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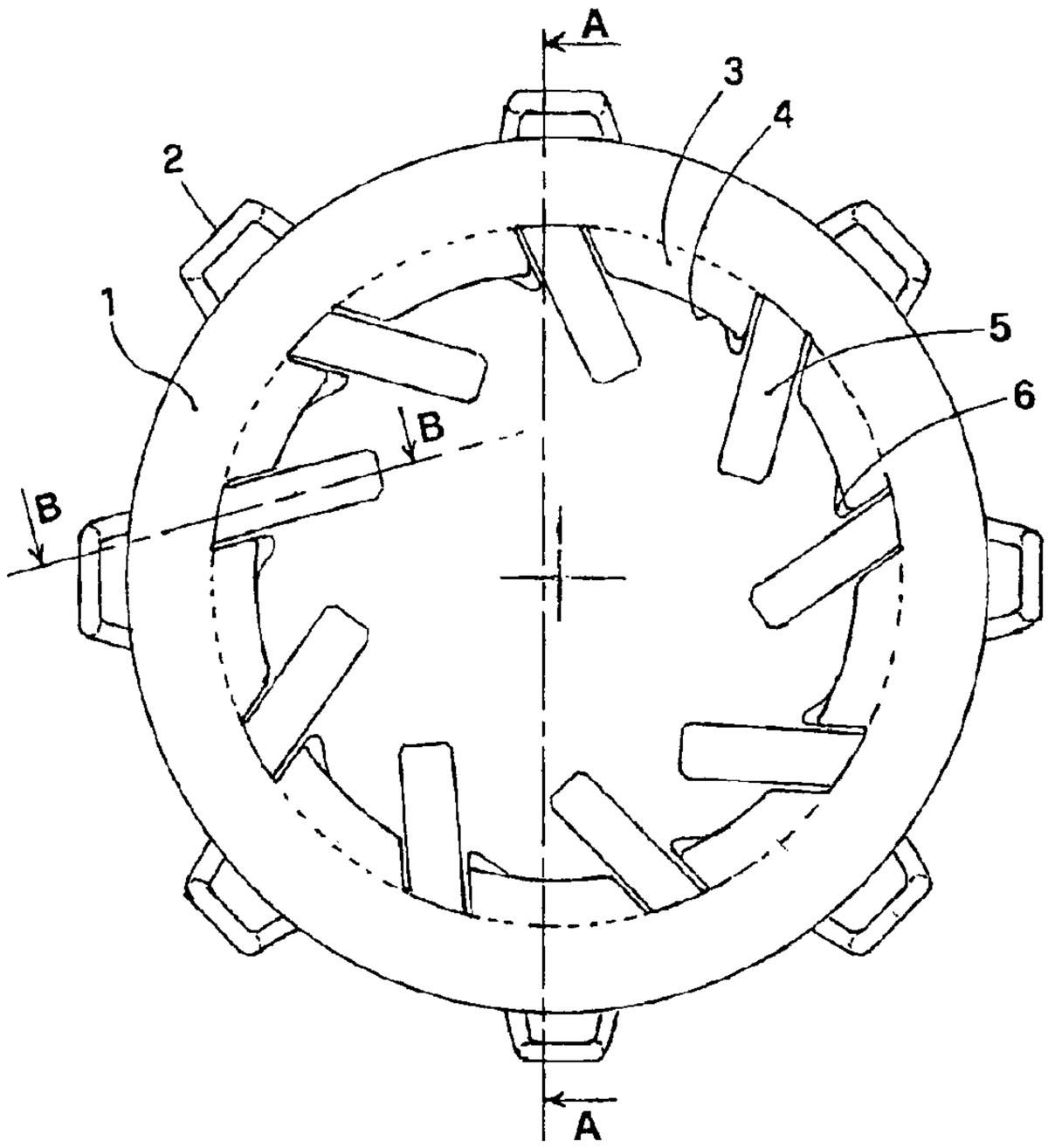
(54) Titre : DEBOBINAGE DE FIL METALLIQUE LOGE DANS UN TAMBOUR
(54) Title: UNWINDING METALLIC WIRE HOUSED IN A DRUM



(57) Abrégé/Abstract:
The invention consists in a circular crown shaped pressure disk (1), furnished with, on its external rim, jutting stirrup shaped, flexible elements (2) whose size makes them adhere, by eventually, inflecting, on the internal surface of the drum (7) within which the said disk is housed, on the internal rim it is equipped with winglets (3) and with flexible tabs (5) directed nearly tangentially in respect to the tubular trunk (8), placed at the centre of the drum (7), capable of stopping the rise of the bundle of coils so as to impede their knotting (between each other) and to help guiding the wire, as it is pulled to the outside of the drum and unwound from the bundle.

ABSTRACT OF THE DISCLOSURE

The invention consists in a circular crown shaped pressure disk (1), furnished with, on its external rim, jutting stirrup shaped, flexible elements (2) whose size makes them adhere, by eventually, inflecting, on the internal surface of the drum (7) within which the said disk is housed, on the internal rim it is equipped with winglets (3) and with flexible tabs (5) directed nearly tangentially in respect to the tubular trunk (8), placed at the centre of the drum (7), capable of stopping the rise of the bundle of coils so as to impede their knotting (between each other) and to help guiding the wire, as it is pulled to the outside of the drum and unwound from the bundle.

UNWINDING METALLIC WIRE HOUSED IN A DRUM

The invention concerns a mechanism for the braking of the unwinding of a bundle of metallic wire housed in a container drum, and is aimed particularly at feeding soldering machines (in particular those operating continuously) with automatic advancing of the wire that constitutes the weld metal.

Coils of metal wire are used, particularly in the field of continuous soldering machines, where wire is unrolled and carried to the soldering point where it is melted to join the two parts to be soldered.

When the quantity of wire being used is large, instead of being wound in rolls of a few kilograms in weight, the metallic wire is contained as a bundle of various quintals inside a drum with a positioning cylindrical core, so that it is capable of feeding wire for a long period of time, eliminating in this way frequent stoppage due to lack of wire.

This type of feeder drum usually is positioned, when operative, with its axis in vertical position, and the wire from the bundle is pulled up by a dragging unit. Due to the elasticity of the wire and of its tendency to straighten out when it is pulled towards the outside, various turns tend to rise together and they can become tangled among each other so as to provoke stoppage of its advancement.

This inconvenience presently is being avoided by the use of a crown-shaped weight, placed inside the drum and on the bundle of wire with the aim of avoiding the rising of various turns at the same time and therefore their tangling up.

However, there is a clearance between the crown and the inner surface of the drum's contour, and between the crown and the surface of the inner tubular trunk which keeps the bundle in position. Without that clearance, since drums are not strictly identical to one another, the crown-shaped weight could adhere to those surfaces and not slide enough to maintain itself adjacent the bundle as the wire is used, or could impede unwinding of the wire because of pressure placed on contours of the drum where it adheres, and would end up blocking wire that should instead move forward.

If instead the crown-shaped weight should have a relatively ample clearance relative to the internal surface of the drum and of the internal tubular trunk, movement of coils at the top of the bundle, determined by unrolling motion, could bring turns or parts of them above the disk and interact with it to form a knot, thereby blocking unwinding of the bundle and consequently of the soldering machine.

Taking the disadvantages and problems of the above technique into consideration, one of the aims of this invention is to provide a device which can stop turns of the bundle inside the feeding drum from lifting away from the bundle itself. This to avoid tangling of the wire that could stop the wire feeding unit, and therefore also the soldering machine.

Another aim of this invention is to provide a device that can act on drums that are not strictly identical and that can avoid one or more coils passing over the device itself, and therefore get tangled on it, causing advancement of the wire from the bundle which is being unrolled to stop.

A further aim is to realise a low-cost relatively-light device, capable of carrying out a non-excessive but regular braking action in time, while the bundle unwinds. This to

avoid stress on the unit that pulls the wire from the bundle to allow an even pull towards the welding point to allow a uniform soldering.

An invention that can reach such results is particularly advantageous because it allows use of drums containing metal wire bundles of various sizes. It favours correct unwinding of the bundles, without the tangling of the wire, and a correct feed to non-stop welding machines so that they can carry out uniform and sized welds as required. This also means without waste due to anomalous feed of the welding wire.

This invention provides an improved device for controlling the unwinding of wire wound in a coil and placed in a drum, the device including an annular crown-like body having flexible resilient elements jutting out from its outer edge for engagement with an interior surface of the outer wall of a drum to guide movement of the device within the drum and inhibit wire from the coil from moving across that interior surface of the drum and leaving the coil, and guiding means on an inner edge of the crown-like body for restraining axial movement of a wound coil of wire within the drum and for guiding wire toward the centre of the drum as it unwinds.

In accordance with this invention such a device can comprise: an annular crown-like body having an inner periphery and an outer periphery, the body being sized to fit between the inner and outer walls of the drum so as to inhibit axial movement of the coil; a plurality of outwardly-protruding flexible elements circumferentially arranged on the outer periphery, for engagement with the interior outer wall of the drum; and a series of tabs arranged on the inner periphery forming inwardly-directed ramping surfaces, for guiding the wire toward the inner wall defining the centre core as it unwinds from the coil and thereby inhibit tangling of the unwinding wire.

Accordingly, this invention consists of an annular crown-shaped device, equipped with jutting flexible elements on its external rim. The size and structure of these elements is such that they can engage, eventually by inflecting, the inner surface of the drum within which it will be placed. On its inner rim the device can be equipped with guiding winglets and flexible tabs oriented in an almost tangential direction with respect to a tubular trunk placed at the center of the drum, such as to reach it to block lifting from the bundle of turns and therefore to avoid their tangling, and consequently to help guide wire as it is pulled and unwound from the bundle to the outside of the drum.

The flexible elements are placed on the outside of the circular crown-shaped structure, so as to prevent wire from the bundle passing over from the external edge of the device and positioning itself over it, thus avoiding tangling. The flexible structure of these elements is such as to allow use of the device of the invention also when the drum in which it is placed has a reduced diameter compared with the one foreseen.

The internal flexible tabs and winglets are adequate to help direct wire toward the tubular trunk in the middle of the drum. The wire is pulled from the outside, and at the same time the winglets and flexible tabs avoid the coils at the top of a bundle (on which the invention is placed) moving excessively and emerging from those winglets and tabs.

In this way the wire from the bundle is urged to unwind in a correct way, and thanks to the light weight of the invention (which normally is moulded of plastic materials), without having to exercise a considerable pressure that would result in an excessive braking action on the wire being pulled from the drum.

More features of the invention and advantages which it provides will be apparent from the following description, which describes a preferred shape in its execution, and which illustrates it as an example which by no means is limiting in the figures of the accompanying drawings, in which:

Figure 1 is a layout view of the lower part of the invention;

Figure 2 is a view along the section line A-A of Figure 1;

Figure 3 is a partial view along the section line B-B of Figure 1;

Figure 4 is a view on a different scale of a section of a drum with the inventive device inserted in it, sectioned along an axial plane.

However, it must be clear that the drawings and the corresponding described parts are given exclusively as an illustration of the invention, without in any way constituting a limitation of it.

In the drawings we have indicated with reference numeral 1 the circular crown-shaped structure, with 2 the stirrup-shaped flexible elements, with 3 the shaped winglets, with 4 their external profile, with 5 the flexible tabs, with 6 thin skeletons that connect the winglets 3 with the tabs 5, with 7 the drum, and with reference numeral 8 its central tubular trunk. In substance, the invention consists of a device capable of carrying out a braking and containing action on the unwinding of the metal wire wound into a bundle and placed inside a containing drum 7, having a tubular center 8. The wire being used can feed welding machines, and in particular those operating non-stop (welding robots).

The device provides a braking action on movement of the coils at the top of the bundle that is being unwound. It consists of an element which can carry out a slight

pushing action on the coils, and is formed by a circular crown 1 having on its outer edge distributed stirrup-shaped flexible elements 2, with a dimension that allows their adherence (bending inwards if necessary) to the internal surface of the drum 7 in which the device is positioned. In this way it can stop the external portions of the coils from rising along the internal surface of the drum 7 and over the level of the disk itself, and as a consequence of the pulling action, the wire could move close to the tubular trunk 8 and create a knot 1 with the effect of slowing or stopping its normal flow.

On its inner edge the disk 1 is equipped with distributed guiding winglets 3 and flexible tabs 5. The former have a profile 4 of the side oriented towards the axis of the drum 7, connected to the thin skeleton 6 curved into a spiral towards the center of the drum, so that the wire of the bundle when pulled is evenly sustained and guided towards the center of the drum 7 to emerge from it staying adjacent to the tubular trunk 8 against which it is pushed by the sequence of flexible tabs 5 with their ramping surfaces 5a that follow it as it unwinds.

The invention therefore carries out two actions. The first one consists of a braking action that also regulates the movement of the coils at the top of the bundle; in fact that movement would be turbulent and disorganized without it. The second action is that of conveying the wire that unwinds, making it emerge from the drum 7 in an almost axial direction as well as a rotory one to follow the coils that unwind from the bundle.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A device for controlling the unwinding of a coil of wire from within a drum having an outer wall with an interior surface and an inner wall defined by a centre core, the device comprising:

an annular crown-like body having an inner periphery and an outer periphery, the body being sized to fit between said inner and outer walls of the drum so as to inhibit axial movement of the coil;

a plurality of outwardly-protruding flexible elements circumferentially arranged on said outer periphery of the annular body, for engagement with the interior surface of the outer wall of the drum; and

a series of tabs arranged on said inner periphery forming inwardly-directed ramping surfaces, for guiding the wire toward said inner wall as it unwinds from the coil and thereby to inhibit tangling of the unwinding wire.

2. A device as defined in claim 1, in which said tabs have shapes which curve away from a wound coil of wire in the drum and extend inwardly toward said inner wall defined by the center core, when the device is within the drum.

3. A device as defined in claim 1, in which said tabs extend inwardly toward said inner wall defined by the centre core, and are flexible and resilient so that they can take a shape curved away from a wound coil of wire in the drum while guiding wire unwinding from the coil.

4. A device as defined in claim 1, 2 or 3, wherein the said tabs extend inwardly in a direction having an angle of less than ninety degrees with said inner periphery.

5. A device as defined in claim 1, 2 or 3, wherein said tabs are oriented so that their innermost surfaces extend along a direction which is substantially tangential to or is substantially parallel to a tangent to said inner wall defining the centre core.

6. A device as defined in any one of claims 1 to 6, further comprising a plurality of guiding winglets arranged along said inner periphery and between said tabs, to assist in restraining axial movement of a coil of wire in the drum and to guide wire unwinding from the coil toward said ramping surfaces and the centre of the drum.

7. A device for controlling the unwinding of wire wound in a coil and placed within a drum, the device comprising an annular crown-like body having flexible resilient elements jutting from its outer edge for engagement with an interior surface of the outer wall of a drum to guide movement of the device within the drum and inhibit wire from the coil from moving across said interior surface of the drum and leaving the coil, and guiding means on an inner edge of the annular body for restraining axial movement of a wound coil of wire within the drum and for guiding wire toward the centre of the drum as it unwinds.

8. The device as defined in claim 8, wherein said guiding means comprises tabs and winglets, both extending from an inner edge of said annular body.

9. A device as defined in claim 9, in which said tabs are flexible and resilient.

10. The device as defined in claim 8 or 9, wherein said tabs are oriented in an direction substantially tangential to a circle interior to the inner edge of the annular body, and suppress inadvertent release of wire from the coil in the drum.

11. The device as defined in any one of claims 7 to 10, in which said flexible resilient elements are stirrup-shaped.

12. A device for controlling the unwinding of wire wound in a coil and placed within a drum having an outer wall with an interior surface, the device comprising an annular crown-like body having an outer peripheral edge spaced from the interior surface of the drum which allows the device to move axially within the drum with unwinding of the wire, the body having flexible resilient elements jutting from its outer peripheral edge to press against said interior surface of the drum outer wall to guide movement of the device within the drum and inhibit wire from the coil leaving the coil, the device also including inwardly-extending tabs on an inner periphery of said annular body and having front edges facing the wire during unwinding, said tabs extending toward the centre of the drum at an angle less than 90 degrees to said inner edge and guiding wire along said edges away from the inner periphery and toward the centre of the drum.

13. A device for controlling the unwinding of wire wound in a coil and placed within a drum, the device comprising an annular crown-like body with tabs on an inner edge and flexible elements on an outer edge, said tabs on said inner edge extending toward the centre of the drum at an angle less than 90 degrees to said inner edge for guiding wire as it unwinds from a coil, and said flexible elements resiliently engaging an interior surface of the outer wall of the drum, when the device is within a drum.

14. The device as defined in claim 12 or 13, in which said tabs are flexible and resilient.

15. A device for controlling the unwinding of wire wound in a coil and placed within a drum having an outer wall with an interior surface, the device comprising an annular crown-like body having an outer peripheral edge which is spaced from

the interior surface of the drum which allows said device to move axially within the drum with unwinding of the wire, a plurality of outwardly-protruding flexible elements circumferentially arranged on said outer peripheral edge for engagement with the interior surface of the outer wall of the drum, flexible tabs on an inner edge of said annular body, and guide winglets on said inner edge of said annular body.

16. A device for controlling the unwinding of wire wound in a coil and placed within a drum having a cylindrical tubular core generally centered therein, the device comprising an annular crown-like body with an inner circular periphery whereby said body surrounds the tubular core and said inner periphery defines an annular space around the tubular core with a given width, the body having flexible resilient elements jutting from its outer peripheral edge to press against an interior surface of the drum outer wall to guide movement of the device within the drum to inhibit wire from the coil leaving the coil, and a plurality of flexible tabs extending at an angle less than 90 degrees to said inner periphery at circumferentially-spaced positions, said tabs having a length to engage the tubular core when said body is in the drum and as the wire uncoils and is pulled from the drum between said tubular core and said flexible tabs.

fig. 1

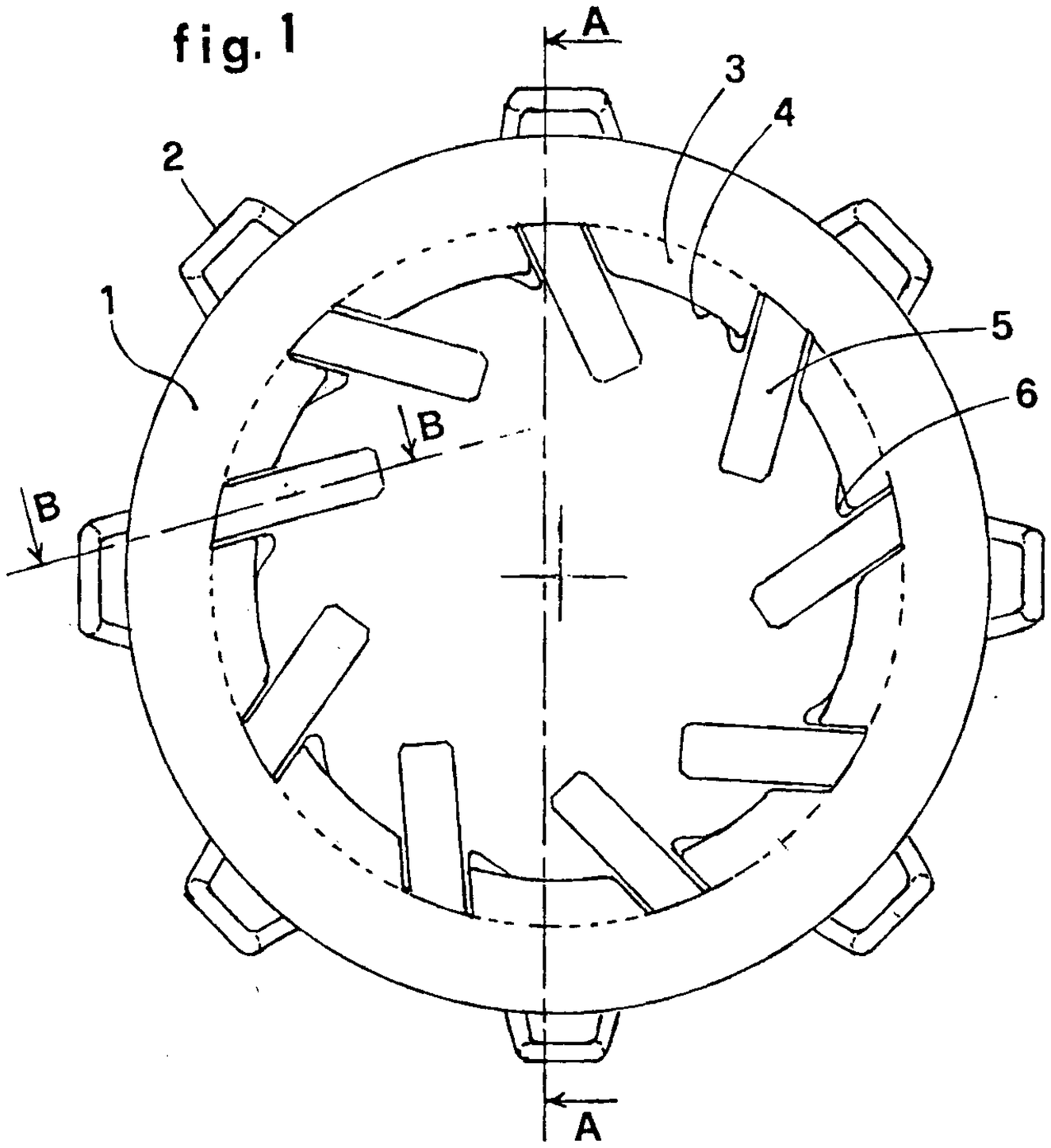
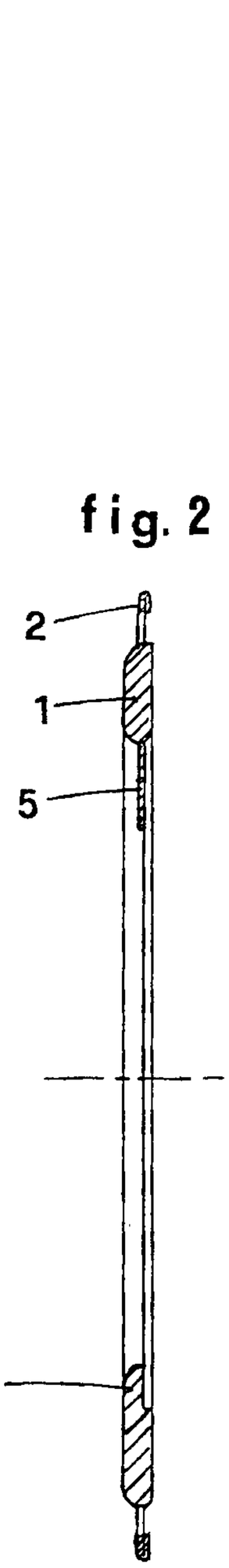


fig. 2



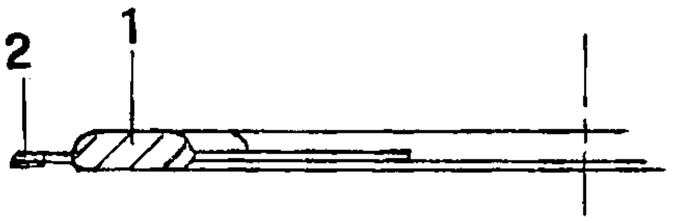


fig. 3

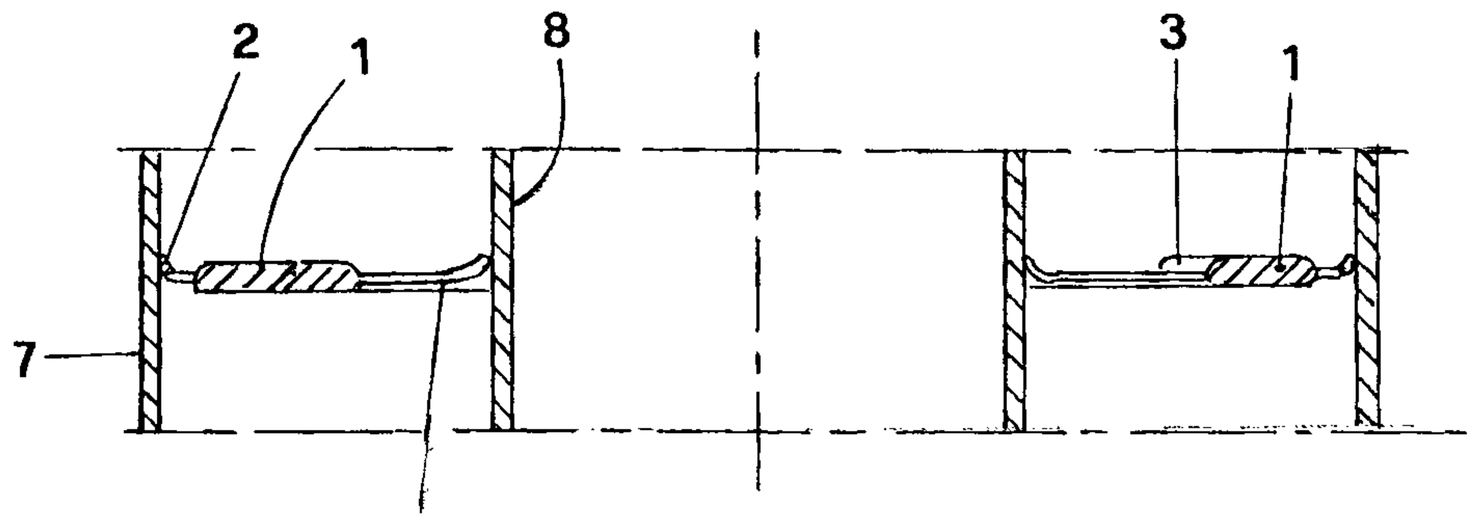
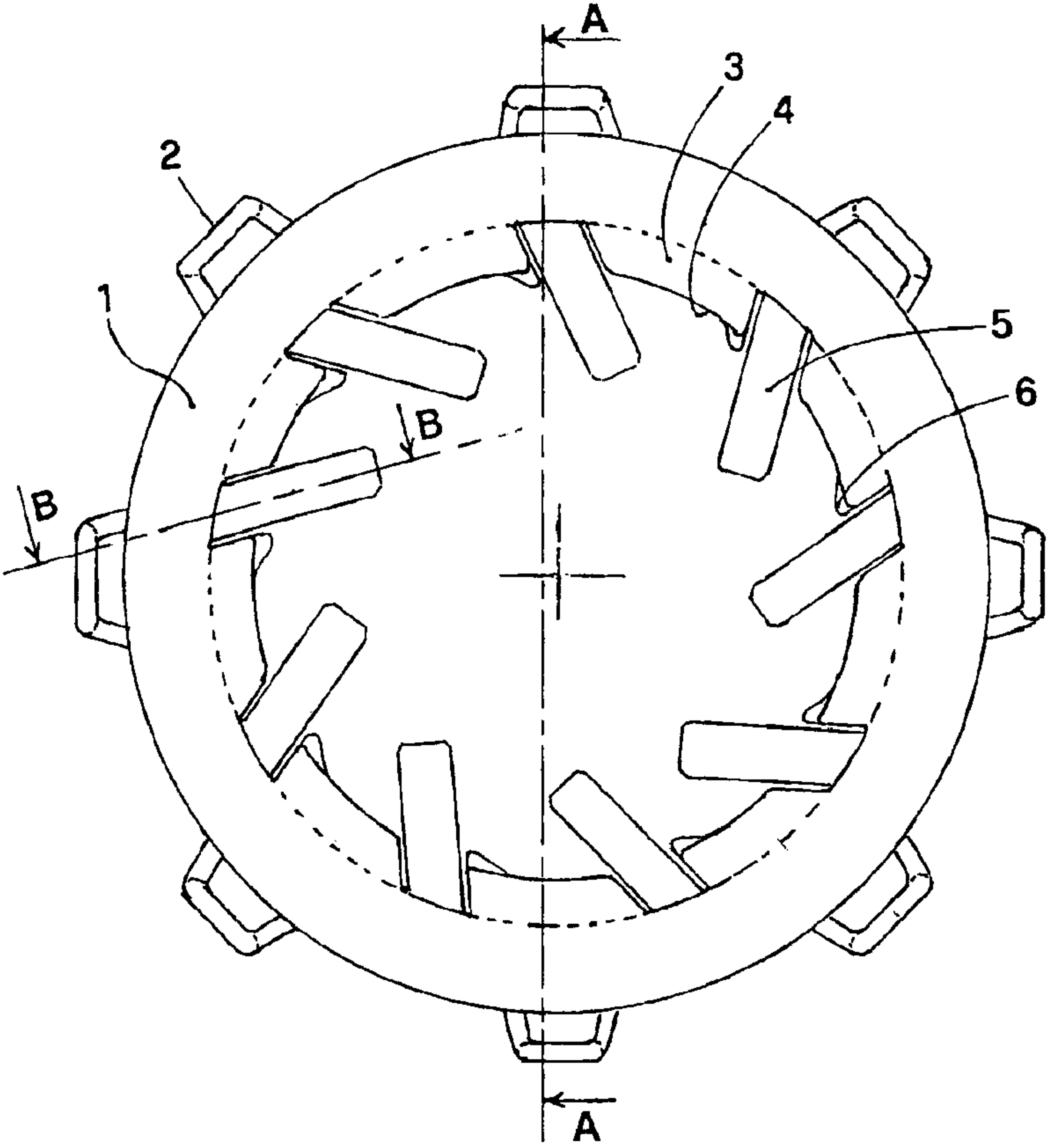


fig. 4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