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DESCRIPTION

[0001] The invention relates to an apparatus for carrying out a cleaning operation applied to the internal neck skin of slaughtered poultry by removing the windpipe, gullet, glandular tissue or remainders thereof.

[0002] Such an apparatus is known from EP-B-1 247 453 and comprises suspension devices for suspending the poultry by the legs, and a first drum which at its periphery is provided with a first curve formed by a first groove. This groove is being traced by a first projection that connects to a rotatable bore organ so as to arrange that movement of the bore organ along the periphery of the first drum causes said bore organ to be inserted from the top into the poultry being suspended by the legs for carrying out the cleaning operation.

[0003] The known apparatus further has presser means comprising a presser chock, which during the cleaning operation rests against the neck skin of the poultry at the breast side and pushes the neck skin of the poultry towards the bore organ. The presser chock cooperates with a second drum provided with a second groove which is being traced by a second projection connected with the pressure chock so as to arrange that said pressure chock is adjustable in height due to its movement along the periphery of the second drum. By arranging that the presser chock is adjustable in height, the pressure chock can be moved upwards at the beginning of the cleaning operation until it reaches a position wherein the pressure chock rests against the neck skin at the breast side of the poultry.

[0004] The presser chock effectively assists the scraping action of the bore organ, so that its efficacy is improved. The presser chock pushing the poultry's neck skin on the breast side towards the bore organ assists in particular the effective removal of the windpipe, which, due to the nature of the tissue of which the windpipe consists, is usually difficult to remove by means of the bore organ.

[0005] It is known that the measure with which the neck skin is pressed against the bore organ is as such quite critical, since on the one hand the scraping action of the bore organ needs to be supported, while on the other hand said scraping action must not result in the neck skin being torn. It is known that an appropriate amount of pressure may be obtained if the presser chock is arranged to move upwards at the beginning of the cleaning operation until it is in a position wherein the presser chock slightly lifts the poultry while the same is suspended by the legs in the hooks. Although this arrangement allows for a considerable tolerance with regard to any possible differences in size of the poultry to be processed, practice learns that poultry sizes may differ more than can be accommodated with the arrangement known from EP-B-1 247 453.

[0006] It is therefore an object of the invention to make the cleaning operation also effective with notable size differences of poultry beyond what can be accommodated with the known apparatus, and to improve the scraping action and arrange that poultry of any size may be

stripped reliably of windpipe, gullet and other tissue that is to be removed.

[0007] Accordingly the apparatus of the invention is embodied with one or more of the appended claims.

[0008] In a first aspect of the invention the first drum and the second drum have an adjustable distance with respect to each other. The adjustable distance of the first drum that is operably connected with the rotatable bore organ, in relation to the second drum that is operably connected with the pressure chock is an effective means to accommodate the apparatus to an exceptionally large range of poultry sizes.

[0009] It is remarked that from US2002/0155803 a carousel type machine is known that has a series of holding fixtures that revolve about a central axis of the machine at the same speed as a conveyor line brings carcasses suspended by their hocks to the machine. The holding fixtures are driven by a first drum and grip the carcasses by the thighs to lift them up against a stop until the tail bones are firmly seated against a stop to establish a point of reference for a processing organ which is driven by a second drum that is movable with respect to the first drum along a shared shaft. In the particular embodiment disclosed in US2002/0155803 the processing tool is a cutter in the form of a knife for making an opening cut into the body cavity of the carcass through the abdominal skin. An alternative embodiment of processing tool may comprise a vent cutter, for example, for cutting the vent from the carcass prior to making the opening cut. US2002/0155803 further mentions that the principles as disclosed in it encompass both such types of processing tools, and other types not specifically mentioned therein, however this very general statement regarding the possible application to other types of processing tools does not provide any pointer, hint or suggestion that would (instead of could) logically and inevitably lead to the application of the features of the characterizing portion of the main claim in an apparatus for carrying out a cleaning operation applied to the internal neck skin of slaughtered poultry.

[0010] Preferably the first drum and the second drum are rotationally adjustable with respect to each other. This measure can be applied independent from the adjustable distance of the first drum and the second arm with respect to each other, or in addition to said measure. In both situations this provides a perfect tuning in time that can be accomplished as to when the rotatable bore organ has to enter and process the poultry depending on the size of the poultry. Otherwise inaccuracies may occur or remain due to the fact that the movements of the rotational bore organ and the pressure chock are independently determined by the said trajectories of the grooves in the respective drums of the bore organ and the pressure chock. The relative position of said trajectories with respect to each other therefore preferably has to be attuned to the size of the poultry, particularly with notable size differences of the poultry. In this connection it is advantageous for realizing a high level of accuracy that the adjustable distance and/or the rotational position of the first drum and the second drum is/are continuously adjustable within a predefined range.

[0011] A suitable embodiment of the apparatus of the invention has the second drum

mounted on a mechanism comprising at least two parts, wherein said two parts of the mechanism are adjustable regarding their mutual distance and regarding their rotational position with respect to each other.

[0012] Advantageously the said two parts of the mechanism are connected with each other through actuators, preferably linear actuators. Preferably the actuators are hydraulic cylinders. Such hydraulic cylinders are simple and cost effective means to arrange for the mutual displacement of the two parts of the mechanism.

[0013] It is further preferred that the second drum is mounted on a first axle of a first part of said mechanism which is rotatably mounted on a second part of said mechanism, which first axle cooperates with a rotationally fixed second axle which is further fixed against longitudinal displacement, and wherein the first axle and the second axle have a joint longitudinal body axis, wherein said first axle and said second axle have cooperating splines and projections to arrange that with variation of the distance of said two parts of the mechanism a longitudinal displacement of the first axle with respect to the second axle occurs causing a simultaneous rotation of the first axle with respect to the second axle.

[0014] The invention will now be explained in more detail with reference to the drawing of a non-limiting preferred exemplary embodiment.

The Figures 1 to 4 in the drawing show a number of successive settings of an apparatus for carrying out a cleaning operation applied to the internal neck skin of slaughtered poultry as proposed by the invention.

Figure 5 shows in an isometric side view the two drums of the apparatus of the invention.

Figure 6A and 6B show in a detail side view the drum operably connected with the pressure chock at a first and at a second altitude.

Figure 7 shows an isometric view of the mechanism which is preferably used for mounting the drum that is operably connected with the pressure chock.

[0015] Identical reference numbers used in the Figures refer to similar parts.

[0016] The apparatus 1 shown in the figures for carrying out a cleaning operation applied to the internal neck skin of slaughtered poultry 2 comprises a first drum 4 and a central axis 3 pertaining to said first drum 4. Along the first drum 4 movable bore organs 5 are provided. One such bore organ 5 is shown in the Figures 1 - 4. To facilitate their activation, said bore organs are in their longitudinal direction movably mounted on rods, which are fastened to an upper plate 11 and a lower plate 12, rotatable about the axis 3. The upper plate 11 may, for example, be driven by a chain such that the bore organs 5 are moved along the drum 4. The periphery of the first drum 4 is provided with a curve formed by a first groove 13, which is being traced by a first projection 14 that is part of the bore organ 5. In this way the movement of the bore

organ 5 along the first drum 4 also results in the bore organ 5 making a movement in its longitudinal direction determined by the curve of the first groove 13, while at the same time a further mechanism causes the bore organ 5 to rotate during said longitudinal movement.

[0017] As further shown in the Figures 1 - 4, the poultry 2 is suspended by the legs from suspension devices 6, for example, hooks.

[0018] While the poultry 2 is suspended by the legs 7 from the hooks, moving in correspondence with the movement of the bore organs 5 along the first drum 4, the bore organ 5 is activated in the manner explained above as soon as the same moves from the top into the poultry 2 (see Figure 1 and Figure 2, respectively), after which it moves such as to exit the poultry 2 via a neck end 8.

[0019] The apparatus is further provided with presser means 9 in the form of a presser chock, which is placed from below, against the neck skin of the poultry 2 at the breast side. In this position, which is illustrated in Figure 2, the presser chock 9 pushes the neck skin of the poultry towards the bore organ 5 such as to enable the latter to effectively scrape the inside of the neck skin of the poultry 2.

[0020] With the presser chock 9 supporting the neck skin from the outside, the internal neck skin can be effectively cleaned when the neck opening 8 is very large, thereby also allowing difficult tissue to be removed. This relates in particular to the windpipe.

[0021] The Figures 2 and 3 show that a small space remains between the bore organ 5 and the presser chock 9, between which the neck skin of the poultry 2 can be accommodated so that the cleaning operation to be carried out with the bore organ 5 will not damage the neck skin.

[0022] The figures show that the bore organ 5 is disposed at a slight slant. The presser chock 9 has a work surface 10 that corresponds with the slanting disposition of the bore organ 5. In an equally possible completely perpendicular disposition of the bore organ 5, the work surface 10 of the presser chock 9 should be disposed correspondingly perpendicular.

[0023] The Figures 2 and 3 show the situation following the start of the cleaning operation, when the bore organ 5 is moving downwards and the presser chock 9 is moved upwards from the initial position shown in Figure 1, until it assumes a position wherein the presser chock 9 rests against the neck skin at the breast side of the poultry, supporting the same. This is caused by the arrangement that the presser chock 9 cooperates with a second drum 15 provided with a second groove 16 which is being traced by a second projection 17 connected with the pressure chock 9. By this arrangement said pressure chock 9 is automatically adjusted in height when it moves past the periphery of the second drum 15.

[0024] Figure 4 shows that the bore organ 5 has completed the cleaning operation after which it will return to the starting position as shown in Figure 1. In that situation the presser chock 9 is

also returned to the initial position of Figure 1, so that the poultry 2 is then again suspended from the hooks 6 by the legs 7 only.

[0025] Figure 5 provides an isometric side view of the apparatus 1 of the invention providing a clearer view at the first drum 4 which at its periphery is provided with a first curve formed by a first groove 13. This groove 13 is traced by a first projection (not visible) that connects to a rotatable bore organ 5 in order to arrange that when the bore organ 5 moves along the periphery of the first drum 4, said bore organ 5 is moved downwards and inserted from the top into the poultry to be processed. Likewise after the poultry is processed, the bore organ 5 moves upwards again.

[0026] Figure 5 also provides a clear view at the presser chock 9 that cooperates with a second drum 15 that is provided with a second curve formed by a second groove 16. This second groove 16 is being traced by a second projection 17 connected with the pressure chock 9 so as to arrange that said pressure chock 9 is adjustable in height due to its movement along the periphery of the second drum 15.

[0027] According to the invention the first drum 4 and the second drum 15 have an adjustable distance with respect to each other as is illustrated in figure 6A and figure 6B. Comparing figure 6A with figure 6B reveals that the second drum 15 that is operably connected with the pressure chock 9 assumes a lower position in figure 6A than it does in figure 6B. With the first drum 4 being at a fixed altitude with reference to the fixed world, this brings about that the distance between the first drum 4 that connects to the rotatable bore organ 5, and the second drum 15 that connects to the pressure chock 9 is variable. Preferably at the same time the first drum 4 and the second drum 15 are rotationally adjustable with respect to each other.

[0028] Both figure 6A and 6B show a preferred embodiment in which the second drum 15 is mounted on a mechanism 18 comprising at least two parts 19, 20, wherein said two parts of the mechanism 18 are adjustable regarding their mutual distance and regarding their rotational position with respect to each other. This is shown clearer in figure 7.

[0029] Figure 7 shows that the two parts 19, 20 of the mechanism 18 are connected with each other through (preferably linear) actuators 23, particularly hydraulic cylinders. The mechanism 18 comprises a first axle 19' of a first part 19 of said mechanism 18 on which the second drum 15 is to be mounted. The said first part 19 is rotatably mounted on a second part 20 of said mechanism 18. The first axle 19' of the first part 19 further cooperates with a rotationally fixed second axle 21 which is also fixed against longitudinal displacement. Figure 7 further shows that the first axle 19' and the second axle 21 have a joint longitudinal body axis and cooperating splines 22 and (nonvisible) projections to arrange that with variation of the distance of said two parts 19, 20 of the mechanism 18, a longitudinal displacement of the first axle 19' with respect to the second axle 21 occurs causing a taneous rotation of the first axle 19' with respect to the second axle 21. Due to the fact that the second drum 15 is mounted on the first axle 19', varying the distance between the first part 19 and the second part 20 of the mechanism 18 results in a simultaneous variation of the altitude of the second drum 15 and of

its rotational position with reference to the fixed axle 21. In this way a very effective and robust apparatus is provided that can be accommodated to processing of poultry in a large range of sizes.

[0030] Although the invention has been discussed in the foregoing with reference to an exemplary embodiment of the apparatus of the invention, the invention is not restricted to this particular embodiment which can be varied in many ways without departing from the invention. It is for instance possible to provide a fixed altitude for the second drum, and make the first drum that is operably connected with the rotatable bore organ variable in height and rotational position with reference to the second drum. The discussed exemplary embodiment shall therefore not be used to construe the appended claims strictly in accordance with this exemplary embodiment. The exemplary embodiment is merely intended to explain the wording of the appended claims without intent to limit the claims to the particular features of this exemplary embodiment. The scope of protection of the invention shall therefore be construed in accordance with the appended claims only, wherein a possible ambiguity in the wording of the claims shall be resolved using this exemplary embodiment.

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- [EP1247453B](#) [\[0002\]](#) [\[0005\]](#)
- [US20020155803A](#) [\[0009\]](#) [\[0009\]](#) [\[0009\]](#)

PATENTKRAV

1. Apparatur (1) til at udføre en renseoperation anvendt på den indvendige halshud på slagttet fjerkræ ved fjernelse af luftrøret, spiserøret, kirtelvæv eller rester deraf, omfattende ophængningsindretninger (6) til ophængning af fjerkræet i benene (7), en første tromle (4), som ved sin periferi er forsynet med en første kurve dannet af en første not (13), som følges af et første fremspring (14), som er forbundet med en roterbart boreorgan (5) for at sørge for at bevægelse af boreorganet (5) langs periferien af den første tromle (4) forårsager af boreorganet (5) indsættes fra oven ind i fjerkræet (2), som er ophængt i benene, for at udføre renseoperationen, og presseorganer omfattende en pressekil (9), som under renseoperationen hviler imod halshuden på fjerkræet (2) ved brystsidens og skubber halshuden på fjerkræet (2) imod boreorganet (5), hvor pressekil (9) samvirker med en anden tromle (15), som er forsynet med en anden kurve dannet af en anden not (16), som følges af et andet fremspring (17) forbundet med pressekil (9) for at sørge for at pressekil (9) er justerbar i højde ved dennes bevægelse langs periferien på den anden tromle (15), **kendetegnet ved, at** den første tromle (4) og den anden tromle (15) har en justerbar indbyrdes afstand.

2. Apparatur (1) ifølge krav 1 eller i overensstemmelse med indledningen til krav 1, **kendetegnet ved, at** den første tromle (4) og den anden tromle (15) er rotationsmæssigt justerbare i forhold til hinanden.

3. Apparatur (1) ifølge krav 1 eller 2, **kendetegnet ved, at** den anden tromle (15) er monteret på en mekanisme (18), som omfatter i det mindste to dele (19, 20), hvor de to dele (19, 20) i mekanismen (18) er justerbare med hensyn til deres indbyrdes afstand og med hensyn til deres rotationsmæssige position i forhold til hinanden.

4. Apparatur ifølge ethvert af kravene 1 til 3, **kendetegnet ved, at** den justerbare afstand og/eller den rotationsmæssige position af den første tromle (4) og den anden tromle (15) er kontinuerligt justerbare indenfor et forudbestemt område.

5. Apparatur (1) ifølge krav 3 eller 4, **kendetegnet ved, at** de to dele (19, 20) i mekanismen (18) er forbundet med hinanden via aktuatorer.

6. Apparatur (1) ifølge krav 3, 4 eller 5, **kendetegnet ved, at** de to dele (19, 20) i mekanismen (18) er forbundet med hinanden via lineære aktuatorer.

7. Apparatur (1) ifølge krav 5 eller 6, **kendetegnet ved, at** aktuatorerne er hydrauliske cylindre (23).

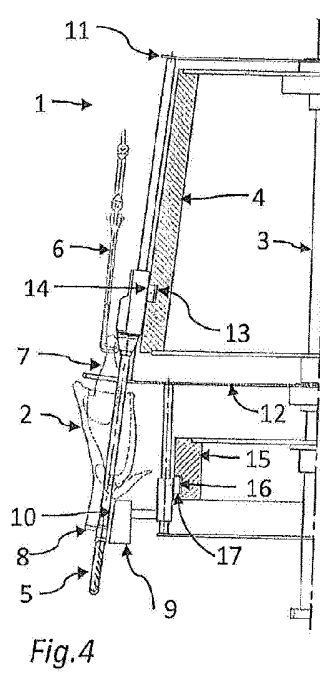
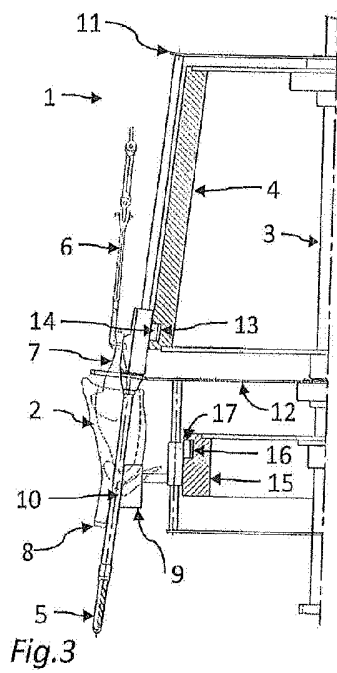
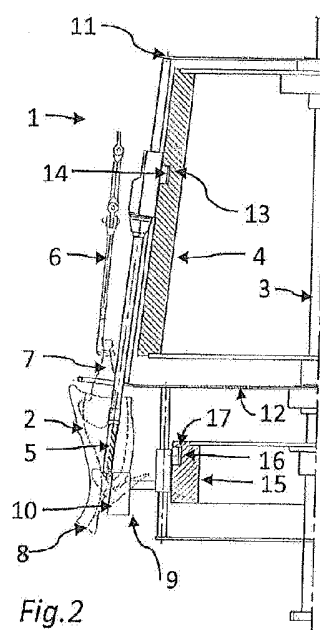
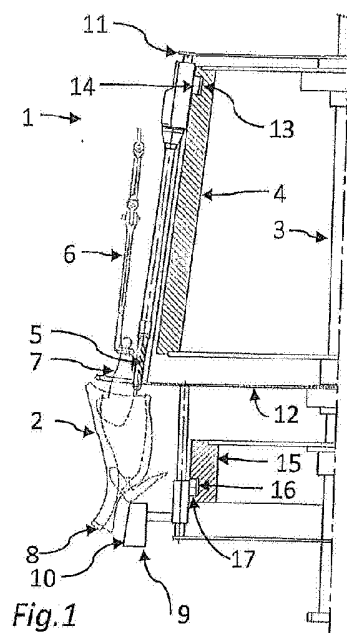
5 8. Apparatur (1) ifølge ethvert af kravene 3 til 7, **kendetegnet ved, at** den anden tromle (15) er monteret på en første aksel (19') af en første del (19) af mekanismen (18), som er roterbart monteret på en anden del (20) af mekanismen (18), hvilken første aksel (19') samvirker med en rotationsmæssigt fast anden aksel (21), som yderligere er fastholdt imod langsgående forskydning, hvor den første aksel (19') og den anden aksel (21) har
10 en fælles langsgående kropsakse og hvor den første aksel (19') og den anden aksel (21) har samvirkende riller (22) og fremspring for at sørge for, at med variation af afstanden mellem de to dele (19, 20) i mekanismen (18) sker der en langsgående forskydning af den første aksel (19') i forhold til den anden aksel (21), hvilket forårsager en samtidig rotation af den første aksel (19') i forhold til den anden aksel (21).

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9. Apparatur (1) ifølge ethvert af de foregående krav 1 til 7, **kendetegnet ved, at** boreorganet (5) er placeret skrånende og pressekilen (9) har en arbejdsflade (10), som svarer til den skrånende anbringelse af boreorganet (5).

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DRAWINGS



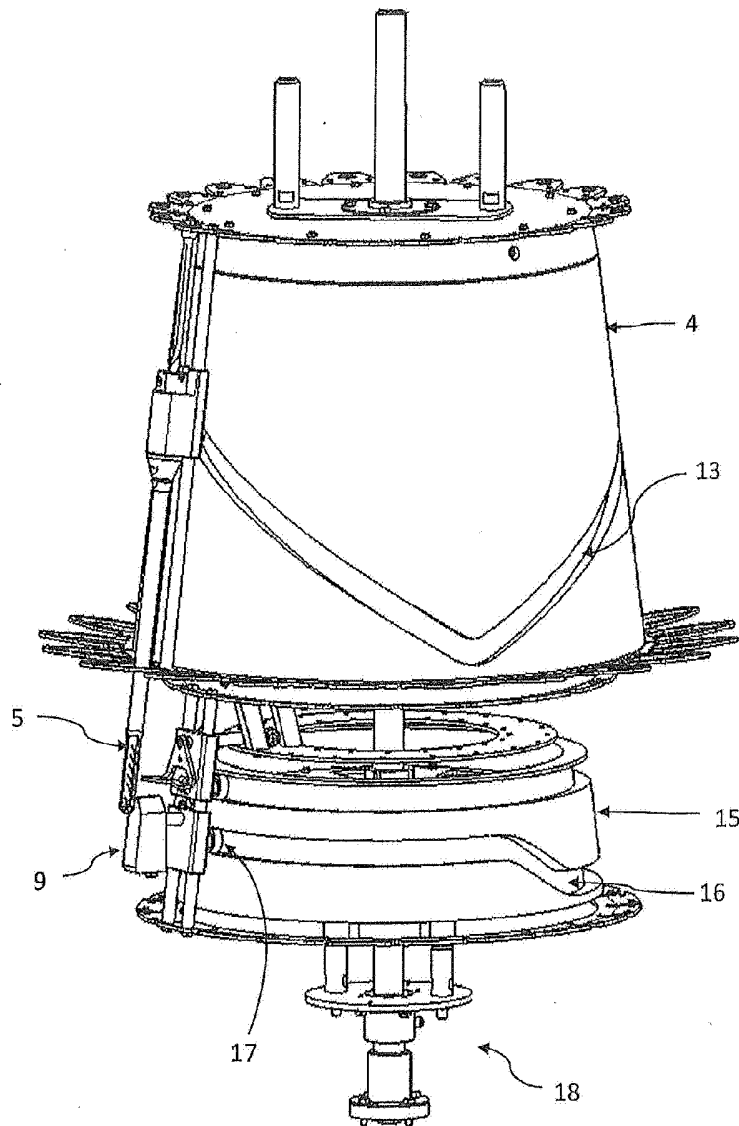


Fig.5

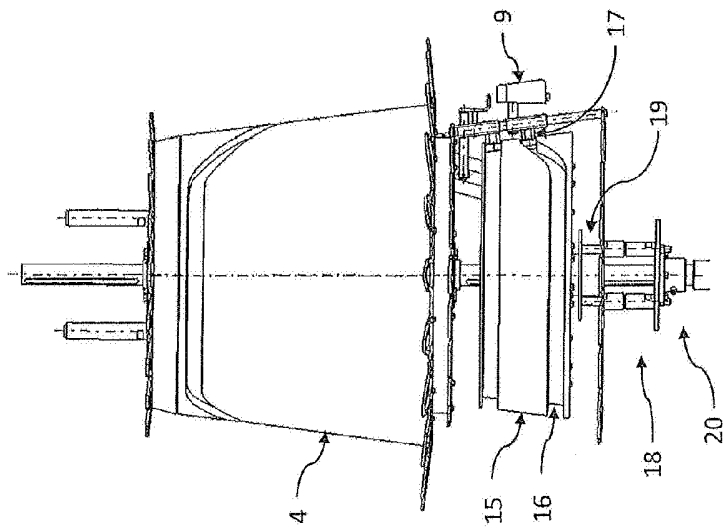


Fig. 6B

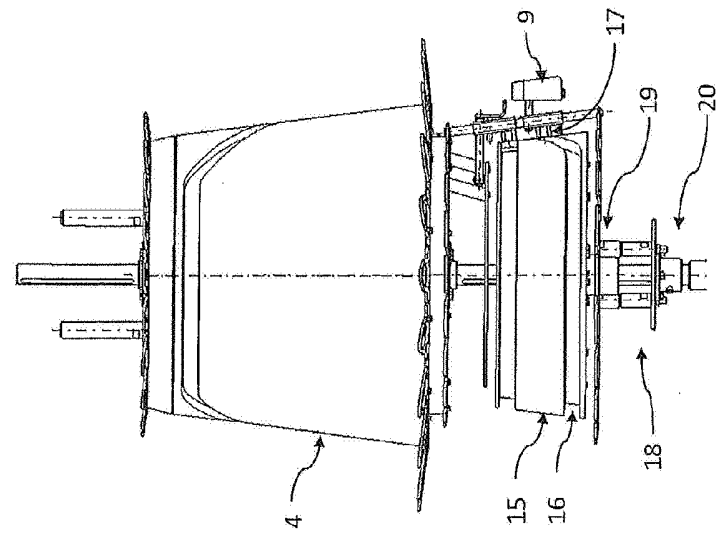


Fig. 6A

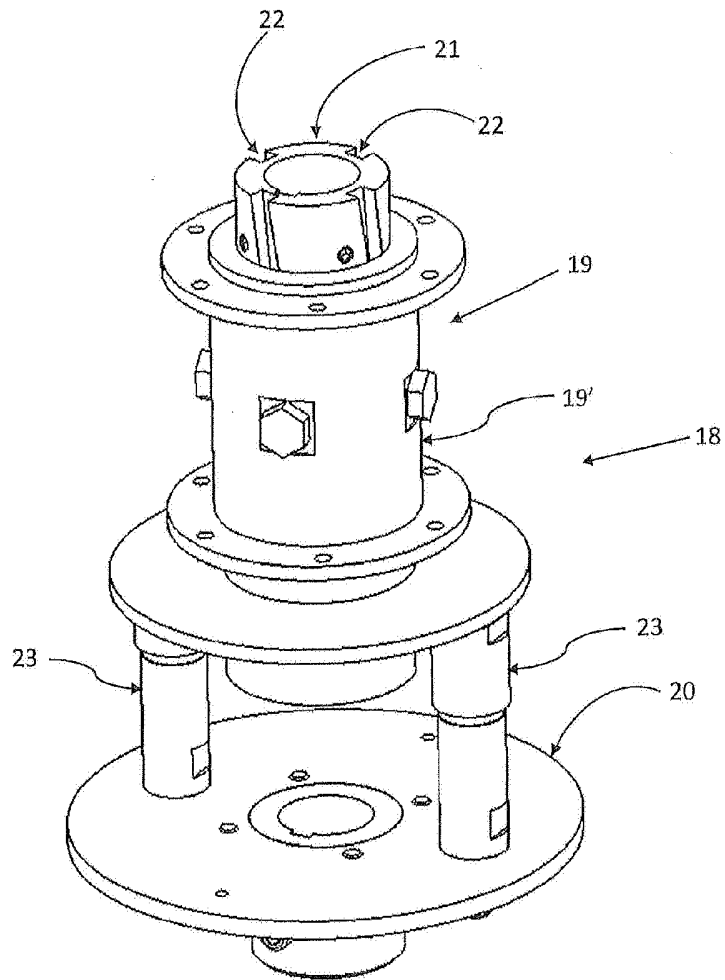


Fig. 7