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(54) Device for brushing

(57) The present invention relates to a brush mechanism designed especially for cleaning the inside of air climatization ducts, said brush mechanism comprising a brush (2) and flexible driving axle (1) for rotating the brush (2), the casing of said flexible driving axle containing an axle which has been designed to rotate the brush (2). A brush (2) in a brush mechanism formed in accordance with the invention is at least partially overlapping the casing of the driving axle (1).

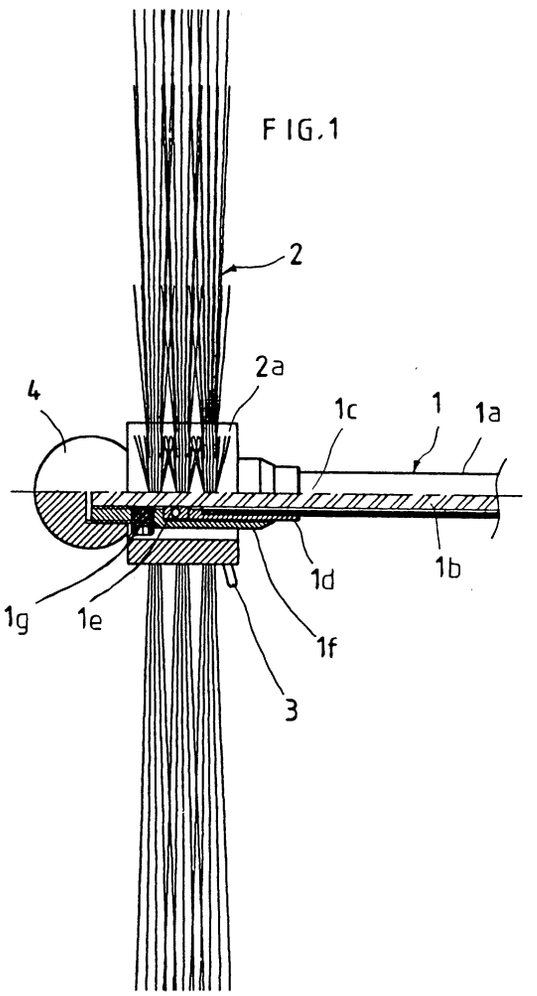

FIG.1

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Description

[0001] The present invention relates to a brush mechanism designed especially for cleaning the inside of air-conditioning ducts, said brush mechanism comprising a brush and flexible driving axle for rotating the brush, the casing of said flexible driving axle containing an axle which has been designed to rotate the brush.

[0002] Cleaning mechanisms/brush mechanisms are used for cleaning air-conditioning ducts. They are pushed into and moved inside the air-conditioning duct in order to clean it. At present, the center part of brushes used in cleaning mechanisms are made of wire formed in the shape of a helix, in between the spirals of which the bristles are secured. The structure of these brushes is similar to the structure of the common bottle brushes found in households. Both ends of the metal helix of the brush extend clearly beyond the brush. The brush is connected to a special long, inflexible hexagonal sleeve, each side of which is 17 mm across in width. The sleeve has a hole inside it, in one end of which the axle, which is inside of and which rotates the driving axle, is attached, and in the other end of which the brush is attached to the helix which is inside the sleeve hole.

[0003] The disadvantage in the aforementioned brush and the method used for its attachments, is that the brush is long, which is caused by its long and rigid central part. Thus, the brush is not able to be moved well through the curves in the air-conditioning ducts. The iron wire axle in the center of the brush is easily bent in the curvatures of the ducts, whereupon dirt is left in the ducts and the iron wire can damage the rust protection in the piping. A further disadvantage is that the brush is on the front end of the driving axle, and thus forms a long and rigid part, which further hinders the movement of the brush through the ducts. The point where the end of the brush meets the end of the driving axle forms a weak point which is easily damaged. In order to shorten the axle inside the driving axle, the entire end of the mechanism would have to be dismantled. The need for shortening the axle arises when elongation occurs while the axle is being used.

[0004] The cleaning effectiveness of the brushes that have been manufactured by winding is weak, and their wires become easily unwound, whereupon the bristles become loose, especially if the brush is not turned in the same direction all the time. In addition to what has already been mentioned, at present, brushes become stuck easily when they drop downwards in a block in the air-conditioning duct and get caught in the corner as they are being pulled away. Getting the brush loose often expedites the ruin of the part of the duct.

[0005] The object of the invention is to provide a brush mechanism, by which the disadvantages associated with the present brush devices will be eliminated. In particular, the object of the invention is to provide a brush mechanism, which moves smoothly around the curves in air-conditioning ducts, and which is durable, easy to service, and long-lasting.

[0006] The object of the invention is accomplished with a brush mechanism, the characteristics of which are set forth in the claims.

[0007] In a brush mechanism formed in accordance with the invention, the brush at least partially overlaps the casing of the driving axle. The brush mechanism is mainly intended to be used for cleaning small air-conditioning ducts. The mechanism is comprised of a flexible driving axle, which is covered by a static casing, and inside of which is a rotating axle. The casing is necessary for the flexible driving axle, because it prevents a breakage point from forming. The axle is generally rotated from one end by a standard drill, whereupon the brush attached to the opposite end of the axle rotates. The driving axle is manually pushed through the air-conditioning duct while the brush is rotating. Generally, the length of the driving axle is not so great; the length may be, for example, 6 meters. The mechanism is manually pulled out of the air-conditioning duct. An advantage of the mechanism compared to those which are motorized is, that it only requires a driving axle, drill and brushes to clean, which makes carrying of the mechanism easy. The mechanism is to be used primarily in one-family homes, row houses, apartment buildings and office buildings.

[0008] The most important advantages of the invention can be mentioned as follows: The brush moves smoothly around the curves in the air-conditioning ducts, and therefore easily. The brush is durable in structure, easy to care for, and long-lasting. Changing brushes can be done easily and quickly. The brush is evenly attached in the driving axle, because it at least partially overlaps the end of the driving axle, also decidedly improving the durability, because there is no weak joining point. The head of the brush does not scratch the surface of the duct. Due to the elongation, the rotation axle inside the driving axle can be shortened easily and quickly. The brush according to the invention has a releaser (projection) in its back corner, which causes the brush to jump if it gets stuck while it is being drawn out, thus the brush does not get stuck inside the duct. Due to the adapting piece according to the invention, the brush according to the invention can also be adapted to fit present cleaning mechanisms, whereby a large number of brushes is not necessary, because the new brush works with all mechanisms. Based on the preceding information, it is clear, that use of the invention will yield great economical savings.

[0009] The invention will now be described in detail with reference to the accompanying drawings, in which

Figure 1 illustrates a certain brush mechanism formed in accordance with the invention, partially cut and perpendicularly viewed from the side,

Figure 2 illustrates a brush mechanism formed in accordance with Figure 1, partially cut and perpendicularly viewed from the side,

Figure 3 illustrates the center part of a brush formed in accordance with Figures 1 and 2, perpendicularly viewed and cut from the side,

Figure 4 illustrates the center part of a brush formed in accordance with Figure 3, as viewed perpendicularly from the end,

Figure 5 illustrates the adapting piece of a certain brush mechanism formed in accordance with the invention, partially cut and perpendicularly viewed from the side, and

Figure 6 illustrates an adapting piece formed in accordance with Figure 5, viewed perpendicularly from the end.

[0010] The brush mechanism presented in Figures 1, 2, 3, and 4 has the following parts and points: a driving axle 1, which is comprised of the casing 1a, the axle 1b, the end with the brush 1c, the sleeve 1d, the bearing 1e, the outer sleeve 1f, and the clamp 1g. Additionally, there is the brush 2, which is comprised of the center part 2a, hole 2d, retainer 2c, stopper 2d, the smaller diameter 2e, and the bigger diameter 2f. Additionally, the figures illustrate the projection 3 and the blocking element 4.

[0011] Figures 5 and 6 illustrate adapting piece 5, which is comprised of an inner hole 5a, outer surface 5b, retainer 5c and stopper 5d.

[0012] The brush 2 used in a brush mechanism formed in accordance with the figures, is placed at least partially overlapping the casing la of the driving axle 1, or the brush 2 is placed entirely overlapping the casing 1a of the driving axle 1. The brush 2 has a center part 2a which has a hole 2b in it. Additionally, the hole 2b contains a retainer 2c, which prevents the longitudinal movement of the brush's 2 driving axle 1 in at least one direction. The retainer 2c is formed out of a stop which is inside the hole 2b. The smaller diameter measurement 2e of the hole 2b is essentially smaller than the greater diameter measurement 2f of the hole 2b. A stopper 2d is inside of the hole 2b. The stopper 2d is a key slot.

[0013] The center part 2a of the brush 2 of the brush mechanism can be advantageously produced of plastic, some mixture thereof, or corresponding material. The method of production and raw materials used are the same as those previously used in producing brushes. The hole 2b, retainer 2c and stopper 2d can be worked, for example, with conventional metal and plastic-working machinery, or most advantageously, they can be manufactured, for example, in connection with the press casting of the center part 2a.

[0014] The center part 2a of the brush 2 has a projection 3, which is formed onto the center part 2a, from which it essentially extends outwards and is comprised of a peg which is attached to the center part 2a. The projection 3 can be advantageously made out of a cylindrical metal peg, one end of which has been made with an external thread, and the other end of which can be rounded. For the projection 3, an internal thread is made in the outer shell of the center part 2a of the brush 2 near the end on the side with the driving axle 1, and advantageously so that when the projection 3 is screwed into place, it is at an angle to the driving axle 1. The angular position causes the projection 3 to catch in the downward joining corners of the air-conditioning ducts, which causes the brush 2 to jump free. The projection 3 can also be made of a nylon bar or a plastic cap can be put onto a metal peg, so that scratching of the air-conditioning ducts will not occur. The projection 3 can also be attached with a conventional type of glue.

[0015] The outer sleeve 1f, on the opposite end of the driving axle 1, has an external thread for the blocking element 4.

[0016] The retainer 5c, used to prevent the longitudinal movement of the adapting piece 5 of the brush 2 in at least one direction, is on the outer surface 5b of the adapting piece 5. This retainer 5c is a stop, which is formed from two different outside diameters, between which exists an intervening surface where the stop is formed. The stopper 5d, which restricts the free rotation of the brush 2, is located on the outer surface 5b of the adapting piece 5.

[0017] The outer sleeve 1f and the adapting piece 5 can be produced from conventional metals using conventional manufacturing techniques and machinery. The stopper 5d of the adapting piece 5 can be made, for example, using a wedge key which can be glued in place.

[0018] A brush head formed in accordance with the invention is assembled in the following way. The casing 1a is underneath the sleeve 1d, which is placed on the end of the driving axle 1 and through which the end of the axle 1b passes. Next, the bearing le is placed on the axle Ib, after which the outer sleeve if is placed against the bearing 1e. The outer sleeve If is attached to the axle 1b in such a way that it cannot rotate using the clamp 1g. In the figures, the clamp 1g is an Allen screw. Next, the brush 2 is placed onto the outer sleeve if, such that the retainer 2c (stop) of the brush 2 comes against the stop of the sleeve if. In placing the brush 2 on the sleeve if, the end of the clamp 1g must come against the stopper 2d of the brush 2, so that the brush 2 is not able to rotate freely. Lastly, the blocking element 4 is turned onto the end of the outer sleeve 1f on the external thread, so that the brush 2 is locked in place. The bearing le reduces the parallel stress exerted on the driving axle 1 and facilitates the rotation of the brush 2. The blocking element 4 can be made using a conventional method, for example, out of plastic.

[0019] It is easy to change the brush 2. First, the blocking element 4 is unscrewed manually, the brush is pulled away and replaced with a new brush. After this, the blocking element 4 is screwed back on manually. The blocking element 4 does not become unscrewed because the brush 2 and the outer sleeve if rotate together as one, so that the blocking element 4 is not subject to the force of rotation.

[0020] A mechanism formed in accordance with the invention is used in the same way as other previous conventional air-conditioner duct cleaning brushes.

[0021] It is evident to a person skilled in the art, that the invention is not limited to the accompanying embodiments, but that it may vary within the scope of the idea of the invention as defined in the accompanying claims. As one of the alternative modifications, it can be mentioned that the raw materials used can be other than those previously suggested.

Claims

1. A brush mechanism designed especially for cleaning the inside of air-conditioning ducts comprising a brush (2) and flexible driving axle (1) for rotating the brush (2), the casing of said flexible driving axle (1) containing an axle which has been designed to rotate the brush (2), *characterized* in that the brush (2) is at least partially overlapping the casing of the driving axle (1).

2. A brush mechanism formed in accordance with Claim 1, *characterized* in that the brush (2) is entirely overlapping the driving axle (1).

3. A brush mechanism, the brush (2) of which includes a center part (2a), inside of which is a hole (2b), *characterized* in that, the hole (2b) contains a retainer (2c), which prevents the longitudinal movement of the driving axle (1) of the brush (2) in at least one direction.

4. A brush mechanism formed in accordance with Claim 3, *characterized* in that the retainer (2c) is formed from a stop which is inside of the hole (2b).

5. A brush mechanism formed in accordance with Claim 4, *characterized* in that the smaller diameter (2e) of the hole (2b) is essentially smaller than the greater diameter (2f) of the hole (2b).

6. A brush mechanism formed in accordance with Claim 3, *characterized* in that a stopper (2d), which advantageously is a key slot, is inside of the hole (2b).

7. A brush mechanism formed in accordance with Claim 3, *characterized* in that a projection (3) is in the center part (2a) of the brush (2).

8. A brush mechanism formed in accordance with Claim 7, *characterized* in that the projection (3) is formed onto the center part (2a), from which it essentially extends outwards and is comprised of a peg which is attached to the center part (2a).

9. A brush mechanism formed in accordance with any of the Claims 1-8, *characterized* in that it comprises an adapter (5), on the outer surface (5b) of which is a retainer (5c) in order to prevent the longitudinal movement of the adapting piece (5) of the brush (2) in at least one direction.

10. A brush mechanism formed in accordance with Claim 9, *characterized* in that there is a stopper (5d) on the outer surface (5b) of the adapter (5) in order to prevent the unrestricted rotation of the brush (2).

FIG.1

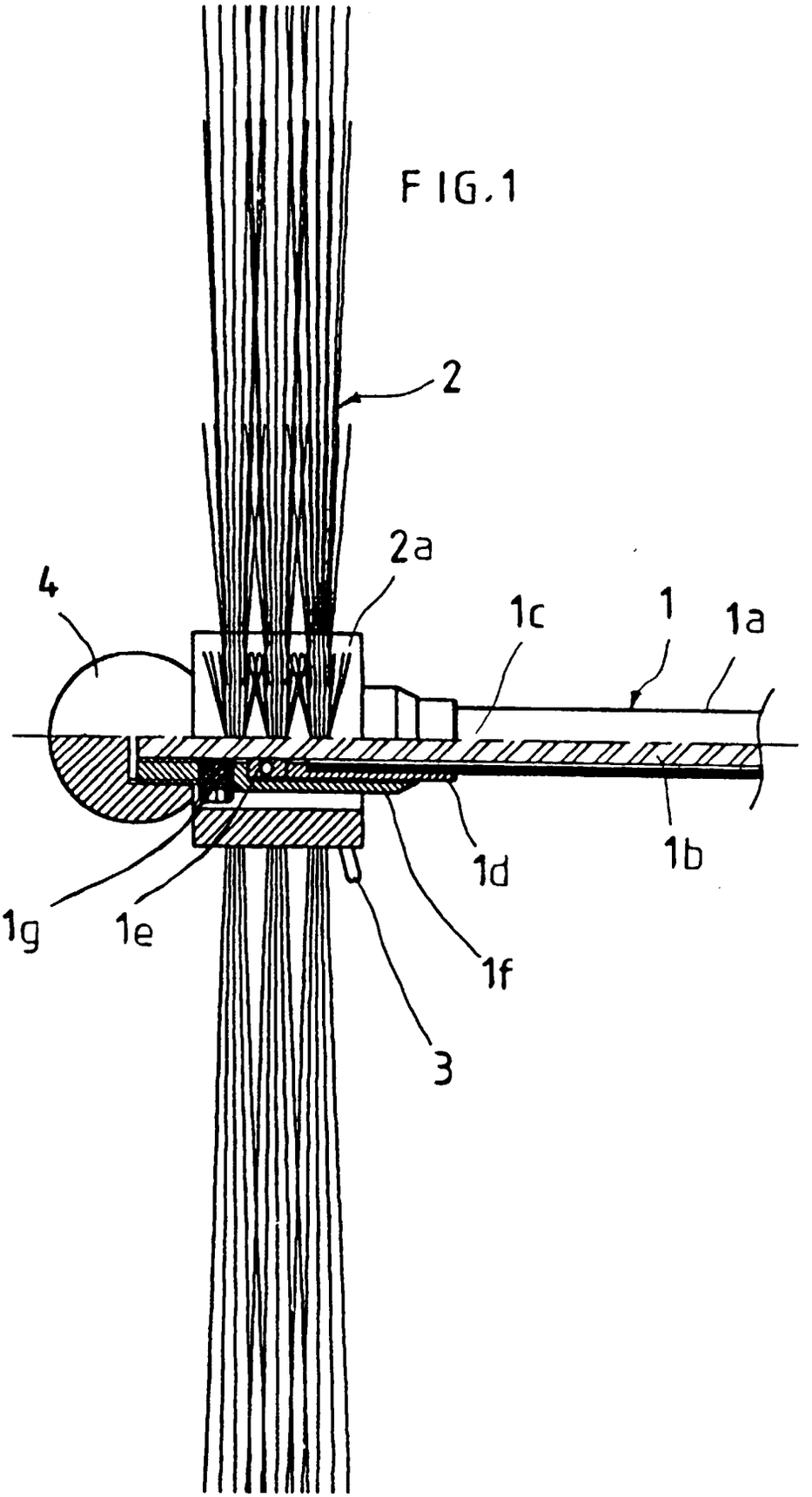

FIG.2

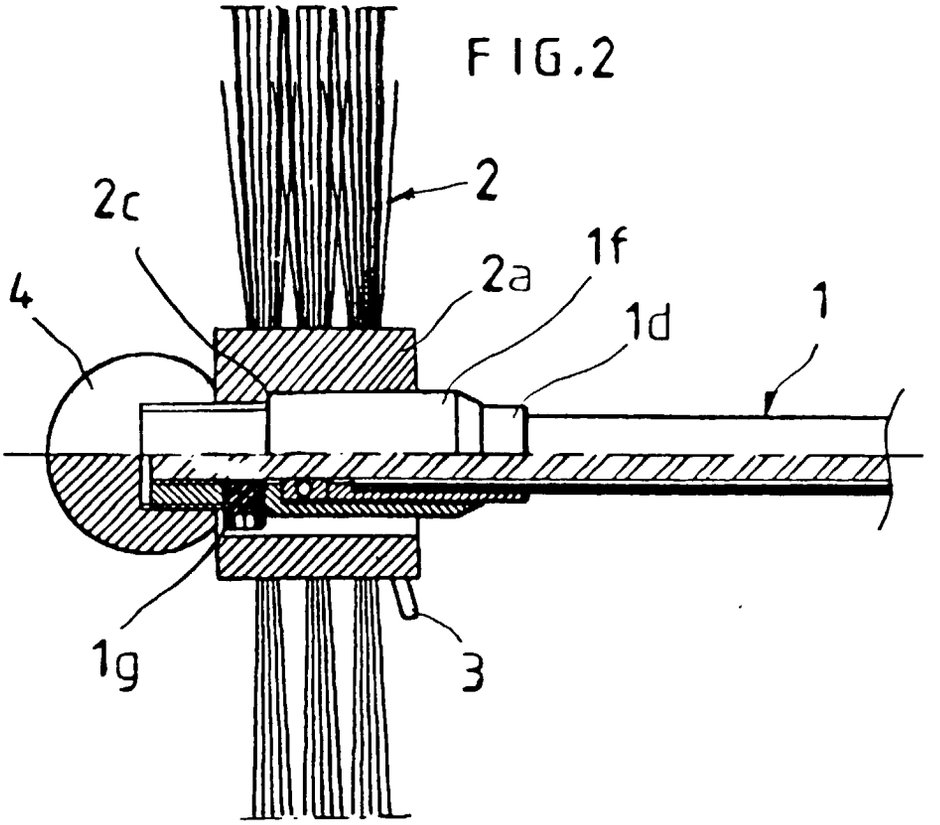

FIG.3

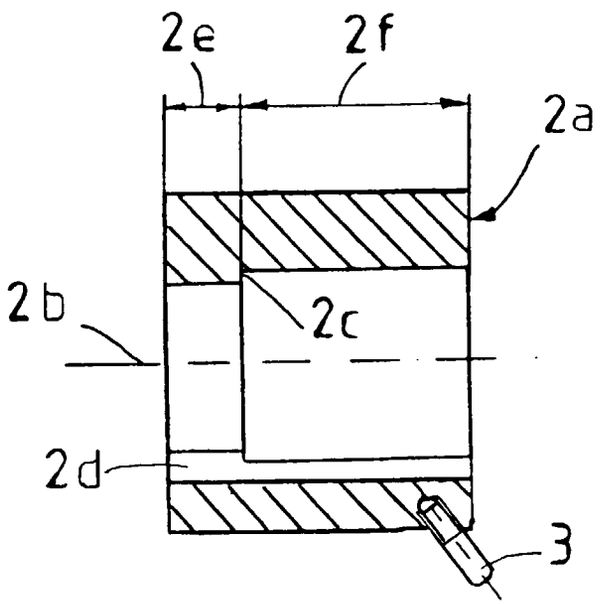

FIG.4

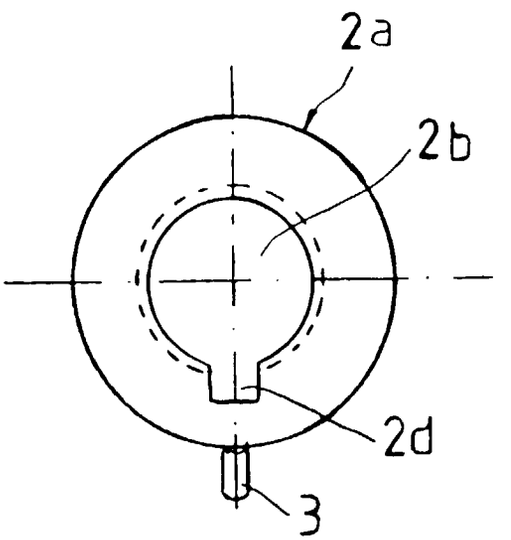

FIG.5

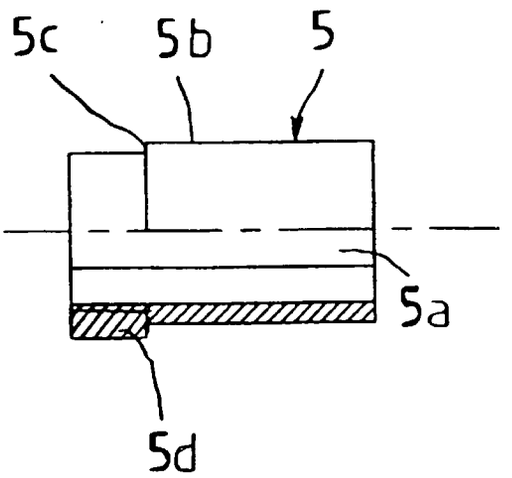

FIG.6