

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 pre-disposition of the closure of the cartridge case of a cartridge 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 gunpowder by means of a dividing element, also 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 a primer.

[0006] Then, the wad is inserted. The lead or steel pellets are charged inside the wad.

[0007] Finally, the working is finished by closing the cartridge case.

[0008] 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.

[0009] 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.

[0010] The prior art discloses the cutting of the upper part of the wad into four or at most six sectors.

[0011] It would be preferable to have even more sectors since the higher the number of the sectors, the better the performance of the cartridge. In fact, the pellets contained in the cartridge will tend to go out of the gun-barrel creating a wider, more uniform, better defined shot pattern.

[0012] However, from the manufacturing point of view it is complex to increase the number of the sectors because the cutting is performed by means of a pin provided with a series of blades disposed on planes that are intersecting one another in the central axis of the pin itself.

[0013] In fact, it is rather difficult to carry out a pin allowing to fix a high number of blades.

[0014] Besides, the backing pad, i.e. the disc on which the wads are worked, is usually provided with a series of

seats where the wads to be cut are positioned. In other words, the seats in which the wads to be cut are positioned and in which the pins with the blades are inserted, are disposed two by two, side by side and very close to each other.

[0015] Consequently, a high number of blades present on each pin could provoke a clash of blades of different pins acting on the seats arranged side by side.

[0016] Aim and function of the invention is to remove the aforementioned drawbacks and still others through the realization of an apparatus and relative process for the realization of cartridges for firearms with better performances.

[0017] In particular, an aim of the invention is to provide an apparatus and a process allowing to perform a high number of cuts on the upper part of the cartridge case so as to obtain a high number of sectors to be bent and joined to one another.

[0018] Another aim of the invention is to provide an apparatus and a process allowing to perform a good number of cuts on the upper part of the cartridge case without reducing the times for obtaining a cartridge.

[0019] These and other aims are achieved according to the invention through an apparatus for the realization of cuts on the upper portion of a wad of a cartridge for firearms, said apparatus comprising at least one cutting pin and one plate in which at least one seat is formed to receive the wad to be cut and the cutting pin inside said wad.

[0020] The cutting pin comprises a first support to which four first blades are fixed and disposed 90 degrees to one another and have cutting edges that define a first cutting axis and protrude from the first support so as to make four equidistant cuts on the wad.

[0021] In particular, said apparatus is characterized by the fact that the one or more cutting pins comprise, above the first support, a second support to which second four blades are fixed and disposed 90 degrees to one another and have cutting edges that define a second cutting axis and protrude from the second support.

[0022] The first cutting axis and the second cutting axis are coincident. The four second blades are disposed at an angle of deviation of 45 degrees with respect to the four first blades so as to make eight cuts on the wad which are angularly equidistant.

[0023] The eight cuts form eight equal sectors in the terminal part of the wad, which are then bent and joined to one another in order to close the cartridge.

[0024] The presence of eight sectors allows to improve the shot pattern as concerns the homogeneity and definition so that it is possible to obtain ballistic results superior to the results obtainable with cartridges produced according to prior art.

[0025] Advantageously, the four first blades and the four second blades have cutting edges of the same length and are disposed at the same height so as to make eight equal cuts on the wad, said cuts being angularly equidistant and disposed at the same height of the wad.

[0026] Moreover, in order to achieve this result, the four first blades cross the second support, and the four second blades cross the first support so that all the blades are arranged at the same height with respect to the cutting pin.

[0027] Advantageously, eight circular projections may be comprised in the one or more seats formed in the plate, said circular projections being deviated 45 degrees to one another and adapted to receive the four first blades and the four second blades so that said blades do not ruin the walls of the one or more seats.

[0028] Furthermore, the one or more seats may comprise an upper flared portion which receives the sectors of the upper portion of the wad, which sectors may be bent outwards during the cutting process performed by the one or more cutting pins.

[0029] Advantageously, the eight circular projections may be formed in correspondence of the upper flared portion of the one or more seats.

[0030] In the plate, at least one first seat of cylindrical shape and at least one second seat of cylindrical shape are formed and are adjacent to each other. First eight circular projections are formed and deviated 45 degrees to each other in the first seat, and second eight circular projections are formed and deviated 45 degrees in the second seat. In particular, one of the first eight circular projections is coincident with one of the second eight circular projections, so that all eight cuts are made in both wads received in the two adjacent seats.

[0031] Advantageously, at least four pairs of seats are formed in the plate which has a circular shape and can rotate, each pair of seats being formed by a first seat of cylindrical shape and a second seat of cylindrical shape, said seats being adjacent to each other. In this way, the workings on the wads may be performed in continuous thanks to the rotation of the plate.

[0032] Besides, the one or more seats formed in the plate may have a cylindrical conformation, a lower enlarged cylindrical portion being formed in the one or more seats and having a greater diameter than the average diameter of the at least one seat. In this way, through this configuration, a braking element may be received in said lower enlarged cylindrical portion to block the wad in the seat.

[0033] The aims and advantages of the invention are also achieved with a process for the realization of cuts on the upper portion of a wad of a cartridge for firearms, characterized by the fact of realizing eight cuts in the wad, which are angularly equidistant from each other.

[0034] The presence of eight sectors allows to improve the shot pattern as concerns the homogeneity and definition so that it is possible to obtain ballistic results superior to the results obtainable with cartridges produced according to prior art.

[0035] Further characteristics and details of the invention will be better understood from the following specification, supplied by way of non-limiting example as well as from the annexed drawings, wherein:

Figure 1 is a side view of a pin included in an apparatus according to the invention;

Figures 2, 3 are views from the top and from the bottom, respectively, of a pin according to Figure 1;

Figure 4 is a top view of a backing pad included in an apparatus according to the invention;

Figure 5 is a side view in section of the backing pad in Figure 4 according to a plane denoted by A in Figure 4;

Figure 6 is a view of a detail denoted by B in Figure 4.

[0036] With reference to the accompanying drawing, number 10 denotes a cutting pin, shown individually in the Figures 1, 2 3, adapted to be inserted into a seat 40, 42 of the seats formed in a backing pad 12, shown individually in the Figures 4, 5, 6.

[0037] The cutting pin 10 comprises a stem 14 to which a first lower support 16 and a second upper support 18 are fixed, to which a series of four first blades 20 and a series of four second blades 22 are fixed, respectively.

[0038] The first support 16 comprises a cross structure formed by four mutually orthogonal arms. Each arm of the four arms comprises a first portion 24 and a second portion 26, which are adjacent to each other, the first blade 20 being received between the first portion 24 and the second portion 26.

[0039] Each first blade 20 is fixed to the first support 16 by means of four fastening screws, not shown in the figures, which are screwed, respectively, into a first threaded hole 28 and into a second threaded hole 30, not visible in the figures, which are formed in the first portion 24, as well as into a third threaded hole and into a fourth threaded hole, not visible in the figures, which are formed in the second portion 26.

[0040] In the Figures 1, 2, 3, only a first blade 20 and the relative second portion 26 and first portion 24 with the relative first hole 28 and second hole 30 are denoted by the numerical references so as to keep the figures clear.

[0041] The second support 18 comprises a cross structure comparable to that of the first support 16 and formed by four mutually orthogonal arms, each arm being provided with a third portion 32 and a fourth portion 34 which are adjacent to each other, the respective second blade 22 being received between the third portion 32 and the fourth portion 34.

[0042] In particular, each second blade 22 is fixed with two fastening screws which are screwed into threaded holes formed in the third portion 32 and with other two fastening screws which are screwed into threaded holes formed in the fourth portion 34, in an equivalent manner to the four first blades 20 of the first support 16.

[0043] Also as concerns the second support 18, in the Figures 1, 2, 3 only a second blade 22 and the relative third portion 32 and the fourth portion 34 are denoted by the numerical references.

[0044] As visible in the same Figures 1, 2, 3, the first support 16 and the second support 18 have the same

conformation. However, since there is an angular deviation of 45 degrees between the first support 16 and the second support 18, the cutting pin 10 is provided with eight blades, namely, four first blades 20 and four second blades 22, which are disposed at equivalent angular distances.

[0045] Besides, each of the four first blades 20 extends above and crosses also the second support 18 while each of the four second blades 22 extends inferiorly and crosses the first support 16.

[0046] In this way, the four first blades 20 and the four second blades 22 all have the same height and are disposed at the same height with respect to the stem 14.

[0047] Through said arrangement, the cuts performed in the upper portion of the wad are eight and all have the same length so that it is possible to obtain eight sectors of the same size, all having the same distance from the bottom.

[0048] The backing pad 12 includes a disc structure 36 in which a lower recess 38 is formed to couple the backing pad 12 to rotation means of known type.

[0049] In the disc structure 36 there are eight pairs of seats, in particular each pair comprises a first seat 40 and a second seat 42 which are adjacent to each other and have the same conformation.

[0050] For convenience of illustration, in the Figures 4 and 6, only some seats 40, 42 are denoted by the numerical reference.

[0051] If seen laterally as in Figure 5, each first seat 40 as well as each second seat 42 are configured as a through-hole of variable diameter, each seat 40, 42 being formed by an upper flared portion 50 connected to an intermediate cylindrical portion 52 communicating, in turn, with an enlarged lower cylindrical portion 54 having a greater diameter than that of the intermediate cylindrical portion 52.

[0052] The enlarged lower cylindrical portion 54 is connected outside the disc structure through a threaded hole 56 adapted to receive a locking screw, not shown in the figure.

[0053] According to a top view, as it appears from Figures 4 and 6, the upper flared portion 50 of each first seat 40 has a circular perimetrical edge communicating with eight circular projections 44 distributed regularly at 45 degrees from each other.

[0054] Likewise, the upper flared portion 50 of each second seat 42 has a circular perimetrical edge communicating with eight circular projections distributed regularly at 45 degrees from each other.

[0055] As shown in particular in Figure 6, the first seat 40 and the second seat 42 are adjacent to each other and provide an orientation of the relative eight circular projections 44, 46 so that one of the eight circular projections 44 of the first seat 40 and one of the eight circular projections 46 of the second seat 42 are coincident so as to identify a common circular projection, identified by the reference 48.

[0056] The process for the realization of cuts in the

wads provides at first that the two wads are received into a first seat 40 and a second seat 42, respectively, and are supported by a braking ring received in the enlarged lower cylindrical portion 54 and locked by a screw screwed into the threaded hole 56.

[0057] A first cutting pin and a second cutting pin, both having the same shape as the previously described cutting pin 10, are inserted into the first seat 40 and the second seat 42, respectively, so that the first blades 20 and the second blades 22 of each cutting pin are arranged in correspondence of the eight circular projections of each seat 40, 42.

[0058] The two cutting pins descend and cut vertically the upper portion of the wads, in correspondence of the upper flared portion 50 of each seat so as to allow a perfect centering with precise equidistant cuts. The cutting pins are then extracted from the seats so as to allow the passage of the cut wads to the subsequent working.

[0059] A technician of the sector may provide modifications or variants that are to be considered as included in the scope of protection of the present invention.

Claims

1. Apparatus for the realization of cuts on the upper portion of a wad of a cartridge for firearms, said apparatus comprising at least one cutting pin (10) and one plate (12) in which at least one seat (40, 42) is formed to receive the wad to be cut and the at least one cutting pin (10) inside of the wad, said at least one cutting pin (10) comprising a first support (16) to which first four blades (20) are fixed and disposed 90 degrees to each other and have cutting edges that define a first cutting axis (H) and protrude from the first support (16) so as to make four equidistant cuts on the wad, said apparatus being **characterized by** the fact that the at least one cutting pin (10) comprises, above the first support (16), a second support (18) to which second four blades (22) are fixed and disposed 90 degrees to each other and have cutting edges that define a second cutting axis (K) and protrude from the second support (18), the first cutting axis (H) and the second cutting axis (K) being coincident, the second four blades (22) being disposed at an angle of deviation of 45 degrees with respect to the first four blades (20) so as to make eight cuts on the wad which are angularly equidistant.
2. Apparatus according to the preceding claim, wherein the first four blades (20) and the second four blades (22) have cutting edges of the same length and are disposed at the same height so as to make eight equal cuts on the wad, said cuts being angularly equidistant and disposed at the same height of the wad.
3. Apparatus according to the preceding claim, wherein

the first four blades (20) cross the second support (18) and the second four blades (22) cross the first support (16).

4. Apparatus according to one of the preceding claims, wherein eight circular projections (44, 46) are comprised in the at least one seat (40, 42) formed in the plate (12), said circular projections being deviated 45 degrees to each other and adapted to receive the first four blades (20) and the second four blades (22). 5
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5. Apparatus according to one of the preceding claims, wherein the at least one seat (40, 42) comprises an upper flared portion (50). 15
6. Apparatus according to the preceding claim when the preceding claim depends on claim 4, wherein the eight circular projections (44, 46) are formed in correspondence of the upper flared portion (50). 20
7. Apparatus according to one of the preceding claims, wherein at least one first seat (40) of a cylindrical shape and at least one second seat (42) of a cylindrical shape are formed and are adjacent to each other, first eight circular projections (44) being formed and deviated 45 degrees to each other in the first seat (40) and second eight circular projections (46) being formed and deviated 45 degrees in the second seat (42), one (48) of the first eight circular projections (44) being coincident with one (48) of the second eight circular projections (46). 25
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8. Apparatus according to one of the preceding claims, wherein at least four pairs of seats (40, 42) are formed in the plate (12) which has a circular shape and can rotate, each pair of seats being formed by a first seat (40) of cylindrical shape and a second seat (42) of cylindrical shape, said seats being adjacent to each other. 35
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9. Apparatus according to one of the preceding claims, wherein the at least one seat (40, 42) formed in the plate (12) has a cylindrical conformation, a lower enlarged cylindrical portion (54) being formed in the at least one seat (40, 42) and having a greater diameter than the average diameter of the at least one seat (40, 42), and a restraining element may be received in said lower enlarged cylindrical portion (54) to block the wad in the at least one seat (40, 42). 45
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10. Process for the realization of cuts on the upper portion of a wad of a cartridge for firearms, **characterized by** the fact of realizing eight cuts in the wad, which are angularly equidistant from each other. 55

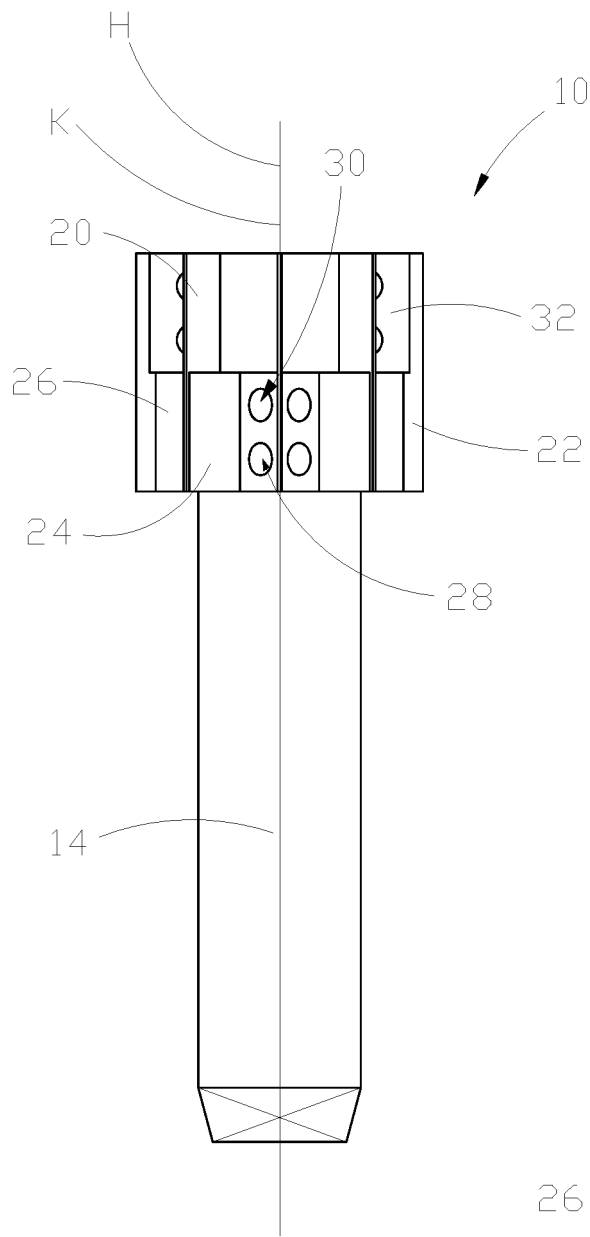


Fig. 1

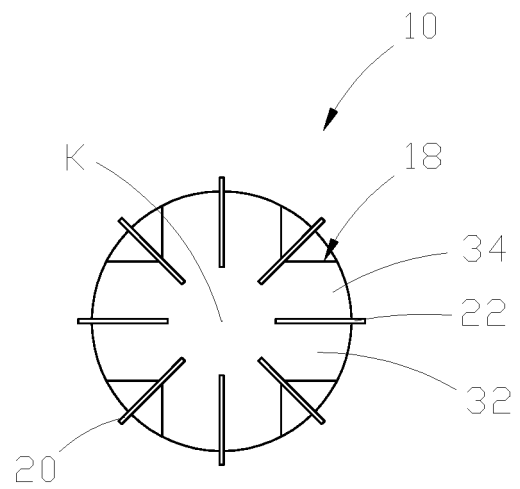


Fig. 2

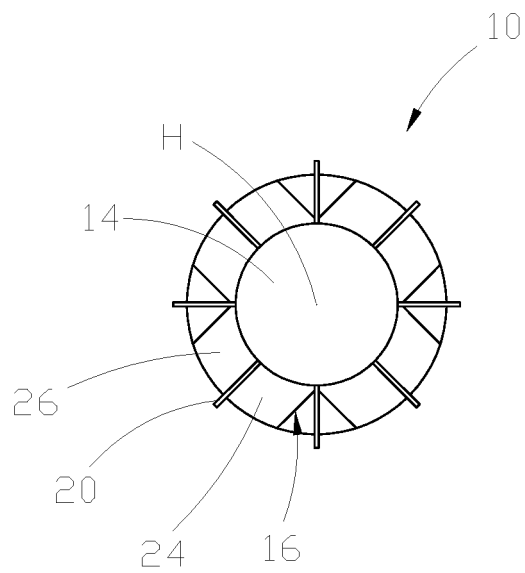
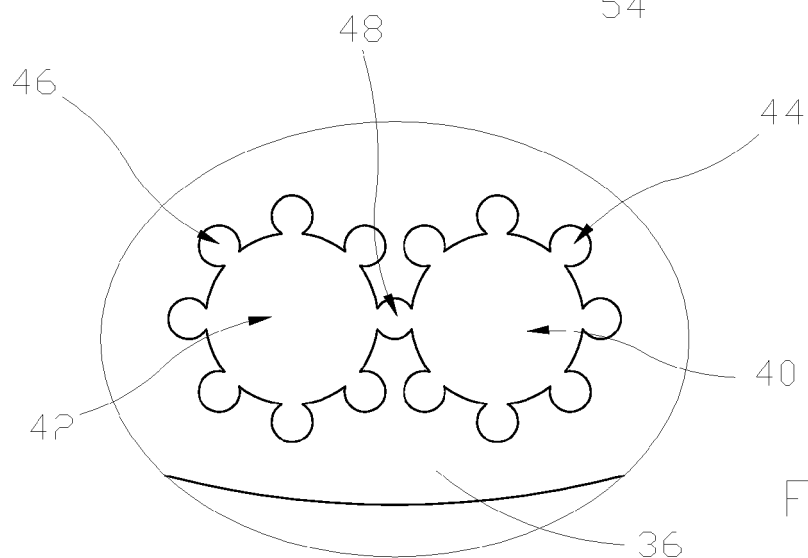
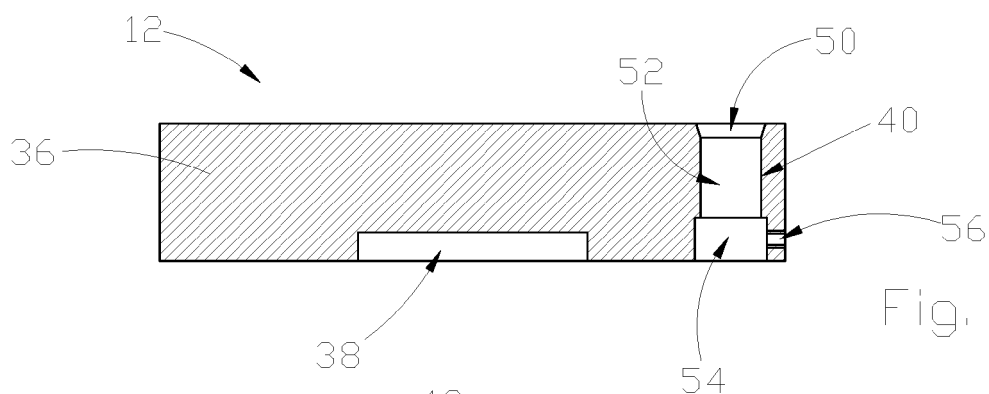
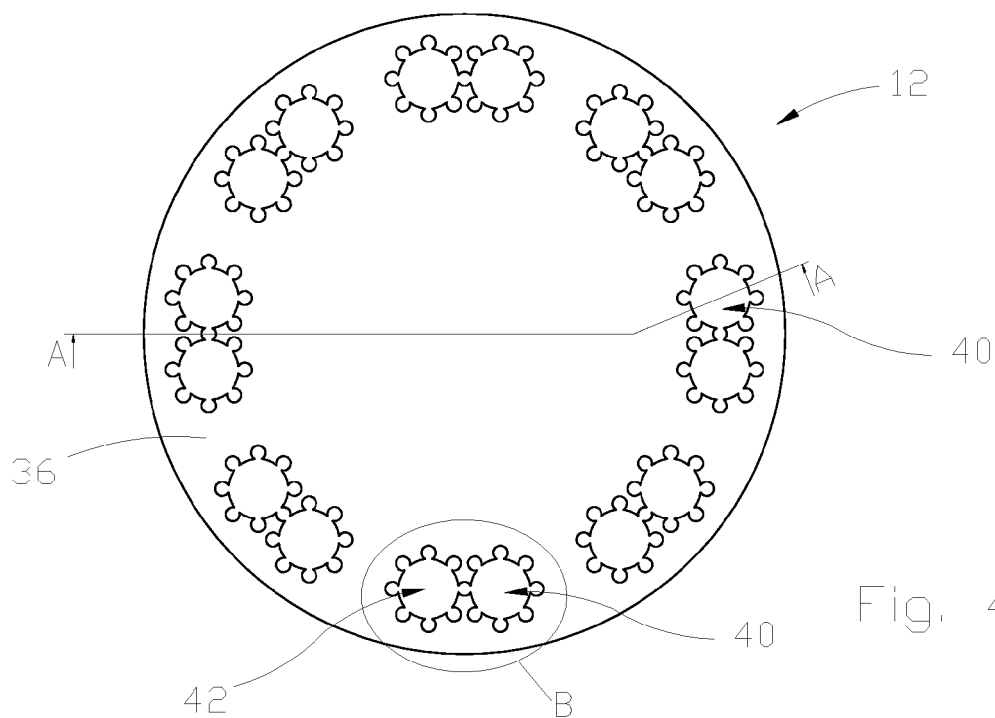


Fig. 3





EUROPEAN SEARCH REPORT

Application Number
EP 16 17 2471

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	US 4 516 460 A (VIZECKY DONALD F [US]) 14 May 1985 (1985-05-14)	1,3-9	INV. F42B7/08 F42B33/00 B26D3/08
A	* column 1, lines 9-10 * * column 4, line 59 - column 5, line 50 * * figures 1-8 *	2,10	
X	US 2013/055916 A1 (MENEFEE III JAMES Y [US]) 7 March 2013 (2013-03-07)	10	
Y	* paragraphs [0101], [0137], [0139] * * figures 6A-6C *	1,3-9	
X	US 2013/228090 A1 (BILLINGS CHRIS L [US]) 5 September 2013 (2013-09-05)	10	TECHNICAL FIELDS SEARCHED (IPC)
A	* paragraph [0016] * * figure 2A *	1	
A	US 4 733 613 A (BILSBURY STEPHEN J [US] ET AL) 29 March 1988 (1988-03-29) * column 5, lines 1-12 * * column 7, lines 30-57 * * figure 6 *	1-10	
A	GB 24230 A A.D. 1896 (PINFOLD JAMES) 9 October 1897 (1897-10-09) * page 3, lines 32-53 * * figures 6, 7, 8, 9 *	8,9	
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 30 September 2016	Examiner Van Leeuwen, Erik
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82