A process for making magazines of firearms and a magazine obtained through such a process. The process includes: providing at least one mold having at least one mold cavity defined by a forming surface, corresponding to a shape to be given to at least one portion of a magazine of a firearm; positioning at least one forming material at the mold cavity; pressing the forming material against the forming surface of the mold cavity so as to deform the forming material according to a configuration of the forming surface. The positioning of the forming material includes positioning at least one tube at the mold cavity; and pressing the forming material against the forming surface of the mold cavity is carried out by pressing the tube from inside towards outside, through action of at least one pressurized liquid.
PROCESS FOR MAKING LOADERS OF FIREARMS, IN PARTICULAR GUNS AND THE LIKE, AND A LOADER OBTAINED THROUGH SUCH A PROCESS

[0001] The present invention refers to a process for making magazines of firearms, in particular pistols and/or the like.

[0002] Also a magazine for firearms, in particular pistols and/or the like, obtained through such a process, is object of the present invention.

[0003] The object of the present invention concerns the industrial field of the production of firearms, like for example, pistols, rifles, machine guns and/or similar firearms that require the use of magazines and/or similar stores for ammunition.

[0004] As it is known the manufacture of the magazines for firearms is carried out through the use of one or more machines for the pressing of the plate, of steel hand, as well as the use of moulds, welding machines and tapping machines.

[0005] In practice, the production of the aforementioned magazines requires a predominant use of presses that are suitably equipped with moulds to deform the plate being supplied through the method of deformation through pressing and/or drawing. Once the plates have been deformed it is necessary to take care of joining them so that the stores take shape.

[0006] Although by carrying out the known processes it is possible to make high quality magazines, the Applicant has found that they still have some drawbacks and can be improved under many aspects, mainly related to the quality of the magazine obtained, to the degree of finishing thereof, to the mechanical and structural resistance thereof, to the production time, as well as to the overall production and/or commercialisation costs of the magazines made.

[0007] In particular, the Applicant has found that the pressing of the plates and the subsequent welding thereof greatly limits the quality of the product obtained, which has at least one visible welding area that, if not carried out perfectly, can alter the overall dimensions of the magazines at the joint areas. It should also be considered that the necessary welding of the plates limits the use of some precious alloys or materials which would be damaged from the high temperature reached during the welding operations.

[0008] In addition, the welding operation takes a significant amount of time to carry out since it must be carried out in the best way possible without damaging the structure of the magazine and altering the overall dimensions.

[0009] Therefore, the cost of known processes is negatively affected both by the time in which the welding operations are carried out and by the time required by the finishing operations to be carried out at the welded areas.

[0010] The overall production costs unavoidably affect the overall commercialisation costs of the magazines.

[0011] The main purpose of the present invention is to provide a process for making magazines of firearms, in particular pistols and/or the like, and a magazine obtained through such a process, that is capable of solving the problems found in the prior art.

[0012] A further purpose of the present invention is to obtain a high quality magazine.

[0013] Another purpose of the present invention is to provide a magazine without joints and/or welding.

[0014] A further purpose of the present invention is to obtain a magazine with precious materials.

[0015] Yet another purpose of the present invention is to reduce the production time of the magazines.

[0016] Finally, another purpose of the present invention is to reduce the overall production and/or commercialisation costs of the magazines.

[0017] The purposes specified above, and yet others, are substantially achieved with a process for making magazines of firearms, in particular pistols and/or the like and with a magazine obtained through such a process, as expressed and described in the following claims.

[0018] It will be described, as an example, the description of a preferred, but not exclusive embodiment of a process for making magazines of firearms, in particular pistols and/or the like and by a magazine obtained through such a process, in accordance with the present invention.

[0019] Such a description shall be carried out hereafter with reference to the attached drawings, given purely as an indication and not for limiting purposes, in which:

[0020] FIG. 1 is a perspective view of a magazine for firearms, in particular pistols and/or the like, in accordance with the present invention;

[0021] FIG. 2 is a side view of the magazine according to the previous figure;

[0022] FIG. 3 is a front view of the magazine according to the previous figures;

[0023] FIG. 4 is a schematic sectioned perspective view of a tube of forming material of the magazine according to the previous figures, engaged in a half-mould, in an important step of the process for making the magazine;

[0024] FIG. 5 is a longitudinal section view of the tube of forming material according to the previous figure, represented during a positioning step thereof between two half-moulds;

[0025] FIG. 6 is a longitudinal section view of the tube of forming material according to FIGS. 4 and 5, represented during a step of engaging the two half-moulds against the tube of forming material and the partial closure of the mould;

[0026] FIG. 7 is a longitudinal section view of the tube of forming material according to FIGS. 4 to 6, represented during a step of injecting a fluid inside the tube of forming material;

[0027] FIG. 8 is a longitudinal section view of the tube of forming material according to FIGS. 4 to 7, represented during a step of total closure of the mould and of axially locking the tube of forming material;

[0028] FIG. 9 is a longitudinal section view of the tube of forming material according to FIGS. 4 to 8, represented during a deformation step obtained through the increase in pressure of the fluid present inside the tube of forming material;

[0029] FIG. 10 is a schematic perspective representation in section of the tube of forming material according to FIGS. 4 to 9, engaged in a half-mould and deformed by the pressurised fluid;

[0030] FIG. 11 is a longitudinal section of the tube of deformed forming material according to the previous figure, represented during a step of separation of the half-moulds and removal of the deformed tube itself;

[0031] FIG. 12 is a perspective view of a tube of forming material suitably deformed.

[0032] With reference to FIGS. 1 to 3, a magazine for firearms, in particular pistols and/or the like, in accordance with the present invention, is wholly indicated with reference numeral 1.
As visible in FIGS. 1 to 3, the magazine 1 comprises a body 2 that is substantially tubular and made from plate, preferably steel, stainless steel, aluminium or Titanium which, on the inside, defines a housing space for one or more bullets to be fed to a respective firearm (not illustrated), in particular a pistol and/or similar firearm.

As represented in figures from 1 to 3, the body 2 is at least open at one end 2a so as to allow the ejection from the housing space 2c of at least one bullet (not represented), in the direction of the barrel (not represented) of the firearm to which the magazine 1 is associated.

With reference to FIGS. 1, 2 and 12, the body 2 has a series of outer surface notches 2b which stiffen the structure and maintain the shot column well guided.

Moreover, the body 2 of the magazine 1 has a plurality of openings 2c, made through removal of material, according to predetermined configurations.

Advantageously, the body 2 of the magazine 1 is made up of a monoblock. In other words, the body 2 of the magazine 1 is without welding or joints and/or similar joining means since its structure consists of a single piece.

The magazine 1 described above is advantageously obtained through the actuation of an innovative manufacturing process which initially comprises the arrangement of a mould 4, provided with at least one mould cavity 5, which is defined by a respective forming surface 6 (figures from 4 to 11).

Advantageously, the forming surface 6 is configured according to a predetermined shape, corresponding to the shape to be given to at least one portion, preferably the entire body 2, of the magazine 1.

In detail, the forming surface 6 has a shape that negatively matches the outer shape of the body 2 of the magazine 1.

In accordance with the present invention, the arrangement of the mould 4 comprises the arrangement of a first and a second half-mould 7, of which at least one has at least one cavity and at least one communication channel 8, in particular two opposite communication channels 8, each extending between the cavity 5 and a side 9 of the half-mould 7.

Subsequently, the arrangement of the mould 4 further comprises the coupling of the aforementioned half-moulds 7 so as to define the mould cavity 5 and the corresponding communication channel 8.

More in detail, the arrangement of the mould 4 comprises arranging a first and a second half-mould 7 each having at least one half-cavity 5a corresponding to the half-cavity 5a of the other half-mould 7 and at least one communication half-channel 8a, in particular two opposite communication half-channels 8a, which each extend between the respective half-cavity 5a and a side 9 of the half-mould 7.

The arrangement step of the mould 4 also comprises the coupling of the half-moulds 7 so as to join the respective half-cavities 5a and the respective communication half-channels 8a and consequently define the mould cavity 5 and the corresponding communication channels 8 which extend between the latter and the respective sides of the mould 4.

As visible in FIGS. 4 and 5, the process of making the magazine 1 further comprises a step of positioning at least one forming material 10 at the mould cavity 5 of the mould 4.

Again with reference to FIG. 5, the positioning of the forming material 10 consists of positioning at least one tube 11 of forming material 10 at the mould cavity 5.

Advantageously, each communication half-channel 8a is counter-shaped to at least one respective portion of the tube 11 of forming material 10, in particular to a half-part of the latter, so as to be able to easily receive it. In such a way, each communication channel 8 defined by the communication half-channels 8a, are, at least partially, counter-shaped to the tube 11 of forming material 10.

Preferably, the positioning of the tube 11 of forming material 10 consists of the interposition of the latter between the half-moulds 7.

In detail, at least one portion, preferably two opposite portions, of the tube 11 of forming material 10, are arranged against the respective communication half-channels 8a of at least one half-mould 7, so that the locking of a half-mould 7 against the other and of both of them against the tube 11 of forming material 10, defines the partial locking of the latter at the mould cavity 5 (FIG. 6).

As represented in the diagram of FIG. 8, once the half-moulds 7 are engaged on the tube 11 of forming material 10, the process provides a step of axially locking the tube 11, which is actuated through the insertion of a closing cap 12, axially perforated, along each communication channel 8, in particular according to a position abutting against the tube 11.

With reference, on the other hand, to FIG. 7, before the step of axially locking the tube 11 of forming material 10, there is a step of injecting a fluid 13, preferably a liquid, even more preferably water, in each communication channel 8 so as to fill the inside of the tube 11.

In particular, the injection of the fluid 13 is carried out through corresponding injecting ducts 14 (figures from 7 to 9) formed through the respective half-moulds 7, crosswise with respect to the communication channels 8.

When the closing caps 12 are inserted along the respective communication channels 8 abutting against the tube 11 of forming material 10, the closing caps obstruct the injecting ducts 14 trapping the fluid 13 inside the tube 11 and the axial holes of the closing caps themselves (FIG. 8).

Subsequently, the process provides the pressing of the forming material 10 against the forming surface 6 of the mould cavity 5 so as to deform the forming material according to the configuration of the forming surface itself.

In detail, the aforementioned pressing of the forming material 10 against the forming surface 6 of the mould cavity 5 is carried out by pressing the tube 11 from the inside towards the outside (FIG. 9), through the action of the aforementioned pressurised fluid 13.

The pressing of the forming material 10 against the forming surface 6 of the mould cavity 5 is advantageously carried out by increasing the pressure of the fluid 13 inside the tube 11.

Advantageously, the increase of the pressure is actuated through the application of respective pressure forces F (FIG. 9) at the holes of the closing caps 12 and directed towards the tube 11 of forming material 10.

The increase in pressure in the fluid 13 determines a deformation of the tube 11 at its weakest structural area, that is to say, the area of the tube 11 arranged at the mould cavity 5 and not abutting against the communication channels 8 of the mould 4. In such a way the fluid 13 is free to deform the tube 11 at the mould cavity 5 pressing the latter against the forming surface 6 of the latter.

In order to obtain a plastic deformation such as to reproduce the shape of the forming surface 6 of the mould cavity and to ensure a thickness of the tube 11 that is substan-
ially constant, it is preferable for the fluid pressure to be between a minimum pressure value of 1.500 bar and a maximum pressure value of 3.000 bar.

[0059] Once the deformation has finished, the fluid is removed, from inside said deformed tube, preferably through suction, through the axial holes of the closing caps. The half-moulds are moved away so as to free the deformed tube that is removed so as to undergo further processes.

[0060] In detail, once the deformed tube has been removed, the latter undergoes a finishing step that is advantageously carried out through one or more laser cutting operations.

[0061] The laser cutting of the deformed tube creates a respective magazine like that illustrated in FIGS. 1 to 3.

[0062] Advantageously, the laser cutting comprises the finishing cutting of the ends of each magazine, as well as making the aforementioned openings and/or holes in accordance with the desired configurations.

[0063] Moreover, in situations of deformation of the tube, such as to create two magazines, joined together, as represented in FIG. 12, the laser cutting makes it possible to separate the latter.

[0064] There is then a step of completing the geometry of some elements of the magazine like for example, lips and/or bottom tabs and/or others. Such a step is advantageously carried out at least one pressing operation of the structure of the magazines. The aforementioned process makes it possible to solve the problems found in the prior art and makes it possible to achieve important advantages.

[0065] First of all, the magazines obtained with the aforementioned process have a high quality.

[0066] In particular, the process ensures the making of monoblock magazines that do not require delicate welding operations of parts to be joined together.

[0067] The elimination of any welding ensures the perfect correspondence between the overall desired dimensions and the overall real dimensions of the magazines obtained.

[0068] In addition, the elimination of welded parts makes it also possible to use alloys and/or precious materials which would become damaged during the welding step. Moreover, the elimination of the welding operations makes it possible to avoid the actuation of further finishing steps, normally carried out at the welding spots and/or seams.

[0069] It should also be considered that making monoblock magazines increases the mechanical and structural resistance thereof with respect to the magazines which have jointed parts.

[0070] In addition, the elimination of the welding operations makes it possible to make the process of making the magazines faster, which translates into a substantial reduction of production costs, as well as of the commercialisation costs of the magazines manufactured. Moreover, the deformation of the tubes of forming material by means of a pressurised fluid makes it possible to protect the conditions of the internal surfaces of the mould, which in the prior art are subject to seizure due to the mechanical action of the punches.

[0071] It should also be added that since there is no tension induced by the deformation of punches a better stability of the piece in the thermal treatment step is obtained.

[0072] It should finally be noted that the yield stress to which the material is subjected greatly increases the mechanical strength and therefore it is possible to avoid the usual thermal treatments.

1-14. (canceled)

15. A process for making magazines of firearms, comprising:

- providing at least one mold including at least one mold cavity defined by a forming surface configured according to a predetermined shape, corresponding to a shape to be given to at least one portion of a magazine of a firearm;
- positioning at least one forming material at the mold cavity;
- pressing the forming material against the forming surface of the mold cavity to deform the forming material according to a configuration of the forming surface;
- wherein:
  - the positioning of the forming material at the mold cavity includes positioning at least one tube of forming material at the mold cavity;
  - wherein the press the forming material against the forming surface of the mold cavity is carried out by pressing the tube from an inside towards an outside, through action of at least one pressurized fluid, or a liquid, or water.

16. A process according to claim 15, wherein the providing the mold comprises:

- providing a first half-mold and a second half-mold, at least one of the half-molds including at least one cavity and at least one communication channel, or two opposite communication channels, extending between the cavity and a side of the half-mold, the communication channel being, at least in part, counter-shaped to the tube of forming material;
- coupling the half-molds to define the mold cavity and the corresponding communication channel.

17. A process according to claim 15, wherein the providing the mold comprises:

- providing a first half-mold and a second half-mold each including at least one cavity corresponding to the half-cavity of an other half-mold and at least one communication half-channel, or two opposite communication half-channels, extending between the respective half-cavity and a side of the half-mold, each communication half-channel being counter-shaped to at least one respective portion of the tube of forming material, or to a half-part of the forming material;
- coupling of the half-molds to join the respective half-cavities and the respective communication half-channels and define the mold cavity and the corresponding communication channel extending between the communication channel and a respective side of the mold.

18. A process according to claim 17, wherein the positioning of the tube of forming material comprises interposition of the forming material between the half-molds, the interposition of the tube of forming material including positioning a portion of the forming material against the communication channel, and locking the half-molds against one another and both against the tube of forming material.

19. A process according to claim 18, further comprising axially locking the tube of forming material, the axial locking being carried out through insertion of a closing cap, axially perforated, along the communication channel, or according to
a position abutting against the tube of forming material interposed between the half-molds.

20. A process according to claim 19, further comprising, before the axially locking the tube of forming material, injecting a fluid in the communication channel to fill the inside of the tube of forming material.

21. A process according to claim 20, wherein a pressure of the forming material against the forming surface of the mold cavity is obtained by increasing pressure of the fluid inside the tube of forming material, the increase in pressure of the fluid deforming the tube of forming material against the forming surface of the mold cavity.

22. A process according to claim 20, wherein after a deformation of the tube of forming material, the process further comprises:
   removing the fluid from inside the deformed tube through a closing cap;
   taking apart the half-molds to free the deformed tube; and
   removing the deformed tube from the half-molds.

23. A process according to claim 22, further comprising finishing the deformed tube, the finishing being carried out through one or more laser cutting operations through which the deformed tube is finished into a magazine for firearms.

24. A process according to claim 23, wherein the laser cutting comprises transversally cutting the deformed tube to make at least two magazines.

25. A process according to claim 23, wherein the laser cutting comprises cutting ends of each magazine.

26. A process according to claim 23, wherein the laser cutting includes making openings and/or windows and/or holes equipped on each magazine being manufactured.

27. A process according to claim 23, further comprising completing a geometry of the magazines through finishing of lips and/or of respective bottom tabs, the completion being carried out through at least one pressing operation.

28. A magazine for firearms, comprising:
   a body made from a plate defining internally a housing space for at least one bullet, the body being open at an end to allow expulsion of the at least one bullet from the housing space,
   wherein a body of the magazine is a monoblock and has no joining welds and/or joining means of plates and the magazine is obtained through a process according to claim 15.