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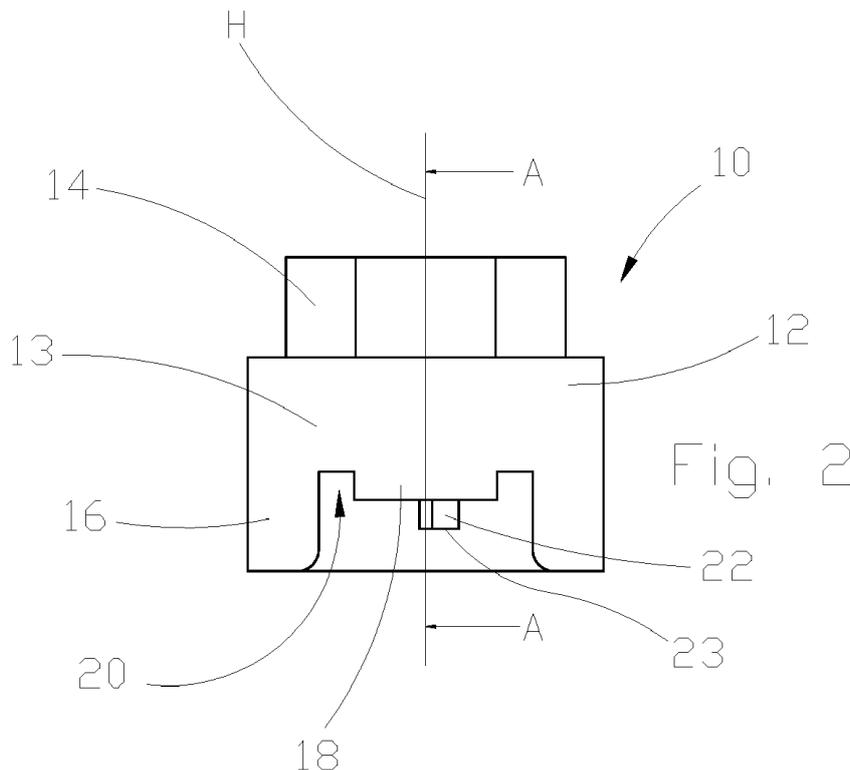
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(54) **APPARATUS AND PROCESS FOR THE REALIZATION OF A CARTRIDGE**

(57) The present invention refers to an apparatus and a process for the realization of a cartridge for firearms, and more particularly, for the realization of a perfect closing of a cartridge case for firearms.



EP 3 101 379 A1

Description

[0001] The present invention refers in general to a process and relative apparatus for the realization of a cartridge for firearms. More particularly, the present invention refers to a process and an apparatus for the closing of a cartridge case for firearms.

[0002] A cartridge for firearms according to a known conformation comprises a plastic cartridge case having a lower metal part, called bottom, in which a primer and a suitable dose of gunpowder are contained. The pellet charge is present in the upper part of the cartridge case, the pellets being conveniently separated from the gun powder by means of a dividing element, called wadding or wad.

[0003] In addition to acting as a dividing element, the wad can act also as a containing element into which lead pellets or steel pellets are charged according to the cartridge model.

[0004] The realization of a cartridge for firearms takes place in a series of sequential workings, each working being subjected to quality controls.

[0005] At first, a dose of gunpowder, variable according to the characteristics of the final product to be obtained, is inserted into the bottom of the cartridge case, preliminarily provided with the primer.

[0006] Then, the wad is inserted.

[0007] Finally, the working is finished by closing the cartridge case. In particular, this last operation consists, at first, in the cutting of the upper part of the cartridge case into sectors of equal size and the subsequent bending of the sectors.

[0008] Then, the formation of the closure is done by means of conical punches and relative flattening. Finally, hemming is performed by means of a hemming tool that shapes the upper portion with a short rotation and a slight warming of the plastic in order to give the definitive shape to the upper portion.

[0009] The workings according to the prior art as described previously involve, unavoidably, the formation of a central hole in closing the cartridge case, which is due to the thickness of the plastic because the plastic thickness does not allow a complete closing although the plastic is well folded.

[0010] The presence of this hole has important consequences in the management of the cartridges; in fact, it is absolutely to be avoided that the cartridges come in touch with liquid substances that could wet the pellets and the gunpowder, which could make the cartridge in question ineffective.

[0011] Besides, owing to the hole in the closure of the cartridge case, it is preferable to keep the cartridges in not very wet or dry environments.

[0012] An aim and function of the invention is to remove the above-mentioned inconveniences and other more through the realization of said apparatus and relative process for the realization of cartridges for firearms, in particular for the realization of the closure of a cartridge

case for firearms.

[0013] In particular, an aim of the invention is to provide an apparatus and a process avoiding the formation of a hole in the closing portion of the cartridge case of a cartridge for firearms.

[0014] A further aim of the invention is to provide an apparatus and a process enabling to realize a perfect closure of the cartridge case of a cartridge.

[0015] These and other aims are reached according to the invention through an apparatus for the realization of cartridges for firearms, comprising a hemming element having a central axis and rotating around said central axis. The hemming element is suitable for the realization of the closure of the cartridge case of a cartridge, said cartridge case having an end portion comprising sectors bent substantially 90 degrees and whose extreme edges are directed towards the central axis of the hemming element.

[0016] The apparatus is characterized by the fact that said hemming element comprises a base comprising a central portion adapted to abut on the bent sectors of the cartridge case, a projecting element being comprised and protruding from the central portion and having a free end.

[0017] The projecting element is adapted to come into contact with the extreme edges of the sectors of the cartridge case, so that during the rotation movement of the hemming element, the extreme edges are cohesive with each other.

[0018] Advantageously, the apparatus according to the invention may provide that the projecting element is disposed laterally with respect to the central axis of the hemming element, so as to perform a movement which follows a circular path on displacing the extreme edges of the sectors of the cartridge case according to the same course.

[0019] Besides, the projecting element may comprise an outer side edge and an inner side edge. In particular, the outer side edge may be shaped substantially like a semicircle whose center is coincident with the central axis of the hemming element so that the projecting element is shaped substantially like a half-moon. This shape allows to obtain a complete closing of the bottom of the cartridge case with a regular shape.

[0020] Advantageously, the inner side edge may have an arcuate shape directed towards the outer side edge so that the projecting element is not crossed by the central axis of the hemming element. This conformation forces the projecting element to follow a circular path, as previously defined.

[0021] The central portion of the hemming element may protrude centrally from the base and may be shaped like a cylinder whose axis is coincident with the central axis of the hemming element.

[0022] Besides, a peripheral portion may protrude from the base and may be shaped like a circular crown whose axis is coincident with the central axis of the hemming element. In this way, a seat is formed between the central portion and the peripheral portion, said seat being

shaped like a circular crown whose axis is coincident with the central axis of the hemming element, said seat being adapted to receive the bent portions of the sectors of the cartridge case.

[0023] Advantageously, moving means may be comprised to move the projecting element with respect to the central portion so that the free end of the projecting element may vary its distance from the central portion and consequently, the depth of the closed central portion of the bottom of the cartridge case may be varied.

[0024] In particular, the hemming element may comprise a bushing and a pin. The bushing may comprise the central portion, previously defined, and the pin may comprise the projecting element, previously defined, and a threaded cylindrical portion. A threaded hole is formed in the bushing so that the cylindrical portion may be screwed or unscrewed in the threaded hole so as to vary the position of the projecting element in respect to the central portion.

[0025] The aims and advantages of the invention are also achieved with a process of realization of the closure portion of a cartridge case of a cartridge for firearms having a central axis, said cartridge case having an end portion comprising sectors bent substantially 90 degrees and whose extreme edges are directed towards the central axis. The process is characterized by the fact that after heating the sectors of the cartridge case, the extreme edges are welded together. In this way, it is possible to avoid that the closure portion of the cartridge case be provided with the conventional central hole. Thus, dust and/or liquids, which could make the cartridge inefficient, are prevented from entering the so-obtained cartridge.

[0026] Advantageously, the process according to the invention may provide that the extreme edges of the sectors are simultaneously pushed downwards and rotated in order to be welded together so that said extreme edges are made cohesive to each other.

[0027] Further features and details of the invention can be better understood from the following specification that is supplied by way of a non-limiting example as well as from the accompanying drawings, wherein:

Figures 1 and 2 are views from the bottom and from a side, respectively, of a hemming element included in an apparatus according to the invention;

Figure 3 is a side view of the hemming element of Figures 1 and 2, seen in section according to a plane indicated by A-A in Figure 2;

Figures 4 and 5 are views from the bottom and from a side, respectively, of a first component of a hemming element included in an apparatus according to a variant of the invention;

Figure 6 is a side view of the first component represented in Figures 4 and 5, seen in section according to a plane indicated by B-B in Figure 5;

Figures 7 and 8 are views from a side and from the bottom, respectively, of a second component of a hemming element to be coupled to the first compo-

nent represented in Figures 4, 5, 6.

[0028] With reference to the enclosed figures, in particular Figures 1, 2 and 3, number 10 denotes a hemming element capable of performing the hemming and, simultaneously, the entire closing of the cartridge case of a cartridge for firearms.

[0029] The hemming element 10 comprises a lower body 12 and an upper body 14 which are joined to each other so as to form an only body.

[0030] The upper body 14 has a hexagonal section and is adapted to be fixed to a known rotary element so as to rotate the entire hemming element 10 around a central axis of rotation H.

[0031] The lower body 12 comprises a cylindrical base 13 from which a peripheral portion 16, shaped like a circular crown, and a central portion 18, shaped like a cylinder, protrude. A seat 20 is formed between the peripheral portion 16 and the central portion 18, said seat being shaped like a circular crown.

[0032] A projecting element 22 protrudes from the base surface of the central portion 18 and is arranged laterally with respect to the central axis H of the hemming element 10 on the whole.

[0033] The projecting element 22 with a free end 23 has an outer side edge 24 and an inner side edge 26.

[0034] The outer side edge 24 is shaped substantially like a semicircle whose center is coincident with the central axis H of the hemming element while the inner side edge 26 has an arched development directed towards the outer side edge 24 so that the projecting element 22 is not crossed by the central axis H of the hemming element.

[0035] The process of realization of the closing portion of a cartridge case by means of the above-described hemming element 10 provides that the end portion of the cartridge case with bent sectors is at first heated to facilitate a shape change and then, it is received into the peripheral portion 16 of the lower body 12 of the hemming element 10.

[0036] In particular, the upper perimetric edge of the cartridge is received into the seat 20, shaped like a circular crown, so as to form the peripheral edge of the closing portion of the cartridge.

[0037] In this way, the hem has a height different from that of the central part of the closing portion of the cartridge. Instead, the central part abuts on the central portion 18 of the hemming element 10.

[0038] Centrally, the projecting element 22 pushes the central zone of the closing portion of the cartridge case downwards. Through its conformation, plastic properties of the cartridge case and rotation performed by the hemming element 10, the ends of the segments forming the closing portion are made cohesive to one another in order to avoid the formation of the central hole which is present, conversely, in the cartridges produced with the equipments and processes according to the prior art.

[0039] According to a variant of the invention, a hem-

ming element comprises a first component and a second component which are assembled with each other, namely, a bushing 50, illustrated in Figures 4, 5 and 6, and a pin 70, illustrated in Figures 7 and 8.

[0040] The bushing 50 has a conformation similar to that of the hemming element 10 previously described.

[0041] The bushing 50 comprises a lower body 52 and an upper body 54 which are joined in a single body.

[0042] The upper body 54 has a hexagonal section and is adapted to be fixed to a rotating means of known type in order to rotate the entire hemming element around a central axis K.

[0043] The lower body 52 comprises a cylindrical base 53 from which a perimeter portion 56 in the shape of a circular crown as well as a central portion 58 having a cylindrical development protrude. Thus, a seat 60 in the shape of a circular crown is formed between the perimeter portion 56 and the central portion 58.

[0044] Besides, a threaded through-hole 62 is formed in the bushing 50.

[0045] The pin 70 comprises a cylindrical portion 72 having a threaded side surface and from whose lower base a projecting element 74 protrudes which is arranged laterally with respect to the central axis of the pin 70, the central axis of the pin 70 being coincident with the central axis K.

[0046] The projecting element 74 with a free end 75 has an outer side edge 76 and an inner side edge 78.

[0047] The outer side edge 76 is substantially shaped like a semicircle whose centre is coincident with the central axis K of the hemming element while the inner side edge 78 has an arched development directed toward the outer side edge 76 so that the projecting element 74 is not crossed by the central axis K of the hemming element.

[0048] The pin 70 may be screwed into the hole 62 of the bushing 50 so as to obtain a hemming element that is more flexible in its use. Indeed, through the coupling by screwing it is possible to vary the distance of the projecting element 74 with respect to the seat 60.

[0049] The process of realization of the closing portion of a cartridge case by using the previously described hemming element, consisting of the bushing 50 and the pin 70, is similar to the process that has been already described for the hemming element 10 from which it differs for the possibility of axially moving the pin 70 with respect to the bushing 50 in order to adjust the depth of the portion worked by the projecting element 74 of the hemming element with respect to the hem.

[0050] A technician of the sector may provide changes or modifications which are to be considered as included in the scope of protection of the present invention.

Claims

1. Apparatus (10) for the realization of cartridges for firearms, comprising a hemming element having a central axis (H; K) and rotating around said central

axis (H; K), said hemming element being suitable for the realization of the closure of the cartridge case of a cartridge, said cartridge case having an end portion comprising sectors bent substantially 90 degrees and whose extreme edges are directed towards the central axis of the hemming element, **characterized by** the fact that said hemming element comprises a base (13; 53) comprising a central portion (18; 58) adapted to abut on the bent sectors of the cartridge case, a projecting element (22; 74) being comprised and protruding from the central portion (18; 58) and having a free end (23; 75), said projecting element (22; 74) being adapted to come into contact with the extreme edges of the sectors of the cartridge case.

2. Apparatus (10) according to the preceding claim, wherein the projecting element (22; 74) is disposed laterally with respect to the central axis (H; K) of the hemming element.

3. Apparatus (10) according to one of the preceding claims, wherein the projecting element (22; 74) comprises an outer side edge (24; 76) and an inner side edge (26; 78), the outer side edge (24; 76) being shaped substantially like a semicircle whose center is coincident with the central axis (H; K) of the hemming element so that the projecting element (22; 74) is shaped substantially like a half-moon.

4. Apparatus (10) according to the preceding claim, wherein the inner side edge (26; 78) has an arcuate shape directed towards the outer side edge (24; 76) so that the projecting element (22; 74) is not crossed by the central axis (H; K) of the hemming element.

5. Apparatus (10) according to one of the preceding claims, wherein the central portion (18; 58) protrudes centrally from the base (13; 53) and is shaped like a cylinder whose axis is coincident with the central axis (H; K) of the hemming element.

6. Apparatus (10) according to one of the preceding claims, wherein a peripheral portion (16; 56) protrudes from the base (13; 53) and is shaped like a circular crown whose axis is coincident with the central axis (H; K) of the hemming element so that a seat (20; 60) is formed between the central portion (18; 58) and the peripheral portion (16; 56), said seat being shaped like a circular crown whose axis is coincident with the central axis (H; K) of the hemming element, said seat (20; 60) being adapted to receive the bent portions of the sectors of the cartridge case.

7. Apparatus (10) according to one of the preceding claims, wherein moving means (62, 72) are comprised to move the projecting element (74) with respect to the central portion (58) so that the free end (75) of the projecting element (74) may vary its dis-

tance from the central portion.

- 8. Apparatus (10) according to the preceding claim, wherein the hemming element comprises a bushing (50) and a pin (70), said bushing (50) comprising the central portion (58), said pin (70) comprising the projecting element (74) and a threaded cylindrical portion (72), a threaded hole (62) being formed in the bushing (50) so that the cylindrical portion (72) may be screwed or unscrewed in the threaded hole (62).
- 9. Process of realization of the closure portion of a cartridge case for firearms having a central axis, said cartridge case having an end portion comprising sectors bent substantially 90 degrees and whose extreme edges are directed towards the central axis, **characterized by** the fact that the extreme edges are welded together.
- 10. Process according to the preceding claim, wherein the extreme edges of the sectors are simultaneously pushed downwards and rotated in order to be welded together so that said extreme edges are made cohesive to each other.

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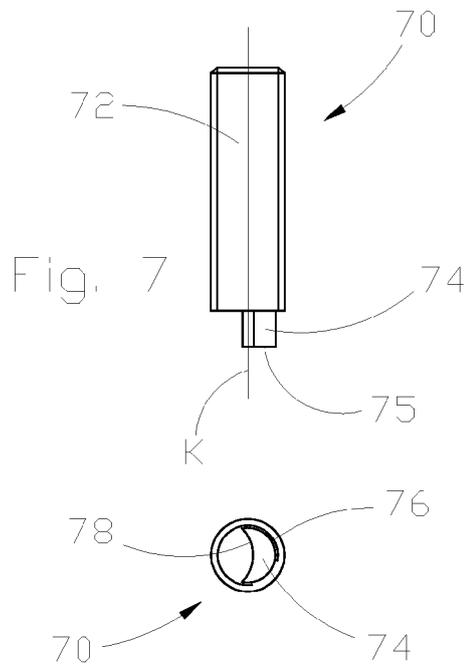
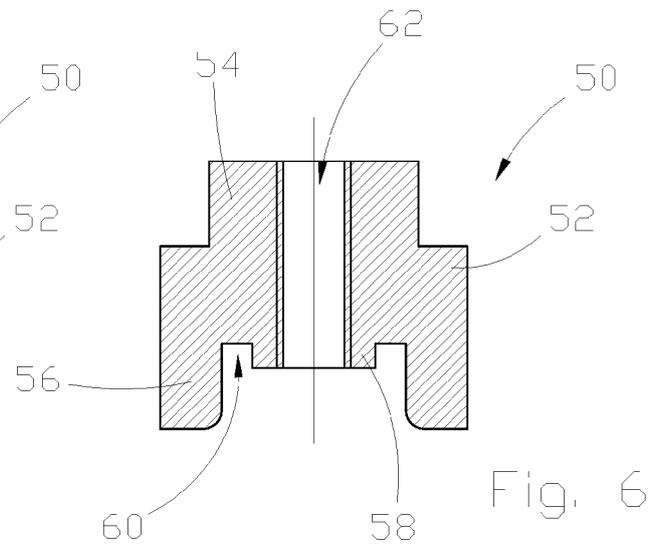
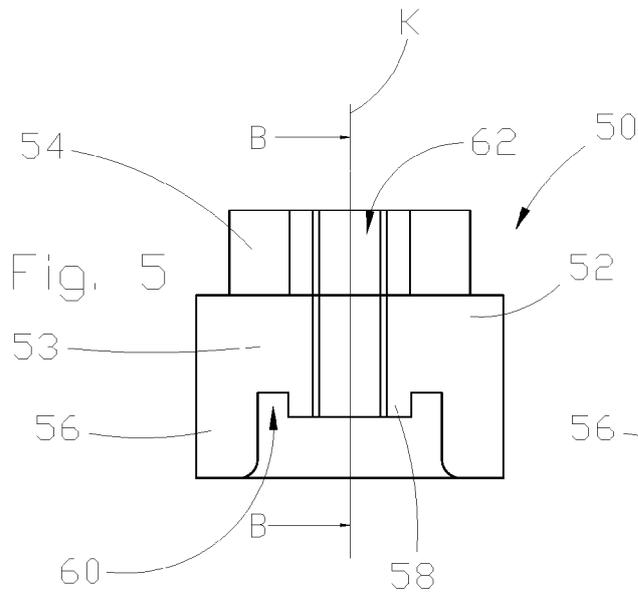
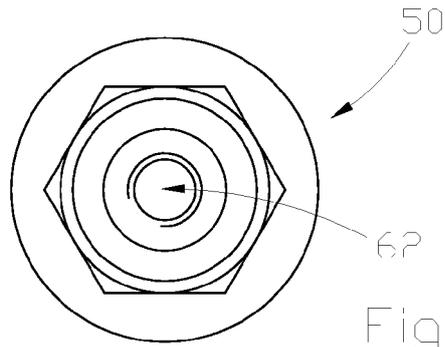
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