(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 440 739 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
09.03.2016 Bulletin 2016/10

(21) Application number: **10744741.9**

(22) Date of filing: **07.06.2010**

(51) Int Cl.:
E21B 17/10 *(2006.01)*

(86) International application number:
PCT/IN2010/000372

(87) International publication number:
WO 2010/143201 (16.12.2010 Gazette 2010/50)

(54) DUAL ROTARY CENTRALIZER FOR A BOREHOLE

DOPPELDREHZENTRIERER FÜR EIN BOHRLOCH

CENTREUR ROTATIF DOUBLE POUR UN TROU DE FORAGE

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK SM TR

(30) Priority: **08.06.2009 IN DE11642009**

(43) Date of publication of application:
18.04.2012 Bulletin 2012/16

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- **DATABASE WPI Derwent Publications Ltd., London, GB; AN 2007-508404 & CN 1 932 232 A (ZHAO K) 21 March 2007**

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Description

FIELD OF THE INVENTION

[0001] The present invention relates to a dual rotating centralizer for a borehole used in wellbores drilled for the extraction of oil or gas. More particularly, the present invention relates to a dualizer having two rotating bodies rotating on a ring, clockwise or anticlockwise on its own axis.

BACKGROUND OF THE INVENTION

[0002] The process of extraction of hydrocarbons such as oil and gas is a multi-step process. During the construction of conventional oil and gas wells a wellbore is generally formed by rotating a drill bit on the end of a drill string. The drill string is maintained substantially on the longitudinal axis of the wellbore by a plurality of casings which are generally referred to as "centralizers" and which are mounted on the drill string at predetermined intervals. The casing is then cemented into place by cement between the inner diameter of the bore hole and the outer diameter of the casing. The cement displaces the heavy, sticky drilling mud left over from the drilling operation. Preferably, the casing is rotated and/or reciprocated longitudinally to promote a uniform distribution of cement around the casing along its length.

[0003] Centralizers are commonly secured at intervals along a pipe string, such as a casing string, to provide stand-off between the exterior wall of the casing string and the wall of a borehole in which the casing string is installed. Whilst this arrangement is quite satisfactory for drilling conventional vertical wellbores problems arise in deviated drilling in which it is desired to drill one part of a wellbore at an angle to a vertical wellbore. In particular, as the drill string changes direction enormous lateral loads are placed on the centralizers. At the present time the construction of the low duty centralizer is such that there is a high probability that they will disintegrate leaving undesirable debris in the wellbore.

[0004] Further, to center the casing within the bore, the industry has also been using centralizing blade assemblies that are attached to the outside of the casing. These blade assemblies are positioned along the length of the casing at regular intervals and held in place with setscrews, clamping collars, and the like. One problem with these blade assemblies is that they commonly became loose due to the rotation and reciprocation of casing and due to which they often slide along the casing. When this happens, they tend to bunch up at one or more locations. This results in poor centralizing of the casing and consequently, a poor cementing job. Another problem with these blade assemblies is that the setscrews often cut the casing as the blade assemblies slide under high torque rotation of the casing. These cuts reduce the integrity of the casing. Another problem with the prior art is that these devices do not address the need to promote smooth, non-turbulent, reduced-friction flow around the centralizer, allowing the sticky drilling mud to release, which reduces the pumping pressure. The major problem with the earlier solid centralizers available is that they are not able to allow the proper rotation of casing and move from their position when the casing is taking place.

[0005] US Patent no 5,095,981 discloses a casing centralizer which comprises a circumferentially continuous tubular metal body adapted to fit closely about a joint of casing, and a plurality of solid metal blades fixed to the body and extending parallel to the axis of the body along the outer diameter of the body in generally equally spaced apart relation, each blade having opposite ends which are tapered outwardly toward one another and a relatively wide outer surface for bearing against the well-bore or an outer casing in which the casing is disposed, including screws extending threadedly through holes in at least certain of the blades and the body for gripping the casing so as to hold the centralizer in place.

[0006] U.S. patent No. 6,006,830 discloses a casing centralizer which comprises an annular body, a substantially cylindrical bore extending longitudinally through said body, and a peripheral array of a plurality of longitudinally extending blades circumferentially distributed around said body to define a flow path between each circumferentially adjacent pair of said blades, each said flow path providing a fluid flow path between longitudinally opposite ends of said centralizer, each said blade having a radial outer edge providing a well-bore contacting surface, and said cylindrical bore through said body being a clearance fit around casing intended to be centralized by said casing centralizer, the centralizer being manufactured wholly from a material which comprises zinc or a zinc alloy.

[0007] Reference may also be made to yet another feature of the centralizers discussed in the prior art i.e. the stop-collars. The previous teachings describe a stop collar at each of the ends of the centralizers to allow free rotation of the centralizer. Thus stop collars are installed at each end of the centralizer. One attempt to provide a bi-directional centralizer involves the fixed placement of a stop collar longitudinally between sliding end collars secured to the ends of the bow springs, and securing the stop collar to the exterior of the casing to be centralized in the bore hole. This configuration provides the desirable bi-directional function of the centralizer because the centralizer will slide along the casing as the centralizer resist collapse and entry into the larger casing until the leading end collar abuts against the stop collar. The longitudinal elongation of the Centralizer slidably displaces the trailing end collar in a direction away from the leading end collar abutted against the stop collar.

[0008] The problem with locating a stop collar longitudinally between sliding end collars is that the thickness of the stop collar prevents the Centralizer ribs from completely radially inwardly collapsing to lie flat along the length of the casing to which the Centralizer is slidably secured. This causes the stop collar to consume valuable

annular space and thereby prevents optimal sizing of subsequent casing.

[0009] An exemplary centralizer is the Lirette et al. centralizer of U.S. Pat. No. 5,575,333. This centralizer uses movable, flexible spring bows to space the casing from the sides of the bore hole. The Lirette et al. centralizer includes threaded ends that allow it to function as a casing coupling that connects sections of an inner casing within an outer casing. However, such movable, flexible spring bows tend to prohibit the rotation of a casing within a bore hole because the spring bows are not typically able to withstand the high torque developed by rotation of the casing relative to the inner surface of the bore hole. Whereas, the present invention provides a dualizer which rotates in both directions and thus induces extra swirl during cementing. The said duallizer need not to be floated between the stop collars as even when the Centralizer is fixed it would allow easy rotation since the two bodies will rotate itself along with casing rotation.

[0010] U.S. Pat. No. 4,830,105 discloses a borehole centralizer having an elongated shank member on which opposed head members are slidable and are connected to movable articulated arms. U.S. Pat. No. 5,261,488 discloses a device for well casing having spring strips. In this invention an additional energizing device is required to increase the bowing spring strips.

[0011] US 2004/0026131 A1 discloses a centralizer which is interposed between two rods of a drilling string. This centralizer clearly distinguishes from the centralizers mentioned before which comprise a casing mounted on the drill string.

[0012] US 4 635 736 A discloses a drill steering apparatus comprising an upper body and a lower cylindrical body securely attached. The purpose of this apparatus is to control the direction of drilling of a wellbore.

[0013] US 4 984 644 A discloses a centralizer consisting of a single cylindrical body.

[0014] US 2 659 439 discloses a centralizer having longitudinally spaced end rings/collars, to which a plurality of longitudinally extending ribs/blades are secured. If desired, a duplicate centering arrangement can be used as shown in fig1 of US 2659439.

[0015] All these devices have problems. Mostly, these problems arise because these centralizers are external add-ons to the casing. As such, they protrude into the well space, they are unable to hold their position in the well, and they generally dig into the casing surface when they move. Further, they do not allow cement to be applied uniformly to the casing. All of these devices require improvements so that the casings can be fixed on a casing pipe and easily rotating to increase the swirl.

[0016] Though these Centralizers have been used successfully for many years in boreholes to overcome the cementing process, they are less satisfactory to free rotation of casing with the Centralizer during mud displacement. Improper rotation of the casing alternatively affects the homogenous cementing process which results the formation of annular space. In these instances, an undesirable phenomenon of leakage is sometimes encountered. Such leakage is detrimental to the long term integrity and sealing efficiency of the cement in the annulus, and the magnitude of such leakage is often enough to require an expensive remedial squeeze cementing job to be carried out to suppress or stop the leakage. Such leakage can cause high volume blow-outs shortly after the cement placement and before the cement has initially set.

[0017] Furthermore, the Centralizers in the prior art faced one of the major problems during rotation of the casing. The solid Centralizers in the prior art were not able to allow the proper rotation of casing and moved from its position when the casing was in place. Further when casing was reciprocated the Centralizer again displaced and was not static while the pipe was being moved.

[0018] For years drilling engineers were looking for an alternative to the regular Centralizers available so that the Centralizer can be fixed on a casing pipe and still rotate allowing easy casing rotation as well as increase swirl.

[0019] For this reason, there is a constant need and it has become customary to maintain the flawless rotation of casing by using a better version of Centralizers in boreholes. Thus, the dual rotary centralizer of the present invention overcomes the disadvantages associated with the prior art casing centralizers by providing the two bodies of the centralizer which are able to rotate on its axis both in clockwise and anticlockwise direction with the centralizer itself being in place due to locking of allen screw onto the casing pipe.

[0020] With the earlier solid Centralizers the best option was to float the Centralizers between the stop-collars to allow the rotation of the casing however with the instant dual rotary Centralizer the Centralizer need not be floated between the stop collars even when the Centralizer is fixed. It would allow easy rotation as the two bodies will rotate itself along with casing rotation, thereby obviating with the requirement of two stop collars. The present apparatus provides dual function of the stop collar as it makes the Centralizer static as well as bi-directional and thus does away with the disadvantages of the prior art.

[0021] Moreover, since each top and lower body rotates separately, the said Centralizer would induce extra swirl during cement pumping. It has been proven that use of swirl inducing device (SID) is helpful during cementing jobs.

[0022] The dualizer of the present invention overcomes all these problems. It is able to withstand the high torque rotation and reciprocation of the casing without slippage, while allowing cement to flow smoothly, evacuating the drilling mud easily, reducing insertion and pumping pressures, and increasing cement flow rates.

OBJECT OF THE INVENTION

[0023] The object is to provide a bi - directional cen-

tralizer.

[0024] Yet another object is to provide a dual rotary centralizer which can rotate clockwise or anticlockwise through its own axis.

[0025] Yet another object is to provide a centralizer apparatus which is able to float freely while rotating around its own axis.

[0026] Yet another object of one or more aspects is to meet aforementioned industry need.

[0027] Yet another object is to provide a dual rotary centralizer for borehole which is particularly suitable for cementing job.

[0028] Yet another object is to provide a dual centralizer which may be disposed at one end with a casing joint and other with the one side of the axis. The other side of the axis is disposed with the other body of the centralizer in free flow rotation.

[0029] Yet another object is to provide a centralizer which withstands high torque rotation and reciprocation without slippage.

[0030] Yet another object is to provide such a dual rotary centralizer which is economical, very inexpensive to manufacture, efficient and easy to use.

BRIEF SUMMARY OF THE INVENTION

[0031] According to the present invention, there is provided a dual rotary centralizer for cementing a casing in a wellbore comprising a ring, an upper cylindrical body longitudally placed on the upper rim of the ring, a lower cylindrical body longitudally placed at the bottom rim of the ring, and an array of equiangularly-spaced blades integrally formed with the body of upper and lower cylindrical bodies. The upper cylindrical body and the lower cylindrical body are arranged to rotate on the axis of the ring both in clockwise and anticlockwise direction, wherein the centralizer is in position due to an inbuilt locking screw.

[0032] Alternative embodiments are set out in the dependent claims.

[0033] The apparatus comprises two rotating bodies and a stop ring. The said rotating bodies rotate clockwise or anticlockwise on its own axis.

[0034] Preferably, the upper and lower bodies have blades which help in swirl motion during the cementing operation. The upper and lower bodies can have various angles as per the requirement of the operation. The two bodies are fitted onto a ring by a locking mechanism.

[0035] The centarlizer of present invention has a construction wherein the two bodies of the centralizer is able to rotate on the axis of a stop ring both in clockwise and anticlockwise direction with the centralizer itself being in position due to the inbuilt locking screw onto the casing pipe. It allows cement to flow smoothly, evacuating the drilling mud easily, reducing insertion and pumping pressures, and increasing cement flow rates.

[0036] The present invention therefore, relates to a dual rotating centralizer for a borehole used in wellbores drilled for the extraction of oil or gas and a method of centralizing a casing tubular in an oil or gas wellbore with the help of said centralizer. More particularly, the present invention relates to a dualizer having two rotating bodies rotating on a ring, clockwise or anticlockwise on its own axis.

[0037] The dual rotary centralizer is formed as a bi-directional centralizer and is economical, very inexpensive to manufacture, efficient and easy to use.

BRIEF DESCRIPTION OF THE DRAWINGS

[0038] The object of the invention may be understood in more details and more particularly description of the invention briefly summarized above by reference to certain embodiments thereof which are illustrated in the appended drawings, which drawings form a part of this specification. It is to be noted, however, that the appended drawings illustrate preferred embodiments of the invention.

FIG. 1 is a perspective view of a centralizer according to the present invention;

FIG. 1A and 1B are front and perspective views of upper cylindrical body used to manufacture the FIG. 1 centralizer;

FIG. 1C and 1D are front and perspective views of a ring used to manufacture the FIG. 1 centralizer.

FIG. 1E and 1F is a view similar to FIG. 1A and 1B but showing lower cylindrical body used to manufacture the FIG. 1 centralizer

FIG. 2 is a perspective view of another embodiment of centralizer according to the present invention.

FIG. 2A and 2B are front and perspective views of upper cylindrical body used to manufacture the FIG. 2 centralizer;

FIG. 2C and 2D are front and perspective views of a ring used to manufacture the FIG. 2 centralizer.

FIG. 2E and 2F is a view similar to FIG. 2A and 2B but showing lower cylindrical body used to manufacture the FIG. 2 centralizer

FIG. 3 is a perspective view of yet another embodiment of centralizer according to the present invention.

FIG. 3A and 3B are front and perspective views of upper cylindrical body used to manufacture the FIG. 3 centralizer;

FIG. 3C and 3D are front and perspective views of

a ring used to manufacture the FIG. 3 centralizer.

FIG. 3E and 3F is a view similar to FIG. 3A and 3B but showing lower cylindrical body used to manufacture the FIG. 3 centralizer

FIG. 4 is a perspective view of yet another embodiment of centralizer according to the present invention.

FIG. 4A and 4B are front and perspective views of upper cylindrical body used to manufacture the FIG. 4 centralizer;

FIG. 4C and 4D are front and perspective views of a ring used to manufacture the FIG. 4 centralizer.

FIG. 4E and 4F is a view similar to FIG. 4A and 4B but showing lower cylindrical body used to manufacture the FIG. 4 centralizer

FIG. 5 is a perspective view of another embodiment of centralizer according to the present invention.

FIG. 5A and 5B are front and perspective views of upper cylindrical body used to manufacture the FIG. 5 centralizer;

FIG. 5C and 5D are front and perspective views of a ring used to manufacture the FIG. 5 centralizer.

FIG. 5E and 5F is a view similar to FIG. 5A and 5B but showing lower cylindrical body used to manufacture the FIG. 5 centralizer

FIG. 6 is a perspective view of yet another embodiment of centralizer according to the present invention.

FIG. 6A and 6B are front and perspective views of upper cylindrical body used to manufacture the FIG. 6 centralizer;

FIG. 6C and 6D are front and perspective views of a ring used to manufacture the FIG. 6 centralizer.

FIG. 6E and 6F is a view similar to FIG. 6A and 6B but showing lower cylindrical body used to manufacture the FIG. 6 centralizer

DETAILED DESCRIPTION OF THE INVENTION

[0039] The present invention relates to an apparatus for use in a wellbore, which comprises two rotating bodies and a stop ring. The said rotating bodies rotate clockwise or anticlockwise on its own axis. Preferably, the present invention provides a dual rotary centralizer with a unique dual rotating design with an advantage of an integral stop. This combination enables a free rotation on the axis of the casing pipe which allows easy casing rotation while the dual rotary centralizer stays in its position onto the casing pipe eliminating altogether the need for stop collars. The clockwise and anticlockwise rotation of two bodies induces extra swirl action.

[0040] Moreover, the locking mechanism employed in the dual rotary centralizer provides excellent rotational performance in mud. They provide exceptional wear resistance, Torque reducing performance which increases the swirling of cement slurry. The rotating dual body ensures that axle shear stresses remain within elastic limits.

[0041] The invention has been further defined by following embodiments:

Referring to figure 1, the centralizer comprises ring 4, upper cylindrical body 1, lower cylindrical body 10 and array of equiangularly-spaced blades 2, 3 integrally formed with the body of upper cylindrical body 1 and lower cylindrical body 10. The ring comprises of grub screw 5 and ring thread 8, placed on the ring. A cylindrical ring has uniform diameter with the ring groove 9 on both sides dimensioned to fit around the cylindrical bodies. Similarly, the upper and lower cylindrical body have groove 6 on one side to fit with the ring and to form a bilaterally rotating centralizer. The wall thickness 7 of upper cylindrical body 1 and lower cylindrical body 10 may depend on the wellbore in which it is used.

[0042] Each of the blades not only extends between longitudinally opposite ends of the upper and lower cylindrical body 1, but also extends circumferentially around the periphery of the centralizer. The orientation of the blades ensures that their respective outer edges 3 collectively provide a generally uniform well bore-contacting surface around the circumference of the centralizer and induces swirl and turbulence to assist bore cleaning.

[0043] Referring to figs. 1 A and 1B, the upper cylindrical body 1 have groove 6 on one side to fit with the ring and to form a bilaterally rotating centralizer. The wall thickness 7 of upper cylindrical body may depend on the wellbore in which it is used. The surface of the upper cylindrical body 1 has an array of equiangularly spaced blades blades 2, 3.

[0044] Referring to figs. 1C and 1D, the ring comprises of grub screw 5 and ring thread 8, placed alternatively on the ring to fit the upper and lower body to form a unitary centarlizer. A cylindrical ring has uniform diameter with the ring groove 9 on both sides dimensioned to fit around the cylindrical bodies.

[0045] Referring to figs. 1 E and 1 F, the lower cylindrical body 1 have groove 6 on one side to fit with the ring and to form a bilaterally rotating centralizer. The wall thickness 7 of lower cylindrical body may depend on the wellbore in which it is used. The surface of the lower cylindrical body 1 has an array of equiangularly spaced blades blades 2, 3.

[0046] Referring to fig. 2 the centralizer comprises ring 4, upper cylindrical body 9, lower cylindrical body 1 and array of equiangularly-spaced blades 2, 3, 10, 11 integrally formed with the body of upper cylindrical body 9 and lower cylindrical body 1. The ring comprises of grub screw 5 and ring thread 8, placed on the ring. A cylindrical ring has uniform diameter with the ring groove on both sides dimensioned to fit around the cylindrical bodies. The upper cylindrical bodies has groove 12 on one side to fit with the ring and to form a bilaterally rotating centralizer. The groove 6 has been provided on the top side to fit with the ring and to form a bilaterally rotating centralizer. The wall thickness 13, 7 of upper cylindrical body 9 and lower cylindrical body 1, respectively, depends on the wellbore in which it is used.

[0047] Each of the blades not only extends between longitudinally opposite ends of the upper cylindrical body 9 and lower cylindrical body 1, but also extends circumferentially around the periphery of the centralizer. The orientation of the blades ensures that their respective outer edges 3 and 12 collectively provide a generally uniform well bore-contacting surface around the circumference of the centralizer and induces swirl and turbulence to assist bore cleaning.

[0048] Referring to figs. 2A and 2B, the upper cylindrical body 9 have groove 12 on one side to fit with the ring and to form a bilaterally rotating centralizer. The wall thickness 13 of upper cylindrical body 9 may depend on the wellbore in which it is used. The surface of the upper cylindrical body 9 has an array of equiangularly spaced blades blades 10, 11.

[0049] Referring to figs. 2C and 2D, the ring comprises of grub screw 5 and ring thread 8, placed alternatively on the ring to fit the upper and lower body to form a unitary centarlizer.

[0050] Referring to figs. 2E and 2F, the lower cylindrical body 1 have groove 6 on one side to fit with the ring and to form a bilaterally rotating centralizer. The wall thickness 7 of lower cylindrical body may depend on the wellbore in which it is used. The surface of the lower cylindrical body 1 has an array of equiangularly spaced blades blades 2, 3.

[0051] Referring to fig. 3 the centralizer comprises ring 4, upper cylindrical body 9, lower cylindrical body 9 and array of equiangularly-spaced blades 10, 11 integrally formed with the body of upper cylindrical body 9 and lower cylindrical body 9. The ring comprises of grub screw 5 and ring thread 8, placed on the ring. A cylindrical ring has uniform diameter with the ring groove on both sides dimensioned to fit around the cylindrical bodies. The upper cylindrical and lower cylindrical bodies have groove 12 on one side to fit with the ring and to form a bilaterally rotating centralizer. The wall thickness 13 of upper cylindrical and lower cylindrical bodies 9 depends on the wellbore in which it is used.

[0052] Each of the blades not only extends between longitudinally opposite ends of the upper cylindrical body 9 and lower cylindrical body 9, but also extends circumferentially around the periphery of the centralizer. The orientation of the blades ensures that their respective outer edges 11 collectively provide a generally uniform well bore-contacting surface around the circumference of the centralizer and induces swirl and turbulence to assist bore cleaning.

[0053] Referring to figs. 3A and 3B, the upper cylindrical body 9 have groove 12 on one side to fit with the ring and to form a bilaterally rotating centralizer. The wall thickness 13 of upper cylindrical body 9 may depend on the wellbore in which it is used. The surface of the upper cylindrical body 9 has an array of equiangularly spaced blades blades 10, 11.

[0054] Referring to figs. 3C and 3D, the ring comprises of grub screw 5 and ring thread 8, placed alternatively on the ring to fit the upper and lower body to form a unitary centarlizer.

[0055] Referring to figs. 3E and 3F, the lower cylindrical body 9 have groove 12 on one side to fit with the ring and to form a bilaterally rotating centralizer. The wall thickness 13 of lower cylindrical body may depend on the wellbore in which it is used. The surface of the lower cylindrical body 9 has an array of equiangularly spaced blades blades 10, 11.

[0056] Referring to fig. 4 the centralizer comprises ring 4, upper cylindrical body 14, lower cylindrical body 1 and array of equiangularly-spaced blades 2, 3, 15, 16 integrally formed with the body of upper cylindrical body 14 and lower cylindrical body 1. The ring comprises of grub screw 5 and ring thread 8, placed on the ring. A cylindrical ring has uniform diameter with the ring groove on both sides dimensioned to fit around the cylindrical bodies. The upper cylindrical bodies has groove 17 on one side to fit with the ring and to form a bilaterally rotating centralizer. The groove 6 has been provided on the top side to fit with the ring and to form a bilaterally rotating centralizer. The wall thickness 18, 7 of upper cylindrical body 14 and lower cylindrical body 1, respectively, depends on the wellbore in which it is used.

[0057] Each of the blades not only extends between longitudinally opposite ends of the upper cylindrical body 14 and lower cylindrical body 1, but also extends circumferentially around the periphery of the centralizer. The orientation of the blades ensures that their respective outer edges 3 and 16 collectively provide a generally uniform well bore-contacting surface around the circumference of the centralizer and induces swirl and turbulence to assist bore cleaning.

[0058] Referring to figs. 4A and 4B, the upper cylindrical body 14 has groove 17 on one side to fit with the ring and to form a bilaterally rotating centralizer. The wall thickness 18 of upper cylindrical body 14 may depend on the wellbore in which it is used. The surface of the upper cylindrical body 14 has an array of equiangularly spaced blades blades 15, 16.

[0059] Referring to figs. 4C and 4D, the ring comprises of grub screw 5 and ring thread 8, placed alternatively on the ring to fit the upper and lower body to form a unitary

centarlizer.

[0060] Referring to figs. 4E and 4F, the lower cylindrical body 1 have groove 6 on one side to fit with the ring and to form a bilaterally rotating centralizer. The wall thickness 7 of lower cylindrical body may depend on the wellbore in which it is used. The surface of the lower cylindrical body 1 has an array of equiangularly spaced blades blades 2, 3.

[0061] Referring to fig. 5, the centralizer comprises ring 4, upper cylindrical body 14, lower cylindrical body 1 and array of equiangularly-spaced blades 10, 11, 15, 16 integrally formed with the body of upper cylindrical body 14 and lower cylindrical body 9. The ring comprises of grub screw 5 and ring thread 8, placed on the ring. A cylindrical ring has uniform diameter with the ring groove on both sides dimensioned to fit around the cylindrical bodies. The upper cylindrical bodies has groove 17 on one side to fit with the ring and to form a bilaterally rotating centralizer. The groove 12 has been provided on the top side to fit with the ring and to form a bilaterally rotating centralizer. The wall thickness 18, 13 of upper cylindrical body 14 and lower cylindrical body 9, respectively, depends on the wellbore in which it is used.

[0062] Each of the blades not only extends between longitudinally opposite ends of the upper cylindrical body 14 and lower cylindrical body 9, but also extends circumferentially around the periphery of the centralizer. The orientation of the blades ensures that their respective outer edges 11 and 16 collectively provide a generally uniform well bore-contacting surface around the circumference of the centralizer and induces swirl and turbulence to assist bore cleaning.

[0063] Referring to figs. 5A and 5B, the upper cylindrical body 14 has groove 17 on one side to fit with the ring and to form a bilaterally rotating centralizer. The wall thickness 18 of upper cylindrical body 14 may depend on the wellbore in which it is used. The surface of the upper cylindrical body 14 has an array of equiangularly spaced blades blades 15, 16.

[0064] Referring to figs. 5C and 5D, the ring comprises of grub screw 5 and ring thread 8, placed alternatively on the ring to fit the upper and lower body to form a unitary centarlizer.

[0065] Referring to figs. 5E and 5F, the lower cylindrical body 9 have groove 12 on one side to fit with the ring and to form a bilaterally rotating centralizer. The wall thickness 13 of lower cylindrical body may depend on the wellbore in which it is used. The surface of the lower cylindrical body 1 has an array of equiangularly spaced blades blades 10, 11.

[0066] Referring to fig. 6 the centralizer comprises ring 4, upper cylindrical body 14, lower cylindrical body 14 and array of equiangularly-spaced blades 15, 16 integrally formed with the body of upper cylindrical body 14 and lower cylindrical body 14. The ring comprises of grub screw 5 and ring thread 8, placed on the ring. A cylindrical ring has uniform diameter with the ring groove on both sides dimensioned to fit around the cylindrical bodies. The upper cylindrical and lower cylindrical bodies have groove 17 on one side to fit with the ring and to form a bilaterally rotating centralizer. The wall thickness 18 of upper cylindrical and lower cylindrical bodies 14 depends on the wellbore in which it is used.

[0067] Each of the blades not only extends between longitudinally opposite ends of the upper cylindrical body 14 and lower cylindrical body 14, but also extends circumferentially around the periphery of the centralizer. The orientation of the blades ensures that their respective outer edges 16 collectively provide a generally uniform well bore-contacting surface around the circumference of the centralizer and induces swirl and turbulence to assist bore cleaning.

[0068] Referring to figs. 6A and 6B, the upper cylindrical body 14 has groove 17 on one side to fit with the ring and to form a bilaterally rotating centralizer. The wall thickness 18 of upper cylindrical body 14 may depend on the wellbore in which it is used. The surface of the upper cylindrical body 14 has an array of equiangularly spaced blades blades 15, 16.

[0069] Referring to figs. 6C and 6D, the ring comprises of grub screw 5 and ring thread 8, placed alternatively on the ring to fit the upper and lower body to form a unitary centarlizer.

[0070] Referring to figs. 6A and 6B, the lower cylindrical body 14 has groove 17 on one side to fit with the ring and to form a bilaterally rotating centralizer. The wall thickness 18 of lower cylindrical body 14 may depend on the wellbore in which it is used. The surface of the lower cylindrical body 14 has an array of equiangularly spaced blades blades 15, 16.

[0071] The blades of the centralizer keep the tubular centralized within the borehole, and bear against the wall of the borehole to reduce friction.

[0072] In one of the embodiments the blades are left oriented and are fitted on the surface of cylindrical body at an angle ranging from 15° to 35°.

[0073] In another embodiment the blades are right oriented and are fitted on the surface of cylindrical body at an angle ranging from 15° to 35°.

[0074] In another embodiment the blades are straight and are fitted on the surface of cylindrical body at an angle of 90°.

[0075] In an embodiment, it is preferred that the entire centralizer be fabricated as a one-piece article (although the blades 10 could be separately formed and subsequently attached to the body by any suitable means).

[0076] In an embodiment, the body of centralizer is made of metals selected from the group consisting of Zinc or its alloys or Aluminum or its alloys, Steel or its alloys, phenolic and various rubber based materials.

[0077] In another embodiment, the body of centralizer is made of Zinc alloys and preferably ZAMAC-12.

[0078] In yet another embodiment the body of centralizer is made of Aluminum alloys and preferably ALUM-6.

[0079] In yet another embodiment, the body of centralizer is made of phenolic and various rubber based ma-

terials preferably HNBR.

[0080] In another embodiment, the blades can be covered with strips of Teflon.

[0081] The upper and lower bodies of the dualizer have blades which help in swirl motion during the cementing operation. The two bodies are fitted onto a ring by a locking mechanism.

[0082] The dual rotary Centralizer may be disposed at one end with a casing joint and other with the one side of the axis. The other side of the axis is disposed with the other body of the Centralizer in free flow rotation.

[0083] In an embodiment, the blade would rotate while lowering the casing with Duallizer remaining in its position.

Claims

1. A dual rotary centralizer for cementing a casing in a wellbore comprising:

   a ring (4);
   an upper cylindrical body (1) longitudinally placed on the upper rim of the ring;
   a lower cylindrical body longitudinally placed at the bottom rim of the ring; and
   an array of equiangularly-spaced blades (10) integrally formed with the body of upper and lower cylindrical bodies (1);
   wherein, the said upper and lower cylindrical bodies are able to rotate clockwise and anticlockwise directions separately on their axis while the centralizer is in position due to an inbuilt locking screw.

2. The dual rotary centralizer as claimed in claim 1, wherein the said ring comprises of grub screw 5 and ring thread 8, placed on the ring.

3. The dual rotary centralizer as claimed in claims 1 and 2, wherein the said ring has uniform diameter with a ring groove 9 on both sides dimensioned to fit around the cylindrical bodies.

4. The dual rotary centralizer as claimed in claim 1, wherein the said array of equiangularly-spaced blades having upper face 3 and lower face 2 molded on the surface of upper cylindrical body and lower cylindrical body.

5. The dual rotary centralizer as claimed in claims 1 and 4, wherein the said blades extends between longitudinally opposite ends of the upper cylindrical body and lower cylindrical body.

6. The dual rotary centralizer as claimed in claims 4 and 5, wherein the said blades extends circumferentially around the periphery of the centralizer.

7. The dual rotary centralizer as claimed in claims 4 to 6, wherein the said blades are oriented, right oriented or straight.

8. The dual rotary centralizer as claimed in claims 4 to 7, wherein the left or right oriented blades are molded at an angle ranging from 15 [deg.] to 35 [deg.].

9. The dual rotary centralizer as claimed in claims 4 to 8, wherein the straight blades are molded at an angle of 90 [deg.].

Patentansprüche

1. Eine Doppeldreh Zentriervorrichtung für das Zementieren eines Gehäuses in einem Bohrloch, umfassend:

   einen Ring (4);
   einen oberen zylindrischen Körper (1) in Längsrichtung auf dem oberen Rand des Rings angeordnet;
   einen unteren zylindrischen Körper in Längsrichtung auf dem unteren Rand des Rings angeordnet; und
   ein Anordnung von gleichwinklig im gleichem Abstand angelegten Schaufelblaettern (10), die integral mit dem Körper des oberen und unteren zylindrischen Körpers (1) gestaltet ist;
   wobei die genannten oberen und unteren zylindrischen Körper sich getrennt rechtsdrehend und linksdrehend einzeln um ihre Achse drehen können, während die Zentriervorrichtung positioniert bleibt bedingt durch eine Verrieglungsschraube.

2. Eine Doppeldreh Zentriervorrichtung nach Anspruch 1, wobei der besagte Ring einen Gewindestift (5) und ein Ringgewinde (8) beinhaltet.

3. Eine Doppeldreh Zentriervorrichtung nach Anspruch 1 und 2, wobei der besagte Ring einen einheitlichen Durchmesser hat, der mit einer Ringnut (9) auf beiden Seiten versehen ist, um sich an die zylindrischen Körper anzupassen.

4. Eine Doppeldreh Zentriervorrichtung nach Anspruch 1, wobei die Anordnung von gleichwinklig im gleichem Abstand angelegten Schaufelblaettern (10), eine obere Fläche (3) und eine untere Flaeche (2) beinhaltet, die auf der Oberflaeche des oberen zylindrischen Körpers und unteren zylindrischen Körpers ausgeformt sind.

5. Eine Doppeldreh Zentriervorrichtung nach Anspruch 1 und 4, wobei die genannten Schaufelblaetter sich zwischen den, in Längsrichtung gegenüberliegen-

den Enden, des oberen zylindrischen Körpers und unteren zylindrischen Körpers erstrecken.

6. Eine Doppeldreh Zentriervorrichtung nach Anspruch 4 und 5, bei der die genannten Schaufelblaetter sich in ringsum um den Umfang der Zentriervorrichtung befinden.

7. Eine Doppeldreh Zentriervorrichtung nach Anspruch 4 bis 6, wobei die genannten Schaufelblaetter nach links, rechts oder gerade ausgerichtet sind.

8. Eine Doppeldreh Zentriervorrichtung nach Anspruch 4 bis 7, wobei die Schaufelblaetter daduch gekennzeichnet sind, dass die nach links oder rechts ausgerichteten Blaetter in einem Winkel, im Bereich von 15 Grad bis 35 Grad, ausgeformt sind.

9. Eine Doppeldreh Zentriervorrichtung nach einem der Ansprüche 4 bis 8, wobei die gerade ausgerichteten Schafelblaetter in einem Winkel von 90 Grad ausgeformt sind.

Revendications

1. Dispositif de centrage rotatif double pour la cimentation d'un tubage dans un puits de forage, comprenant:

un anneau (4);
un corps cylindrique supérieur (1) placée longitudinalement sur le bord supérieur de l'anneau;
placé longitudinalement un corps cylindrique inférieure au bord inférieur de l'anneau; et
un ensemble de pales équi-angulaires espacées (10) intégralement formée avec le corps de corps cylindriques supérieure et inférieure (1);
dans lequel, lesdits corps cylindriques supérieure et inférieure sont en mesure de tourner dans le sens horaire et le sens antihoraire directions séparément sur leur axe tandis que le centralisateur est en position en raison d'une vis de blocage intégré.

2. Le centralisateur double rotatif selon la revendication 1, dans lequel ladite anneau comprend des vis sans tête 5 et du filetage de l'anneau 8, placé sur l'anneau.

3. Le centreur double rotatif selon les revendications 1 et 2, dans lequel ladite anneau a un diamètre uniforme avec une gorge annulaire 9 des deux côtés dimensionnés pour s'adapter autour des corps cylindriques.

4. Le centreur double rotatif selon la revendication 1, dans lequel ladite série d'aubes équiangulaires espacées ayant la face supérieure 3 et la face inférieure 2 moulé sur la surface supérieure du corps cylindrique et le corps cylindrique inférieur.

5. Le centreur double rotatif selon les revendications 1 et 4, dans lequel lesdites lames se prolonge entre les extrémités longitudinalement opposées du corps cylindrique supérieur et inférieur corps cylindrique.

6. Le centreur double rotatif selon les revendications 4 et 5, dans lequel lesdites lames se prolonge circonférentiellement autour de la périphérie du centreur.

7. Le centreur rotatif double selon les revendications 4 à 6, dans lequel lesdites lames sont laissées orientée, non orientée ou droite.

8. Le centreur double rotatif selon les revendications 4 à 7, dans lequel les lames de gauche ou de droite sont moulées orienté à un angle compris entre 15 [deg.] À 35 [deg.].

9. Le centreur double rotatif selon les revendications 4 8, dans lequel les lames droites sont moulées sous un angle de 90 [deg.].

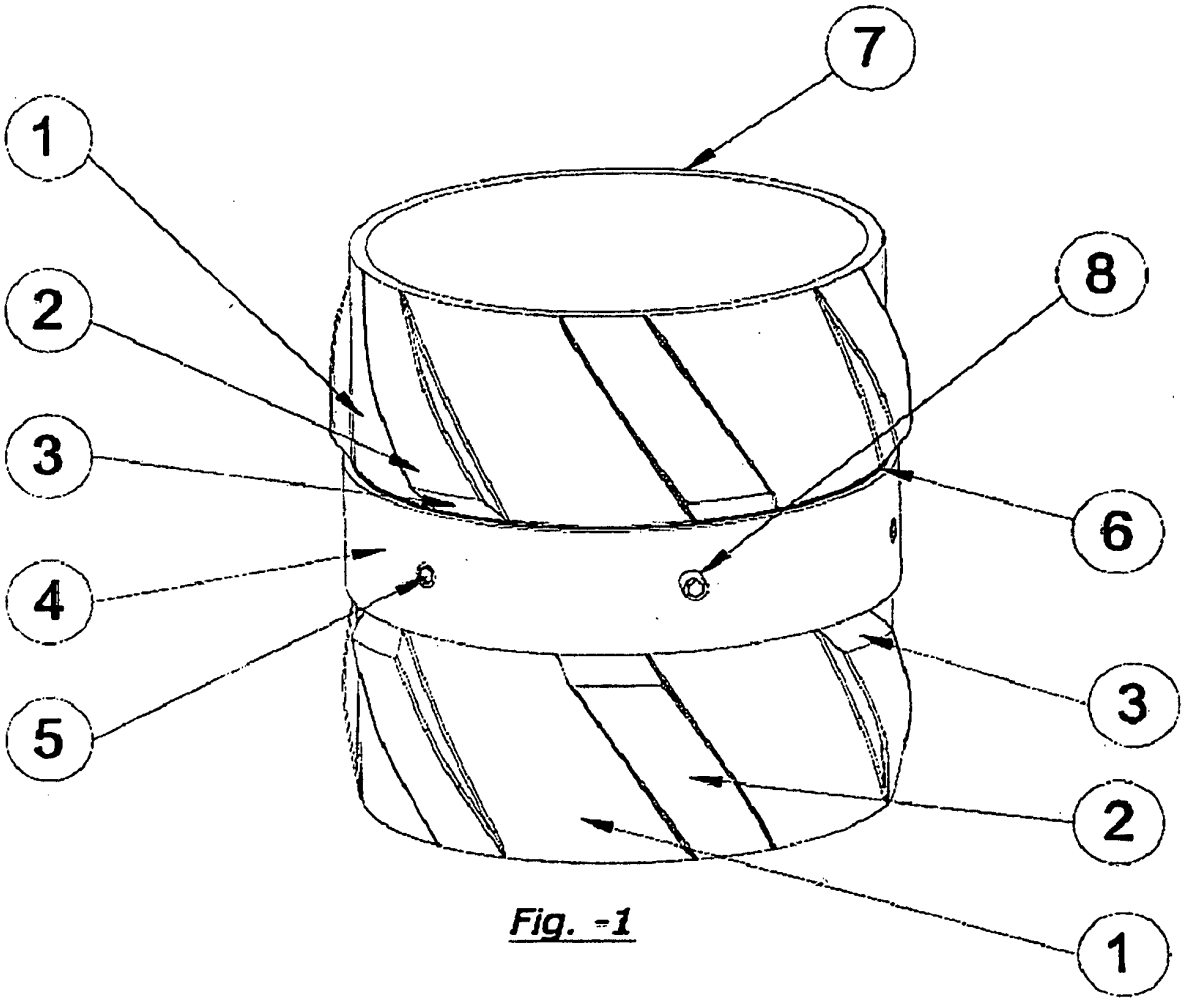


Fig. -1

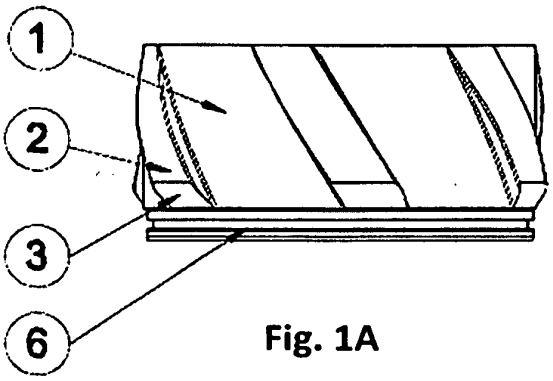


Fig. 1A

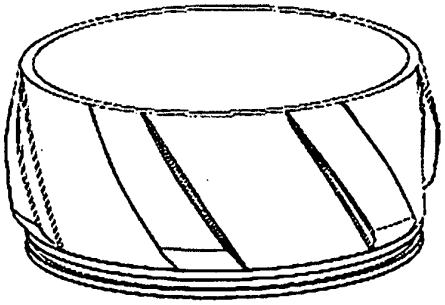


Fig. 1B

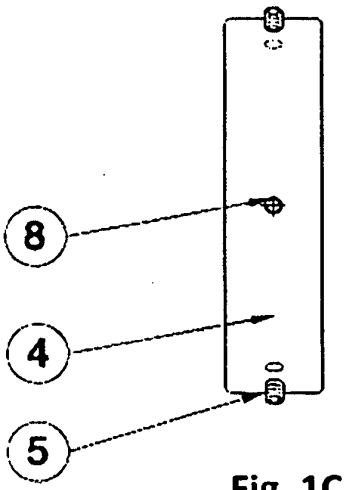


Fig. 1C

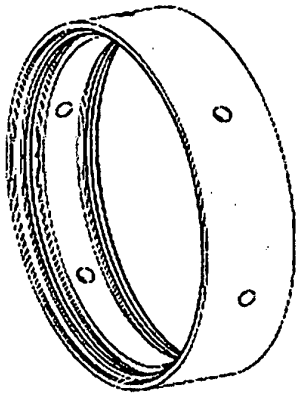


Fig. 1D

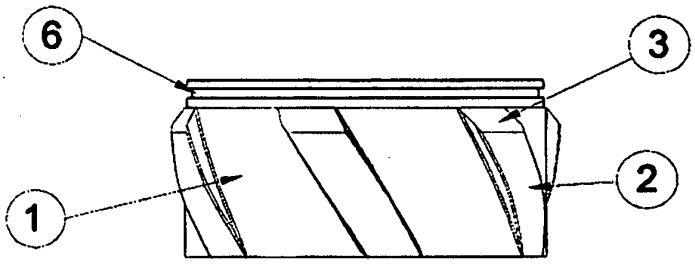


Fig. 1E

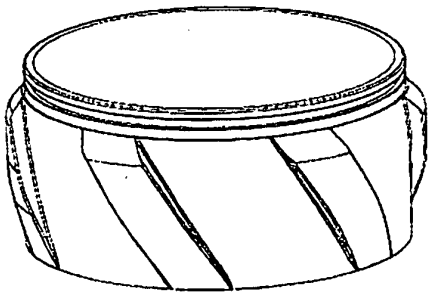


Fig. 1F

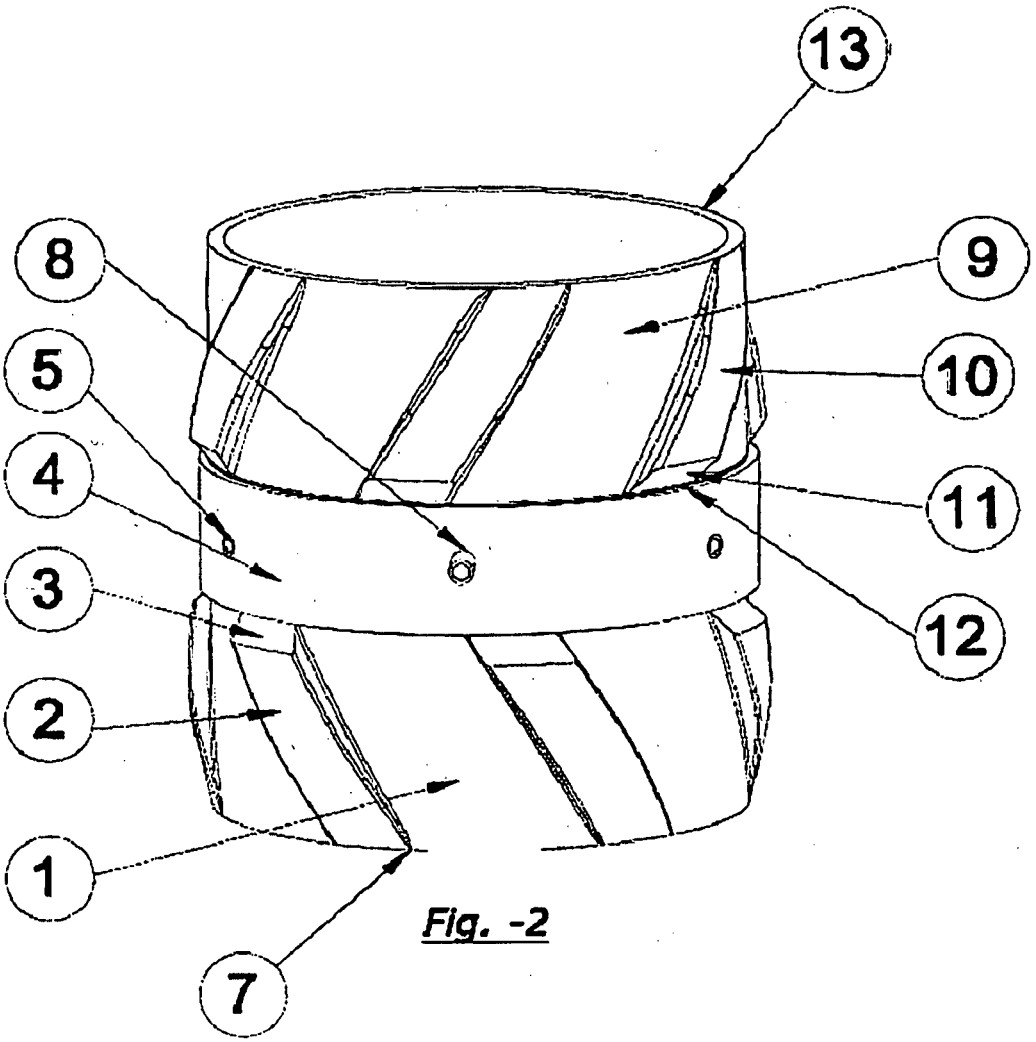


Fig. -2

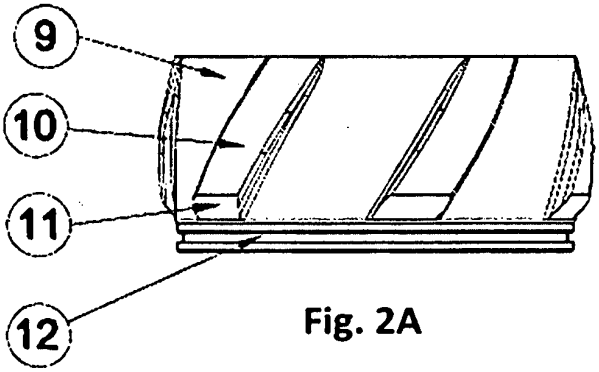


Fig. 2A

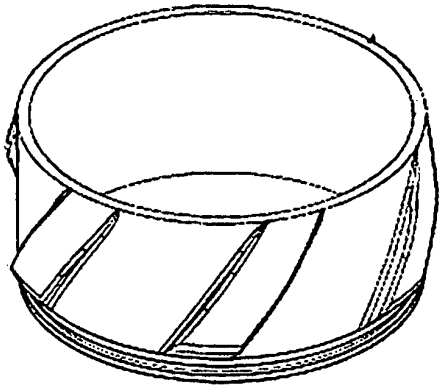


Fig. 2B

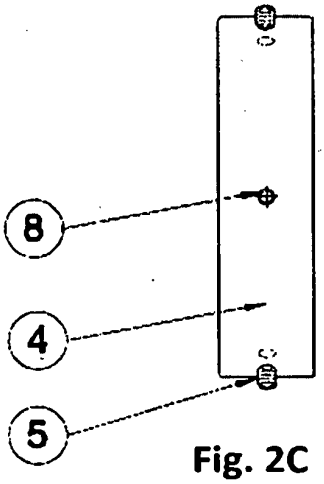


Fig. 2C

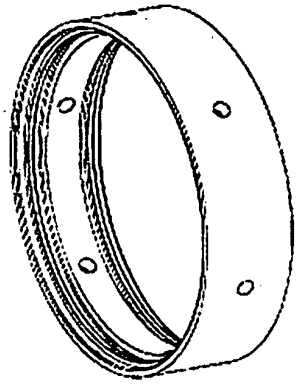


Fig. 2D

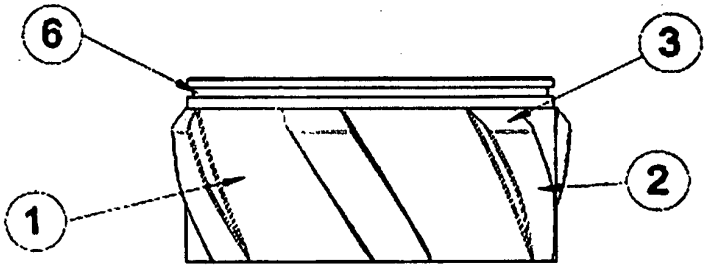


Fig. 2E

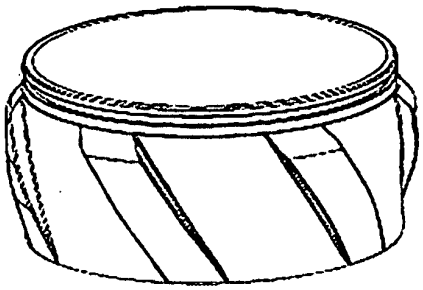


Fig. 2F

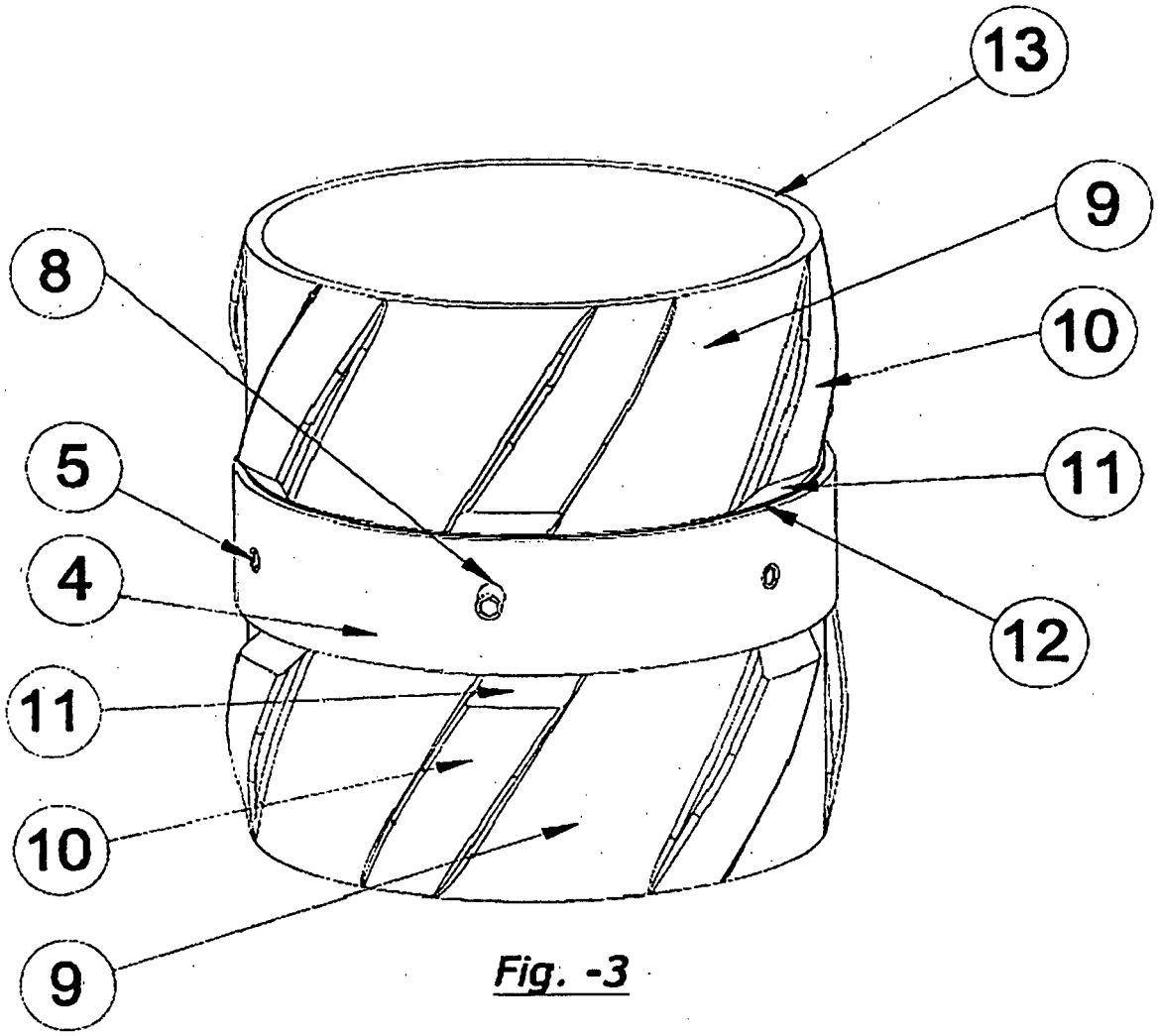


Fig. -3

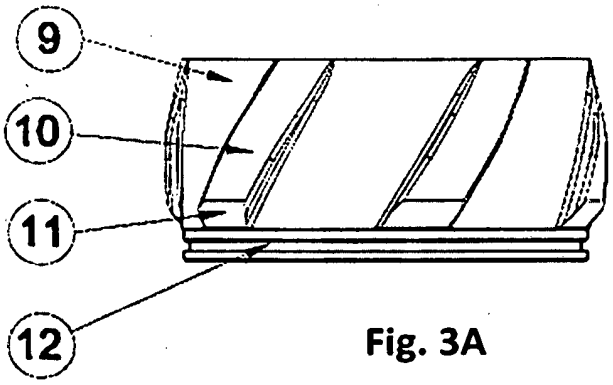


Fig. 3A

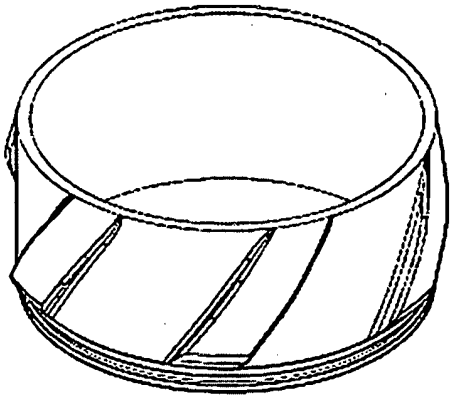


Fig. 3B

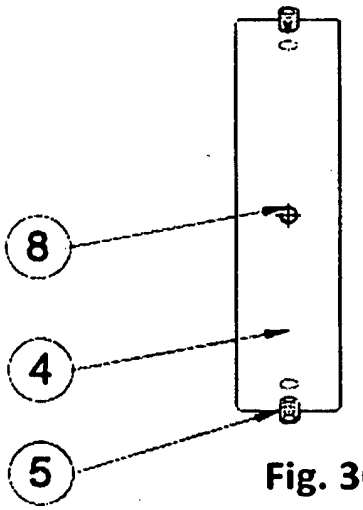


Fig. 3C

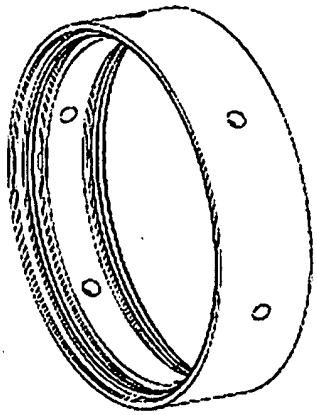


Fig. 3D

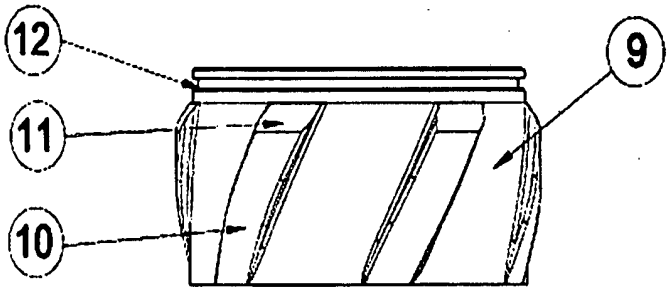


Fig. 3E

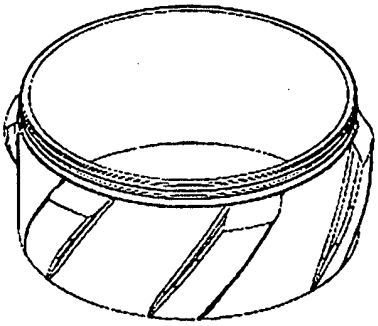


Fig. 3F

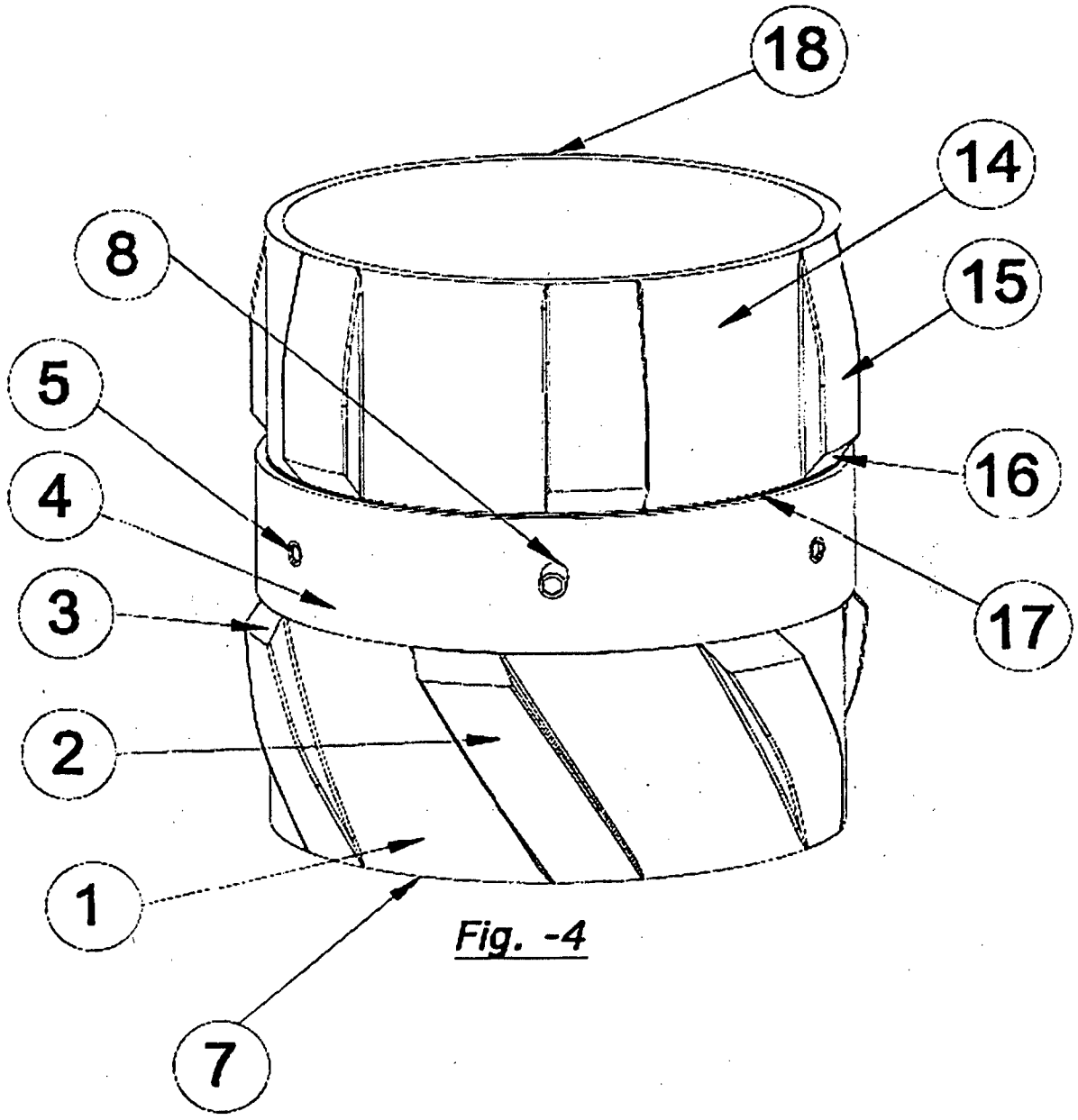


Fig. -4

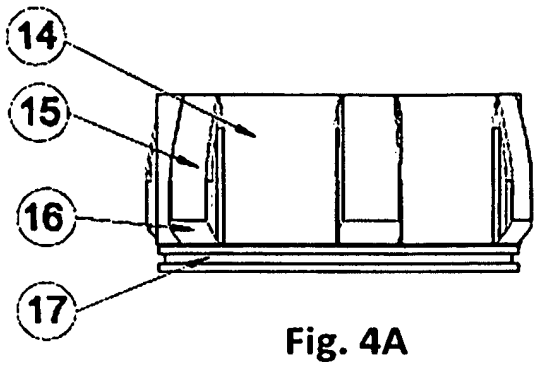


Fig. 4A

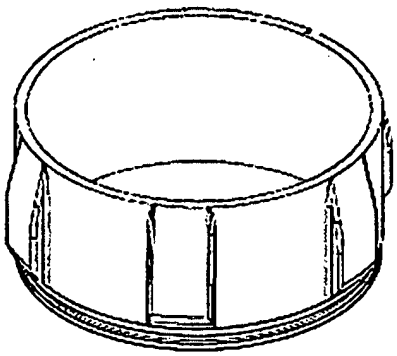


Fig. 4B

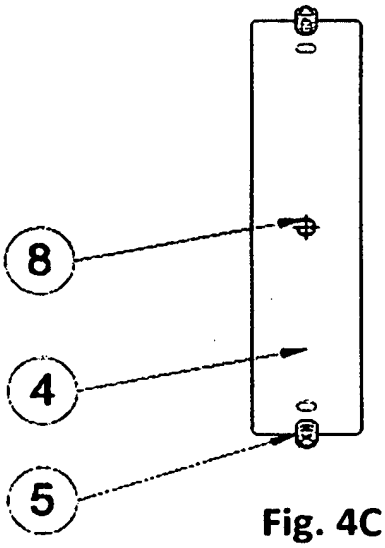


Fig. 4C

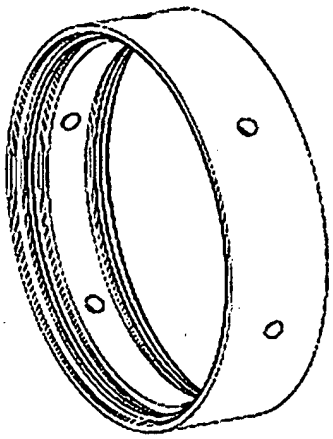


Fig. 4D

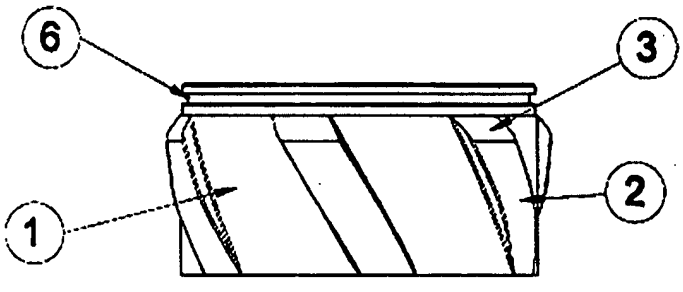


Fig. 4E

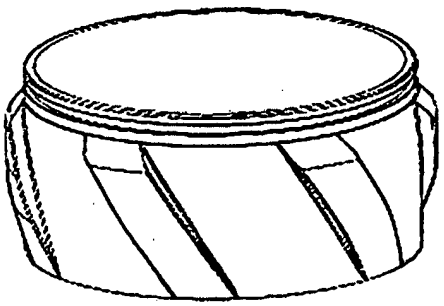


Fig. 4F

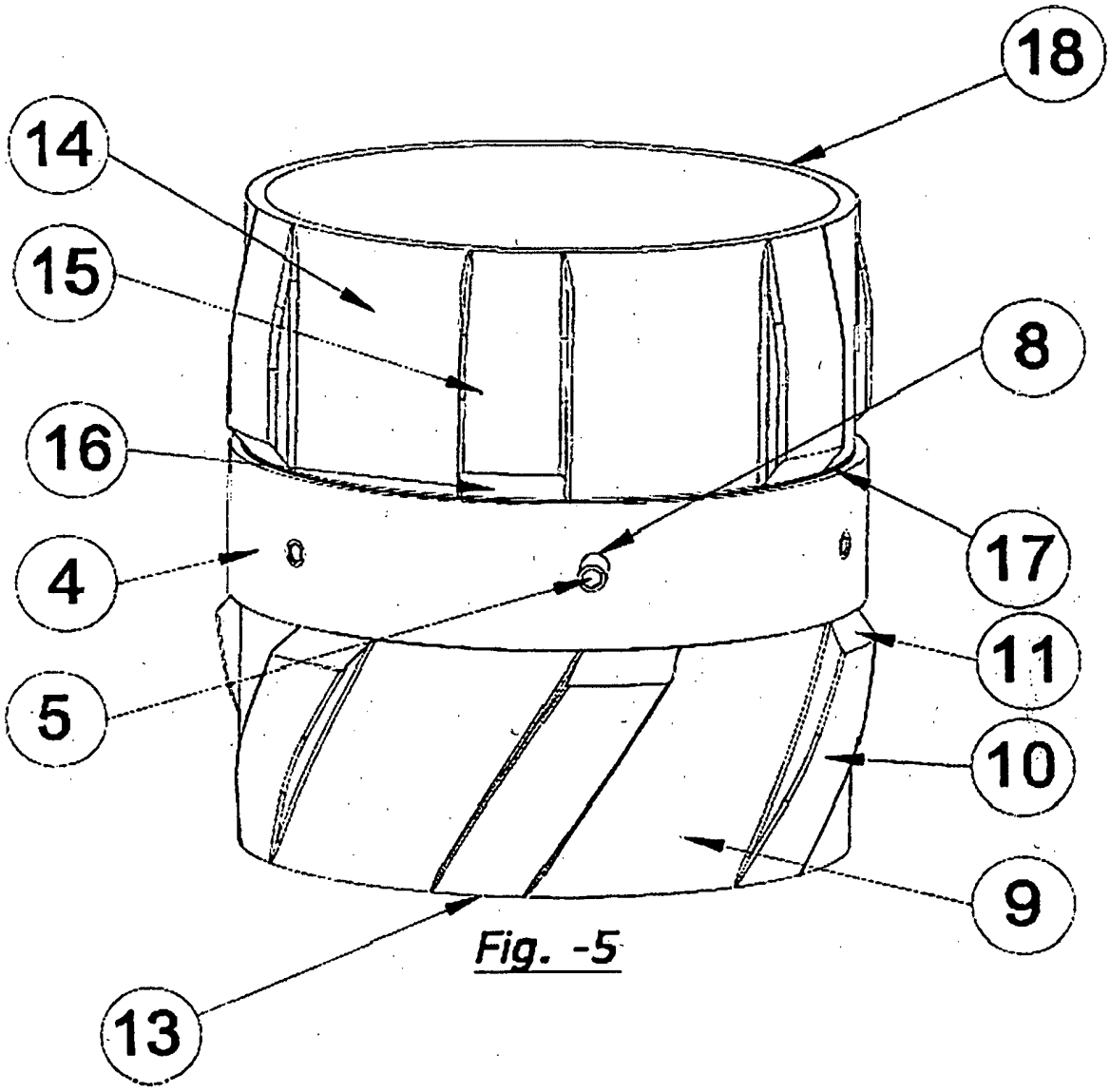


Fig. -5

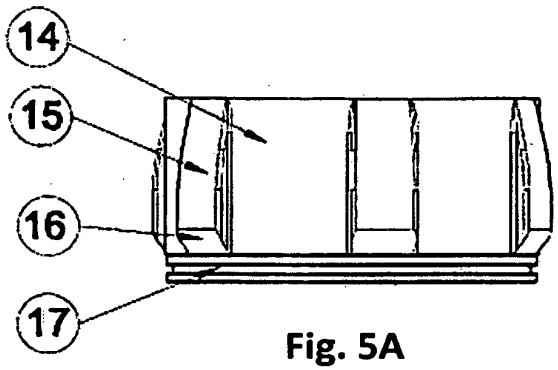


Fig. 5A

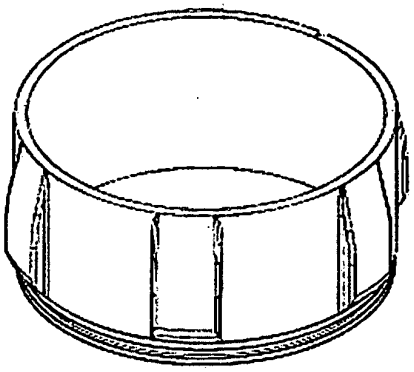


Fig. 5B

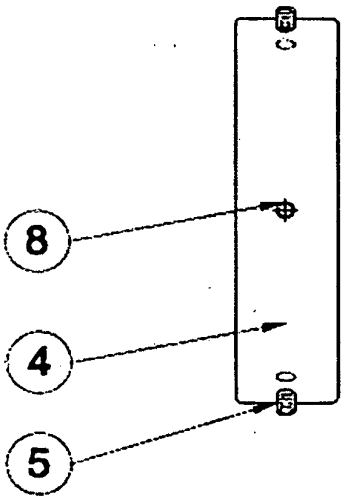


Fig. 5C

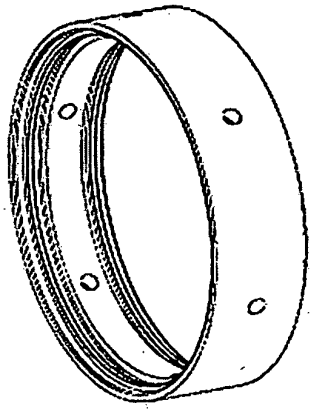


Fig. 5D

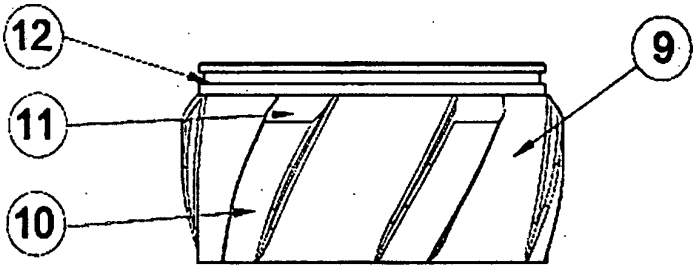


Fig. 5E

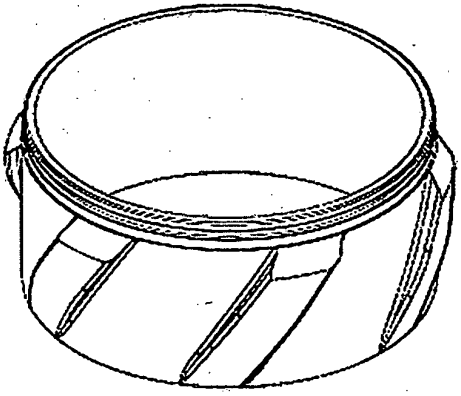
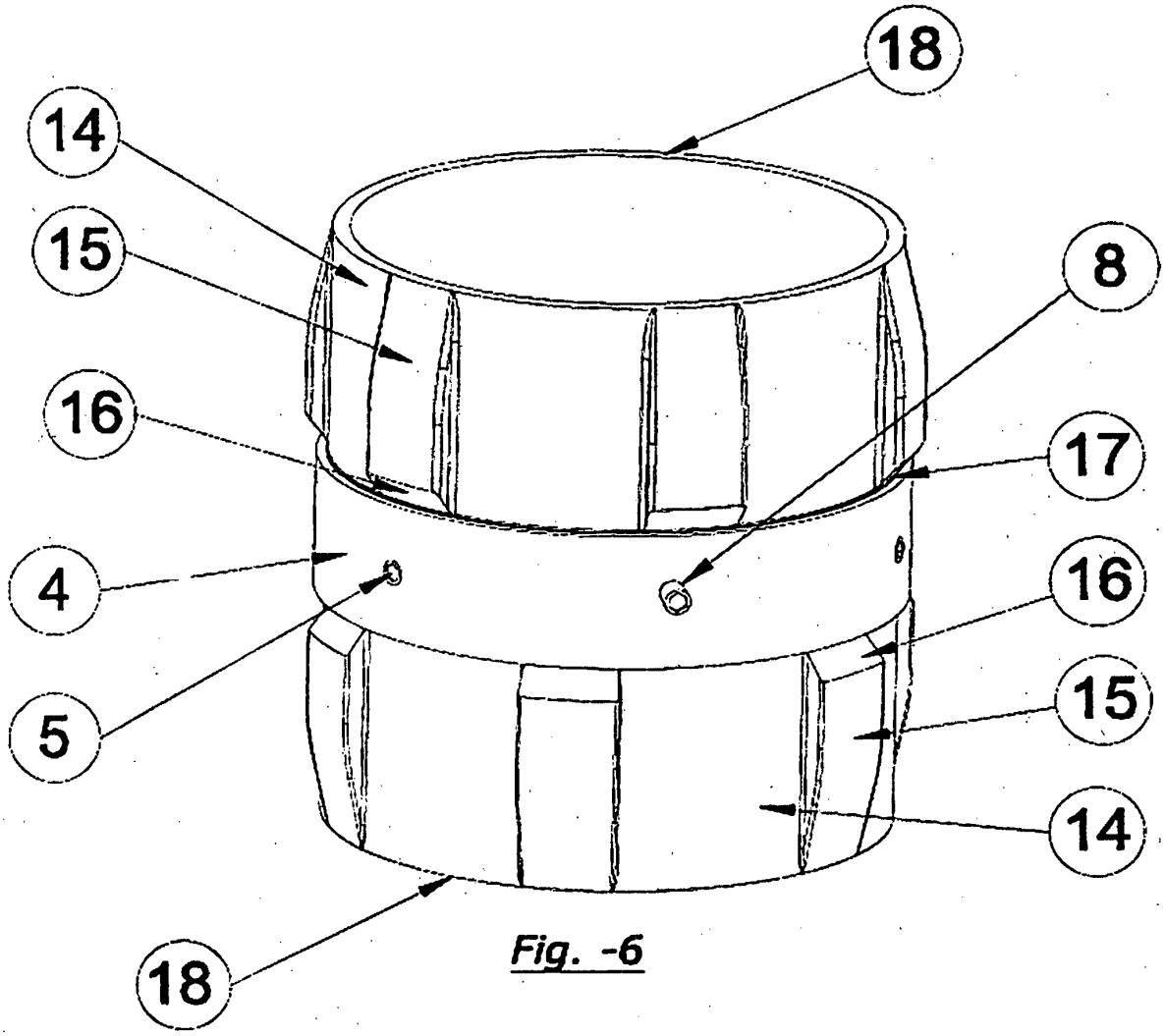


Fig. 5F



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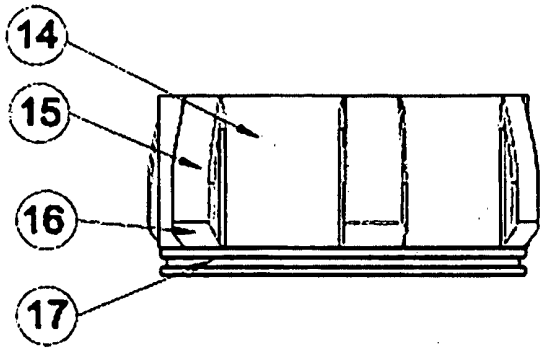


Fig. 6A

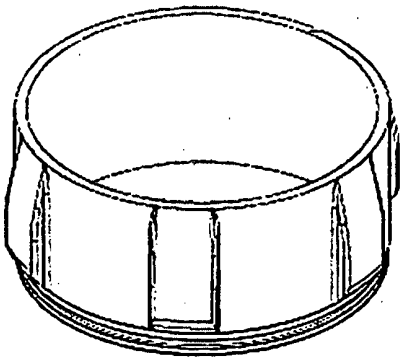
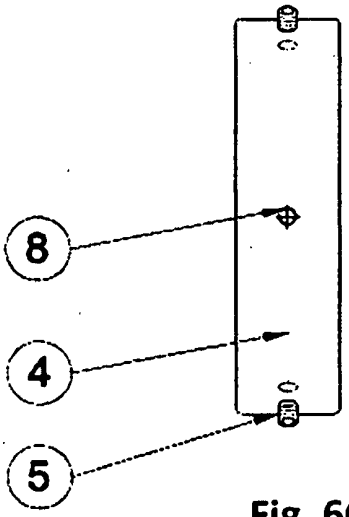


Fig. 6B



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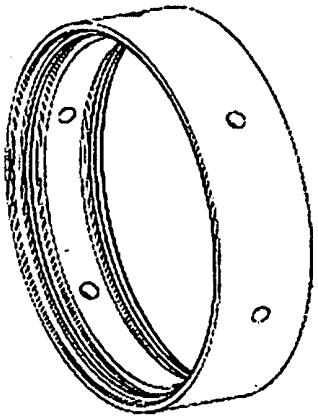

Fig. 6D

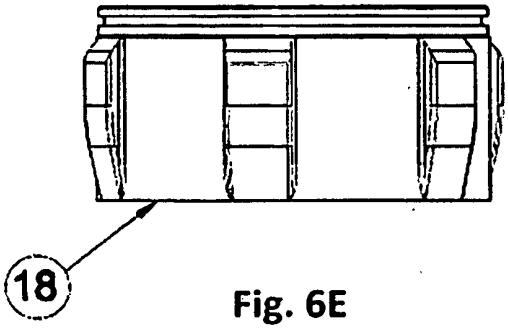

Fig. 6E

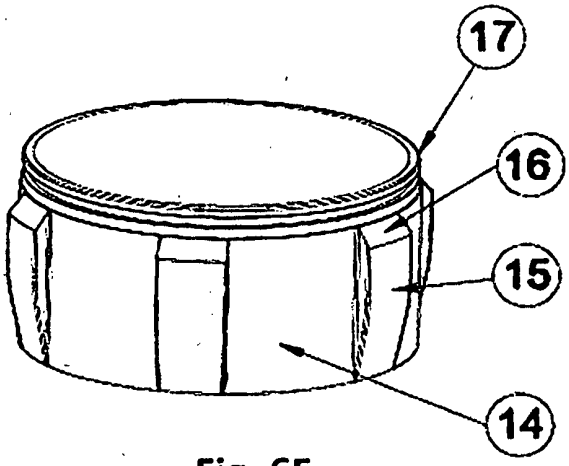

Fig. 6F

REFERENCES CITED IN THE DESCRIPTION

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