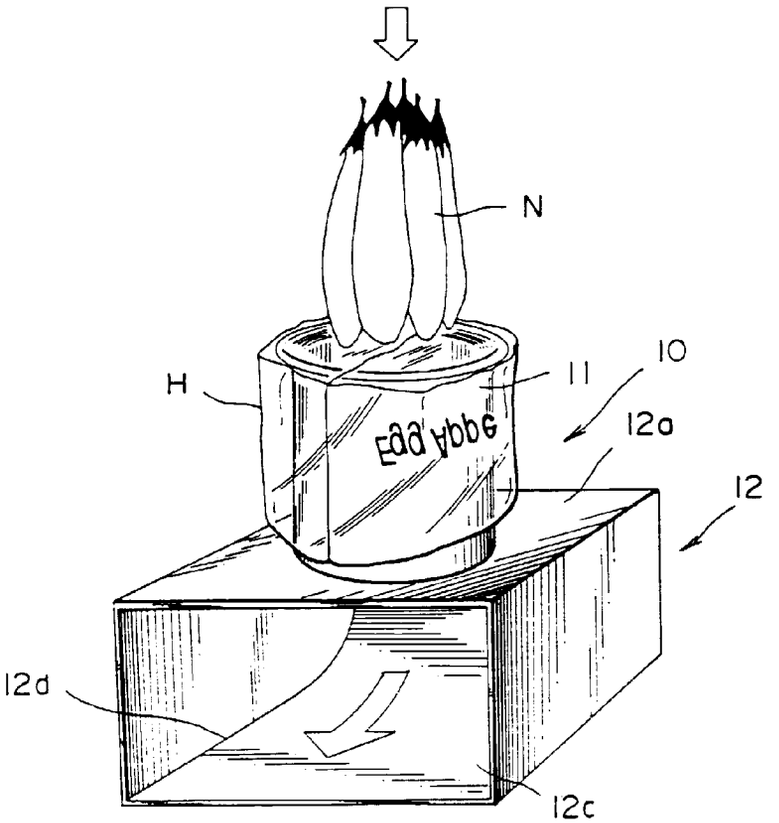


FIG. 5

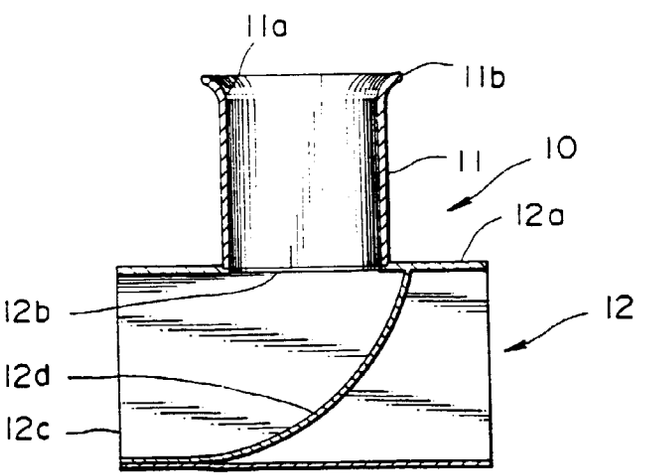


FIG. 6(a)

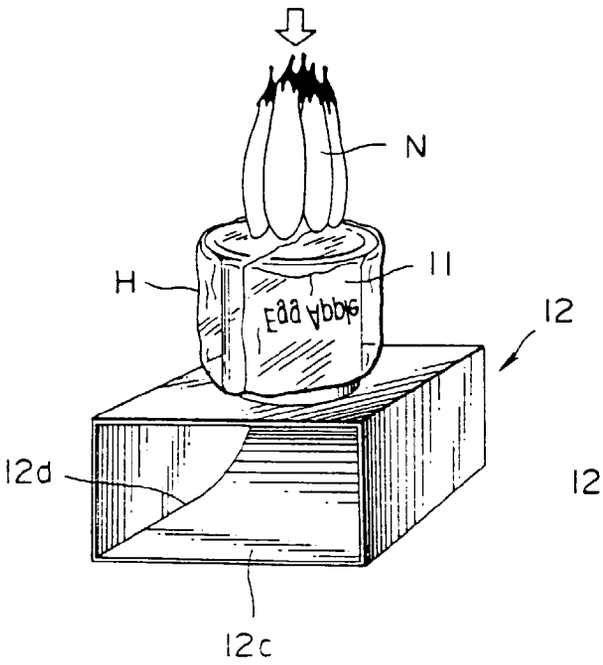


FIG. 6(b)

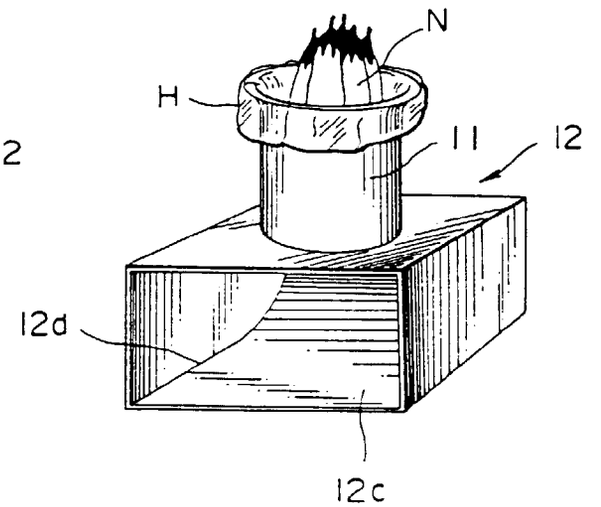


FIG. 6(c)

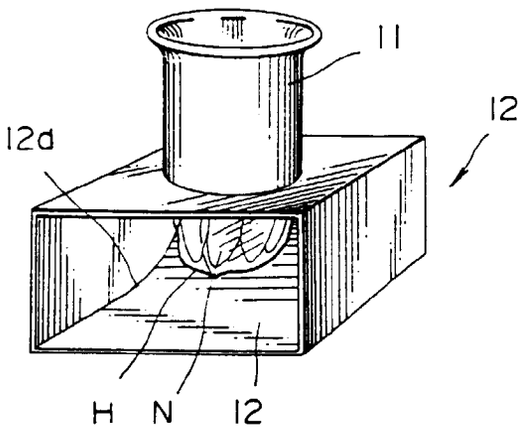


FIG. 6(d)

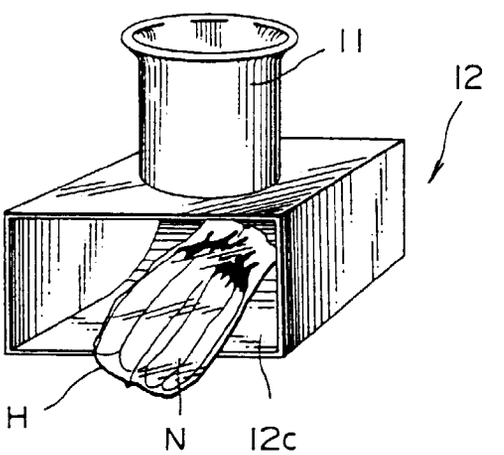


FIG. 7

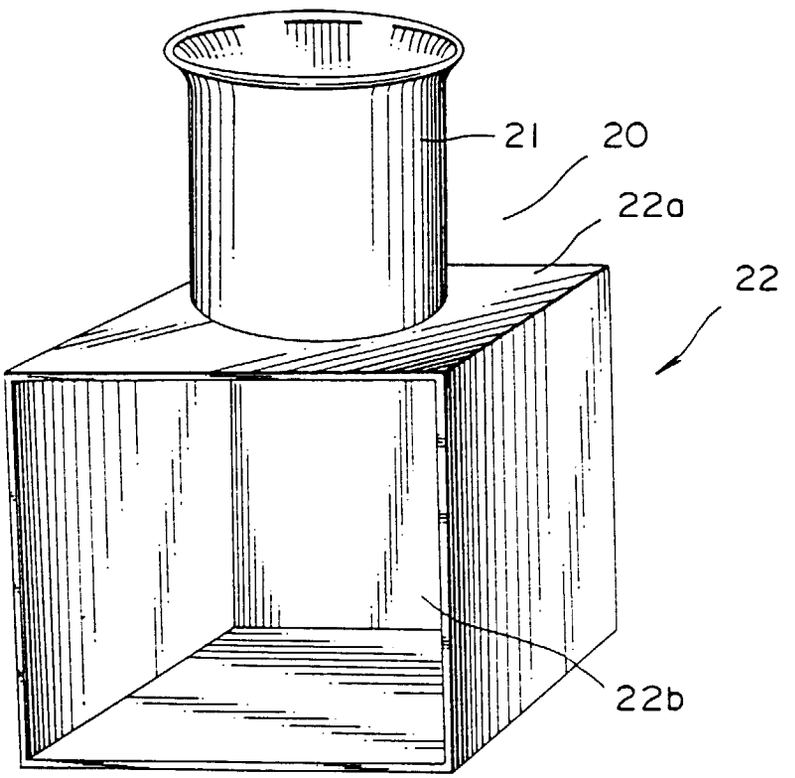


FIG. 8

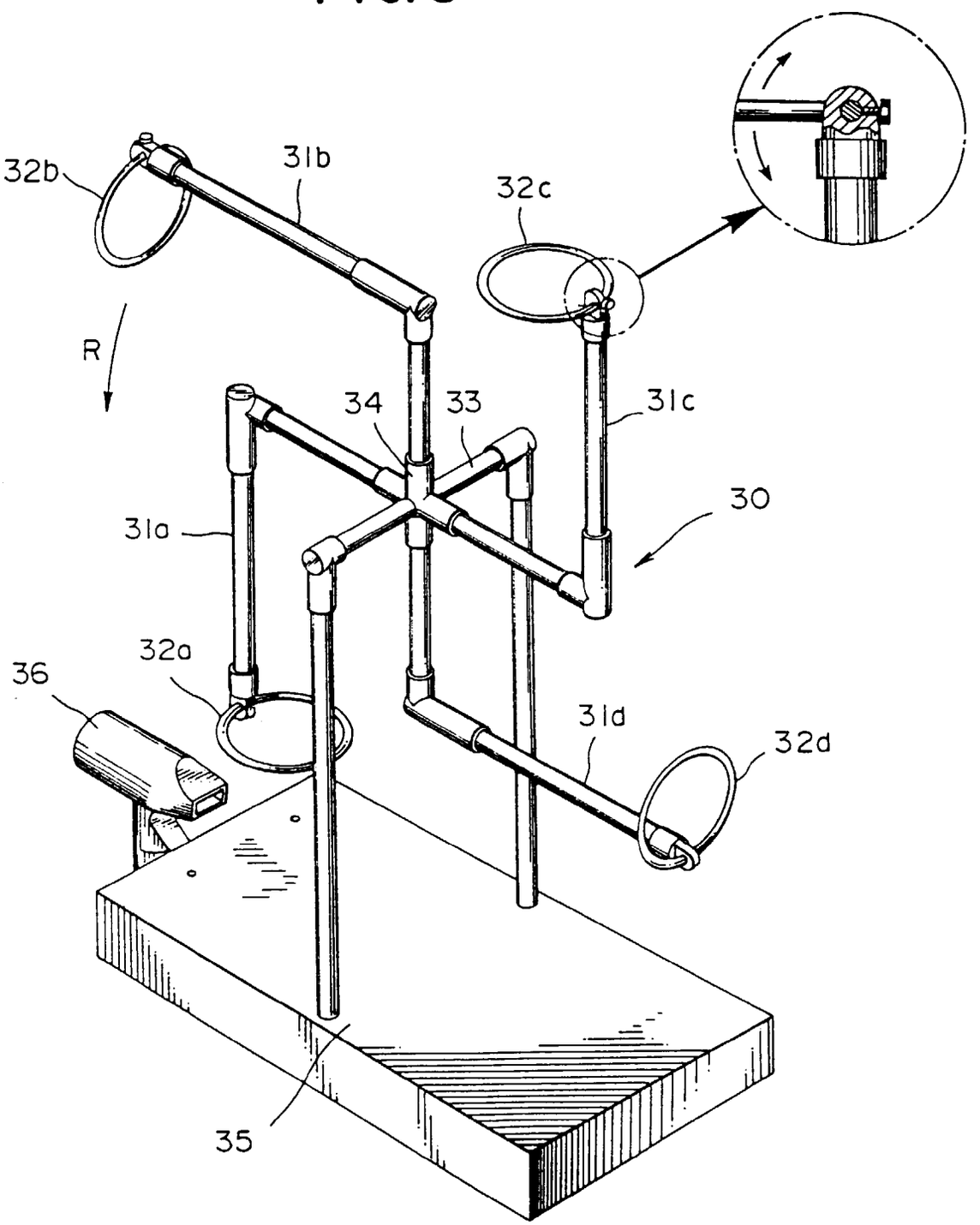
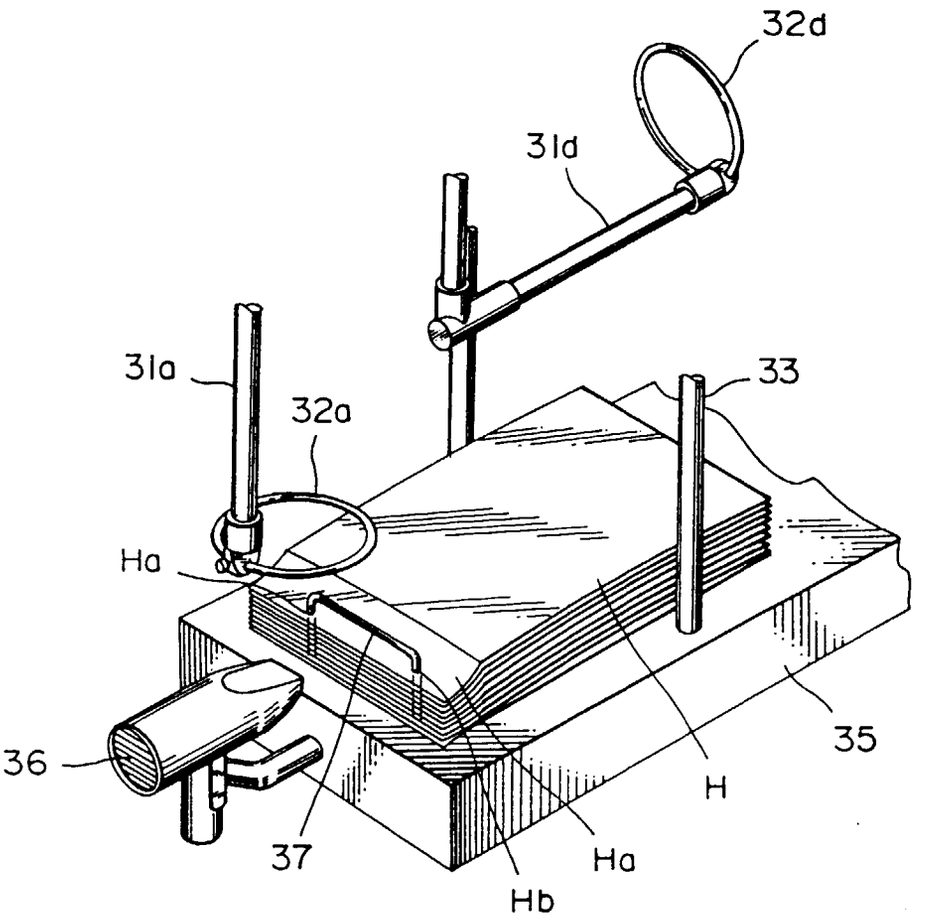


FIG. 9



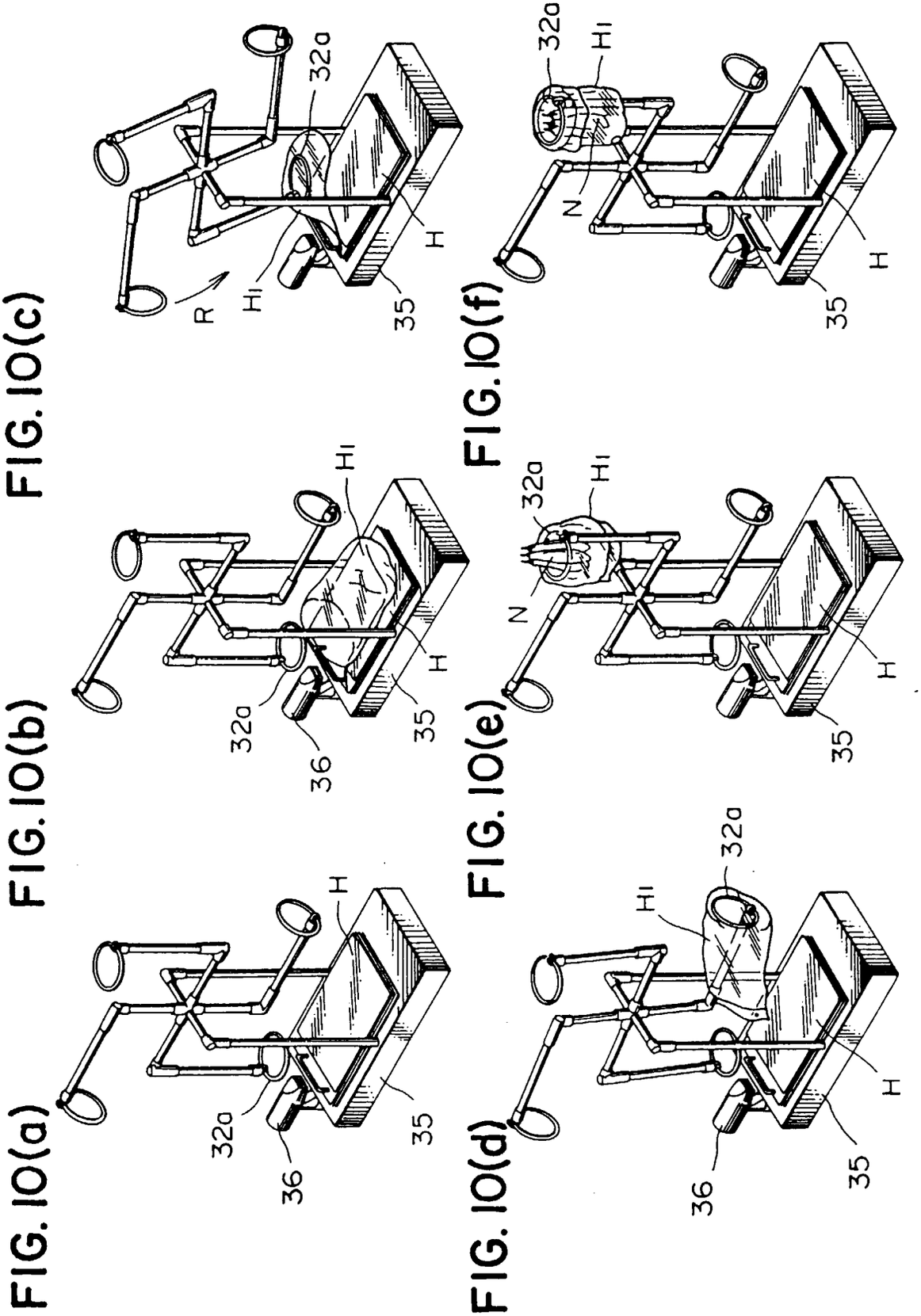


FIG. 10(a)
FIG. 10(b)
FIG. 10(c)
FIG. 10(d)
FIG. 10(e)
FIG. 10(f)
H
H1
32a
35
36
N
R

FIG. 11

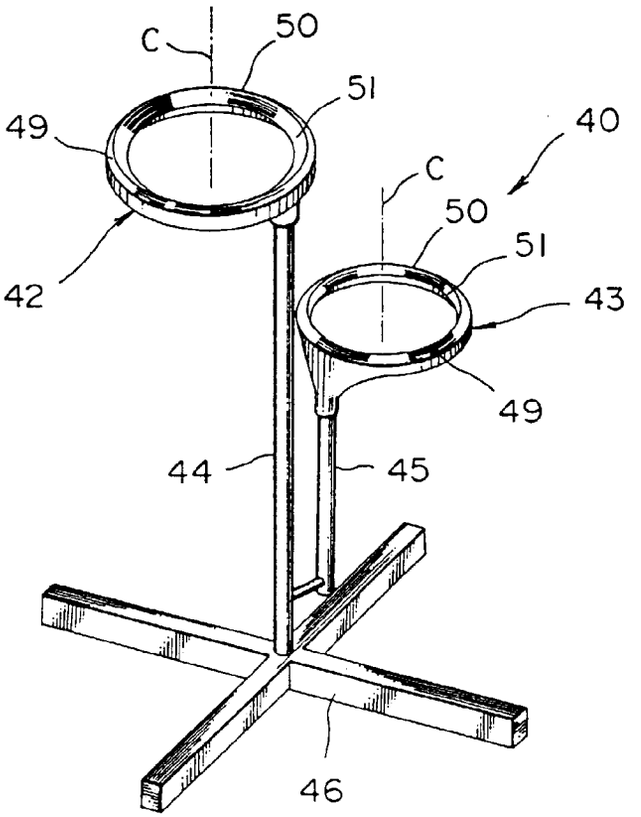


FIG. 12

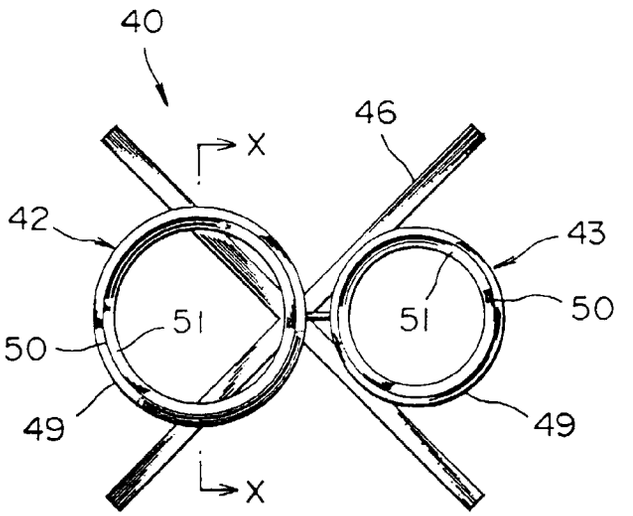


FIG. 13(a)

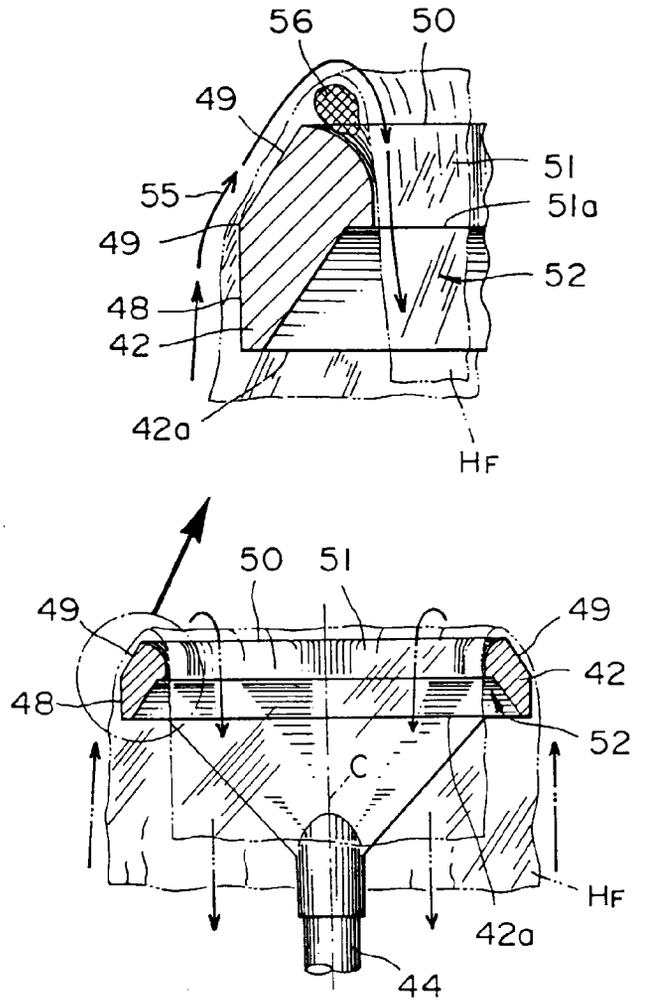


FIG. 13(b)

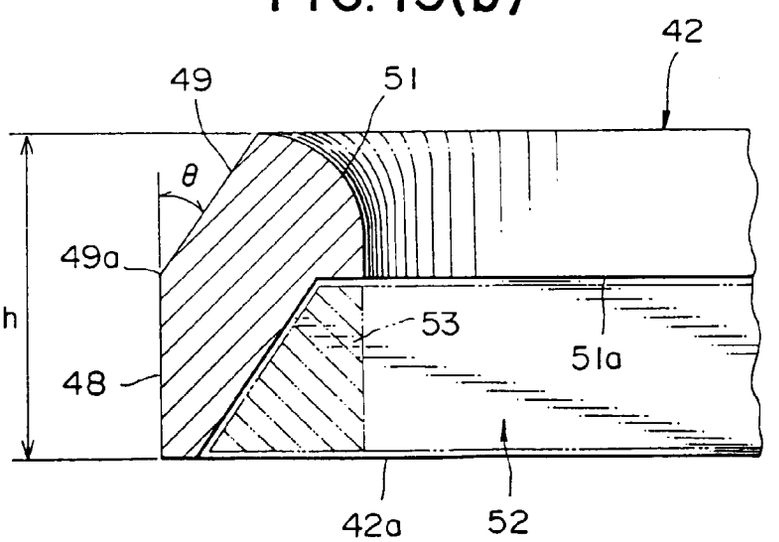


FIG. 14

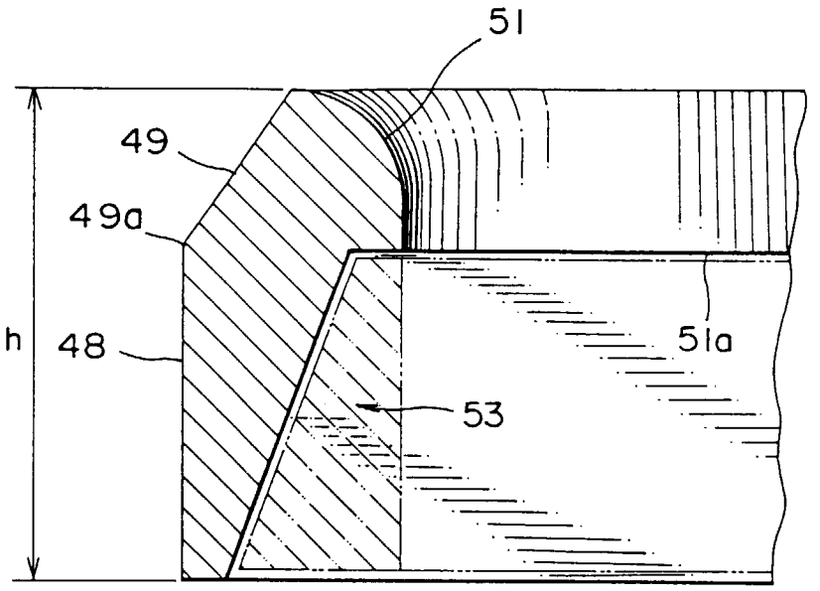


FIG. 15(a)

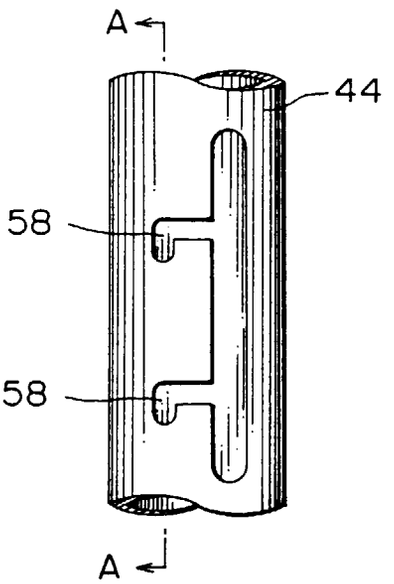


FIG. 15(b)

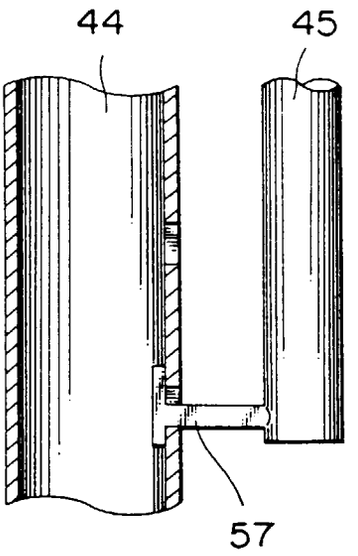


FIG. 16(c)

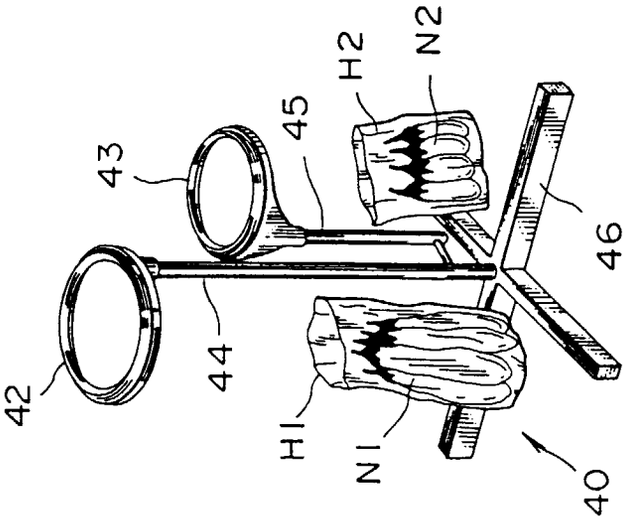


FIG. 16(b)

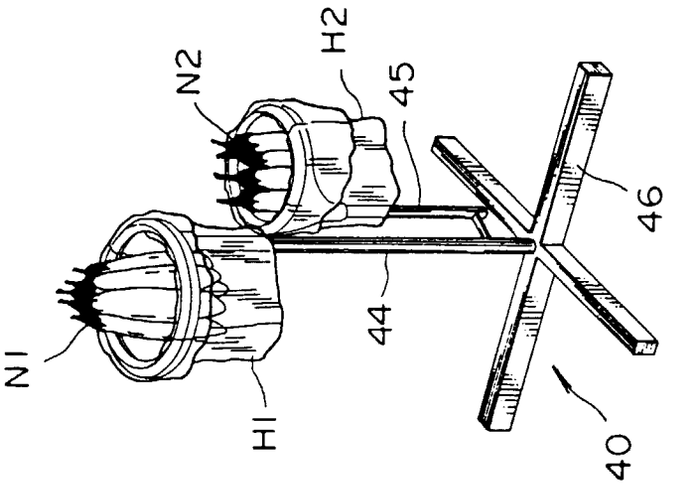


FIG. 16(a)

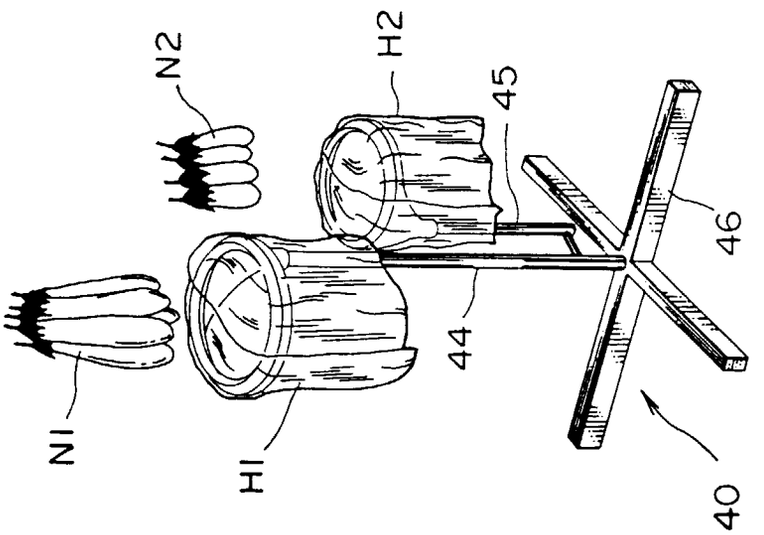


FIG. 17

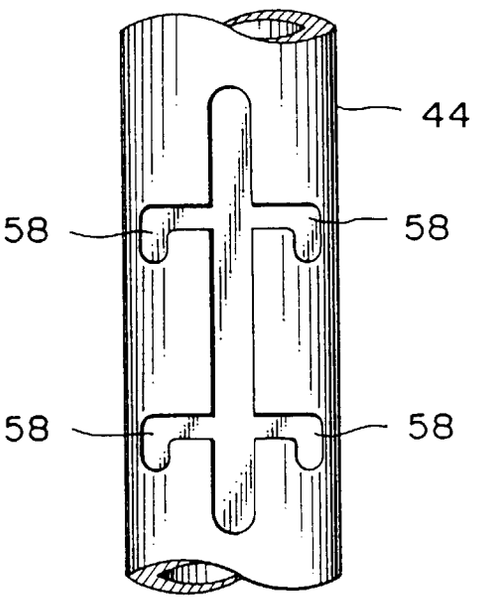


FIG. 18

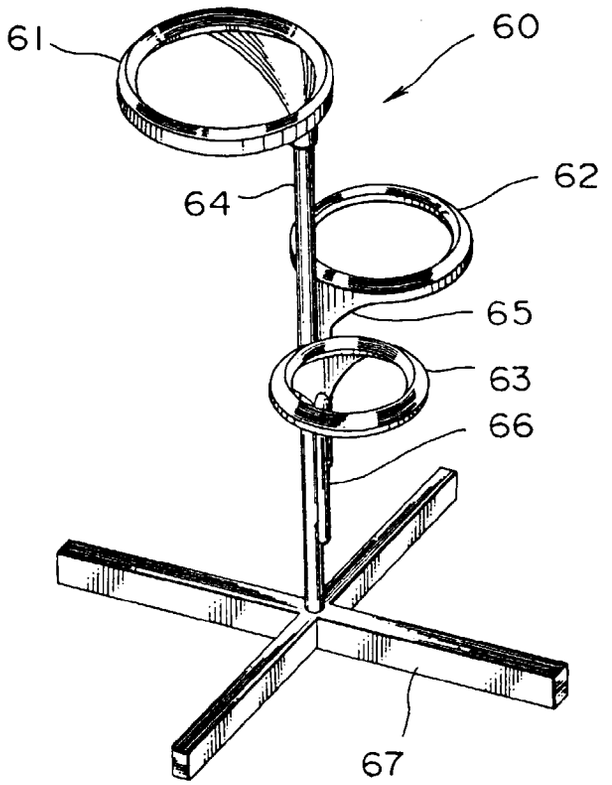


FIG. 19

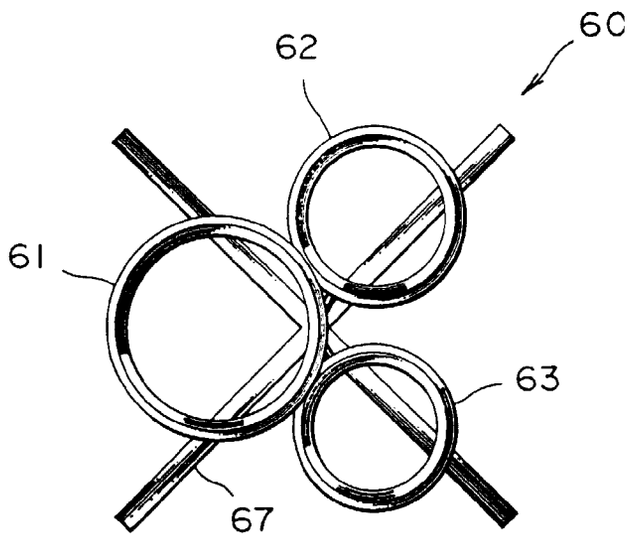


FIG.20

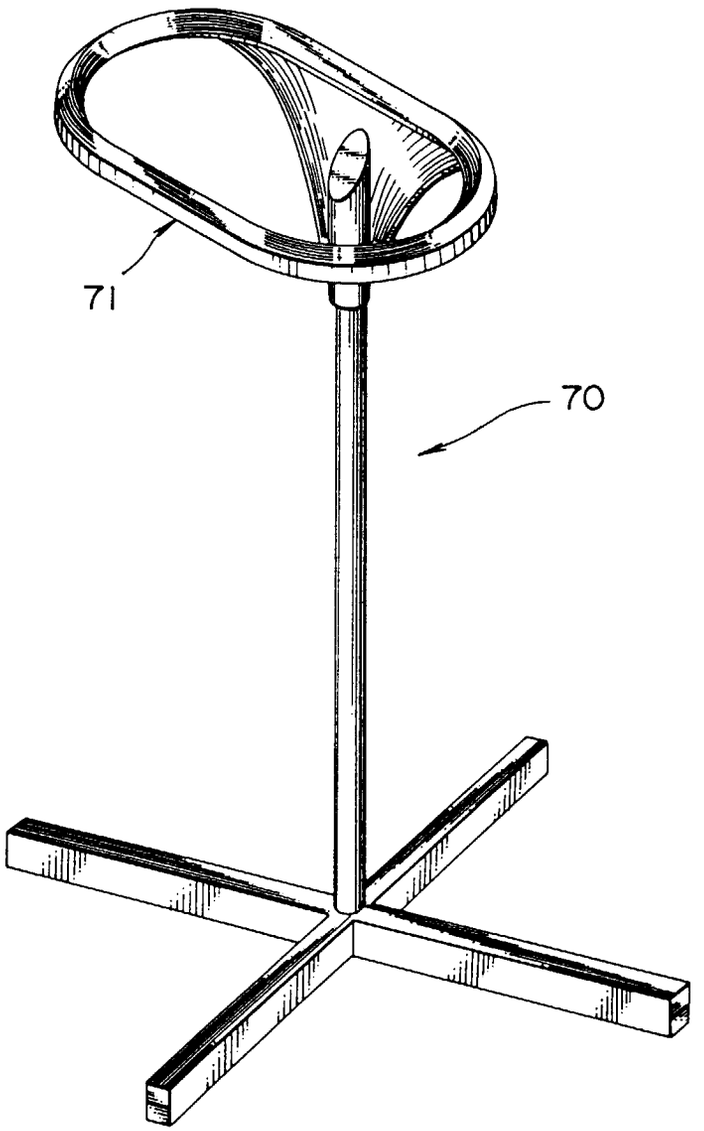


FIG.21

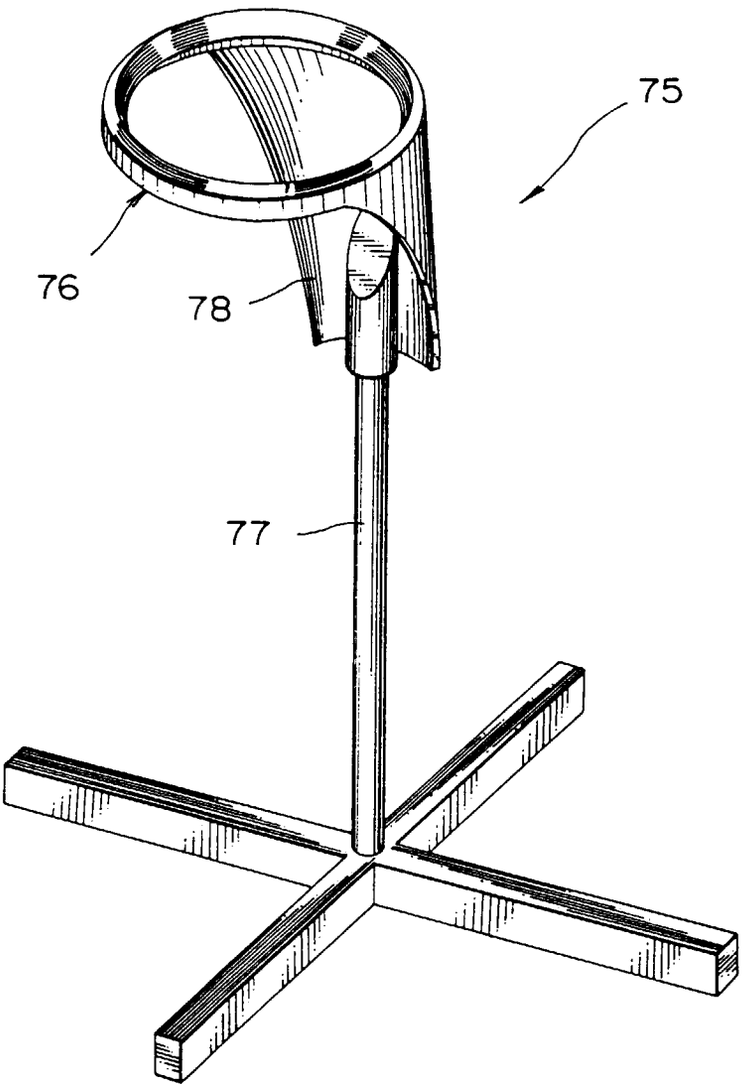


FIG.22

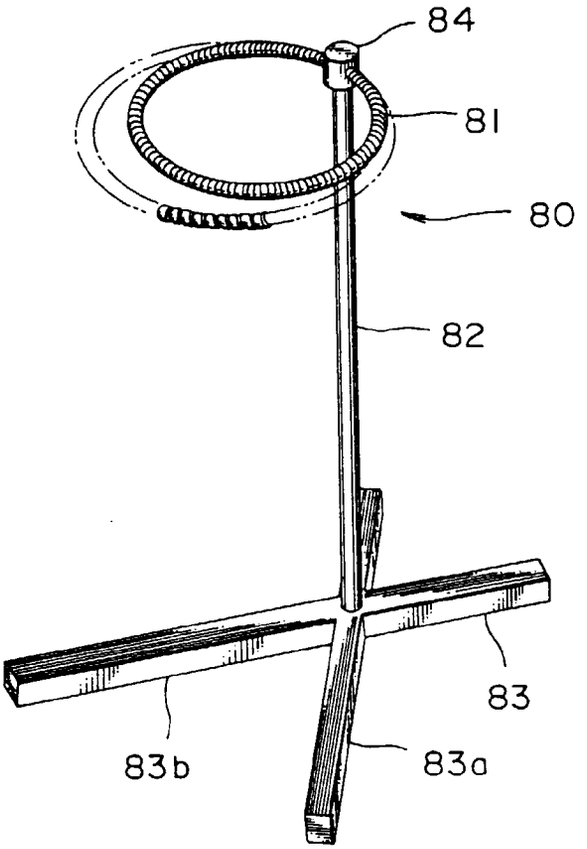


FIG.23

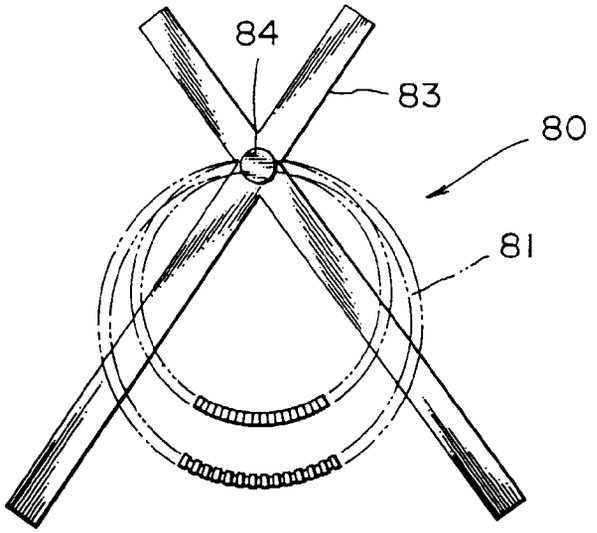


FIG.24(a)

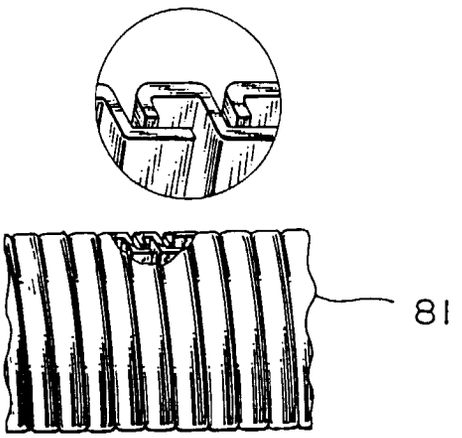


FIG.24(b)

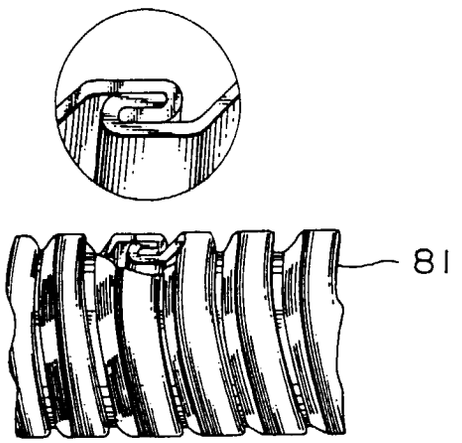


FIG.25(c)

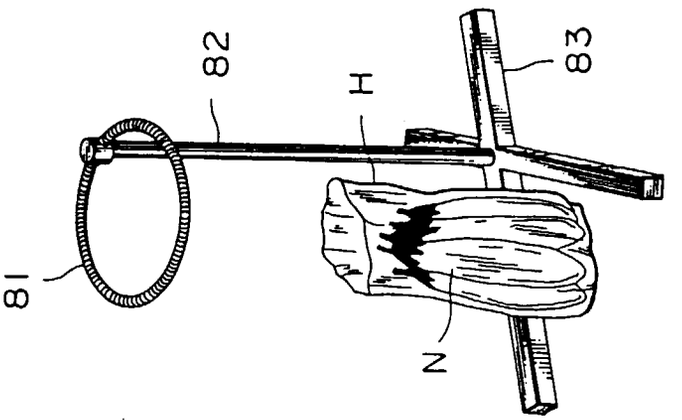


FIG.25(b)

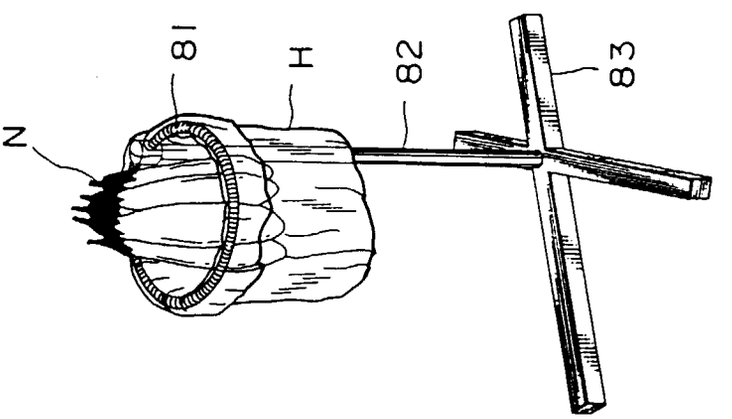


FIG.25(a)

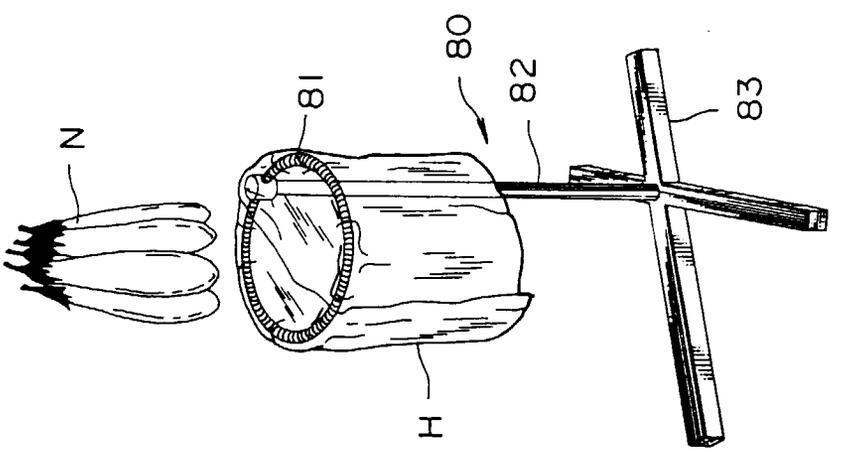


FIG. 26

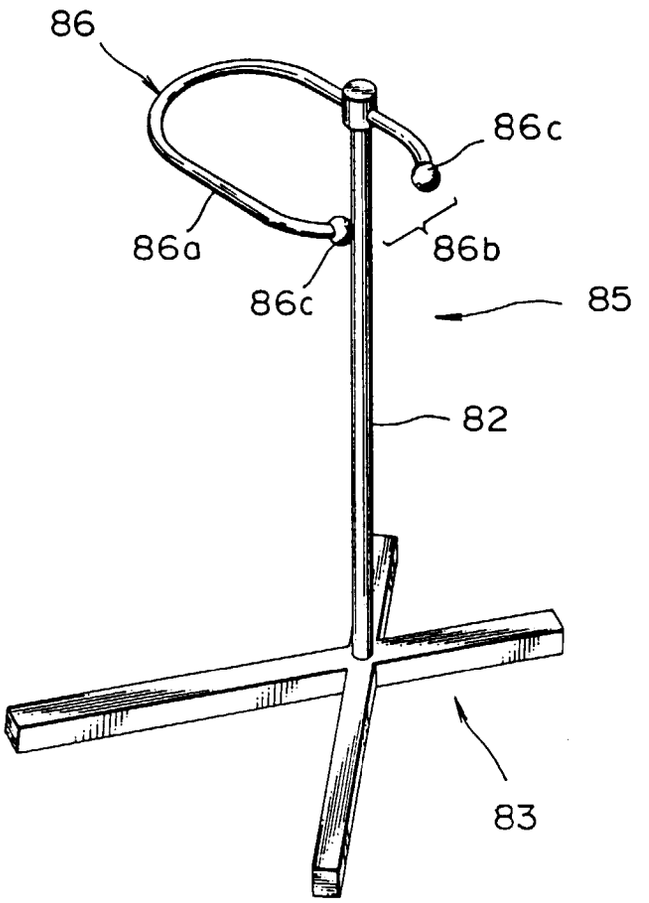


FIG. 27

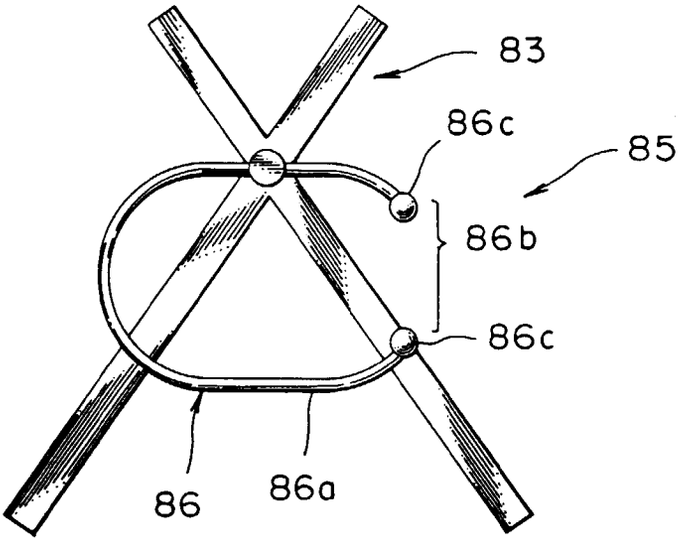


FIG.28(c)

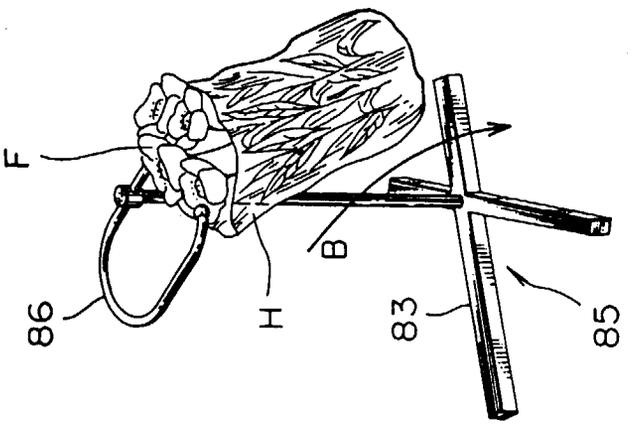


FIG.28(b)

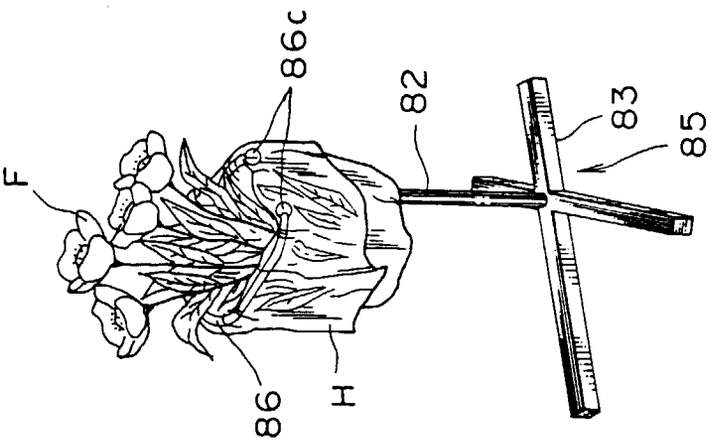


FIG.28(a)

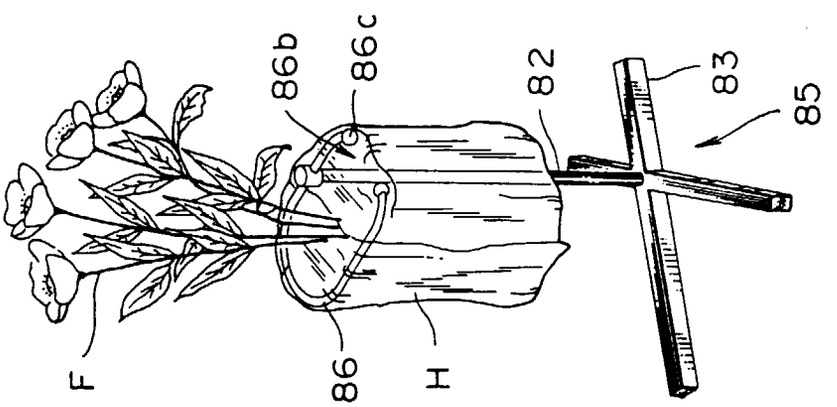


FIG.29

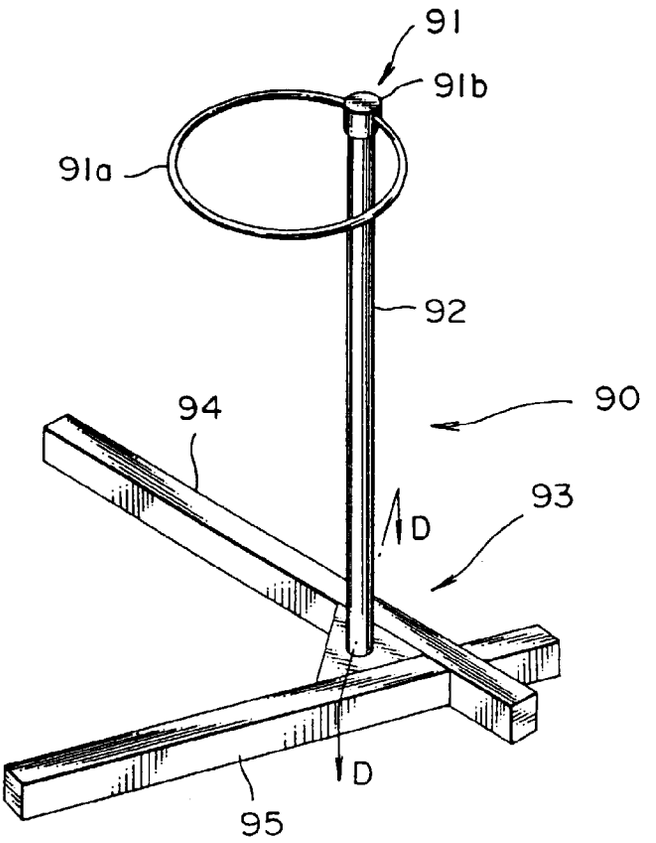


FIG.30

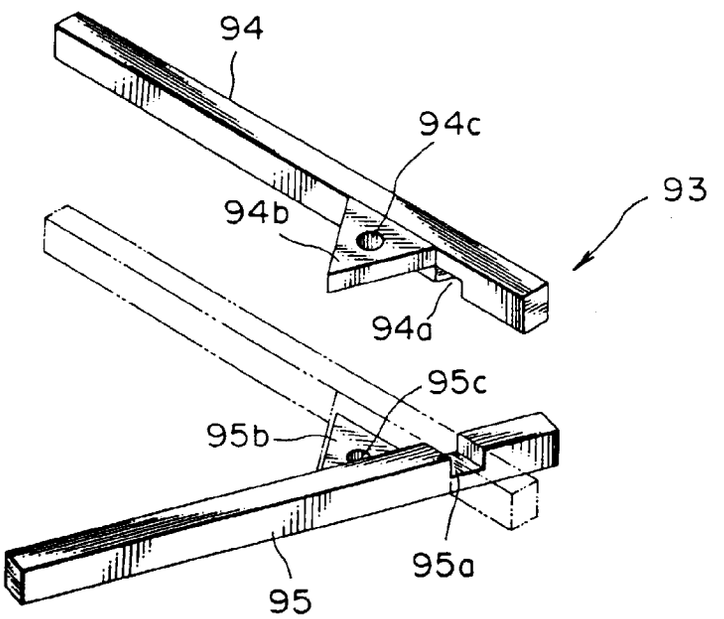


FIG.31

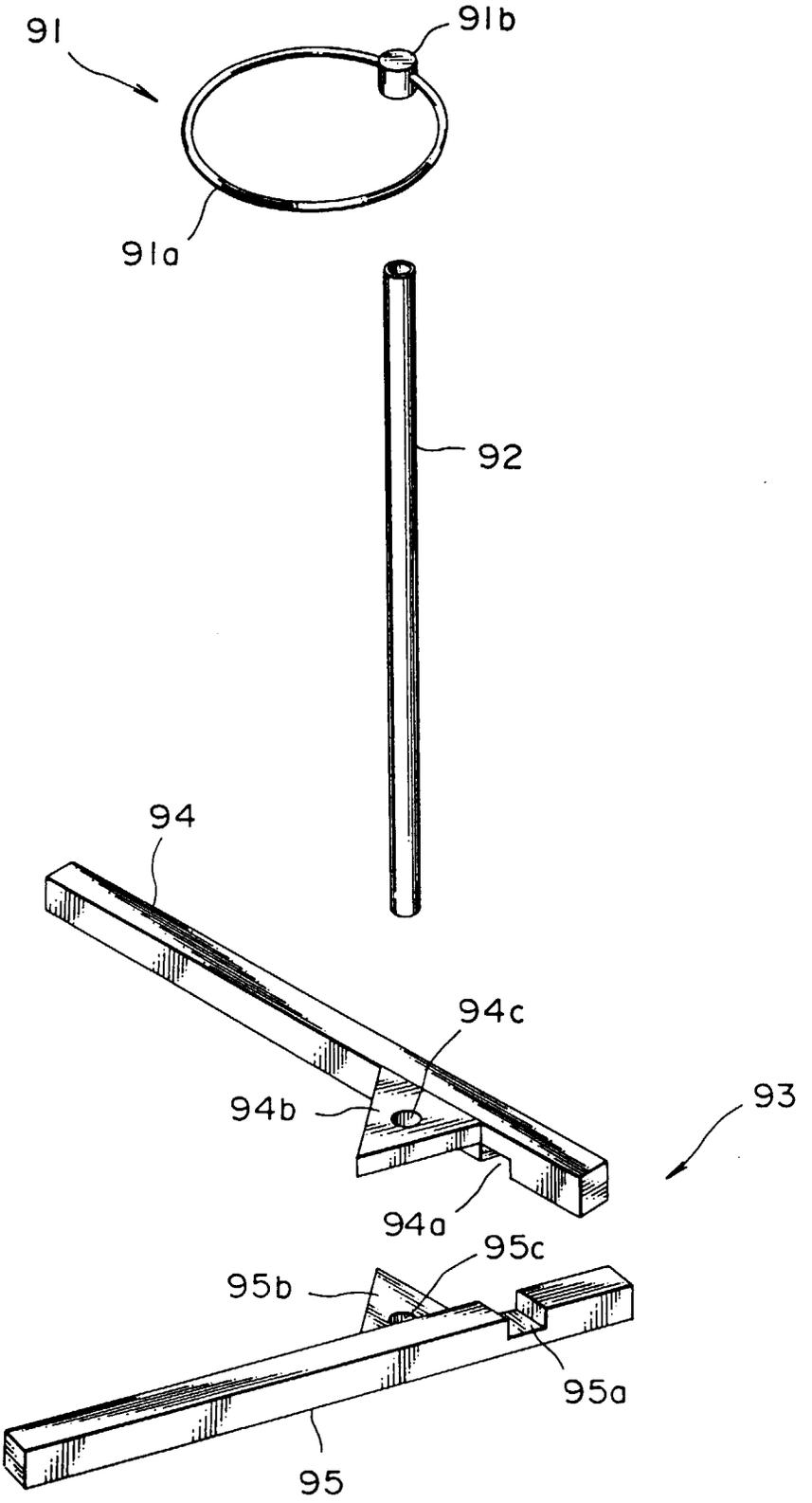


FIG.32

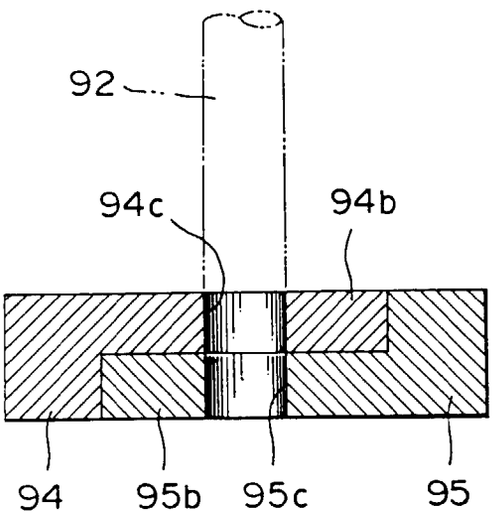


FIG.33(c)

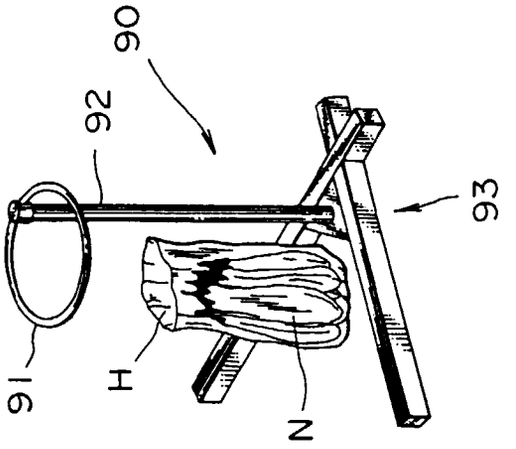


FIG.33(b)

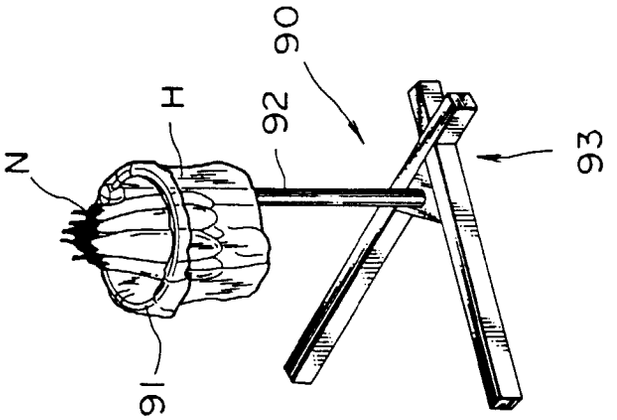


FIG.33(a)

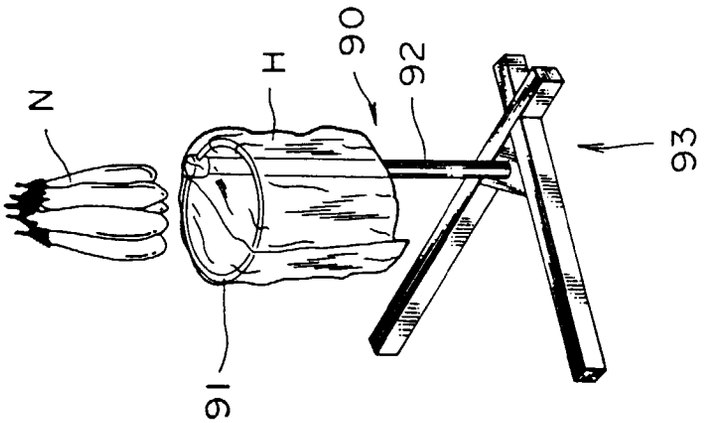


FIG.34

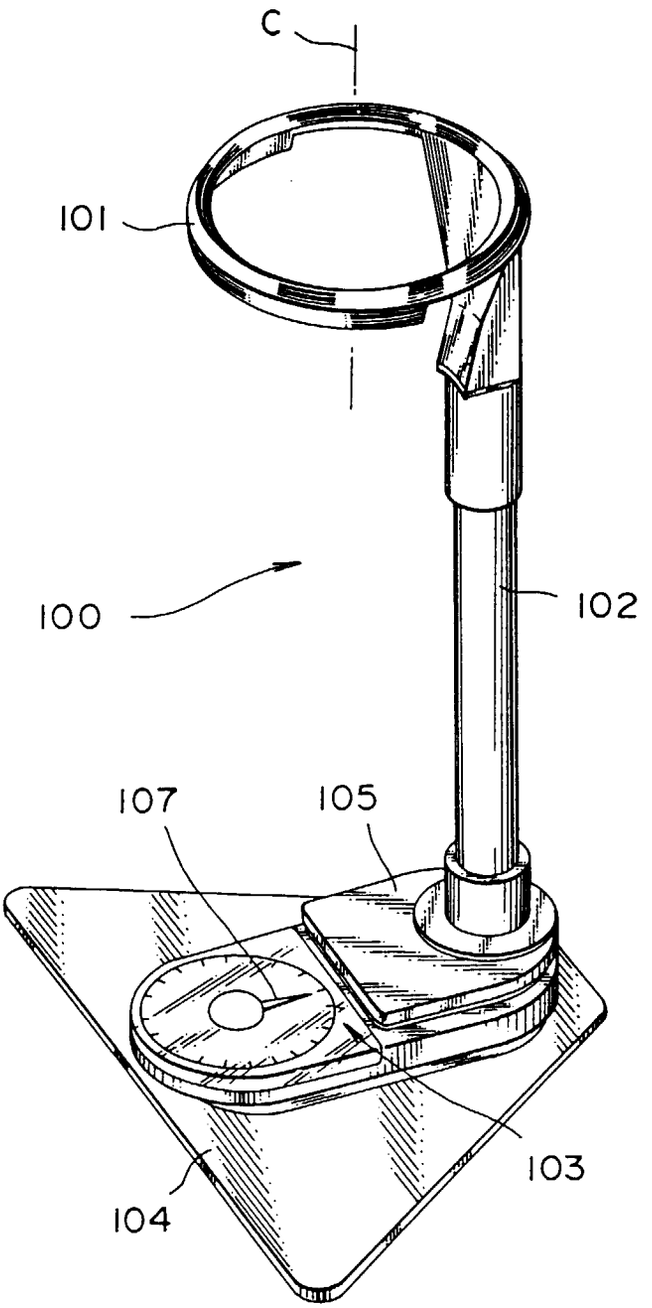


FIG. 35

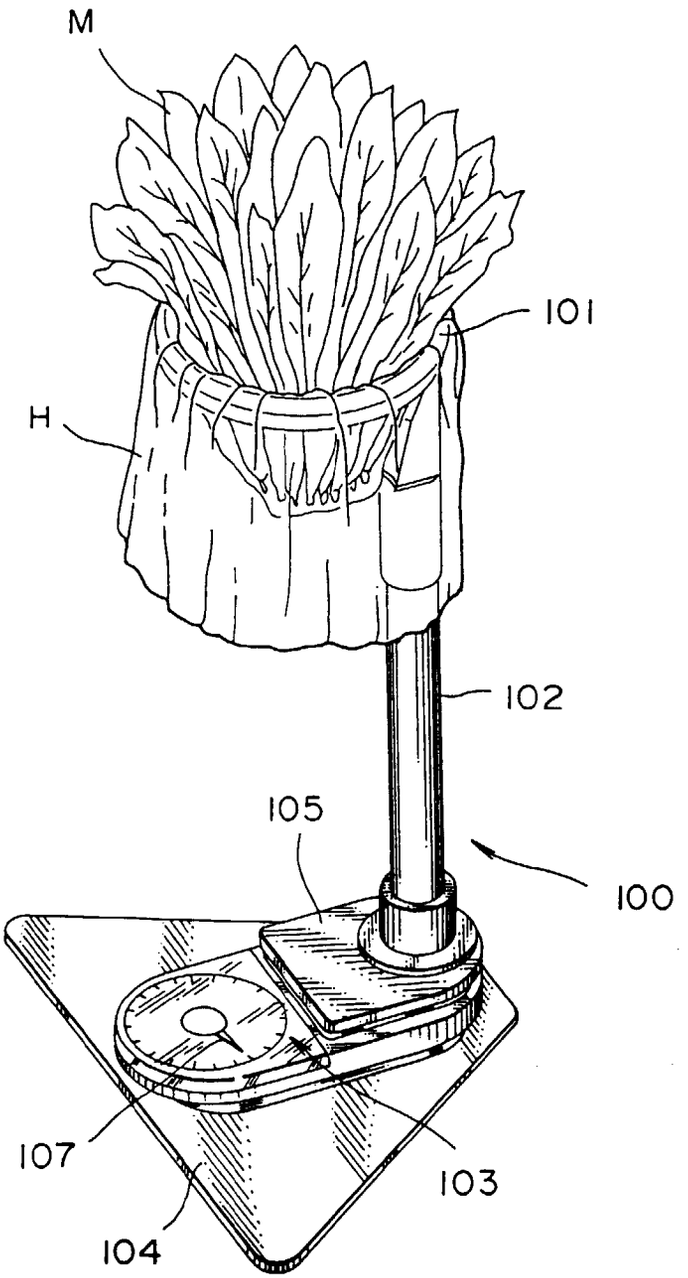


FIG.36(c)

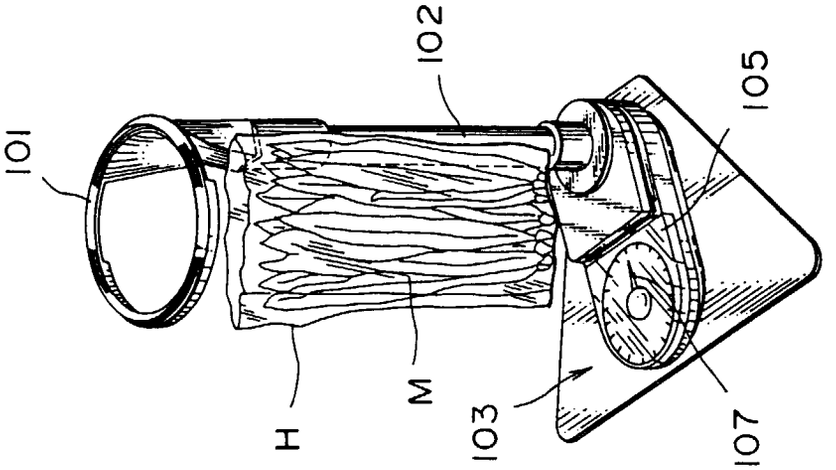


FIG.36(b)

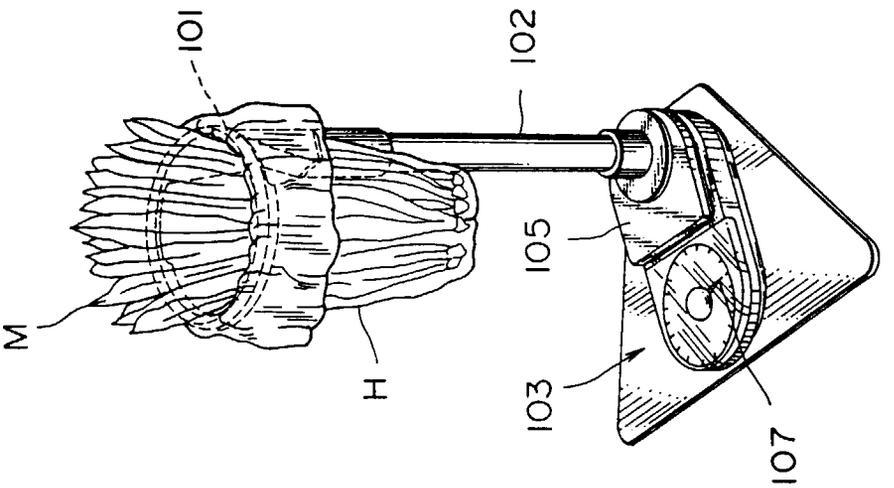


FIG.36(a)

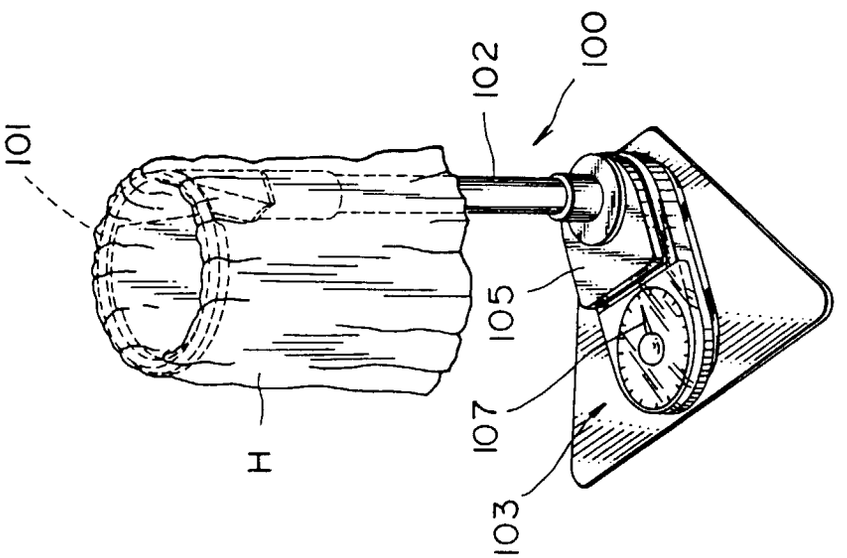
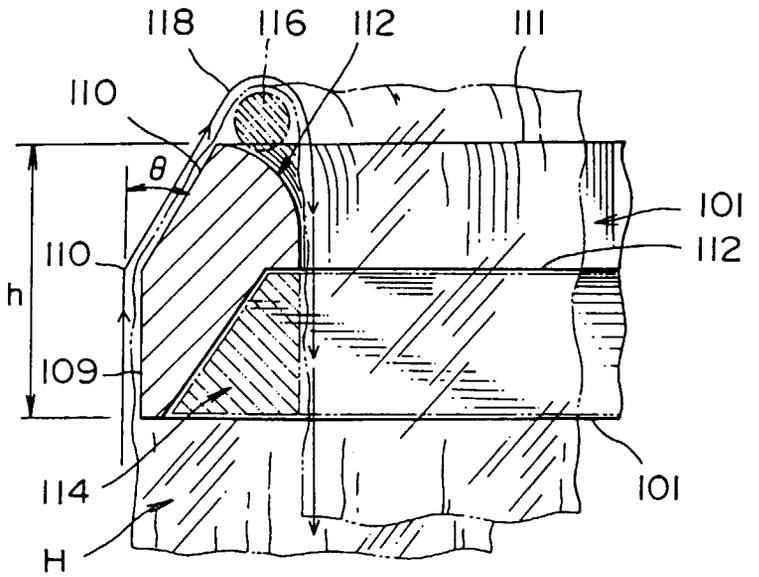


FIG. 37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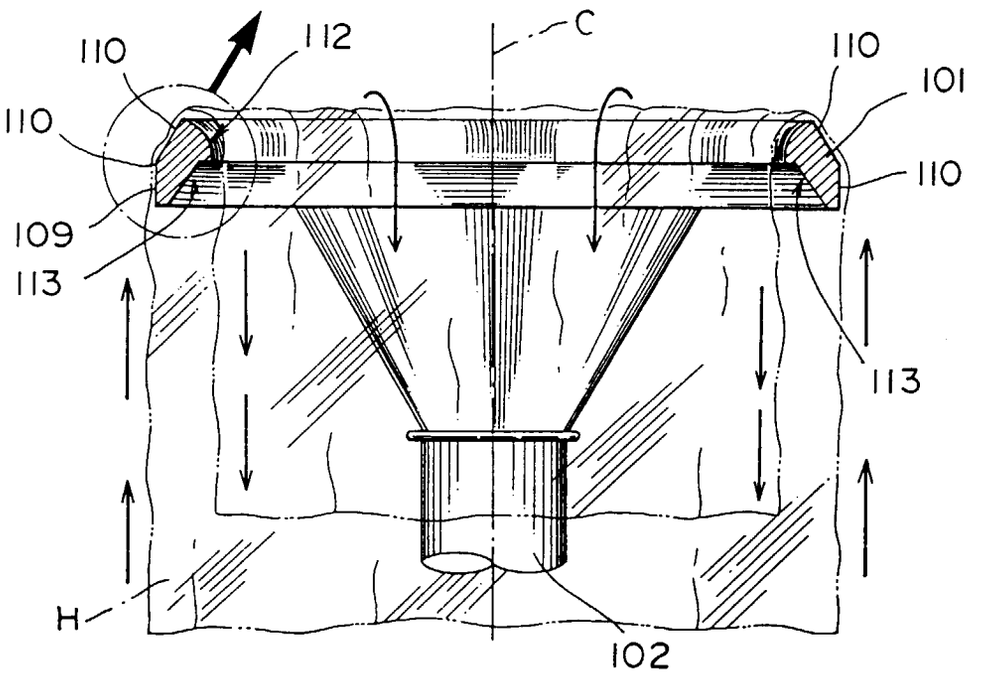
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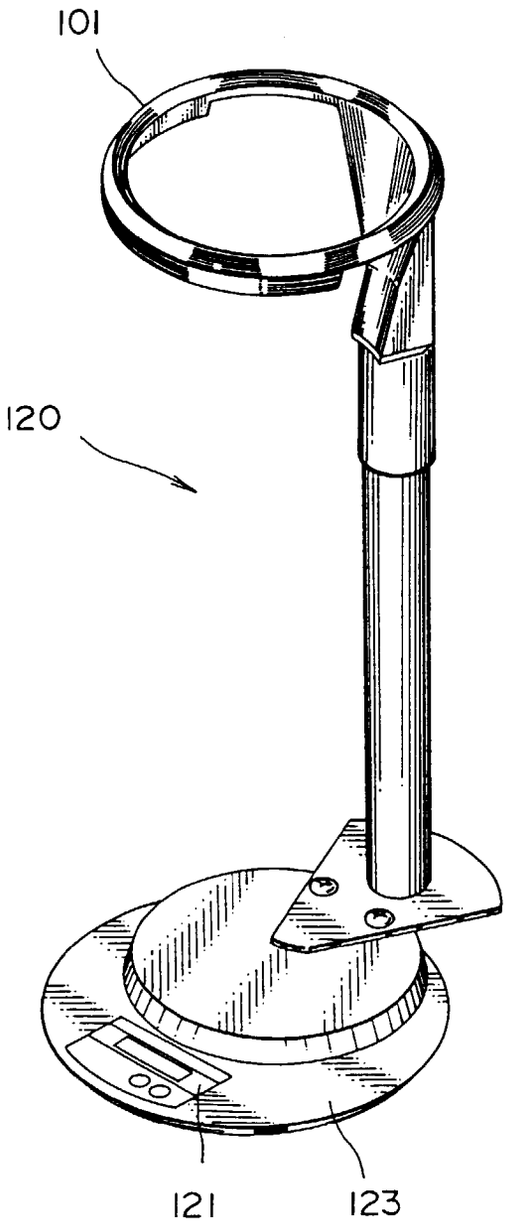
FIG. 38



European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 96 30 4550

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X Y A	US-A-4 572 251 (AGROWNAUTICS) * abstract; figures 1-5 * ---	1 2-7,11, 13-15 19	B65B67/12
Y	US-A-4 708 307 (DAIGLE) * the whole document * ---	2,3,11, 13-15	
Y	US-A-4 562 983 (KLEFBECK) * abstract; figure 1 * ---	3	
Y	DE-U-93 07 650 (HAMMERLIT) * the whole document * ---	4-7	
Y	FR-A-2 640 943 (MOREAU) * the whole document * ---	13-15	
X	US-A-2 939 259 (HECKLER) * the whole document * ---	1	
A	GB-A-231 295 (CONNERY) * the whole document * -----	17	TECHNICAL FIELDS SEARCHED (Int.Cl.6) B65B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	10 September 1996	Claeys, H

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