An end cap (1) having a sidewall (7) and a front side (8). The end cap (1) includes internal ribs (2) that are inwardly directed to form a clamping receptacle for an object (10). Ribs (2) are separated from front side (8) by a space (3).
END CAP WITH SPRINGED RIBS FOR PACKAGING OBJECTS

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The invention concerns an end cap with springed ribs for packaging objects.

[0003] End caps with springed ribs have become known in several forms of execution. They serve the purpose of holding an object that is to be packaged securely, without shocks and without vibration in the packaging.

[0004] 2. Description of the Prior Art

[0005] To do this, the known art is to arrange springed ribs or large burrs in a packaging container in a radially inward direction on the inside walling. A receiving opening for a tool to be held in is formed between these ribs or naps.

[0006] The diameter of the receiving opening is precisely matched with the diameter of the machined part and may not be changed. The result of this among other things is that the springed ribs on the bottom side of the opening, meaning the side against which the closing side of the end caps is formed, is connected to the end cap. However, in this way it is only possible for an object with a certain diameter to be received by the end cap.

SUMMARY OF THE INVENTION

[0007] Therefore the invention is based on the task of developing an end cap of the type mentioned in the introduction, which will create suitable clamping receptability in a package for objects of different diameters.

[0008] A fundamental characteristic of the invention is that a particular characteristic of the spring of the springed ribs is achieved. This takes the shape of the springed ribs in the end caps being simply configured on the sidewalls and that there is no need to secure the end cap to the closing end wall. In this way the springed ribs are flexible throughout their entire length because there is no attachment to the inside wall of the end cap.

[0009] In this way the springed ribs may also be flexibly bent against the end wall and as a result do not experience any kinds of forces of impact or inverse stress, which would exert a spring back effect on the springed ribs.

[0010] The design construction now provides for that the end cap provides for several springed ribs that are attached at an angle to one another and are of springable design and which are positioned jammed against the outside dimension of the machined part to be held. Then, in accordance with the invention, the attachment is simply to the sidewalls. With regard to the front side of the end cap a minimum spacing is maintained, which ensures that the individual rib is able to move freely against the front side.

[0011] The springed ribs are positioned to the sidewall using a fixative so that they rise up into the end cap. The design of their attachment to the sidewall of the end cap in this is formed in somewhat of a right angle. This arrangement against the sidewall may also, however, be at an angle less than 90°. As a result, a corresponding requirement in the angle of the spring of the springed ribs may be met with regard to the object to be held securely. The more direct the arrangement is, that is angled at 90°, the more steeply the spring effect may be formed. If, by comparison, the arrangement of the springed ribs to the sidewall of the end cap forms an angle of less than 90°, the stiffness of the receptability for the object is reduced.

[0012] At the same time the springed ribs grip the outside dimension of the machined part to be held and tightly jam this part in the end cap. A large surface arrangement of the springed ribs to the machined part is preferable, and with it a good wedging effect for the machined part. The machined part to be held is introduced into the insertion opening of the end cap using a slight turning movement into the front view of the slightly fan shaped springed ribs, which change shape elastically and create the clamping receptive action mentioned above.

[0013] In order to make the insertion of the object to be held securely easier the provision has been made for the springed ribs to be rounded off or tailored at the opening. On the one hand the tailoring is in relation to the sidewall rising upwards into the inside wall of the end cap and on the other hand, in relation to the end wall of the spring. In this way, the result is a tailored corner for each spring in the insertion area of the end cap, meaning in its front side area.

[0014] Furthermore, there is provision for the springed ribs in this area to be formed bent outwards so that from the front side in the center of the end cap an enlarged insertion area is formed that exerts a centering function. In this way, the machined part to be wedged in may be inserted into the end cap more easily.

[0015] The terminology used here “end cap” is understood so far as that in accordance with an initial form of execution of the invention the end cap consists of an adapter part, which displays a circumferential wall, to the inside circumference of which the springed ribs are arranged, the free movable ends of which are directed radially inwards and in this way form an approximately centrally aligned clamping receptacle for an object to be held, in many cases for a machined part to be held. The adapter part is implanted into the packaging as a separate piece and secured there. However, it may also be used without the packaging as a stand and a freestanding storing piece for the machined part to be held.

[0016] However, aside from forming the end cap, one of this type of clamping receptacle may be positioned immediately in the packaging container as an adapter part, in a second form of execution of the invention. The previously mentioned springed ribs, which form the clamping receptacle, may be positioned immediately on the walls of the packaging container, for example a shell.

[0017] In a further form of execution there may be provision for several of this type of clamping receptacle to be positioned in a packaging container so that a row of this type of machined parts is able to be wedged and held in a single, comprehensive packaging container. In this way the wedged stand can fix the object to be clamped over a longer distance.

[0018] Importantly, a clamping receptacle for the machined part to be held, consisting of several, radially bendable springed ribs, is created so that a variety of machined part diameters can be clamped.

[0019] In the sense of the invention the terminology “rib” is also understood to have several meanings.
Therefore, it is not only springed ribs with right-angled profiled sections that are provided but also, in accordance with the invention, all the profile forms of springed ribs are taken advantage of, so far as care is taken that the springed ribs are created with their ends in a radial inward direction being elastically flexible and arranged wedged against the outside circumference of the machined part.

In this way, there may also be provision for that the profile of the springed ribs is, at least partially, adapted to the circumference of the shape of the machined part so that a large surface arrangement is the result on the outside circumference of the machined part, conditional on the predetermined profile of the rib.

Other forms aside from the rightangle shaped, profiled springed ribs with the tailoring or similar on the entry side may also be used, such as for example, Y-shaped, profiled springed ribs, hollow springed ribs, elliptical or oval springed ribs and or other adaptations.

In exactly the same way it is not essential to solving the task that the axial length of the springed ribs is planned continuously along the entire length of the end caps. The length should be selected in such a way that a large enough clamping receptacle is guaranteed for the machined part to be held. The form of the springed ribs in the direction of their linear extension may thus also be interrupted or shortened and re-formed at another place in the linear direction again.

The framework of this invention naturally encompasses not only the machined parts to be held but also all types of goods to be packaged. For the sake of simplicity the holding of a machined part is outlined in the previous description although the invention pertains to all the objects to be packed.

The subject matter of this invention is not just the result of the object of the individual protective claims but also out of the combination of the individual claims one below the other.

FIG. 4: a cross sectional drawing of a packaging container, for example, a shell, with two end caps positioned in it, in between which a linear object is received securely clamped in the shell.

DESCRIPTION OF A PRESENTLY PREFERRED EMBODIMENT OF THE INVENTION

In FIG. 1 an end cap 1 is shown in the form of a plastic body, which forms a circumferential sidewall 7 with a square or rectangular outside circumference. A front side of the end cap 1 is bounded with the front side 8. This may be either partially or even totally closed. The only requirement is that it is guaranteed that the object to be securely placed does not slip through the end cap 1.

The other front side of the end cap 1 is formed by the opening 9 of the end cap.

It is fundamental to the invention in this that there is no direct link between this front side 8 and the allocated sides of the springed ribs 2 so that the front side 8 of the end cap 1 cannot have any direct reverse impact force on the springed ribs 2. What is more, the space 3 is drawn in the figures, which graphically proves this context.

This space 3 does not necessarily have to be formed, it should be pointed out that the front side of the springed rib 2 directed towards front side 8 may also lie adjacent but that this however has no direct connection with it.

It is preferable however for there to be at least a small space as is shown in drawing in accordance with FIG. 1, since this simplifies the fabrication of the end cap 1.

On the inside circumference of the sidewalls 8 there are four springed ribs 2 positioned peripherally at an angle of approximately 90° next to one another. Between their radially inward directed ends they form a clamping receptacle for an object to be held 10. This is to be seen in the diagram in FIG. 2.

Incidentally, the range of spring 11 is also shown in FIG. 2, which reflects the elasticity of the springed ribs. This range is indicated by the four double arrows. The springed ribs may be deformed up to the adjacent inside of the end cap 1. In this way, in at least one form of execution of this invention, the ends that form the receiving area of the springed ribs 2 are so elastic with the links 5 and the tailoring 6 that these areas stretch so far that total deformation is possible.

FIG. 3 shows the cut through the configuration similar to in FIG. 1, in which the object 10 has already been inserted into the end cap 1 to the point that it is fixed facing forwards. In this diagram it can be seen clearly that the springed ribs 2 display a space 3 compared with the end cap 1 closing front side 8 of the end cap 1.

By introducing the object 10 into the end cap 1 the springed ribs 2 were bent away to the side so that they are secured to the insides of the end cap 1 using the fastener 4 and stretch from these out towards the outside of the object 10, where depending on the diameter of the object to be secured 10 they are further moulded either a little or a lot.

The drawing in FIG. 4 shows the received end cap 1 arranged in a shell 12. In this the shell 12, 13 has received
a total of two such end caps 1, in order to guarantee the best possible fit for the object 10. One of the end caps 1 is arranged in the cover of the shell 12 and the other is in the shell 13 itself. In this drawing the shell cover 12 is a cover, which is formed around the shell 12.

[0043] Again here it is important that the springed ribs 2 have no direct connections with each of the front sides 8, at least partially close the end caps.

Drawing Legend

[0044] 1 end cap
[0045] 2 rib
[0046] 3 space
[0047] 4 fixture
[0048] 5 link
[0049] 6 tailoring
[0050] 7 end caps sidewall
[0051] 8 end caps front side
[0052] 9 end caps opening
[0053] 10 object
[0054] 11 spring range
[0055] 12 shell cover
[0056] 13 shell

What is claimed is:

1. An end cap for the receiving and holding of objects, in which the object to be packaged is received into a holding device, formed out of several springed ribs directed radially inwards inside the end cap, which are positioned partially jammed on the outside circumference of the object to be held, characterized by that the springed ribs 2 compared with the closing front side (8) form at least a minimum spacing so that the springed ribs (2) are formed so that they can move freely against the front side (8).

2. An end cap in accordance with claim 1, characterized by that the springed ribs (2) in the area of the opening on the front side (9) of the end cap (1) display a link (5) in the form that the springed ribs (2) display a radius running towards the outside so that a somewhat funnel shaped entrance aid is formed.

3. An end cap in accordance with claim 1 or 2 characterized by that the springed ribs (2) in the area of the front side opening (9) of the end cap (1) on the front side form a tailored corner (6).

4. An end cap in accordance with one of the claims 1 through 3 characterized by that the springed ribs (2) are formed so elastically that they can be deformed up to the adjacent walling of the inside of the end cap (1).

5. An end cap in accordance with one of the claims 1 through 4 characterized by that the springed ribs (2) are also formed so elastically in the area of the front side opening (9) are formed so that they can be deformed up to the adjacent walling of the inside of the end cap (1).

6. An end cap in accordance with one of the claims 1 through 5, characterized by that the end cap can be received into a receiving or packaging shell (12, 13) for objects.

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