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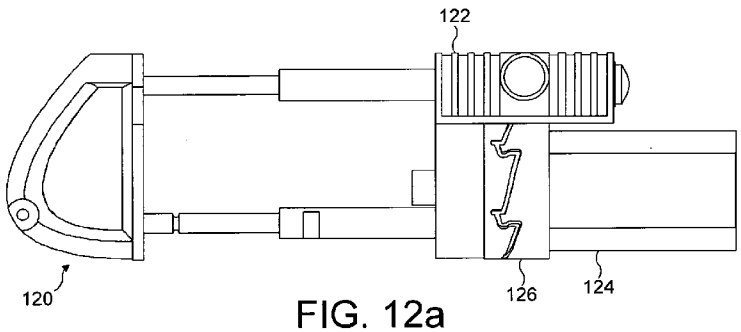

FIG. 12a

(57) Abstract: Disclosed is apparatus for dispensing wall drying inserts (1) one at a time from a magazine (124). The magazine may be demountably secured to a dispensing gun (120), operable to dispense wall drying inserts to a predetermined depth. Thus, wall drying inserts may be dispensed more rapidly and reliably than previously possible. For example, large number of inserts may be installed into holes drilled into a wall of a building in order to prevent or remove damp, and the apparatus of the present invention is more convenient and time-efficient than dispensing wall drying inserts into the holes by hand.

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Apparatus and Method for Dispensing a Wall Drying Insert

Introduction

The present invention relates to apparatus and a method for preventing damp in walls and in particular to the fitting of wall drying inserts.

Background to the Invention

Wall drying inserts are used to prevent or lessen the effects of damp on a building. The wall drying insert is typically fitted inside a hole that extends through the wall at or near ground level and operates by attracting moisture present in the wall into a channel which collects the moisture and acts as a vent to remove the moisture by evaporation in the presence of circulating air.

European Patent No. EP 0 874 094 describes a wall drying insert made of porous material which is mounted in a horizontal hole that has been drilled in the wall. The wall drying insert is shaped such that its rounded lower surface is in contact with the inner surface of the hole. The abovementioned patent document also describes other wall drying inserts such as those described in UK Patent No. GB 2,241,729 and UK Patent No. GB 251,807 which disclose the use of wall drying inserts which are installed into an inclined hole.

Typically, where a building is to be protected against damp using wall drying inserts such as those described in EP 0 874 904 it is necessary to fit a large number at

approximately 50cm intervals at or near ground level on the wall. Therefore, it may be necessary to fit tens or hundreds of the wall drying inserts in a building.

The process of fitting the wall drying inserts requires a hole to be drilled for each insert and for the insert to be manually pushed into the hole. Whilst, the contact between the lower rounded surface of the insert can provide sufficient grip, the insert could be removed manually which increases the risk of vandalism.

In addition, because of the number of wall drying inserts that may require to be fitted, there is a need to allow for this to occur quickly and accurately.

Summary of the Invention

According to a first aspect of the present invention there is provided apparatus for dispensing wall drying inserts one at a time from a magazine.

Apparatus for dispensing wall drying inserts from a magazine one at a time enables a number of wall drying inserts to be dispensed conveniently and rapidly. For example, large number of inserts may be installed into holes drilled into a wall of a building in order to prevent or remove damp, and the apparatus of the present invention is more convenient and time-efficient than dispensing wall drying inserts into the holes by hand.

Preferably, the apparatus comprises one or more wall drying inserts, and a dispensing gun, the dispensing gun comprising:

- a rotatable support and a magazine secured to the rotatable support;
  the magazine comprising a plurality of cavities disposed around a central axis, each said cavity adapted to house a wall drying insert;
- a plunger operable to move parallel to the central axis between a first position, and a second position which is within a cavity; and
- a coupling mechanism which converts linear motion of the plunger into rotational motion of the rotatable support in order to rotate the magazine about the central axis, from a first orientation wherein the plunger is in alignment with a first cavity to a second orientation wherein the plunger is in alignment with a second cavity adjacent to the first cavity, responsive to predefined motion of the plunger, in use.

Thus, in use, each of the one or more wall drying inserts are positioned inside a said cavity, the plunger is moved from the first position to the second position within a first cavity, the first cavity housing a wall drying insert, so as to push the wall drying insert out of the cavity, and the plunger is moved from the second position to the first position so as to permit rotation of the magazine from the first orientation to the second orientation responsive to predefined motion of the plunger.

Repeated actuation of the plunger causes the magazine to rotate through all available orientations, corresponding to each said cavity, and the one or more wall drying inserts are pushed out of each respective cavity. Accordingly the apparatus enables a plurality of wall drying inserts to be loaded into a magazine and pushed out of their respective cavities, for example into holes in a wall, by repeat actuation of the plunger, without the requirement for wall drying inserts to be individually loaded.

Provision of a dispensing gun with a plunger adapted to dispense one or more wall drying inserts facilitates the reliable dispensing of wall drying inserts, as wall drying inserts may be dispensed into holes in a wall at a constant depth into each hole, the depth predetermined by the length of the plunger. This compares to a system of manually inserting wall drying inserts without the use of the dispensing gun, where the depth of inserts in wall are prone to vary.

Furthermore, the orientation of each said wall drying insert with respect to each said cavity may be controlled (typically by the provision of a spring clip mounted to each said wall drying insert) such that the orientation at which each wall drying insert is dispensed, relative to the dispensing gun, is constant. Accordingly, where wall drying inserts are, for example, dispensed into a wall or into holes in a wall, their orientation and depth into the wall may be more reliably controlled than by manually dispensing wall drying inserts.

Preferably, the magazine is demountably secured to the rotatable support. Thus, when empty, the magazine may be refilled, or demounted and another full magazine secured to the rotatable support.

Preferably, predefined motion of the plunger comprises motion of the plunger parallel to the central axis between a first position and a further first position, and may comprise motion from a first position to a further first position, and/or from a further first position to a first position, in use. Alternatively, or in addition, predefined motion

of the plunger may comprise motion of the plunger from the second position to the first position, or the further first position, in use.

In some embodiments, the dispensing gun comprises a spirit level. The spirit level provides an accurate indication of the orientation of the dispensing gun and thus enables the orientation at which each said wall drying insert is dispensed to be accurately controlled.

The magazine may comprise recycled materials. Preferably the magazine is disposable and/or recyclable. The magazine may, for example, be constructed from cardboard.

In some embodiments the magazine is constructed from a single sheet of material, which may be disposable, recyclable or recycled material such as cardboard.

Thus, a full magazine may be demountably secured to a dispensing gun, demounted when all of the wall drying inserts housed therein have been dispensed, and a further full magazine demountably secured to the dispensing gun.

Apparatus comprising a magazine housing a plurality of wall drying inserts is advantageously operable to dispense wall drying inserts, for example into holes in walls, more rapidly and reliably than is possible by manually dispensing wall drying inserts.

The magazine preferably comprises six cavities, and in some embodiments comprises fewer than six, or greater than six cavities.

Preferably each said cavity has a corrugated inner surface, or surfaces, the said corrugations preferably running perpendicular to the central axis. Typically, each said wall drying insert is provided with a resilient spring clip and each said spring clip is retained within a channel on a corrugated inner surface of a cavity, when housed in the magazine. Each said wall drying insert is thus retained within the magazine and is not liable to fall out of the magazine under its own weight or when the magazine is transported, or demountably secured to the dispensing gun. However, force applied by the plunger is sufficient to cause the spring clip to deflect, or further deflect, and cause the upper edge to ride over a corrugation and into an adjacent channel, and so on until the wall drying insert is dispensed.

In some embodiments the rotatable support comprises a cylinder adapted to slideably receive a magazine, and thereby demountably secure the magazine to the rotatable support.

Preferably the magazine is generally prismatic in shape and may for example be shaped generally as an *n*-prism, where *n* may be between 3 and 8, and where *n* is preferably 6. Preferably the magazine is a hexagonal prism (a 6-prism), and preferably comprises six tubular cavities, each said cavity having a triangular cross section.

Preferably the internal surface of the cylinder is adapted to cooperatively receive the magazine.

A cooperative fit between the cylinder and the magazine prevents relative rotational motion of the magazine and the cylinder.

Preferably the length of the plunger is adjustable. In some embodiments, the plunger is telescopic and may be telescopically extended or telescopically compressed, and fixed in one of a plurality of lengths.

Wall drying inserts may be provided in a variety of lengths and a dispensing gun may be advantageously adjustable to dispense wall drying inserts of various lengths.

The coupling mechanism may comprise a coupling member.

The coupling mechanism (which may comprise a coupling member) and/or the plunger may be operatively connected to a handle.

In some embodiments the handle is slideably operable to move the plunger between the first and second positions.

The coupling member and/or the plunger may be resiliently biased and, for example, may be spring biased. In some embodiments the plunger is resiliently biased in the first position, and in some embodiments may be resiliently biased in the second position.

A resiliently biased plunger or coupling member advantageously ensures that the dispensing gun does not, under normal conditions, dispense a wall drying insert until an operator overcomes the resilient bias, for example by manually operating a slideable handle.

In accordance with a second aspect of the present invention there is provided apparatus for dispensing a wall drying insert, comprising:
a wall drying insert and an applicator, the applicator comprising:
a cavity adapted to house the wall drying insert;
a rotatable member;
a coupling which converts rotational motion of the rotatable member into linear motion in order to move the coupling through the cavity; and
an abutment which is adapted to be operatively connected to the wall drying insert and to the coupling;
wherein, in use, the wall drying insert is positioned inside the cavity in operative connection with the abutment and rotation of the rotatable member pushes the abutment which pushes the wall drying insert out of the cavity into a hole in a wall.

In some embodiments the applicator comprises a substantially tubular member, the substantially tubular member defining the cavity. Preferably the cavity is substantially tubular.

Thus, the invention extends to apparatus for fitting a wall drying insert into a hole in a wall, comprising:
a wall drying insert and an applicator, the applicator comprising:
a substantially tubular member adapted to house the wall drying insert;
a rotatable member;
a coupling which converts rotational motion of the rotatable member into linear motion in order to move the coupling through the substantially tubular member; and
an abutment which is adapted to be operatively connected to the wall drying insert and to the coupling;
wherein, in use, the wall drying insert is positioned inside the tubular member in operative connection with the abutment and rotation of the rotatable member pushes the abutment which pushes the wall drying insert out of the tubular member into a hole in a wall.

Preferably, an inner surface of the cavity comprises a stop surface which prevents rotation of the abutment.

Preferably, an inner surface of the cavity comprises at least one flat surface which acts to prevent rotation of the abutment.

In some embodiments, the cavity, or the tubular member, as the case may be, has a quadrilateral cross section and may, for example, be square or rectangular. In some embodiments, the cavity, or the tubular member, as the case may be, has a triangular cross section.

Preferably, the tubular member is made of a recyclable material.

Preferably, the tubular member is made of cardboard.

Preferably, the coupling comprises a threaded shaft connected to the rotatable member and a threaded sleeve which is operatively connected to the abutment.

Preferably, the threaded shaft is positioned coaxially with the substantially tubular member.

Alternatively, the coupling comprises a threaded shaft connected to the rotatable member and a threaded sleeve which forms part of the abutment.

Preferably, the rotatable member rotates relative to the tubular member.

Preferably, the rotatable member is adapted to receive a tool designed to rotate the rotatable member.

Preferably, the tool is a drill.

Preferably, the rotatable member is recessed into the cavity.

Preferably, the rotatable member comprises the head of the applicator.

Preferably, the or each said wall drying insert (of the first and second aspects) comprises:

an interface surface shaped such that when inserted in a horizontally extending hole in a wall, the interface surface inclines progressively upwardly to provide an interface between the insert and circulating air in the hole.

The terms up, down, upwards, upwardly, downwards, above, below and other terms denoting orientation are intended to describe the relative position or orientation of features of the invention, with respect to the intended orientation of apparatus in use.

Preferably, the or each said wall drying insert is porous, and all or a part of the or each said wall drying insert may be composed of a porous material. The or each said wall drying insert may be composed of a porous ceramic material.

A porous wall drying insert provides a large effective surface area onto which moisture may be drawn by capillary action. Additionally, the large surface area of a porous wall drying insert facilitates evaporation of moisture which has been drawn onto, or into, the wall drying insert.

Preferably, the or each said wall drying insert has a channel extending therethrough, such that at least a portion of the or each said wall drying insert is tubular.

Preferably the interface surface defines an aperture extending into the channel.

Thus, in use, water impinging the interface surface flows generally downwards and into the channel through the aperture.

Preferably, the interface surface is concave, such that all parts of the interface surface are angled downwards towards the aperture.

Preferably, the or each said wall drying insert comprises and an outward facing surface, an upper portion of which is adapted to receive a resilient spring clip for securing the wall drying insert in a hole in a wall.

Preferably, the or each said wall drying insert comprises a resilient spring clip extending from an upper portion of an outward facing surface.

Thus, in use, the spring clip engages with the inner surface of the cavity in which each said wall drying insert is housed so as to prevent a wall drying inset from falling

out of the cavity prior to being dispensed, and is sized so as to engage with the inside of a hole in a wall into which the or each said wall drying insert is dispensed so as to retain the wall drying insert therein. Furthermore, the spring clip constrains the orientation of each said wall drying insert within each said cavity, and ensures that each said wall drying insert is dispensed at a consistent orientation (with respect to the cavity).

For example, in embodiments wherein the or each said cavity has a triangular cross section (such as each of the cavities of a hexagonally prismatic magazine) a spring clip may abut two of the internal walls of a cavity and thus rotationally constrain a wall drying insert within the cavity.

Preferably each said cavity has a corrugated inner surface, or surfaces, the said corrugations preferably running perpendicular to the central axis.

In some embodiments, an upper portion of the outward facing surface of the or each said wall drying insert comprises a slot, and the resilient spring clip is adapted to be retained in the slot. Preferably, the resilient spring clip comprises a barb which is fitted into an indentation in the wall drying insert, which may be an indentation extending from the lower surface of the slot.

Preferably, the barb is resiliently connected to a mounting.

Alternatively, the barb is resiliently mounted on the wall drying insert.

Preferably the barb is substantially U-shaped.

In some embodiments, a portion of the outward facing surface of the or each said wall drying insert is adapted to support a grip. The grip may be supported in a surface indentation such as a groove. Preferably, the grip comprises an insert which is adapted to fit in a groove.

Preferably, the grip extends along the groove and is provided with one or more teeth extending outwardly. Preferably the one or more teeth are resilient. Thus, in use, the one or more teeth engage with the inner surface of the cavity so as to prevent a wall drying inset from falling out of the cavity prior to being dispensed, and are sized so as

to engage with the inside of a hole in a wall into which the or each said wall drying insert is dispensed so as to retain the wall drying insert therein.

Preferably, the wall drying insert is provided with connecting means which allow a plurality of wall drying inserts to be connected together. For applications requiring use of a plurality of wall drying inserts in a single hole (such as might be the case for walls above a certain depth) optimal performance is provided when the wall drying inserts are aligned. For example, in embodiments comprising wall drying inserts each having a channel extending therethrough, alignment of the wall drying inserts ensures that air circulates between wall drying inserts, and water is able to flow along the channel of a first wall drying insert to a channel of a second wall drying insert without encountering the inner surface of the hole (which would cause moisture to be reintroduced to the wall).

Preferably, the or each said wall drying insert comprises a first end shaped as a male connector of connecting means, and a second end that is a female connector of connecting means.

Thus, in use, where a first end of a first wall drying insert abuts a second end of a second wall drying insert, male and female portions of connecting means are brought into cooperatively engagement.

Preferably, the male and female connectors are, respectively, formed generally as a ball and socket.

Holes in walls typically contain dust and debris, for example debris created by drilling the hole. When an object, such as a wall drying insert, is inserted into a hole in a wall, there is a tendency for debris to build up ahead and around the first end introduced into the hole. Such debris may prevent a wall drying insert from adopting the optimal position in the hole. For example, a build up of debris may reduce the surface area of a porous wall drying insert in contact with the inner surface of a hole in a wall, and therefore reduce the rate at which water is drawn from the wall by capillary action. A build up of debris may also compromise air circulation, and/or prevent alignment of wall drying inserts and thus prevent alignments of channels extending through wall drying inserts having channels extending therethrough.

A ball and socket arrangement is particularly advantageous since the male connector (the "ball") comprises no vertices and therefore debris in a hole has a low propensity to build up ahead of the wall drying insert having a first end so configured, as it is dispensed into the hole.

This allows the present invention to be used in walls of different thicknesses more easily.

Preferably, the wall drying insert is provided with an end cap.

Preferably, the end cap is adapted to allow air to pass through it.

According to a third aspect of the present invention there is provided a dispensing gun for dispensing one or more wall drying inserts from a magazine housing one or more wall drying inserts, the dispensing gun comprising:

- a rotatable support and a magazine secured to the rotatable support; the magazine comprising a plurality of cavities disposed around a central axis, each said cavity adapted to house a wall drying insert;
- a plunger operable to move parallel to the central axis between a first position, and a second position which is within a cavity; and
- a coupling mechanism which converts linear motion of the plunger into rotational motion of the rotatable support in order to rotate the magazine about the central axis, from a first orientation wherein the plunger is in alignment with a first cavity to a second orientation wherein the plunger is in alignment with a second cavity adjacent to the first cavity, responsive to predefined motion of the plunger, in use.

Preferably, the magazine is demountably secured to the rotatable support.

Thus the invention extends to a dispensing gun for dispensing one or more wall drying inserts from a magazine housing one or more wall drying inserts, the dispensing gun comprising:

- a rotatable support a, adapted to be demountably secured to a magazine comprising a plurality of cavities disposed around a central axis, each said cavity adapted to house a wall drying insert;
- a plunger operable to move parallel to the central axis between a first position, and a second position which is within a cavity; and

- a coupling mechanism which converts linear motion of the plunger into rotational motion of the rotatable support in order to rotate the magazine about the central axis, from a first orientation wherein the plunger is in alignment with a first cavity to a second orientation wherein the plunger is in alignment with a second cavity adjacent to the first cavity, responsive to predefined motion of the plunger, in use.

And thus the invention further extends both to a magazine comprising a plurality of cavities disposed around a central axis, each said cavity adapted to house a wall drying insert, and to a kit comprising a dispensing gun and one or more magazines.

Preferably, predefined motion of the plunger comprises motion of the plunger parallel to the central axis between a first position and a further first position, and may comprise motion from a first position to a further first position, and/or from a further first position to a first position, in use. Alternative, or additionally, predefined motion of the plunger comprises motion of the plunger from the second position to the first position, or the further first position, in use.

Further preferred and optional features of the dispensing gun correspond to preferred and optional features of the dispensing gun of the first aspect.

According to a fourth aspect of the present invention, there is provided an applicator for dispensing a wall drying insert, comprising:
a cavity adapted to house a wall drying insert;
a rotatable member;
a coupling which converts rotational motion of the rotatable member into linear motion in order to move the coupling through the cavity; and
an abutment which is adapted to be brought into operative connection with a wall drying insert and the coupling.

Preferably, an internal surface of the cavity comprises a stop surface which prevents rotation of the abutment.

Preferably, an internal surface of the cavity comprises at least one flat surface which acts to prevent rotation of the abutment.

In some embodiments the applicator comprises a substantially tubular member, the substantially tubular member defining the cavity. Preferably the cavity is substantially tubular.

In some embodiments, the cavity, or the tubular member, as the case may be, has a quadrilateral cross section and may, for example, be square or rectangular. In some embodiments, the cavity, or the tubular member, as the case may be, has a triangular cross section.

Preferably, the tubular member is made of a recyclable material.

Preferably, the tubular member is made of cardboard.

Preferably, the coupling comprises a threaded shaft connected to the rotatable member and a threaded sleeve which is operatively connected to the abutment.

Preferably, the threaded shaft is positioned coaxially with the cavity.

Alternatively, the coupling comprises a threaded shaft connected to the rotatable member and a threaded sleeve which forms part of the abutment.

Preferably, the rotatable member rotates relative to the cavity.

Preferably, the rotatable member is adapted to receive a tool designed to rotate the rotatable member.

Preferably, the tool is a drill.

Preferably, the rotatable member is recessed into the tubular member.

Preferably, the rotatable member comprises the head of the applicator.

Further preferred and optional features of the applicator correspond to preferred and optional features of the applicator of the second aspect.

According to a fifth aspect of the present invention, there is provided a wall drying insert comprising:

an interface surface such that when inserted in a horizontally extending hole in a wall, the interface surface inclines progressively upwardly to provide an interface between the insert and circulating air in the hole.

Preferably, the wall drying insert is porous. The wall drying insert may be composed of a porous ceramic material.

Preferably, the wall drying insert has a channel extending therethrough, such that at least a portion of the wall drying insert is tubular.

Preferably the interface surface defines an aperture extending into the channel.

Preferably, the interface surface is concave, such that all parts of the interface surface are angled downwards towards the aperture.

Preferably, the or each said wall drying insert comprises and an outward facing surface, an upper portion of which is adapted to receive a resilient spring clip for securing the wall drying insert in a hole in a wall.

Preferably, the or each said wall drying insert comprises a resilient spring clip extending from an upper portion of an outward facing surface.

In some embodiments, an upper portion of the outward facing surface of the or each said wall drying insert comprises a slot, and the resilient spring clip is adapted to be retained in the slot. Preferably, the resilient spring clip comprises a barb which is fitted into an indentation in the wall drying insert, which may be an indentation extending from the slower surface of the slot.

Preferably, the barb is resiliently connected to a mounting.

Alternatively, the barb is resiliently mounted on the wall drying insert.

Preferably the barb is substantially U-shaped.

In some embodiments, a portion of the outward facing surface of the wall drying insert is adapted to support a grip. The grip may be supported in a surface indentation such

as a groove. Preferably, the grip comprises an insert which is adapted to fit in a groove.

Preferably, the grip extends along the groove and is provided with one or more teeth extending outwardly. Preferably the one or more teeth are resilient. Thus, in use, the one or more teeth engage with the inner surface of the cavity so as to prevent the wall drying inset from falling out of the cavity prior to being dispensed, and are sized so as to engage with the inside of a hole in a wall into which the wall drying insert is dispensed so as to retain the wall drying insert therein.

Preferably, the wall drying insert is provided with connecting means which allow a plurality of wall drying inserts to be connected together.

Preferably, the wall drying insert comprises a first end shaped as a male connector of connecting means, and a second end that is a female connector of connecting means.

This allows the present invention to be used in walls of different thicknesses more easily.

Thus, in use, where a first end of a first wall drying insert abuts a second end of a second wall drying insert, male and female portions of connecting means are brought into cooperative engagement.

Preferably, the male and female connectors are, respectively, formed generally as a ball and socket.

This allows the present invention to be used in walls of different thicknesses more easily.

Preferably, the wall drying insert is provided with an end cap.

Preferably, the end cap is adapted to allow air to pass through it.

According to a further aspect of the invention, there is provided a kit of parts comprising:

a magazine comprising a plurality of cavities disposed around a central axis, each said cavity adapted to house a wall drying insert; and
a plurality of wall drying inserts.

Preferably, the kit comprises a dispensing gun according to the third aspect, the dispensing gun comprising the magazine. The magazine may be demountably secured, or demountably securable, to the rotatable member of the dispensing gun.

Preferably, each said wall drying insert is housed in a cavity of the magazine.

Preferably, each of the plurality of cavities houses a wall drying insert.

The kit may comprise a plurality of magazines.

According to a sixth aspect of the present invention there is provided a method of dispensing wall drying inserts one at a time from a magazine.

Preferably, the method comprises the steps of:

- providing a dispensing gun comprising a rotatable support and a magazine secured to the rotatable support, the magazine comprising a plurality of cavities disposed around a central axis, each said cavity adapted to house a wall drying insert;
  the dispensing gun further comprising a plunger and a coupling mechanism which converts linear motion of the plunger into rotational motion of the rotatable support; and
- moving the plunger from a first position to a second position within a first cavity housing a wall drying insert, so as to push the wall drying insert out of the cavity, and thereby dispense the wall drying insert.

Preferably the magazine is demountably secured, or securable, to the rotatable support. The method may comprise the step of demountably securing the magazine to the rotatable support. Alternatively, or in addition, the method may comprise the step of demounting a magazine (which may be an empty magazine) from the rotatable support.

Preferably the method comprises the step of moving the plunger in a predefined manner, so as to cause the magazine to rotate from a first orientation in which the

plunger is in alignment with the first cavity, to a second orientation in which the plunger is in alignment with a second cavity adjacent to the first cavity.

Preferably, the method comprises the step of moving the plunger parallel to the central axis between a first position and a further first position in a predefined manner, so as to cause the magazine to rotate from a first orientation to a second orientation. The method may comprise the step, or steps of moving the plunger from a first position to a further first position, and/or from a further first position to a first position, in a predefined manner. Alternatively, or additionally, method may comprise the step, or steps of moving the plunger from the second position to the first position, or the further first position, in a predefined manner.

In some embodiments, the method comprises the step of moving the plunger from the first position to the second position, to thereby dispense a first wall drying insert, moving the plunger parallel to the central axis between a first position and a further first position in a predefined manner, so as to cause the magazine to rotate from the first orientation to the second orientation, and from the first position to the second position within the second cavity, to thereby dispense a second wall drying insert.

In some embodiments, the method is a method of dispensing one or more wall drying inserts into a hole in a wall, and comprises the step positioning the magazine such that the first cavity adjacent to a hole in a wall, and moving the plunger from the first position to the second position to thereby dispense a wall drying insert into the hole. The method extends to a method of dispensing a plurality of wall drying inserts into a plurality of holes in a wall, or a plurality of wall drying inserts into a single hole in a wall, or a plurality of wall drying inserts into each of a plurality of holes in a wall.

Preferably, the method comprises the step of recycling an empty magazine.

Preferably, the method comprises the step of providing each said wall drying insert with a resilient spring clip adapted to retain, and orient, each said wall drying insert in a cavity.

Further preferred and optional features correspond to preferred and optional features of the first, third and fifth aspects.

The invention extends in a further aspect to a method of removing moisture from a wall, comprising the steps of providing one or more holes in a wall, and dispensing one or more wall drying inserts into the one or more holes.

In some embodiments, the one or more holes are substantially horizontal. In some embodiments, the method comprises the step of drilling the or each said hole and thereby providing the one or more holes.

Preferably the method comprises the step of dispensing one or more wall drying inserts by the method of the sixth aspect.

According to a seventh aspect of the present invention there is provided a wall comprising one or more wall drying inserts according to the fifth aspect.

Brief Description of the Drawings

The invention will now be described by way of example only with reference to the accompanying drawings in which:

Figure 1 is a perspective view of an embodiment of a wall drying insert in accordance with the present invention;

Figure 2 is a side view of a second embodiment of a wall drying insert in accordance with the present invention;

Figures 3a, 3b and 3c show an embodiment of an end cap for a wall drying insert in accordance with the present invention;

Figure 4 is a plan view of a third embodiment of the present invention;

Figure 5 is a front view of an example of a grip in accordance with the present invention;

Figure 6a is a side view of another example of a grip in accordance with the present invention and figure 6b is a front view of the same;

Figure 7 is a side view of a fourth embodiment of a wall drying insert in accordance with the present invention;

Figure 8 is a side view of a fifth embodiment of a wall drying insert in accordance with the present invention;

Figure 9 is a side view of a sixth embodiment of a wall drying insert in accordance with the present invention;

Figure 10 is a side view of two wall drying inserts in accordance with the present invention connected together;

Figure 11a is a side view of an applicator in accordance with the present invention in use with a wall drying insert, figure 11b shows the end face of the rotating head of the applicator.

Figure 12a is a side view, and Figure 12b is a front view, of apparatus for dispensing wall drying inserts;

Figure 13 shows perspective views of a further embodiment of a wall drying insert;

Figure 14a shows a plan view, and Figure 14b shows a cross sectional side view, of the wall drying insert of Figure 13;

Figure 15a shows a cross sectional view of a wall drying insert, and figure 15b shows a cross sectional view of a wall drying insert housed in a cavity and retained therein by a spring clip;

Figure 16 shows a perspective view of a magazine;

Figure 17 shows a cross sectional perspective view of a fully extended dispensing gun;

Figure 18 shows a cross sectional perspective view of a fully compressed dispensing gun;

Figures 19a-9d show a schematic representation of the operation of the coupling member to rotate the rotatable support member, during use of the dispensing gun.

Detailed Description of the Drawings

Figure 1 is a perspective view of the general arrangement of a wall drying insert 1. The wall drying insert comprises a generally cylindrical body 3 having an internal surface 5 which is inclined when the wall drying insert is positioned in a horizontally bored hole. The internal surface 5 further comprises an aperture 7 which forms part of a channel 15 that extends along the length of the wall drying insert 1. The wall drying insert 1 is open at its first end 9 and its second end 11 to allow air to circulate through it. Connector 13 is also shown at the first end 9.

Figure 2 is a side view of a second embodiment of the present invention. The wall drying insert 21 comprises a generally cylindrical body 23, a connector 25 located at its first end 35 and a grip 38 extending out from the cylindrical surface of the wall drying insert 21. The aperture 27 is shown and takes the form of a hole in the internal surface 29 in a manner similar to that shown in figure 1.

Channel 31 is also shown extending from the first end 35 to the second end 37. As is clear from the figure, the generally cylindrical shape of the wall drying insert contains an open cut-away portion 33 which forms the walls of the internal surface 29 and channel 31 towards the second end of the wall drying insert 21.

Figures 3a, 3b and 3c show a plug 41 which is sized to fit in the end of a wall drying insert in accordance with the present invention. Figure 3a is a side view of the stopper 41 which has a plug 43 attached to a flange 45. The plug 43 contains a through hole 44 which allows air to pass through the plug and into the channel of the wall drying insert. The mesh cover 47 of figure 3c is positioned over the outside facing surface of the plug.

Figure 4 shows a plan view of another embodiment of the present invention. The wall insert 51 comprises a generally cylindrical body 53 with an aperture 55 through surface 57 and a channel 63 similar to that described in previous embodiments of the invention. Grips 65 and 67 are also shown projecting from the surface of the wall drying insert. In this example of the invention, the grips are integrally formed with the

wall drying insert. Grips 65 have outwardly extending surfaces which meet at an apex 66 to form a shape that is or resembles an isosceles triangle or a pyramid. The grips 65 are positioned on either side of the cylindrical body 53.

Grips 67 are positioned diametrically opposite one another on the first end 59 of the wall drying insert 51 as shown with an additional grip (not shown) positioned on the rear surface. The grips are designed to resist further movement of the wall drying insert once it has been inserted into a hole.

Figure 5 shows another type of grip 71 comprising resiliently mounted teeth or barbs 73 extending from a base 72 which is adapted for insertion into a slot 83 (figure 7) positioned in the outer surface of the wall drying insert 81 (figure 7). This grip may also be used in slot 87 of wall drying insert 85 of figure 8.

Figures 6a and 6b show another type of grip 75 which comprises a cylindrical body 77 adapted for insertion into the channel of a wall drying insert. The teeth or barbs 79 are resiliently mounted on the cylindrical body such that they can be bent over to allow insertion but spring up into position to provide grip when positioned in the wall.

Figure 9 shows another embodiment of the present invention. In this example the wall drying insert 91 is substantially as described with reference to other embodiments of the invention. In this example the grip comprises a pair of resilient, integrally formed upwardly extending prongs 95 which are threaded through apertures 93 in the lower surface of the wall drying mount 91. The upper end of each prong extends through an outwardly facing surface beyond the top of the generally cylindrical shape of the wall drying insert to provide grip when positioned in a wall.

Figure 10 is a side view of two wall drying inserts 99, 101 connected via connector 103.

Figure 11a shows an applicator 111 in accordance with the present invention. The applicator comprises a tubular body 113 having a square cross section. A rotatable head 115 is positioned at a first end 116 of the tubular body 113. The rotatable head is connected to a threaded shaft 117 which is connected to a threaded coupling collar 119. The threaded coupling collar 119 moves up and down the threaded shaft 117 when the rotatable head is turned and is adapted to contact one end of the wall drying insert at 121 to push it out from the tube.

In this embodiment of the present invention, the square cross section of the tube 113 provides a restraining surface which prevents the threaded coupling collar 119 from rotating and ensures that it moves linearly along the threaded shaft 117.

Figure 11b shows the end surface of rotary head 115. The end surface contains a drill coupling 123 which allows a power drill to be connected to the applicator to provide rotational motion to drive the wall drying insert into the hole. In another embodiment of the invention, the rotatable head can be smaller and be recessed into the end of the tubular body.

The applicator may also be provided with an end cover which can form a stopper similar to that shown in figure 3. Alternatively, the stopper can be stored in the tube. It should also be noted that the applicator tube and/or the wall drying insert can contain a barcode or other unique identifier which identifies the individual wall drying insert and/or applicator. This information can be used to allow the supplier and/or manufacturer to identify precisely which inserts have been used on any given job.

In use, the wall drying insert 121 is initially positioned inside the tubular body 113. When a drill is connected to the coupling 123, rotation of the drill bit turns the rotatable head 115 which turns the threaded shaft 117. The threaded shaft is connected to the thread of the collar 119 and this combination of elements converts the rotational motion of the drill into linear motion in the collar 119 which pushes the wall drying insert 121 out of the tube 113 and the inside walls of the tube prevent the threaded collar from turning.

The applicator of the present invention is designed to allow rapid and easy insertion of wall drying inserts. The improvements to the insert described herein allow them to be more securely fixed in their holes and to allow them to be connected together to fit deeper walls.

Figures 12a and 12b show apparatus 120 for dispensing wall drying inserts, comprising a dispensing gun 122 and a magazine 124 demountably secured to the rotatable support member 126 of the dispensing gun. This is more clearly visible in Figure 12b, showing the apparatus 120 from the front. The magazine (shown as empty in figure 12b) has a hexagonal cross section and comprises six cavities 125 disposed about a central axis. The magazine is retained within a hexagonal cavity

127 in the rotational member. Visible through each said cavity is a hole 129 in the base of the hexagonal cavity.

Figures 13, 14a and 14b show a further embodiment of a wall drying insert 130. Referring to Figure 13, the insert comprises a generally cylindrical body 131 with a first end 132 and a second end 133 and a channel 134 extending from the first end to the second end through the body.

A downward-sloping interface surface 135 is provided in the upper side of the body, which defines an aperture 138 in communication with the channel 134. The interface surface is concave, such that all parts of the surface slope downwards towards the aperture.

As can be best seen in Figure 14b, the first end 132 and the second end 133 of the wall drying insert, together comprise a ball and socket arrangement operable to function as connecting means to connect and align more than one wall drying insert inserted into a hole in a wall, in use. The concave profile of the ball surface 140 of the first end is shaped to cooperate with the convex profile of the socket surface 142 of the second end of another wall drying insert.

A slot 144 is provided in the upper surface of the cylindrical body, between the interface surface and the second end. A portion of the slot extends into the channel, as show in Figure 15a. The slot is adapted to retain a resilient spring clip 146, and the spring clip is shaped to retain the wall drying insert within a cavity, between adjacent ridges of a corrugated inner surface of the cavity, with the interface surface oriented towards an apex 148 of the cavity.

Figure 16 shows a perspective view of a magazine 124 comprising six cavities disposed around a central axis 149. The cavities are defined by a hexagonal outer shell 160 (typically composed of cardboard) supported by cross braces 150, 151 and 152, each provided with corrugated surfaces. The corrugations 154 are oriented perpendicular to the axis and thus define parallel ridges. The spring clip is sized so as to fit between parallel ridges and, when inserted into slot 144, to retain a wall drying insert within the cavity against the outer shell 160. The spring clip is composed of a resilient material (typically a resilient plastics material) which can deform to permit the spring clip to move over the parallel ridges, thus enabling a wall drying insert to be

introduced into a cavity to the required depth when sufficient force is applied to deform the spring clip, and to retain the wall drying insert therein.

Accordingly, prior to use, the magazine 124 typically houses six wall drying inserts, retained within respective cavities by spring clips, and oriented with their interface surfaces directed towards the axis 149.

Figure 17 shows a cross sectional perspective view of dispensing gun 122 in a fully extended configuration, comprising a body 170. Mounted to the body is a side handle 172. The rotatable support member 126 is secured to the body by a radial ridge 175 extending from the body which cooperates with a radial groove 176 in the outer surface of the rotatable support member. The radial ridge is able to slide within the radial groove so as to enable the rotatable support member to rotate around axle 178, which extends from the centre of the base of the cavity 127, into housing 180.

The body also comprises piston chamber 182, slideably connected to handle 173 by telescopic piston 184. A plunger 188 extends from the handle, through aperture 190 in the body 170 and is aligned with one of holes 129 in the base of cavity 127. Thus, the handle may be moved in the direction E to cause the plunger to move through a hole 129, until the handle 173 abuts the body 170, as shown in Figure 18. As the handle is moved in the direction E, the telescopic piston is slideably received by the piston chamber. Expansion spring 195 is positioned around spindle 192 and abuts both the piston chamber end cap 193 and annular surface 194 within the telescopic piston, thereby biasing the telescopic piston in an extended position.

Coupling member 198 is positioned within the body. Ring 200, around axle 178, is biased by spring 202 in the direction E. Peg 204 extends from the ring into longitudinal groove 206 on the outer surface of the plunger. A further peg 205 extends from the underside of plate 208 into serpentine groove 209 around the circumference of the rotatable support member (shown in Figure 19, and discussed below). The spring force of spring 202 exceeds (and preferably greatly exceeds) the spring force of the expansion spring, such that the coupling member (and thus the handle) is forced in the direction E as far as permitted by the serpentine groove. Accordingly, in the absence of external force in the directions E or F, the handle rests in an expanded position (but not the fully expanded position depicted in Figure 17). When the handle 173 is fully extended in the direction F, the peg 204 abuts plunger end cap 210, causing the coupling member 198 to move in the direction E (forcing

spring 202 into compression) until top plate 208 abuts the rear face 212 of the body, and the dispensing gun is fully extended, as shown in Figure 17.

When the handle is at rest in the extended position, the dispensing gun is configured to receive a magazine (which typically initially houses six wall drying inserts) into cavity 127, as shown in Figure 12. When a magazine is so installed, each cavity aligns with a hole 129.

Thus, in use, the open end of the magazine is placed against a wall so as to align a the lowermost cavity (and thus the plunger) with a hole in the wall, and the handle is moved from the extended position, in the direction E, to the fully compressed position shown in Figure 18, where the handle abuts the body. During this process, peg 204 slides within longitudinal groove 206 as the plunger moves in the direction E. As the plunger extends into the cavity, through a hole 129, the end of the plunder abuts the wall drying insert housed in the cavity and dispenses the wall drying insert from the cavity to a predetermined depth in the hole in the wall. Furthermore, the spring clip ensures that the wall drying insert is dispensed into the wall in a predetermined orientation with respect to the dispensing gun.

Typically, wall drying inserts are dispensed into pre-drilled holes having a diameter slightly greater than the external diameter of the wall drying insert. Accordingly, the spring clip, initially adapted to retain the wall drying insert in the cavity, as described above, deflects as the second end of the wall drying insert enters the hole, and the wall drying insert is thus retained within the hole in the wall, and forced into contact with the lower surface of the hole in the wall, by the elastic force of the spring clip.

The wall drying insert is composed of a porous material and, when introduced into a hole in a damp wall, moisture is drawn into the wall drying insert material by capillary action (facilitated by maximized contact area between the internal surface of the hole, as ensured by the spring clip), eventually evaporating due to the action of air circulating through the channel 134. In some cases, walls may be extremely damp. Thus, the interface surface is adapted to receive water impinging thereon and direct the water into the channel through the aperture 138, from where it will either flow out of the wall through the channel, or evaporate. Accordingly, the wall drying insert functions most efficiently when installed into a hole in a wall with the interface surface pointing upwards.

When the handle 173 of the dispensing gun is moved in the direction E from the position as shown in Figure 18, to the fully extended position as shown in Figure 17, via the extended position, the plunger end cap 210 catches the peg 202, and pulls the coupling member in the direction E. Subsequent movement of the handle back to the extended position from the fully extended position causes the rotatable support member to rotate 1/6 of a rotation (60 degrees), so as to align an adjacent cavity with the plunger, thus readying the apparatus to dispense another wall drying insert therefrom. This may be better understood with reference to Figure 19.

Figures 19a-19d show a schematic representation of the operation of the coupling member to rotate the rotatable support member, during use of the dispensing gun. Figure 19a shows features of the apparatus discussed above, labelled in accordance with Figure 17 and 18. The positions of pegs 204 and 205 are depicted, and the outline of the top plate 208 is shown, although these would not be visible from the top view of Figures 19a-19d.

Figure 19a shows the apparatus in a resting position, corresponding to the handle being in the extended position. Peg 205 rests at an apex I in the serpentine groove, biased by spring 202. Peg 204, in longitudinal groove 206, abuts the plunger end cap 210. The expansion spring holds the handle, and therefore the plunger, in the extended position. As can be seen in the corresponding front cross sectional view of the rotatable support member, when peg 205 at an apex I, the plunger is aligned with a hole 129. The handle may then be moved between the extended position, to the compressed position to dispense a wall drying insert. Movement of the handle and plunger between the extended position and the compressed position does not result in any change in the position of the coupling member, or of the rotatable support member. Thus, following dispensing of a wall drying insert, the plunger is aligned with an empty cavity.

Figure 19b shows the apparatus in a fully extended position. Movement of the handle and the plunger from the extended position shown in Figure 19a to the fully extended position shown in Figure 19b, by application of force on the handle in the direction F, pulls the coupling member in the direction F, due to the force applied by the plunger end cap to peg 204. Peg 205 is drawn through the serpentine groove to an apex II, which in turn transmits the linear motion of the coupling member into rotational motion of the rotatable support member and, as can be seen in the corresponding front cross sectional view, when the peg 205 is in an apex II, the rotational no longer

aligns with a hole 129 (and thus does not align with a cavity). In the fully extended position, the spring 202 is in compression.

Release of the force on the handle in the direction F results in the tension in spring 202 overcoming the spring force of the expansion spring in the telescopic piston, and the coupling member and the plunger is forced in the direction E. Peg 205 is thus forced along the serpentine pathway away from an apex II, around an elbow III and along a ramp IV, coming to rest in a further apex I, as show in Figures 19c and 19d. Movement of the peg 205 along a ramp IV causes the linear motion of the coupling member to be converted into rotational motion of the rotational member, rotating the rotatable support member so as to align the plunger with a further hole 129 and a further cavity. The cycle depicted in Figures 19a-19d may be repeated any number of times to cycle the position of the rotatable support member so as to sequentially align the plunger with each available cavity, such that all wall drying inserts may be sequentially dispensed.

Improvements and modifications may be incorporated herein without deviating from the scope of the invention.

Claims

1. Apparatus for dispensing wall drying inserts one at a time from a magazine.

2. Apparatus according to claim 1, comprising one or more wall drying inserts and a dispensing gun, the dispensing gun comprising:
- a rotatable support and a magazine secured to the rotatable support;
the magazine comprising a plurality of cavities disposed around a central axis, each said cavity adapted to house a wall drying insert;
- a plunger operable to move parallel to the central axis between a first position, and a second position which is within a cavity; and
- a coupling mechanism which converts linear motion of the plunger into rotational motion of the rotatable support in order to rotate the magazine about the central axis, from a first orientation wherein the plunger is in alignment with a first cavity to a second orientation wherein the plunger is in alignment with a second cavity adjacent to the first cavity, responsive to predefined motion of the plunger, in use.

3. Apparatus according to claim 2, wherein the predefined motion of the plunger comprises motion of the plunger parallel to the central axis between a first position and a further first position.

4. Apparatus according to claim 2 or claim 3, wherein the magazine is demountably secured to the rotatable support.

5. Apparatus according to claims 2 to 4, wherein the magazine comprises six cavities.

6. Apparatus according to claim 3, wherein the magazine is a hexagonal prism comprising six tubular cavities, each said cavity having a triangular cross section.

7. Apparatus according to claims 2 to 6, wherein each said cavity has a corrugated inner surface, or surfaces.

8. Apparatus according to a one preceding claim, wherein each said wall drying insert is provided with a resilient spring clip and each said spring clip is

retained within a channel on a corrugated inner surface of a cavity, when housed in the magazine.

9. Apparatus according to claims 2 to 8, wherein the coupling mechanism and/or the plunger are operatively connected to a handle and wherein the handle is slideably operable to move the plunger between the first and second positions.

10. Apparatus for dispensing a wall drying insert, comprising:
a wall drying insert and an applicator, the applicator comprising:
a cavity adapted to house the wall drying insert;
a rotatable member;
a coupling which converts rotational motion of the rotatable member into linear motion in order to move the coupling through the cavity; and
an abutment which is adapted to be operatively connected to the wall drying insert and to the coupling;
wherein, in use, the wall drying insert is positioned inside the cavity in operative connection with the abutment and rotation of the rotatable member pushes the abutment which pushes the wall drying insert out of the cavity into a hole in a wall.

11. Apparatus according to claim 10, wherein an internal surface of the cavity comprises a flat surface which acts to prevent rotation of the abutment.

12. Apparatus according to claim 10 or claim 11, wherein the coupling comprises a threaded shaft connected to the rotatable member and a threaded sleeve which is operatively connected to the abutment.

13. Apparatus according to claims 10 to 12, wherein the rotatable member is adapted to receive a drill, to rotate the rotatable member.

14. Apparatus for fitting a wall drying insert into a hole in a wall, comprising:
a wall drying insert and an applicator, the applicator comprising:
a substantially tubular member adapted to house the wall drying insert;
a rotatable member;

a coupling which converts rotational motion of the rotatable member into linear motion in order to move the coupling through the substantially tubular member; and

an abutment which is adapted to be operatively connected to the wall drying insert and to the coupling;

wherein, in use, the wall drying insert is positioned inside the tubular member in operative connection with the abutment and rotation of the rotatable member pushes the abutment which pushes the wall drying insert out of the tubular member into a hole in a wall.

15. Apparatus according to any one preceding claim, wherein the or each said wall drying insert comprises an interface surface shaped such that when inserted in a horizontally extending hole in a wall, the interface surface inclines progressively upwardly to provide an interface between the insert and circulating air in the hole.

16. Apparatus according to any one preceding claim, wherein the or each said wall drying insert is composed of a porous material.

17. Apparatus according to any one preceding claim, wherein the or each said wall has a channel extending therethrough, such that at least a portion of the or each said wall drying insert is tubular.

18. Apparatus according to claims 15 to 17, wherein the interface surface defines an aperture extending into the channel.

19. Apparatus according to claims 15 to 18, wherein the interface surface is concave, such that all parts of the interface surface are angled downwards towards the aperture.

20. Apparatus according to claims 15 to 19, wherein the or each said wall drying insert comprises a resilient spring clip extending from an upper portion of an outward facing surface.

21. Apparatus according to claims 15 to 20, wherein the or each said wall drying insert is provided with connecting means which allow a plurality of wall drying inserts to be connected together.

22. Apparatus according to claim 21, wherein the or each said wall drying insert comprises a first end shaped as a male connector of connecting means, and a second end that is a female connector of connecting means.

23. Apparatus according to claim 22, wherein the male and female connectors are, respectively, formed generally as a ball and socket.

24. A dispensing gun for dispensing one or more wall drying inserts from a magazine housing one or more wall drying inserts, the dispensing gun comprising:

- a rotatable support and a magazine secured to the rotatable support; the magazine comprising a plurality of cavities disposed around a central axis, each said cavity adapted to house a wall drying insert;
- a plunger operable to move parallel to the central axis between a first position, and a second position which is within a cavity; and
- a coupling mechanism which converts linear motion of the plunger into rotational motion of the rotatable support in order to rotate the magazine about the central axis, from a first orientation wherein the plunger is in alignment with a first cavity to a second orientation wherein the plunger is in alignment with a second cavity adjacent to the first cavity, responsive to predefined motion of the plunger, in use.

25. A dispensing gun according to claim 24, wherein the predefined motion of the plunger comprises motion of the plunger parallel to the central axis between a first position and a further first position.

26. A wall drying insert wall drying insert comprising:
an interface surface such that when inserted in a horizontally extending hole in a wall, the interface surface inclines progressively upwardly to provide an interface between the insert and circulating air in the hole.

27. A wall drying insert according to claim 26, composed of a porous material.

28. A wall drying insert according to claim 26 or claim 27, having a channel extending therethrough, such that at least a portion of the or each said wall drying insert is tubular.

29. A wall drying insert according to claims 26 to 28, wherein the interface surface defines an aperture extending into the channel.

30. A wall drying insert according to claims 26 to 29, wherein the interface surface is concave, such that all parts of the interface surface are angled downwards towards the aperture.

31. A wall drying insert according to claims 26 to 30, comprising a resilient spring clip extending from an upper portion of an outward facing surface.

32. A wall drying insert according to claims 26 to 31, comprising a first end shaped as a male connector of connecting means, and a second end that is a female connector of connecting means, wherein the male and female parts are formed and arranged to cooperatively engage.

33. A wall drying insert according to claim 32, wherein the male and female connectors are, respectively, formed generally as a ball and socket.

34. A kit of parts comprising:
a magazine comprising a plurality of cavities disposed around a central axis, each said cavity adapted to house a wall drying insert; and
a plurality of wall drying inserts.

35. A kit of parts according to claim 34, comprising a dispensing gun, wherein the magazine is demountably securable to a rotatable support of the dispensing gun.

36. A kit of parts according to claims 34 or 35, wherein each of the plurality of cavities houses a wall drying insert.

37. A kit of parts according to claims 34 to 36, comprising a plurality of magazines.

38. A method of dispensing wall drying inserts one at a time from a magazine.

39. A method according to claim 39 comprising the steps of:

- providing a dispensing gun comprising a rotatable support and a magazine secured to the rotatable support, the magazine comprising a plurality of cavities disposed around a central axis, each said cavity adapted to house a wall drying insert;
- the dispensing gun further comprising a plunger and a coupling mechanism which converts linear motion of the plunger into rotational motion of the rotatable support; and
- moving the plunger from a first position to a second position within a first cavity housing a wall drying insert, so as to push the wall drying insert out of the cavity, and thereby dispense the wall drying insert.

40. A method according to claim 39, wherein the magazine is demountably securable to the rotatable support.

41. A method of dispensing a plurality of wall drying inserts according to claims 39 to 40, comprising the steps of moving the plunger from the first position to the second position, to thereby dispense a first wall drying insert, moving the plunger parallel to the central axis between a first position and a further first position in a predefined manner, so as to cause the magazine to rotate from the first orientation to the second orientation, and from the first position to the second position within the second cavity, to thereby dispense a second wall drying insert.

42. A method according to claims 39 to 41, comprising the step of positioning the magazine such that the first cavity adjacent to a hole in a wall, and dispensing a wall drying insert into the hole.

43. A method according to claims 40 to 42, comprising the steps, demounting an empty magazine from the rotatable support, and demountably securing a further magazine to the rotatable support.

44. A method of removing moisture from a wall, comprising the steps of providing one or more holes in a wall, and dispensing one or more wall drying inserts into the one or more holes according to the method of claims 38 to 43.

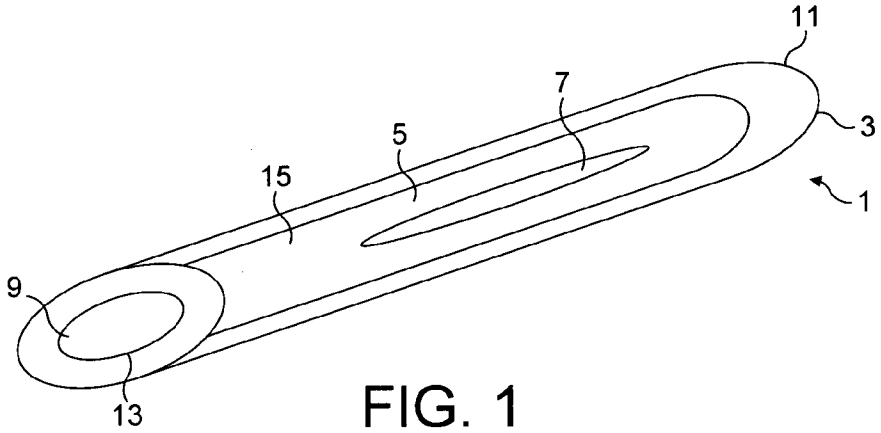

FIG. 1

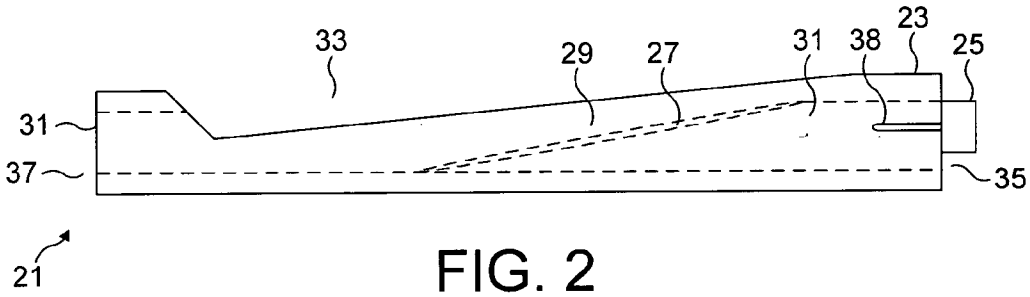

FIG. 2

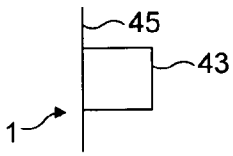

FIG. 3a

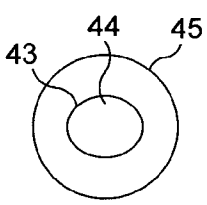

FIG. 3b

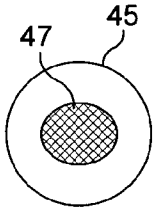

FIG. 3c

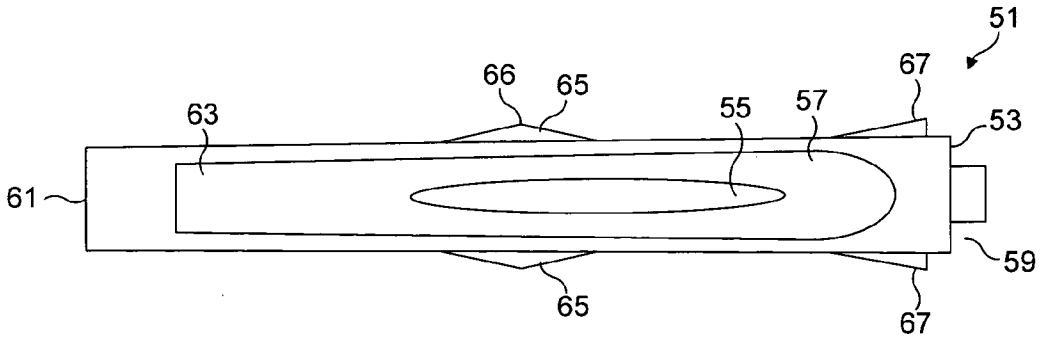

FIG. 4

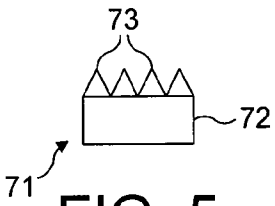

FIG. 5

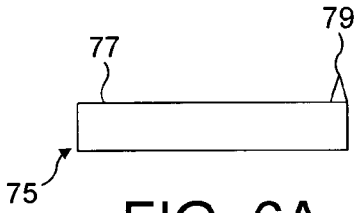

FIG. 6A

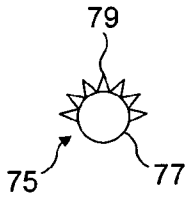

FIG. 6B

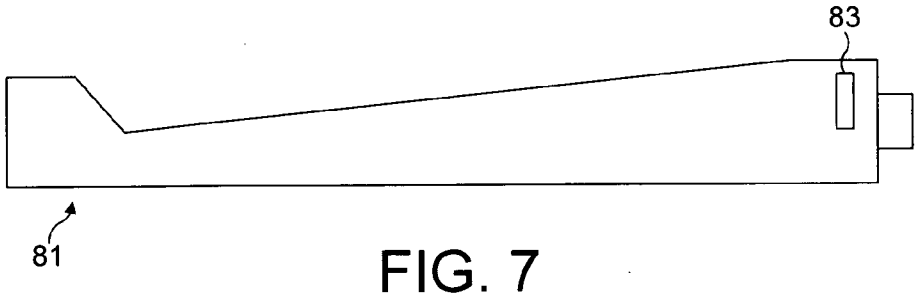

FIG. 7

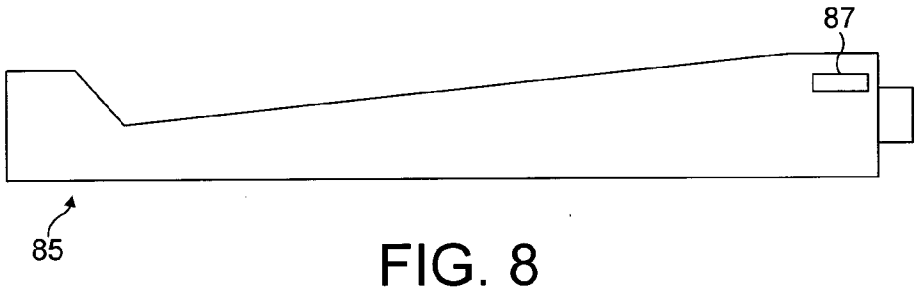

FIG. 8

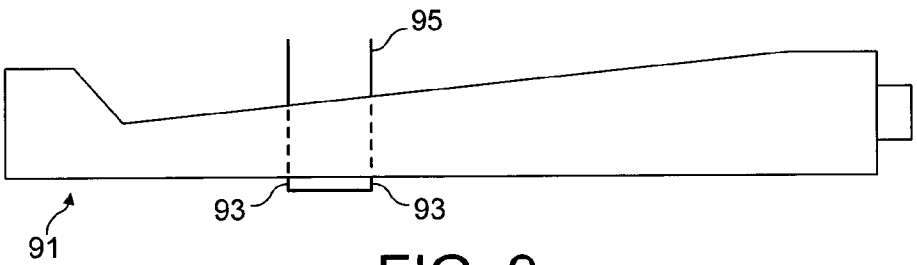

FIG. 9

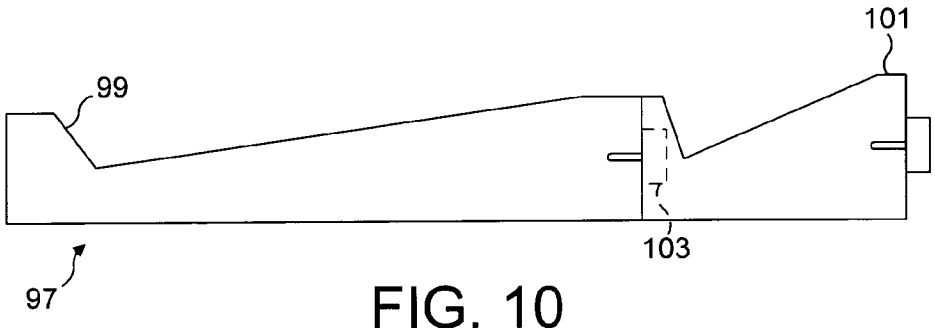

FIG. 10

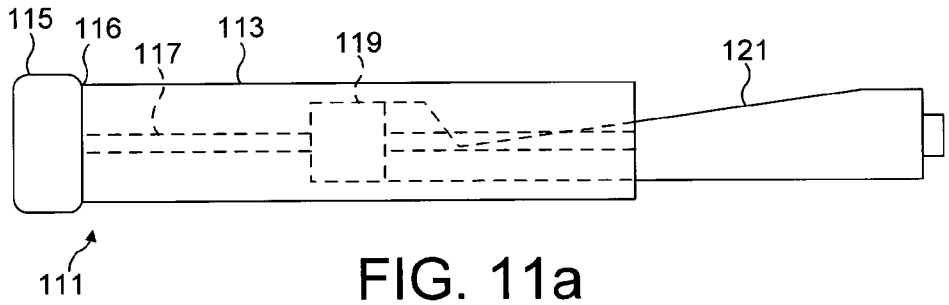

FIG. 11a

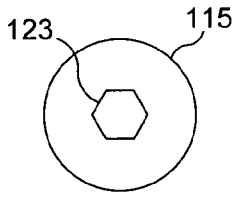

FIG. 11b

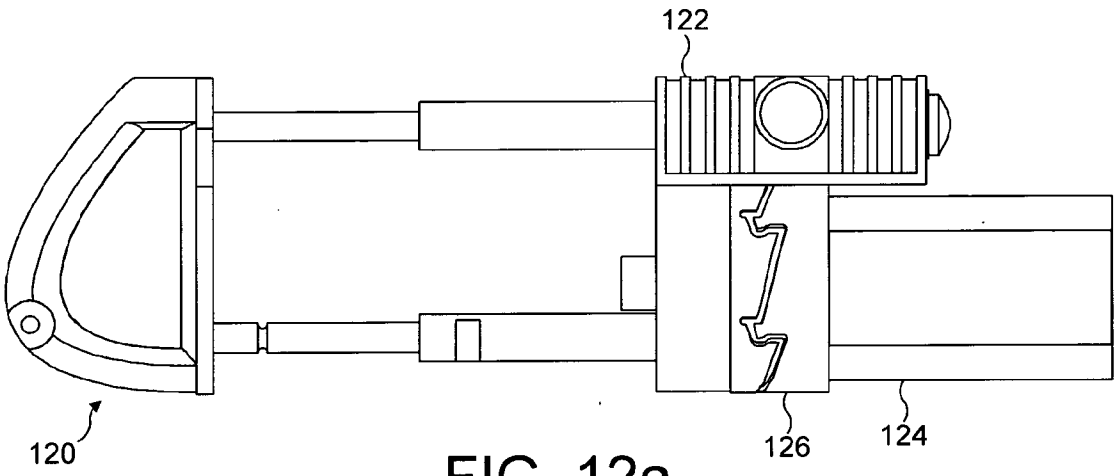

FIG. 12a

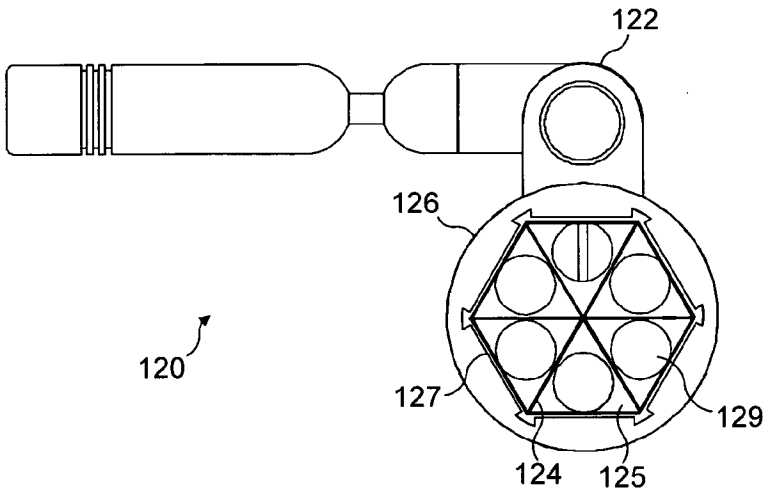

FIG. 12b

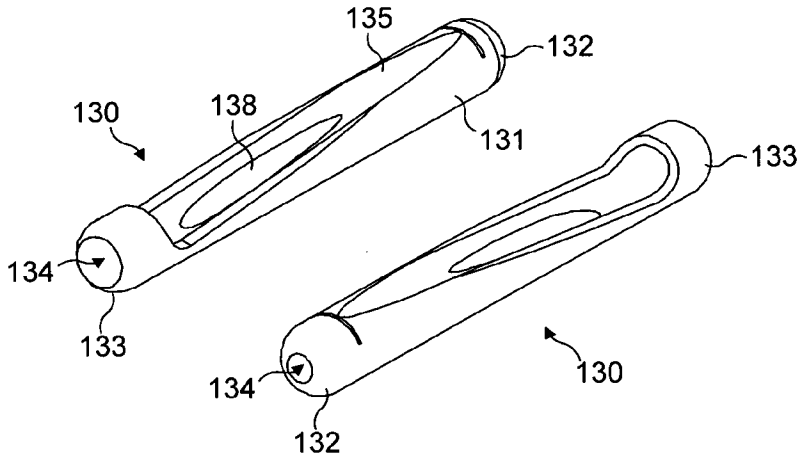

FIG. 13

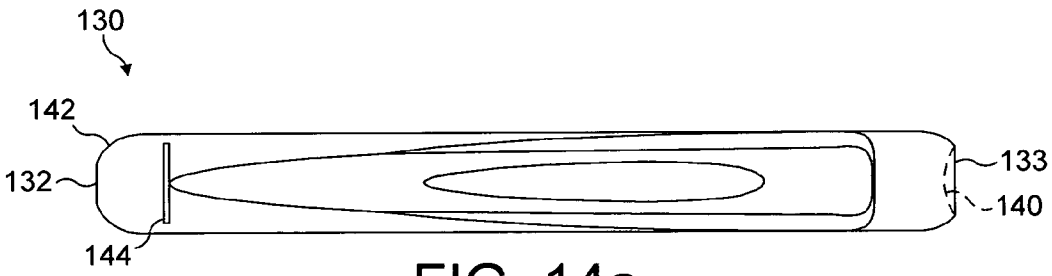

FIG. 14a

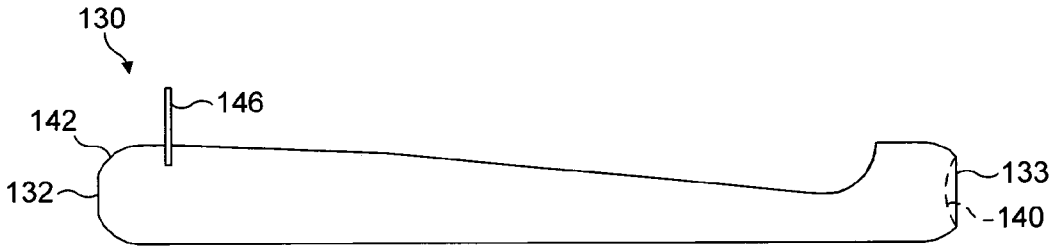

FIG. 14b

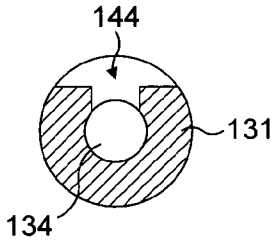

FIG. 15a

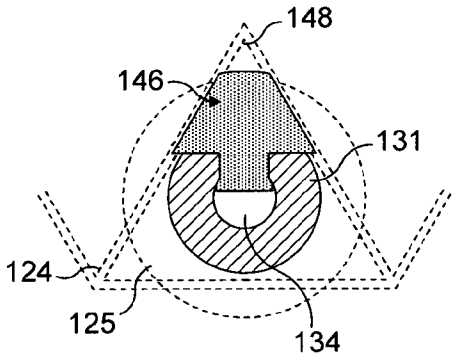

FIG. 15b

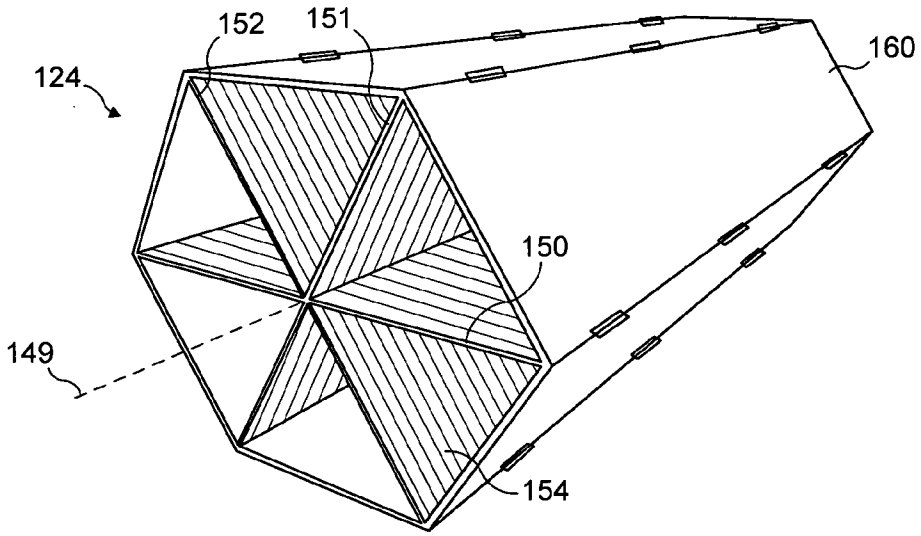

FIG. 16

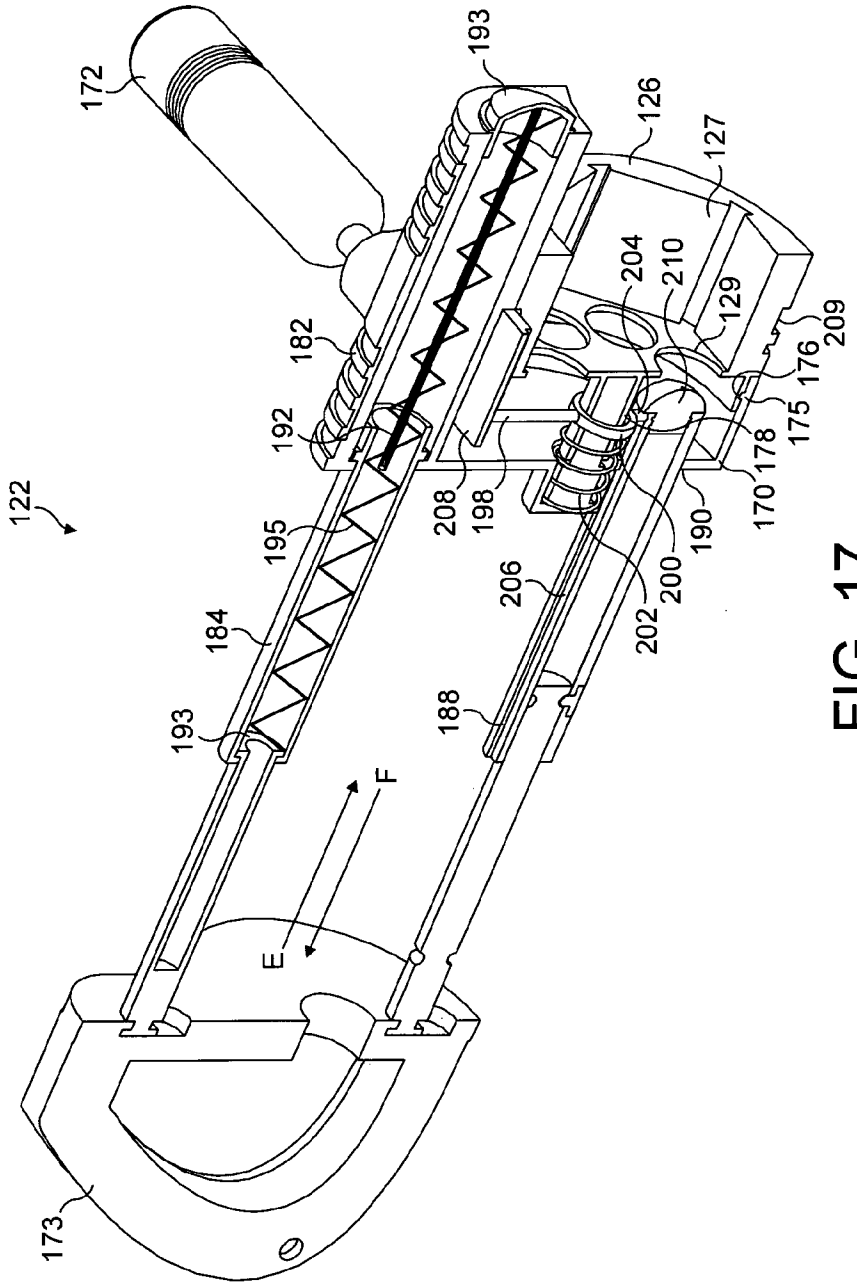
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FIG. 17

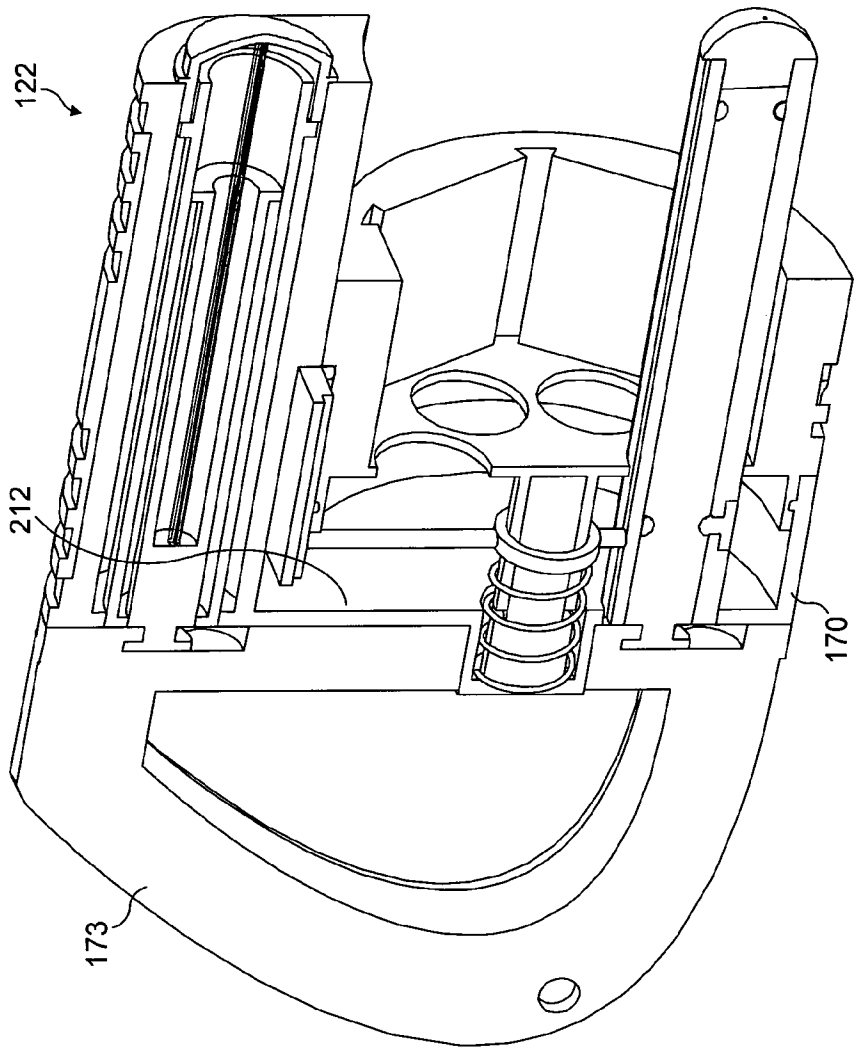

FIG. 18

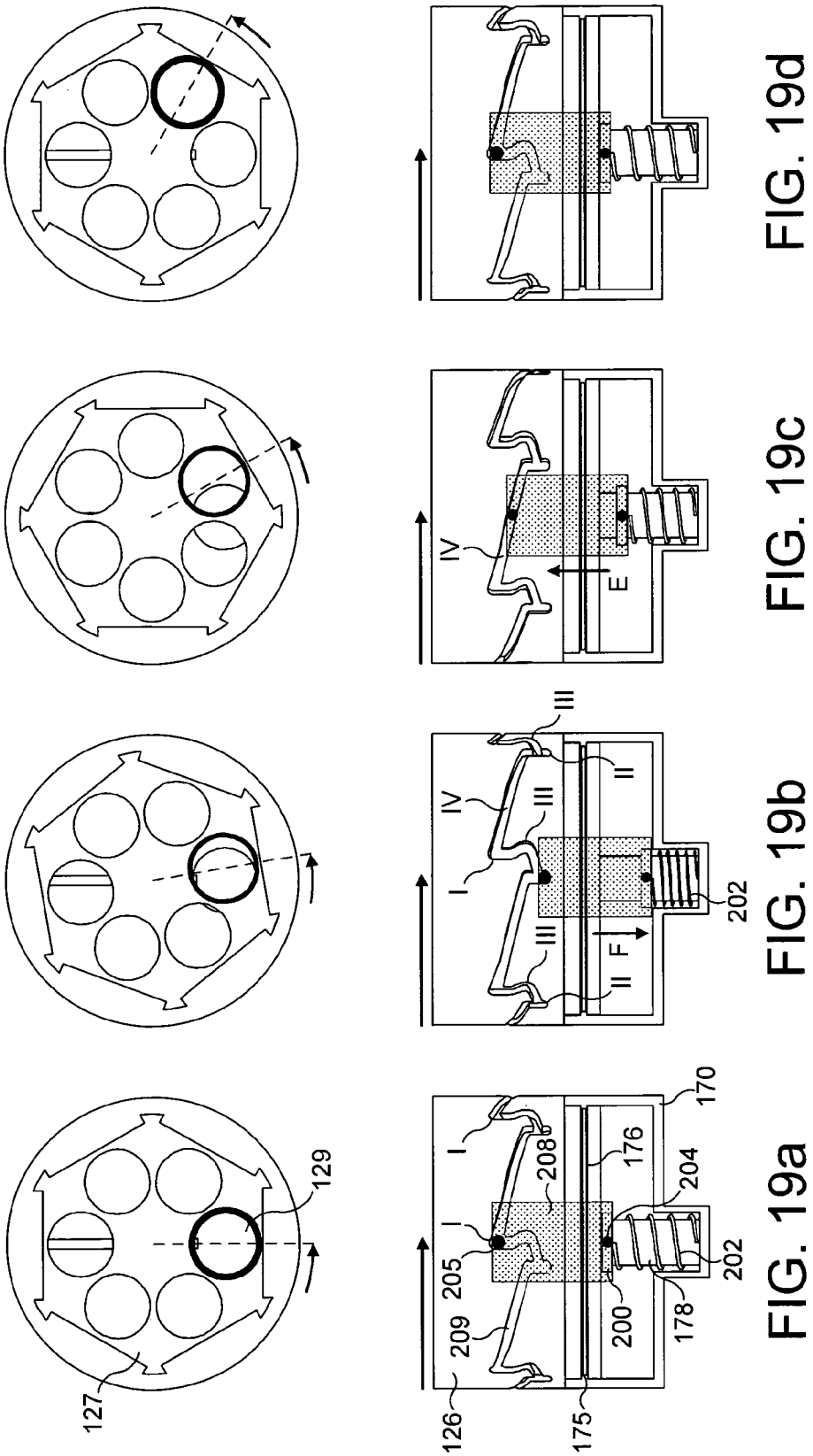

FIG. 19a FIG. 19b FIG. 19c FIG. 19d

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2009/002655

A. CLASSIFICATION OF SUBJECT MATTER
INV. E04B1/70 B25C1/02
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
E04B B25C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 449 622 A2 (HILTI AG [LI]) 25 August 2004 (2004-08-25) paragraph [0016]; claim 1; figure 1	1
X	US 2 256 012 A (WALTER BLAIR) 16 September 1941 (1941-09-16)	1
Y	figures 1,4,5,7	34-38,44
X	EP 0 874 094 A2 (HOUSE DOCTOR HOLDINGS LTD [GB] MULHERON MALCOLM [GB]) 28 October 1998 (1998-10-28)	26-28
Y	claim 8; figures 3,4	34-38,44
X	FR 1 189 634 A (BETTINGER) 5 October 1959 (1959-10-05) figures 1,2	26-28

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
12 April 2010	21/04/2010

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Rosborough, John

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INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2009/002655

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 999 479 A (HELMUTH SCHONENBERGER; MARCEL SCHONENBERGER) 28 July 1965 (1965-07-28) figure 1 -----	26,28,32
X	CH 235 727 A (MUELLER ALOIS [CH]) 31 December 1944 (1944-12-31) figures 1,2 -----	26,28,29

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Information on patent family members

International application No
PCT/GB2009/002655

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