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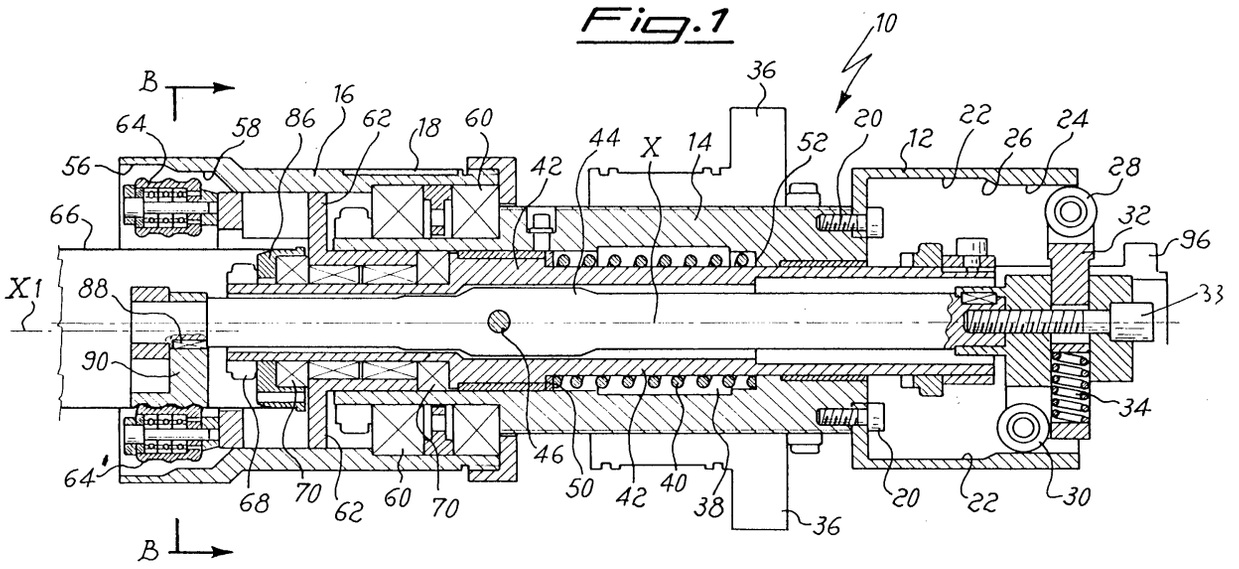
(54) Device for straining extruded or drawn bodies

(57) A device (10-100) for the localized strain of extruded or drawn bodies, especially containers or bombs (66) provided with a mouth from aluminum or other suitable material, having a cylindrical form, painted and/or lithographed, fed on a grasping means or pliers of a tapering machine for tapering their upper part, comprising:

- a substantially cylindrical body, having differentiated diameters, wherein a lever (44-110, 110') is provided that bears a counter-mold (90 - 156,156') in touch with the internal lateral surface of containers (66) starting from their mouth;
- at least a straining tool (64, 64'-150, 150') cooperating with the counter-mold (90-156,156') to obtain at least a raised and/or recessed impression on said containers;
- supporting (72, 72'-142, 142') and guide (80, 82 - 146,146') means for said at least one straining tool (64, 64'-150, 150'), suitable to lead said straining tool to cooperate with said counter-mold (90,156,156').

Fig.1



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Description

[0001] The present invention relates to a device for the localized strain of extruded or drawn bodies.

[0002] More particularly, the present invention relates to a device for the localized strain, on one or more prefixed zones of the lateral surface, of an extruded or drawn metal body for the realization of impressions.

[0003] The expression "extruded or drawn body" as referred to in the present invention and the claims, comprises in particular bodies of a substantially cylindrical shape from aluminum, alloys thereof, steel or like metal materials, obtained by extrusion or blown or deep-drawn material, and intended for forming bombs or enbloc containers for atomized spraying, tapered on the upper part and provided at the mouth with a collar for the application of the delivery valve.

[0004] It is known that said metal enbloc containers or bombs, provided with a valve for the atomization or delivery of products, are employed for pressure-manufacturing several products, such as for instance spray deodorizers.

[0005] Said containers or bombs, prevailingly made from aluminum or alloys thereof by means of extrusion, have in the starting step the shape of cylindrical bodies or preforms and, in such state, are submitted to a painting operation both in the inside and in the outside. Afterwards, the external lateral surface of said containers is lithographed, in order to create on same writings and/or decorative elements, such as for instance, the mark of the product.

[0006] The so obtained cylindrical bodies are then fed to a so-called tapering machine, that performs on the same bodies many sequential operations, among which the shaping of the bottom, the progressive tapering of the upper part near the mouth and the edging of the mouth, in order to form the engaging or stabilization seat of the atomization or delivery valve.

[0007] Tapering machines of this kind are already known in the literature. So, for instance, patent EP-A-0275369 discloses a multi-station tapering machine comprising an intermittent rotary- table provided with pliers or grasping means for the fastening of the painted and lithographed cylindrical body or preform, and an opposite front drum having an alternate translation motion, privided with a plurality of forming tools or spindles that step in sequentially on said cylindrical body or preform.

[0008] The different interventions realized on the preform comprise the formation of an annular throat, adjoining the tapered zone, that allows the snap-application and the stabilization of a lid on the finished containers.

[0009] The containers, obtained according to the conventional production methods, have an entirely smooth lateral surface, both along the part having a cylindrical development, and the upper tapered zone; the lithography obtained on the outside of the containers does not determine, in fact, raised or recessed sectors or any roughness detectable by the touch.

[0010] Vice-versa, the present trend is that of realizing on the containers or bombs in question, and in particular on specific zones of their lateral surface, recessed or raised impressions of various configuration and size such as horizontal, rectilinear, superposed, raised or recessed scorings. The creation of said impressions allows, in fact, to achieve remarkable advantages from both the aesthetic and functional point of view. As concerns the aesthetic aspect, the raised or recessed impressions can reproduce and highlight a mark or further decorating elements, interrupting the monotony of the smooth surface of the container. With regard to the functional aspect, said impressions determine on said container a surface roughness that facilitates the grasping and handling of the body by final users.

[0011] The raised or recessed impressions can be realized with machine-tools separate and different from the tapering ones that sequentially perform the tapering of the extruded or drawn bodies; but a solution of this type would unavoidably lead to an increase in the overall production costs and to a decrease in the amount of pieces realized, with the ensuing yield reduction.

[0012] Besides, as the cylindrical bodies or preforms are painted and lithographed on the external surface and, therefore, provided with writings and decorations on the external surface, the impressions must be obtained on well precise free zones, so as not to alter or superpose on existing writings or decorations.

[0013] Object of the present invention is to solve the above described problem.

[0014] More particularly, the object of the present invention is to provide a device suitable to realize recessed or raised impressions directly on the known tapering machines, that perform the other working steps to realize tapered and edged containers, without the help of auxiliary devices that might alter the production cycle.

[0015] A further object of the present invention is to provide a device allowing to realize said impressions on extruded or drawn bodies or on cylindrical preforms on a prefixed and localized position, so as not to interfere with writings or decorations previously formed on said preforms.

[0016] According to the present invention, these and still other objects, that will become apparent thanks to the following description, are obtained by a device for the localized strain of cylindrical extruded or drawn metal bodies, painted in the inside and on the outside, and lithographed on the external surface, fed by a grasping means or pliers of a multi-station rotary -table tapering machine, comprising:

- a substantially cylindrical hollow body, having differentiated diameters, wherein a lever is located that bears a counter-mold touching the internal lateral surface of the extruded or blown metal body, starting from its mouth;

- at least a straining tool cooperating with the counter-mold to obtain at least a raised and/or recessed impression on said containers; and
- support and guide means for said at least one straining tool, suitable to lead said straining tool to cooperate with said counter mold.

[0017] Said device ifor the localized strain s located on the table or drum having an alternate translation motion of a known tapering machine in association with other forming tools or spindles, and does not involve therefore the preparation of specific separate machines.

[0018] The constructive and functional characteristics of the device of the present invention will be better understood from the following detailed description which refers to the attached drawings which represent some preferred embodiments thereof reported only by ways of illustrative, non limiting examples, and wherein;

Figure 1 shows a schematic, partly sectioned, lateral view of the device for the localized strain of extruded or drawn metal bodies of the present invention;

Figure 2 shows a schematic cross-section view, along the B-B line of Figure 1, of the same device;

Figure 3 shows a schematic, perspective view of the device of Figure 1 applied on the alternate translation motion-table or drum of a known tapering machine;

Figure 4 shows a schematic view of a longitudinal section of the device of the present invention according to an alternative embodiment; and

Figure 5 shows a schematic, front view of the device of the preceding figure 4.

[0019] With reference to Figures 1-3, the device for the localized straining of an extruded or drawn metal body of the present invention, indicated as a whole by 10 on Figure 1, comprises a tubular substantially cylindrical body, having differentiated diameters, comprising a first rear part or sector 12 having the form of a shaped sleeve, a second intermediate part 14 and a third front part or sector 16. Said front sector 16 is provided along its external lateral surface with at least a recessed zone 18 where a trapezoid or serrated belt, known *per se*, is fitted on. The rear sector 12, having a circular plan, is fastened with one or more screws 20 to the intermediate part 14. Said rear sector 12 has, along the internal surface, two adjoining surfaces 22,24 with differentiated diameters: a first surface 22, facing the second intermediate part 14, and a second rear surface 24. In particular, the first surface 22 has a diameter greater with respect to the back surface 24, to which it is connected through a recess 26 having a stress-raising angle.

[0020] The internal front of said rear sector 12 defines, substantially, a cam, stricken by opposite rollers 28,30 radially supported by a fork or pin 32, kept in elastic tension by means of a spring 34.

[0021] The second intermediate part 14 of the device 10, coaxial with respect to the rear sector 12, is formed by a tube fastened externally by means of conventional ring nuts or threadings, and through a support 36, to the alternating translation motion front table or drum of a known tapering machine.

[0022] Said intermediate part 14 has, on the inner surface, a recess 38 circumscribed by opposite shoulders 50, 52, inside of which an helical spring 40 is located.

[0023] A tubular body 42 is located in, and protrudes longitudinally in the cavities of the first rear part 12, of the second intermediate part 14, and of the third part or front sector 16. Spring 40 is located between said tubular body 42 and the internal surface of the intermediate part 14, between the opposite shoulders 50, 52.

[0024] A tilting lever 44 is located in the inside of said tubular body 42 and has its fulcrum on said tubular body 42 trough a conventional pin 46 or the like. The rear end of the tilting lever 44 is connected to fork or pin 32, for instance by means of a screw 33. Said tilting lever 44 is caused to move from the first rear part or sector 12 through rollers 28,30 that strike in alternation surfaces 22,24 with differentiated diameters of the same sector 12.

[0025] The third part or front sector 16 is fitted on the intermediate part 14 and is consists of a shaped sleeve whose internal surface, in correspondence of the mouth, has two adjoining surfaces 56,58 having differentiated diameters; the most advanced surface 56 has a diameter greater than that of the innermost surface 58.

[0026] Between said front 16 and intermediate 14 parts or sectors there is provided at least a ball bearing 60. In the inside of the front sector 16 a transversal support 62 is fastened to which at least a straining tool 64 is tied, suitable to realize the impression on the lateral side of the bomb or container 66. In the preferred embodiment of the figures, the straining tools 64, 64' are in number of two, diametrically opposed to each other. Support 62 is fastened to the tubular body 42 through a ring nut 68 on ball bearings 70 and is caused to rotate through the connection with body 16 by means of conventional keys or like means.

[0027] As can be inferred in particular from Figure 2, the straining tools 64,64' are connected to the cross support 62 through a lever 72, 72' having its fulcrum on said support 62 through a pin 74, 74' or like means. Levers 72, 72' during the rotation of the front sector 16, tend to remain open towards the outside, following the effect of the centrifugal force. Said rotation of the front sector 16 is realized by means of a conventional belt, abutting on the recessed zone 18 and connected to a motor (not shown in the figure).

[0028] A couple of rollers 80, 82, tied at the free end of levers 72, 72' strike alternatively surfaces 56, 58 with differentiated diameters of the front sector 16. When rollers 80, 82 strike surface 58 having a smaller diameter of said sector 16, the straining tools 64, 64' approach the lateral surface of container 66, realizing the impres-

sion thereon.

[0029] Said container 66 is locked in a grasping means or pliers of the intermittent rotary table of a tapering machine and is so positioned as to have the mouth facing the device 10 of the present invention. Said device 10 is fixed to the front drum having an alternate translation motion. The drum is moved with alternate motion in the direction of said table or pliers of the container, according to the technique described for instance in the above mentioned European patent.

[0030] In the inside of the front sector 16, near ring nut 68, a centering ring 86 is positioned that has a cylindrical profile with a conic stress-raiser for container 66. Said centering ring 86 is stricken by the container 66 in the advancing step of the alternating translation motion of the front drum of the tapering machine.

[0031] At the front part of the tilting lever 44, in correspondence of the straining tools 64, 64', a counter-mold 90 is fixed with one or more keys 88, intended for being positioned in the inside of container 66, to contrast the thrust of said tools 64, 64' during the creation of the impression(s). The profile of counter-mold 90 corresponds in the negative or the positive to that of said straining tools 64, 64'.

[0032] As can be seen in particular in Figure 1, the device 10 of the present invention, as a whole, is misaligned with respect to container 66 located on the table or pliers of the tapering machine. The axis of device 10 is indicated by "X", while the one of the container or can 66 is indicated by "X1". The extent of misalignment or offset corresponds to the one necessary, from the point of view of cantilever or depth, to create the impression (s) on said container.

[0033] During the operation, device 10, borne by the alternate translation motion table of a known tapering machine, advances in the direction of container 66, whose mouth strikes the centering ring 86. Such strike causes the stop of the axial travel of the tubular body 42 and the ensuing compression of spring 40, while the travel of the intermediate part 14 and the front sector 16 as well as of the rear sector 12 goes on. Roller 30 is now along surface 24 having a shorter diameter of the rear sector 12, adhering thereto under the effect of spring 34.

[0034] This position of roller 30 causes the opening tilting towards the outside of lever 44, that causes counter-mold 90 to get in touch with the internal lateral surface of container 66, on the point where the impression must be realized.

[0035] Directly afterwards, rollers 80, 82, borne by levers 72, 72', strike surface 58 having a smaller diameter of the front sector 16, approaching from the outside the lateral surface of container 66. The simultaneous rotation of sector 16, through the belt fitted on the recessed zone 18, brings the straining tools 64, 64' in pressure-touch on the external lateral surface of container 66, in the only zone corresponding to the misalignment or offset mentioned above. The straining tool(s) 64, 64' can strike one or more times said external surface of container 66 depending on the programmed rotations of the front sector 16.

[0036] From the rear front of straining device 10, a grooved shaft 94 protrudes, as illustrated on Figure 3, fixed to a base 96 integral with the rear front of device 10. A bushing 98 having a complementary grooved profile, engages with said shaft 94. A second similar straining device 10' can be applied to said bushing 98. Said bushing 98 supports a covering mantle 98', suitable to orient and keep in a prefixed position the tubular body 42, preventing its rotation.

[0037] Figures 4 and 5 illustrate an alternative embodiment of the straining device of the present invention. According to such embodiment, the creation of impressions on containers 66 is realized through molding instead of roll forming with straining tools 64, 64' and concerns simultaneously, by way of non limiting example, two or more zones of said containers.

[0038] The device, indicated as a whole by 100 in Figure 4, comprises an external tubular body 102 having a greater diameter in the front part 104. Said body 102 circumscribes a coaxial tubular body 106, bearing a pin 108 which is the fulcrum of a two-arm lever 110, 110', connected with each other substantially shears-like. In the rear part, both arms 110, 110' of the lever are closure-tensioned by a spring 112 or like elastic means. The back head of device 100 is closed by a lid 114, for instance screwed to said device, which supports centrally and keeps axially aligned a support 116. In the front part oriented towards arms 110, 110', of said support 116, two or more rollers 118, located side by side, are connected.

[0039] A key 120 ties support 116 to lid 114. The rear end of arms 110, 110', connected to each other, circumscribes on the internal front a cam-shaped profile, with a mouth 122 having a width greater with respect to the diameter of rollers 118. Said mouth 122 is afterwards recessed and forms a gap 124 between the two arms 110, 110' having a width corresponding to the diameter of said rollers 118.

[0040] The internal tubular body 106 has in the central-rear zone an annular recess 126 delimited by opposite shoulders 130,132. A helical spring 128 is arranged in said recess 126 and strikes the opposite shoulders 130,132. Shoulder 130 is formed on the same internal tubular body 106, while the other shoulder 132 is obtained along the internal surface of the external tubular body 102.

[0041] The front part 104, having a greater diameter, of the tubular internal body 102 has in the inside two adjoining surfaces 136,138 having different diameters, a surface 136 of which, oriented towards the mouth of the front part 104 has a greater diameter with respect to the rear surface 138. Said front part 104 comprises in its inside a static support 140 for at least two levers 142, 142' having their fulcrum on the same support at an end in 144. The front end of each lever 142,142' oriented towards the mouth of the front part 104, bears a roller

146, 146' suitable to strike alternatively the adjoining surfaces 136, 138 having different diameter. To each of said rollers 146, 146' and levers 142,142' a mold or tool 150, 150' is associated, oriented parallel to the longitudinal axis of device 100 in working position, and having a profile corresponding to the impression to be created on the container or can 66. In the same way as the preceding embodiment illustrated in figs.1-3, can 66 strikes with its own mouth a centering ring 152 fastened to the front end of the tubular body 106.

[0042] Levers 142, 142', as illustrated in Figure 5, are elastically supported by a spring 154, 154' that keeps them tensioned during the opening.

[0043] The front end part of each of arms 110,110' forming the shears-lever, is tied, by means known *per se*, to a shaped block 156, 156'. Said blocks 156,156' constitute as many counter-molds of tools 150, 150' whose profile they repeat in the negative or positive. The blocks or counter-molds 156, 156' abut in the inside of container 66, opposed to tools 150, 151' during the realization of the impressions on said container 66 that is aligned with the axis of the straining device 100.

[0044] The impressions on containers 66 are obtained as function of the apart-stretching, through rollers 118, of the arms 110,110' of the shears lever and of the positioning of rollers 146, 146' along surface 138 having a shorter diameter of the front part 104 of the external tubular body 102. The apart-stretching of arms 110, 110' brings the counter-molds 156, 156' in touch with the internal surface of container 66, while the positioning of rollers 146, 146' along the surface 138 with a smaller diameter causes the compression of tools 150, 150' on the external surface of the same containers, opposed to the aforesaid counter-molds 156, 156'.

[0045] According to this alternative embodiment, device 100 of the present invention that realizes the impressions has no rotating parts and the longitudinal axis of containers 66 is aligned with the axis of said device.

[0046] In this embodiment, the impressions are created simultaneously and in an advantageous non critical manner along two opposite zones of the lateral surface of containers 66.

[0047] It is however expected that the solution comprising the shears-lever with arms 110, 110' can be used also for the first embodiment previously described of the device of the present invention. In this case, said shears-lever will be combined with a cam having an elliptical internal profile, instead of the circular profile cam formed on the front sector 16, to obtain at the same time impressions on one or more zones of containers 66. Said replacing cam may however have any profile, to form optionally several impressions along several spaced zones, either equidistant or not to each other, of the lateral surface of containers 66.

[0048] The utilization of the solution comprising the shears-lever with an elliptical internal profile will not involve the misalignment of the strain device 10 with respect to the longitudinal axis of containers 66.

[0049] The device for the localized straining of an extruded or drawn metal body of the present invention may be located on the front drum having a translation motion of a tapering machine for the production of a container of the cylindrical enbloc bomb for atomizers having a tapered and edged upper end.

[0050] The process for the production of said container provided with at least one recessed or raised impression on determined and prefixed zones of the lateral surface, includes:

- providing the external surface of an extruded or drawn and deep-drawn body painted both in the inside and in the outside and lithographed on the external lateral surface, with, at least one notch or reference signal obtained in a predefined angle position with respect to the zone prefixed for the impression;
- arranging said extruded or drawn body, provided with at least a notch or signal, in a pliers of the intermittent rotation table of a rotary-table, multiple-station tapering machine;
- positioning said extruded or drawn body in such a manner that the zone predefined for the impression be aligned with the device (10, 100) of the present invention for obtaining the impression; said device being located on the opposite front drum having an alternating translation movement of the tapering machine;
- locking said extruded or drawn body in the prefixed position;
- making at least one impression on said at least a prefixed zone of the extruded body by means of said device (10, 100), and
- performing subsequently on said tapering machine the operating steps of tapering, customized cutting, upper edging, and control.

[0051] The positioning of the extruded or drawn body can be carried out by means of a numerical control orienting device, which the tapering machine is provided with, comprising a detector of the notch or reference signal. Said detector can be of the optic type, such as a photocell, a video camera, or a laser ray device.

[0052] The notch or reference signal can be realized with a paint or a contrasting color with respect to the one used for the external painting of the container.

[0053] While the device for the localized strain of the present invention has been described and illustrated with reference to some embodiments, it is obvious than many changes and variants will be apparent to those skilled in the art, in the light of the aforesaid description. Therefore, the present invention intends to cover all the changes and variations that fall within the spirit and the scope of the following claims.

Claims

1. A device (10-100) for the localized straining of an extruded or drawn body, especially a container or bomb (66) provided with a mouth, made from aluminum or other suitable material, having a cylindrical form, painted and/or lithographed in the internal and/or external lateral surface(s), fed on a grasping means or pliers of a rotary-table, multiple-station tapering machine, comprising:

   - a substantially cylindrical tubular body, having differentiated diameters, wherein a lever (44, 110, 110') is arranged that bears a counter-mold (90,156 156') in touch with the internal lateral surface of the container (66) that extends toward the mouth;
   - at least a straining tool (64, 64', 150, 150') cooperating with the counter-mold (90, 156, 156') to obtain at least a raised and/or recessed impression on said container;
   - supporting (72,72',142,142') and guide (80,82,146,146') means for said at least one straining tool (64,64',150,150'), suitable to lead said straining tool to cooperate with said counter-mold (90,156,156').

2. The device according to claim 1, wherein the tubular body having differentiated diameters comprises a first part or rear sector (12) opposite to the container (66), a second intermediate part (14) and a front sector (16) oriented towards the container (66), coaxial and misaligned to each other with respect to the longitudinal axis of container (66) borne by the grasping means or pliers of the tapering machine, said front sector (16) being externally provided with a recessed zone (18) wherein a trapezoid or serrated belt is fitted on, connected to a motor.

3. The device according to claim 2, wherein the front sector (16) has along its internal surface two adjoining sectors (56, 58) having differentiated diameters, stricken alternatively by the guide means (80), constituted by rollers borne by the supporting means (72, 72').

4. The device according to any one of the preceding claims, wherein the supporting means (72, 72') comprise one or more levers, having their fulcrum at an end (74, 74') on a support (62), transversally extended in said sector (16); the at least one straining tool (64,64') being connected to said support (62) in an intermediate position.

5. The device according to any of the preceding claims, wherein the intermediate part (14) of the cylindrical body having differentiated diameters is comprises by a tube fastened to the rear sector (12) and, through a support (36), to the alternating translation motion front drum of the tapering machine; said intermediate part (14) being provided on the internal surface with a recess (38) for an helical spring (40), and circumscribing towards the inside a tubular body (42) wherein said lever (44) is located that has its fulcrum on the tubular body (42) through a pin (46).

6. The device according to one or more of the preceding claims, wherein the rear sector (12) has in its inside two adjoining surfaces (22, 24) having differentiated diameters, alternatively stricken by at least a roller (28,30), radially supported by a pin (32) kept in elastic tension by an helical spring (34).

7. The device according to any of the preceding claims, wherein the at least one straining tool (64,64') is located in correspondence of the surfaces or sectors (56,58) having a differentiated diameter.

8. The device according to any of the preceding claims, wherein a support (62) is fastened to the tubular body (42) through a ring nut (68) with interposed ball bearings (70); a centering ring (86, 152) for the mouth of containers (66) being located near said ring nut (68).

9. The device according to claim 1, wherein the cylindrical body, housing the lever (110, 110'), has in the front part (104) having a greater diameter, along its internal surface, two adjoining surfaces (136,138) having different diameters, alternatively stricken by said guide means (146, 146') constituted by two or more rollers.

10. The device according to claim 9, wherein the lever (110,110') comprises two arms shear-connected to each other by a fulcrum pin (108), forming, on the rear, a mouth (122) progressively recessed to form a gap (124) having a width equivalent to the diameter of one or more rollers (118), borne by an axial support (116) tied to a lid (114) that closes on the rear front said tubular body.

11. Use of the device for the localized straining of extruded or drawn bodies according to any of the preceding claims on a rotary-table, multiple-station tapering machine.

Fig.1

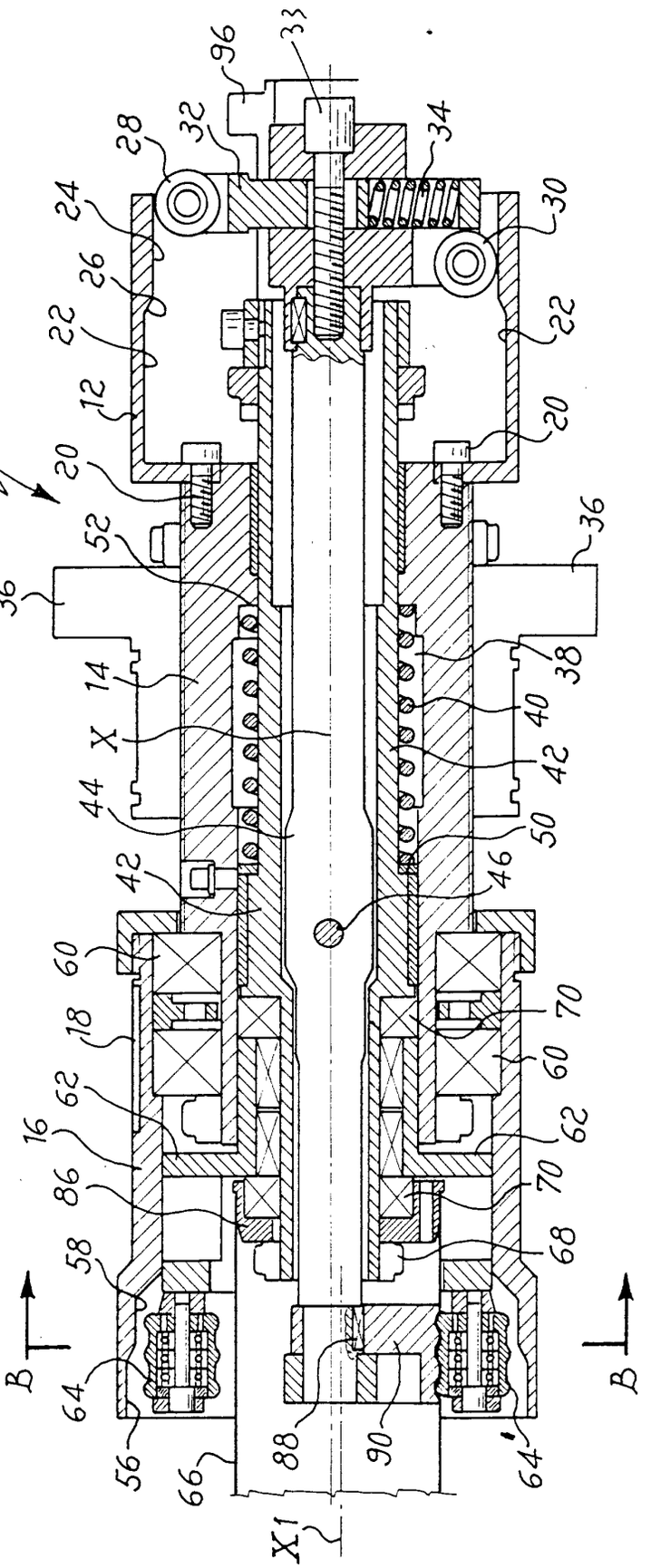
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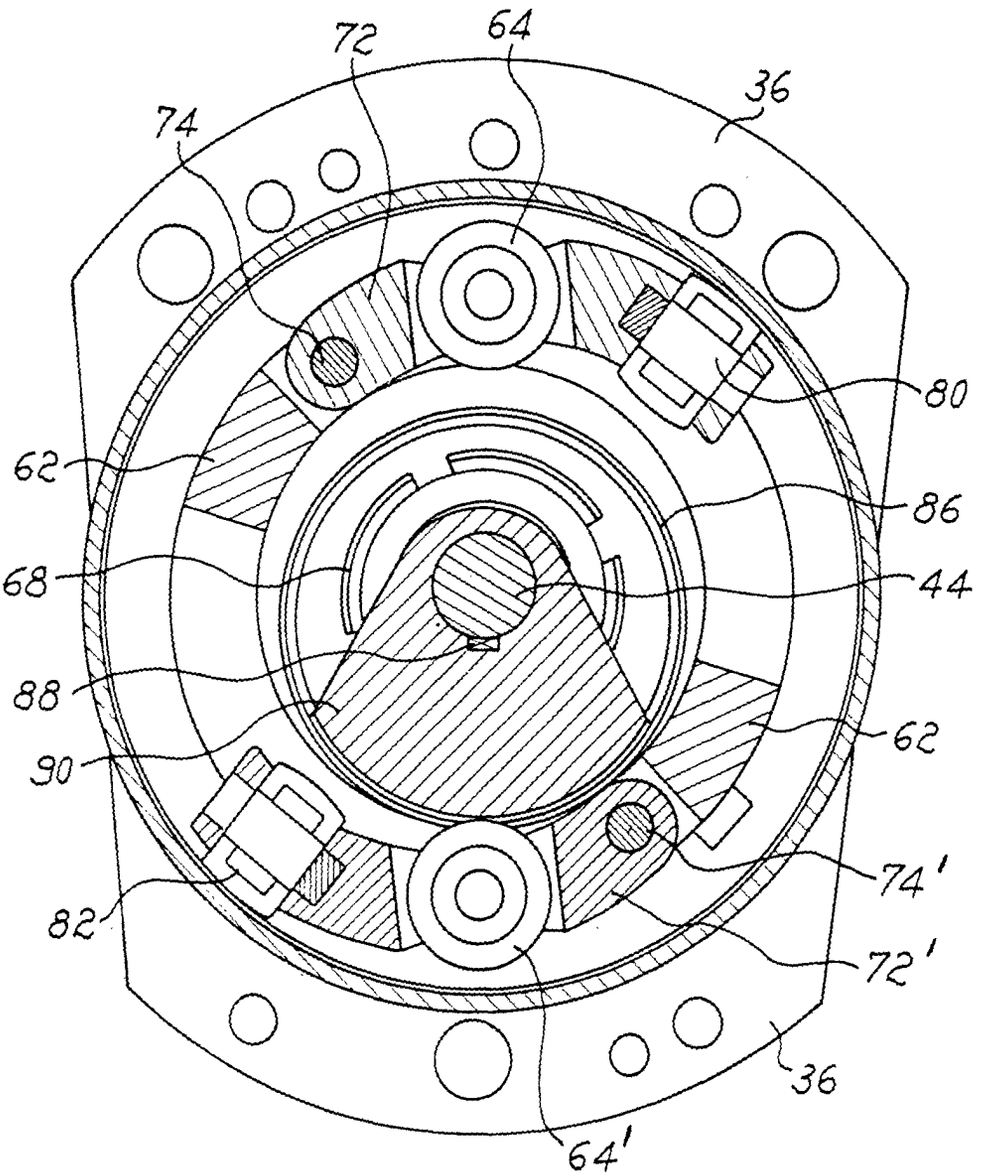
Fig.2



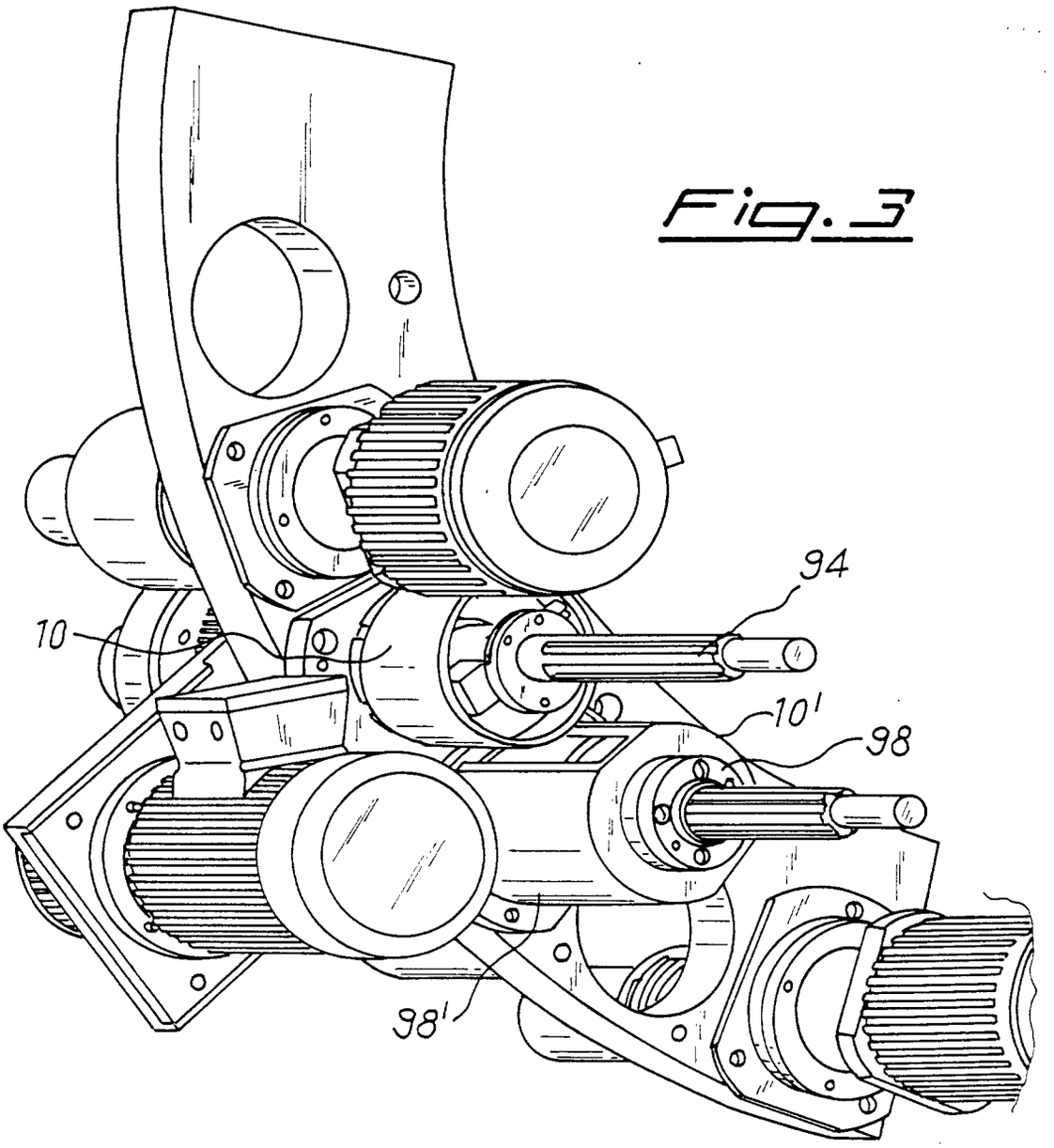


Fig. 3

Fig.4

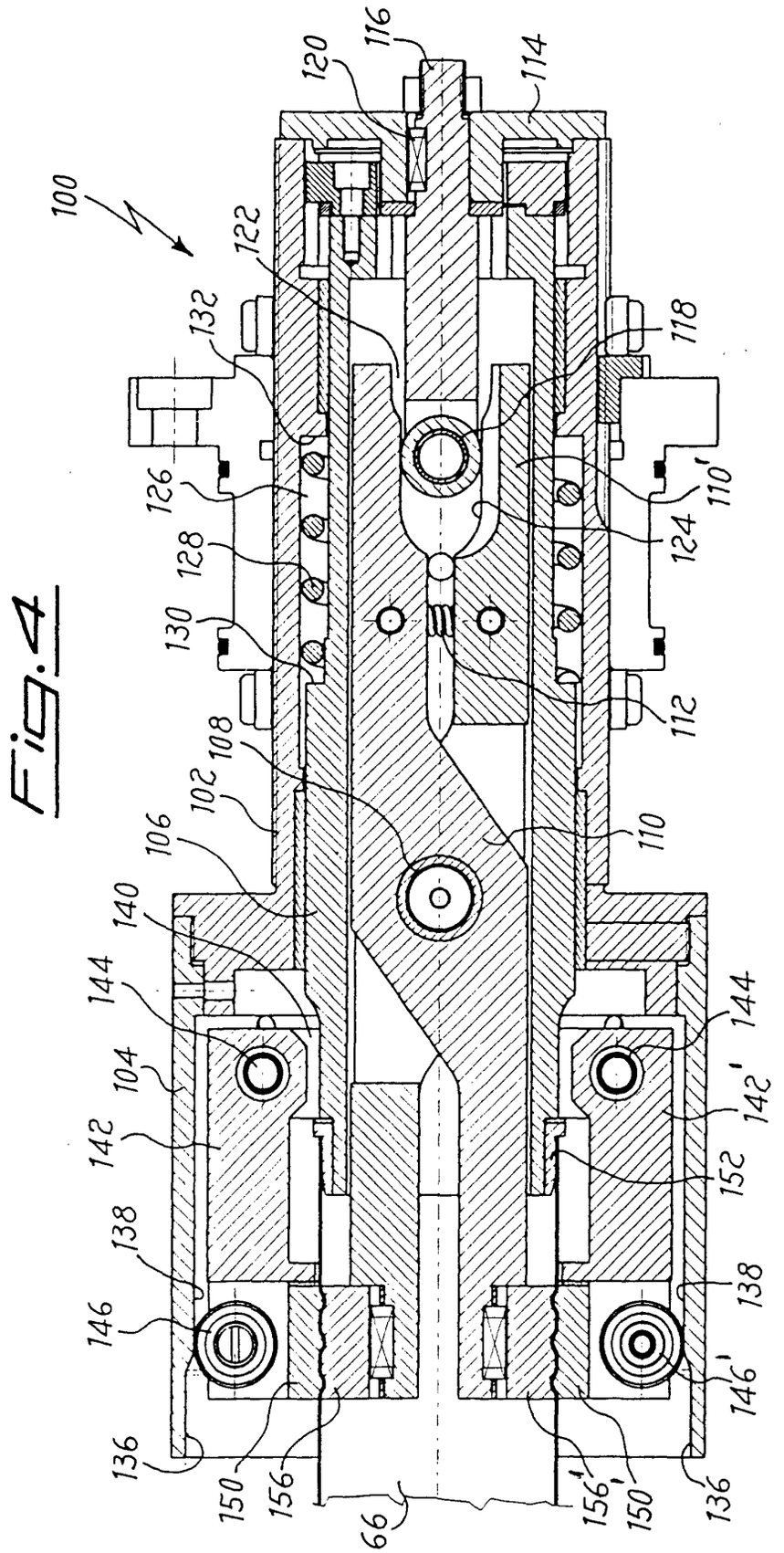

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Fig.5