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(54) Title: A SUPPLY CHUTE FASTENING DEVICE FOR INSULATING INTERFACES, SUCH AS ABSORBING ACCESSORIES, A SUPPLY CHUTE, A METHOD FOR USING SUCH A TOOL AND A TILE TO BE FASTENED BY SAID TOOL

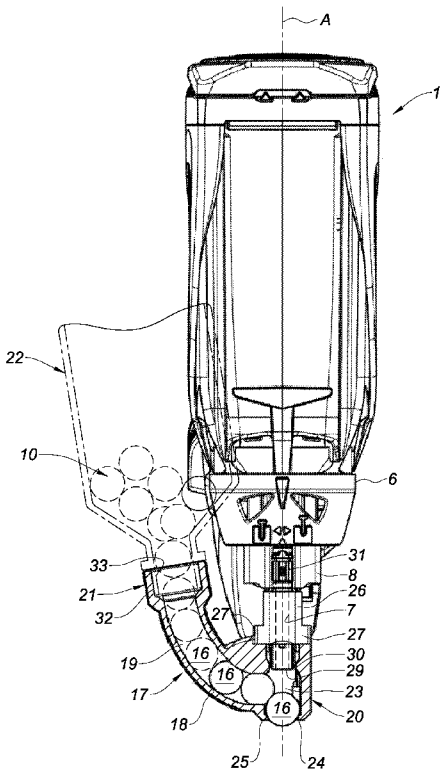

Fig. 1

(57) Abstract: - An insulating interface supply chute fastening tool, a supply chute, a method for using such a tool and a tile to be fastened by said tool. - The tool for fastening a part fastening member on a supporting material, the fastening member (4) comprising a fastening stem (11) and an abutment head (12) for abutting the part (2) on the supporting material (3) comprises a motor for driving the fastening member and a nose for receiving the fastening member. Advantageously, it comprises a supply chute (17) for insulating interfaces (10), for introducing in the tool nose an insulating interface (10) ahead of the stem (11) of a fastening member (4) arranged in said nose.

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A SUPPLY CHUTE FASTENING DEVICE FOR INSULATING INTERFACES, SUCH AS ABSORBING ACCESSORIES, A SUPPLY CHUTE, A METHOD FOR USING SUCH A TOOL AND A TILE TO BE FASTENED BY SAID TOOL

The present invention relates to a tool for fastening part fastening members on a supporting material and, more particularly although not exclusively, a fastening tool of the nailing tool, screwing device, etc. type allowing fastening members to be fastened with a minimum effort, a high reliability and an optimum safety.

As an example of use, such a nailing tool is particularly well adapted for laying nails for fastening tiles on roof battens. Each tile is provided, to this end, with at least one through-hole for the stem of the nail fastening in the batten, while the nail head, with a diameter higher than the through-hole, applies against the circumference of the hole, on the external side of the tile.

For carrying out such a fastening, the nails contained in a magazine associated with the nailing hole are driven successively in a tip guide axially provided in the nose of the nailing tool and, when a safety sensor of the nailing tool is placed in abutment on the external side of the tile, around said hole, the operator triggers the control of a powder or gas driving motor of the nailing tool, propelling the fastening member (nail) axially out of the tip guide, beaten down, via its stem, into the wooden batten, while its head applies against the external circumference of the hole, fastening the tile to the batten.

If fastening as such provides a high efficiency in terms of laying speed, accuracy and quality of the achieved fastening, as compared to using a hammer, for instance, on the other hand, there is the problem of absorbing the shock upon the impact of the head of the nail being expelled with the circumference or the external surface bounding the hole of the tile.

Indeed, under the action of the propelling motor, the nail is axially ejected with a significant energy, and thus, a significant axial force, which can result, upon the impact of the head of the nail with the circumference of the hole of the tile, in the latter being chipped, in pits occurring, even in the tile breaking, and thus having to be replaced.

A solution could involve providing a washer between the nail head and the external circumference, so that the head applies against the washer and not directly on the tile.

Although this solution provides good results, it however significantly puts at a disadvantage the laying time as, for each nail to be laid, a washer should be positioned around the hole and then, the tool nose should be applied around the washer, against the external side of the tile. Moreover, it results therefrom that the operator should have a washer supply at hand, in addition to the nail rows for the nailing tool, such a supply being all the larger as it should contain washers of different sizes being adapted to the different nails.

The aim of the present invention is, more specifically, to overcome such drawbacks and to generally prevent the part to be fastened (tiles,

plates, or the like) from being damaged upon the contact of the fastening member head (nail, screw, etc.) on the latter.

To this end, this invention relates to a tool for fastening a part fastening member on a supporting material, the fastening member comprising a fastening stem and an abutment head for abutting the part on the supporting material, and said tool comprising a motor for driving the fastening member and a nose for receiving the fastening member, said tool being characterized in that it comprises a supply chute for absorbing accessories, so as to introduce in the tool nose an absorbing accessory ahead of the stem of the fastening member arranged in said nose.

Thus, upon each operation of the tool, an absorbing accessory is also positioned before the fastening member, by means of the supply chute, being driven axially by the head of the fastening member (the stem thereof having crossed the accessory) for making up an insulating interface absorbing the shock between the member head and the part, for example a nail with a tile to be laid. Consequently, it is no longer damaged.

The efficiency of such a fastening tool, in terms of laying speed and quality is thereby maintained, such a tool being, more specifically, able to be a nailing tool or a screwing device.

Actually, while the problem underlying this invention was an absorbing problem, the Applicant does not intend to restrict the scope of the application to such a field. They actually intend to widen the field of this invention.

Thus, and more generally, this invention relates to a tool for fastening a part fastening member on a supporting material, the fastening member comprising a fastening stem and an abutment head for abutting the part on the supporting material, said tool comprising a motor for driving the fastening member and a nose for receiving the fastening member, characterized in that it comprises an insulating interface supplying chute for introducing in the tool nose an insulating interface ahead of the stem of a fastening member arranged in the nose.

Thus, there is provided insulation, in the broad sense, between the fastening member and the part.

According to two examples, the interface could absorb the energy of the shock between the fastening member head and the part to be fastened as previously indicated, or could stop the thermal energy from outside for taking part in the thermal insulation of a building at the level of fastening members with the structure of the building.

According to another example, the insulating interface could electrically isolate the fastening member from the part to be fastened when necessary, cancelling in particular every short circuit risk.

According to another example still, the insulating interface could have a tightness function in a building, preventing water, air, particles and dust from penetrating between the fastening member and the part to be fastened.

Naturally, the insulating interface could combine several of the above mentioned functions.

Finally, said insulating interfaces are accessories arranged in the chute.

To this end, said supply chute comprises a duct wherein said accessories are received successively and having a first end being connected to the nose, so as to receive an accessory arranged ahead of the stem of said fastening member present in the nose.

A single accessory forming the insulating interface is thus arranged ahead of the fastening member.

In order to position the insulating accessory ahead of the fastening member, the first end of the chute has a channel coaxial to the nose and ending with an internal flange against which the external periphery of the accessory applies. Thus, the latter is maintained in axial abutment in said channel, downstream the member.

Advantageously, said supply chute comprises a second end, to which a storage supply is connected, containing the accessories and driving them successively in the duct of said chute.

Thus, supplying the chute is directly ensured by the supply integral therewith allowing to store a large quantity of insulating accessories and thereby to impart a valuable operating autonomy of the tool, and to have a compact tool.

Preferably, the accessories are shifted in the chute through gravity so as to be spontaneously positioned ahead of the fastening member.

The accessories are advantageously manufactured, including in the application for shock absorption, in an energy absorption resiliently

deformable material and they preferably have a shape belonging to the group of spheres, cylinders, parallelepipeds or the like, so as to have a sufficient axial dimension depending on the member stem, so as to absorb the impact of the fastening member head and protect the part.

The tool could be of the powder, gas, pneumatic or electric type.

This invention further relates to a supply chute for insulating interfaces. The chute is remarkable in that it is arranged so as to be mounted ahead of the nose of a tool for fastening members of a part to be fastened on a supporting material, such as previously defined.

The invention further relates to a method for using a fastening tool of the nailing tool or screwing device type, such as previously defined, for fastening a part on a supporting material by a fastening member with a fastening stem and an abutment head.

The method, wherein the part to be fastened is positioned on the supporting material and the fastening member is positioned on the supporting material through the part pressing it against the supporting material, is remarkable in that an insulating interface is introduced downstream the fastening member and the part is pressed against the supporting material with the insulating interface which has been crossed by the fastening member.

Thus, an insulating interface is always arranged between the fastening member head and the part being fastened on the supporting material.

The invention also relates to a tile to be fastened on a roof batten by means of a fastening member able to cross a receiving hole in the tile.

Advantageously, the tile has, on its external side, a footprint for positioning a fastening tool and a receiving housing for an insulating interface arranged so as to be associated with said fastening member. Preferably, the interface receiving housing is concentric to the hole in the tile.

Thus, upon fastening the tile, the tool is appropriately wedged on the external side thereof and, in the case of an absorbing accessory, the latter is also received and centred with respect to the receiving hole, thus providing a safe and appropriate fastening.

For example, said footprint comprises projections of the external side of the tile and arranged around said hole, for positioning therebetween, a supply chute provided at the end of the nose of the fastening tool. And said housing is hemispherical and arranged so as to receive an insulating interface, with a substantially complementary shape.

This invention will be better understood from the following description of an embodiment of the fastening tool according to the invention, with reference to the appended drawing in which:

- Fig. 1 shows, in a bottom view, a fastening tool with, in a section, a supply chute containing insulating interfaces forming, in this example, shock absorbing accessories between the fastening members and the part to be fastened;

- Fig. 2 shows an exploded perspective view of the chute;

- Fig. 3 is a view of a fastening member comprising, in this example, a nail and an absorbing accessory;

- Fig. 4 shows, in a perspective view, the part to be fastened, such as a tile, by means of fastening members; and

- Fig. 5 shows, in an axial sectional view, positioning the tool on the tile, with the absorbing accessory arranged on the latter, before the operation of said tool.

The tool 1 being illustrated on Fig. 1 is, in this example, a nailing tool of the usual type for fastening parts 2 on a supporting material 3 by fastening members 4. The latter are nails 5 issued from a not shown magazine, crosswise integrally made with the nose 6 of the nailing tool and engaging successively in the bore 7 of a tip-guide 8 arranged in the nailing tool nose. For axially expelling each nail according to the axis A of the nailing tool 1, in the housing 9 of the latter, there are arranged, in a known and not shown way, a gas, powder or electric driving motor, and a sprue or intermediary piston acting, through the controlled action of the motor, against the nail so as to eject it, according to the axis A, from the internal bore 7 of the tip-guide and allowing it to be anchored in the supporting material fastening the part therein.

When the latter is made in a crumbly material such as a tile, as will be subsequently seen (or any other part likely to be deformed or damaged by the violent contact of the nail on it), the fastening

member 4 advantageously comprises, as shown on Fig. 3, a nail 5 and an insulating interface 10, making up, in the described example, a shock absorbing accessory.

It can be seen on this Fig. 3 that the nail, usually, comprises a fastening stem 11 intended for anchoring in the supporting material 3, such as a roof batten 13 (Fig. 5), and an abutment head 12 for pressing the part 2 on the supporting material. The aim of the absorbing accessory 10 is to insulate the abutment head 12 of the nail 5 from the external side 14 of the supporting material such as a tile 15, playing the part of an energy absorption interface. It has, in this example, a spherical shape, such as a bead 16 made in an energy absorption material, such as a natural or synthetic rubber, or a similar material.

For achieving an automatic positioning of the absorbing beads 16, without hindering the fastening speed provided by such a tool, the nailing tool 1 comprises, according to this invention, a supply chute 17 for absorbing accessories 10, in the present case, the beads, allowing to introduce them, one by one, in the nose 6 of the tool, ahead of the stem 11 of a fastening member arranged in the bore 7 of the tip-guide.

As illustrated on Figs. 1 and 2, the supply chute 17 comprises a side wall 18 delimiting an internal through-duct 19 wherein the absorbing accessories 10 are arranged. As the latter are beads 16, the duct 19 has a circular section with a diameter somewhat higher than that of the dimensionally identical beads, on the other hand. These are thereby arranged in a row in the duct ending with a first end 20 able to cooperate with the tip-

guide 8 of the nailing tool and with a second end 21 being connected to a supply 22 of absorbing beads 16.

More particularly, the first end 20 of the chute 17 has a cylindrical axial channel 23 into which the duct 19 opens up substantially transversally and being intended to receive a bead 16. When the chute is mounted at the end of the tip-guide 8, the channel 23 is coaxial to the axis A of the nailing tool and including to the internal bore 7, shown in dashed lines on Fig. 1, of the tip-guide, wherein the not visible nail is received.

The bead 16 issued from the duct 19 introduces itself through gravity into the channel 23 and axially comes in abutment against a shoulder delimiting the channel. As it can be seen on Fig.1, the diameter of the shoulder 24 is close to the diameter of the bead 16 so as to maintain it in the duct and, as will be seen subsequently, to allow the flange to travel around the bead thanks to its intrinsic resilience upon the removal of the tool with the chute after the nail has been fastened. The axial abutment bead thus protrudes from the transversal side 25 ending the first end 20 of the chute 17.

Opposite this side 25, the first end 20 is intended for being connected to the tip-guide 8. To this end, Figs. 1 and 2, a connecting nosepiece 26 ends the wall 18 of the chute, extending the axial channel 23. This nosepiece 26 makes a monobloc with the chute and ensures mounting slidably the chute 17 around the tip-guide 8 and its axial holding in position on the latter via resilient tabs 27 enclosing the tip-guide and cooperating with it, here, via links of the notch and tenon type 28. The nosepiece 26 is

thereby easily engaged around the tip-guide 8 up to coming, in this case, into axial abutment against the end 29 of the tip-guide, via an internal shoulder 30 arranged in the channel 23. Alternatively, the nosepiece could screw on the tip-guide.

Thus, mounting the chute 17 on the tip-guide 8 is made particularly easy, with the channel centred and coaxial with the axis A of the tip-guide, so that the absorbing bead 16 is located perfectly in the axis of the nail, downstream the latter.

Moreover, it can be seen on Figs. 1 and 2 that the nosepiece 26 of the chute is advantageously topped with a safety sensor 31, known as such, for abutting the tip-guide against the part.

The second end 21 of the chute is arranged under the form of a link 32 intended to receive, through screwing for instance, the threaded neck 33 of a container making up the supply 22 of absorbing accessories. There is shown partially and in mixed lines the container 32 containing the absorbing beads 16, these being driven through gravity in the curved duct 19 of the chute successively up to the channel 23 with the flange 24.

With this supply 22, the nailing tool 1 is provided with a valuable operating autonomy, replacing a container with another one being, on the other hand, fast, as it does not require any auxiliary tool.

As previously indicated, the nailing tool 1 finds an advantageous use in fastening tiles 15 on roof battens 13.

With reference to Fig. 4, an example has been shown, of a tile 15 to be fastened with the

nailing tool 1 of the invention, as will be seen later on.

The tile 15 been shown comprises, in this example, for allowing it to be fastened to a batten, two through-holes 34. The number of holes could be different. The tile might not comprise any holes, the fastening members themselves crossing the tile while forming holes. On the external side 14 of the tile and around the holes 34 there are provided housings 35 for receiving absorbing accessories 10, that is, in the present case, hemispherical housings wherein the absorbing beads 16 are received. These are thus correctly centred with a large contact surface with the tile 15.

In addition, for facilitating positioning the nailing tool 1 on the tile 15, so that it is substantially in the axis of the through-hole, footprints 36 are provided on the external side 14 of the tile. Such footprints are defined by protruding parts 37 the circumference of which substantially bounds the periphery of the first end 20 of the chute 17, at the level of the transversal side 25 in which the channel opens up.

Fastening the tile 15 on the batten 13 by the nailing tool 1 is shown referring to Fig. 5. A fastening member 4 has already been laid. The stem 11 of the nail 5 has diametrically crossed the absorbing bead 16, then the corresponding hole 34 for beating in the wood of the batten 13. The bead 16 acts as an insulating interface between the head 12 of the nail and the tile, absorbing the nail impact.

For fastening the other fastening member, the nailing tool 1 is brought into contact with the

external side 14 of the tile 15, substantially perpendicularly to the latter. To this end, the end 20 of the chute 17 is inserted in the protruding parts 37 so that the tool is perfectly in the axis of the through-hole. The transversal side 25 of the first end is in abutment against the external side 14 of the tile and the absorbing bead 16, located in the channel 23, engages via its part emerging from the transversal side 25 in the corresponding hemispherical housing 35. The latter is thereby correctly positioned.

It should be noticed that the bead 16.1 punctually in contact with the bead 16 in the tile housing and pushed by the other beads, maintains this bead 16 against the flange 24, and is partially located in the channel 23, without however hindering the shift of the nail 5 issued from the bore 7 of the tip-guide.

For triggering the shot, the operator presses the nailing tool 1 against the tile 15 up to the moment when the safety sensor 31, as a result of the axial recoil of the chute 17 and hence of the tip-guide 8 with respect to the housing 9 of the nailing tool, allows for the shot under the action of the sprue, pushed by the driving means, the nail 5 is ejected from the bore 7 of the tip-guide with its stem 11 which pierces diametrically the bead 16, then goes through the hole 34 so as to be anchored into the batten 13. The nail 5, on Fig. 5, has been shown while being driven into the batten. And this until the head 12 of the nail applies against the absorbing bead 16 which, as it is made in a deformable material, allows to absorb the energy resulting from the impact

of the nail head on the bead. And this, without being prejudicial to the integrity of the tile.

The shot being completed, the tool 1 is moved apart, and the travel of the flange 24 around the bead 16, the latter being pressed by the head of the nail driven into the batten, occurs with no particular resistance as a result of the natural resilience of the bead.

After the shot, another nail engages in the tip-guide 8 and the following bead is introduced through gravity in the axial channel 23 until coming into abutment against the flange 24. The other beads simultaneously follow in the duct 19 of the chute, being in punctual contact therebetween. A new shot could be triggered for fastening another tile.

Such tool 1 with chute 17 for absorbing accessories 10 is not limited to a nailing tool and could be, as an example, a screwing device, screws replacing the nails. Furthermore, using the tool is not limited to tiles but to any item to be fastened, able to deform or to become damaged upon fastening members.

If the spherical shape seems to be the most appropriate for absorbing accessories, including for gliding down the latter through gravity, such a shape could be different or be cylindrical, frustoconical, parallelipedic or other, the most important feature being that upon each shot, an accessory is located in the channel ahead of the fastening member, for absorbing the shock energy with the latter.

Although it has been described with reference to a shock absorption insulating interface, it is obvious that this invention is not restricted to

this interface type which could have another specific function or combined functions, such as a tightness, electrical insulation, thermal insulation function etc., as previously described.

CLAIMS

1. A tool for fastening a part fastening member on a supporting material, the fastening member (4) comprising a fastening stem (11) and an abutment head (12) for abutting the part (2) on the supporting material (3), said tool comprising a motor for driving the fastening member and a nose (6) for receiving the fastening member,

characterized in that it comprises a supply chute (17) for insulating interfaces (10) for introducing in the tool nose an insulating interface (10) ahead of the stem (11) of a fastening member arranged in said nose.

2. The tool according to claim 1,

wherein the insulating interface (10) absorbs the shock between the fastening member head and the part to be fastened.

3. The tool according to claim 1,

wherein the insulating interface (10) ensures a thermal insulation.

4. The tool according to claim 1,

wherein the insulating interface (10) ensures an electrical insulation.

5. The tool according to claim 1,

wherein the insulating interface (10) ensures some tightness.

6. The tool according to any of claims 1 to 5,

wherein the insulating interfaces (10) are accessories arranged in the chute (17).

7. The tool according to claim 6,

wherein said supply chute (17) comprises a duct (19) inside which said accessories are received in a

row and having a first end (20) being connected to the nose, so as to receive an accessory arranged ahead of the stem of said fastening member present in the nose.

8. The tool according to claim 7,

wherein the first end (20) of the chute has a channel (23) being coaxial to the nose (6) and ending with an internal flange (24) against which the external periphery of the accessory (10) can apply.

9. The tool according to any of claims 7 or 8,

wherein said supply chute (17) comprises a second end (21) to which a storage supply (22) is connected, containing accessories (10) and driving them successively in the duct of said chute (17).

10. The tool according to any of claims 6 to 9,

wherein the accessories (10) are made in a resiliently deformable material.

11. The tool according to any of claims 6 to 10,

wherein the accessories (10) have a shape belonging to the group of spheres, cylinders, parallelepipeds.

12. The tool according to any of claims 6 to 11,

wherein the accessories (10) are shifted in the chute (17) through gravity.

13. The tool according to any of claims 1 to 12,

wherein it is of the powder, gas, pneumatic or electric type for part fastening members to be fastened on a supporting material.

14. The tool according to claim 13,

wherein a safety sensor (31) for abutting said tool against the supporting material is mounted on the supply chute (17).

15. The tool according to any of claims 1 to 12,

wherein it is of the screwing device type for screwing part fastening members on a supporting material.

16. A method for using a fastening tool such as defined according to any of claims 1 to 15, for fastening a part on a supporting material by a fastening member (4) with fastening stem (11) and abutment head (12), said method wherein the part to be fastened (2) is laid on the supporting material (3) and the fastening member (4) is fastened on the supporting material through the part, pressing the latter against the supporting material,

characterized in that the insulating interface (10) is introduced downstream the fastening member (4) and the part is pressed on the supporting material with the insulating interface (10) which has been crossed by the fastening member (4).

17. Insulating interface supply chute,

characterized in that it is arranged so as to be mounted ahead of the nose of a tool (1) for fastening members (4) of a part to be fastened on a supporting material, such as defined according to any of claims 1 to 16.

18. A tile (15) to be fastened on a roof batten (13) by means of at least one fastening member (4) able to cross a receiving hole (34) in the tile,

characterized in that it has, on its external side (14), a positioning footprint (36) for a fastening tool (1) and a receiving housing (35) for an insulating interface (10) arranged so as to be associated with said fastening member.

19. The tile according to claim 18,

wherein the interface receiving housing (35) is concentric to the hole.

20. The tile according to claim 18 or 19,

wherein said footprint (36) comprises protruding parts (37) of the external side (14) of the tile and arranged around said hole (34), so as to position therebetween a supply chute (17) provided at the end of the nose (6) of a fastening tool.

21. The tile according to any of claims 18 to 20, wherein said housing (35) is hemispherical and arranged for receiving an insulating interface (10) of the fastening member, with a substantially complementary shape.

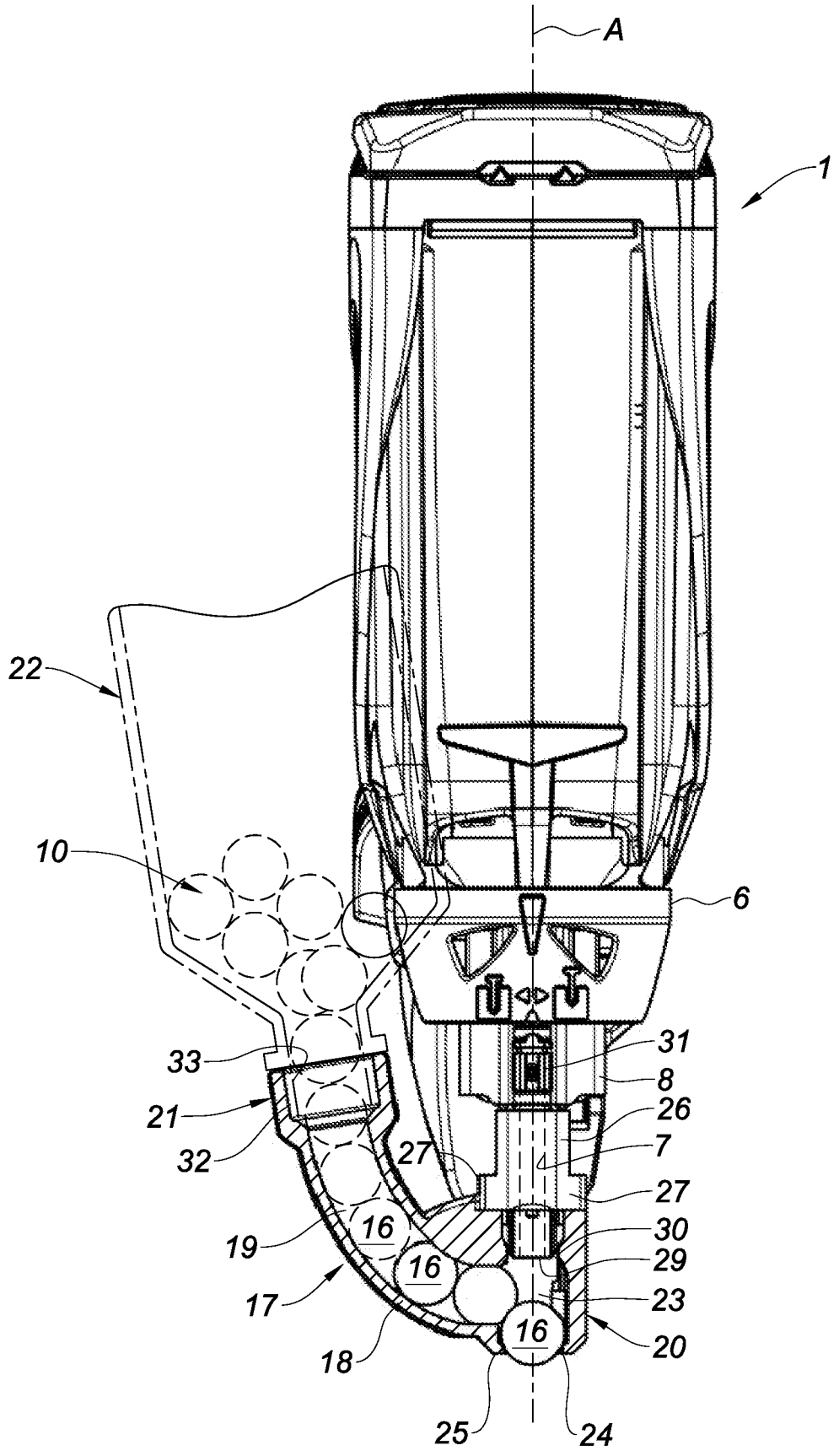

Fig. 1

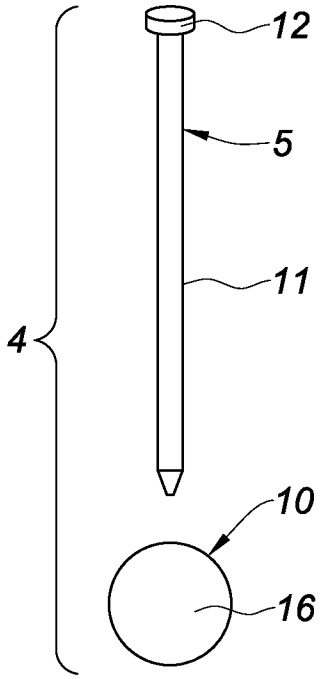

Fig. 3

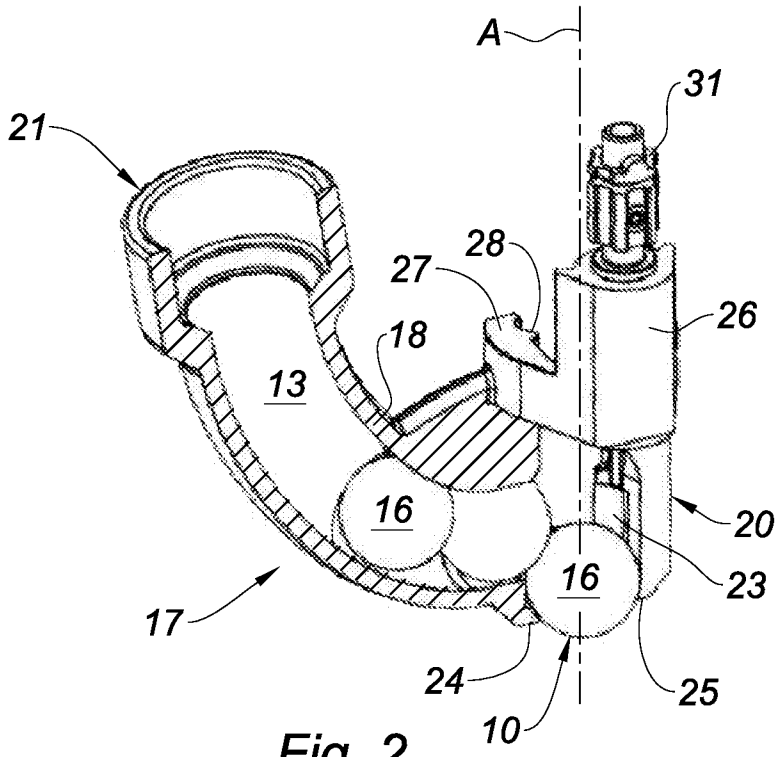

Fig. 2

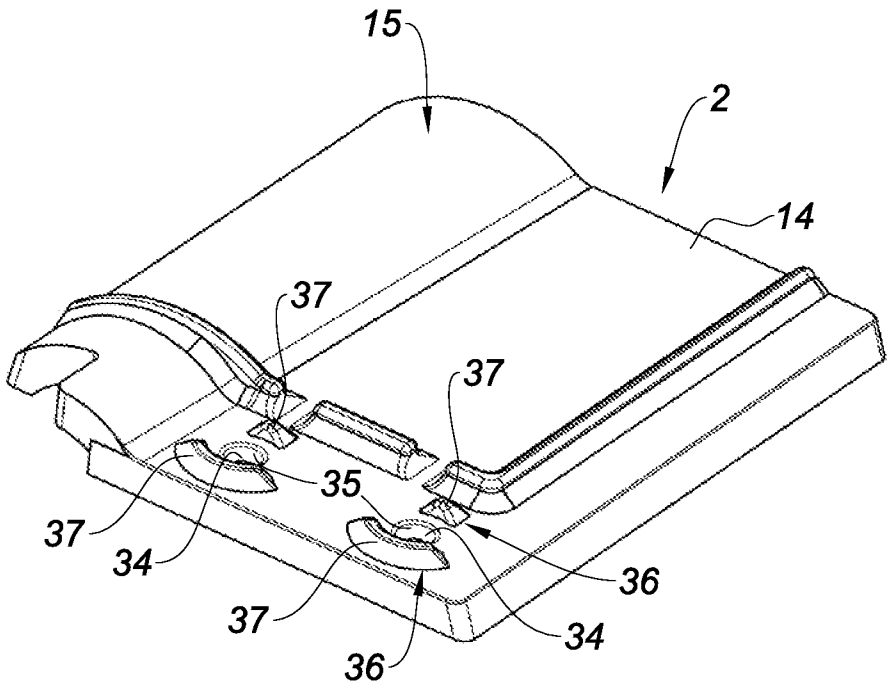

Fig. 4

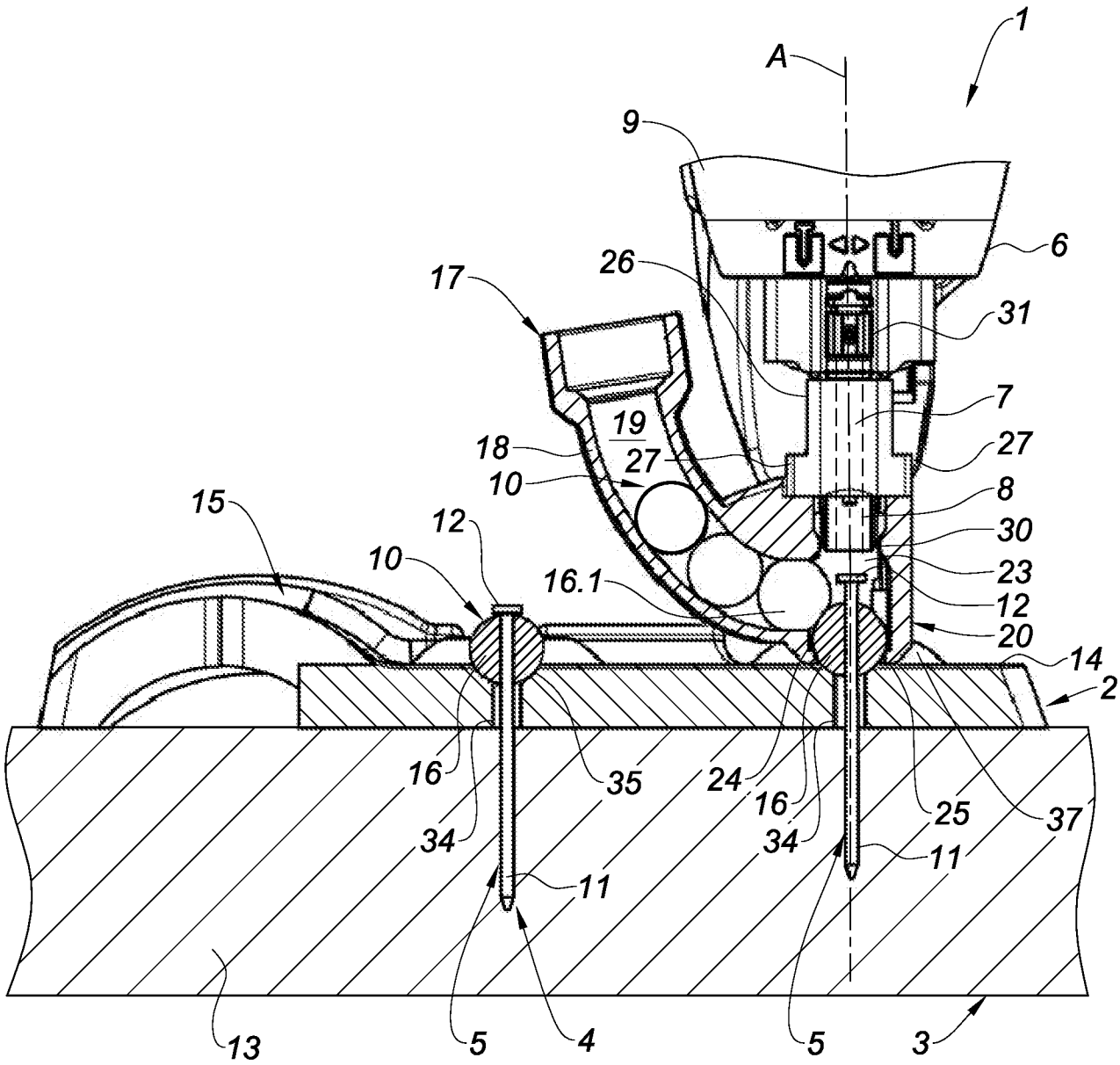
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Fig. 5