The present invention concerns a process for making magazines of firearms and a magazine obtained through such a process. The process comprises the steps of: providing at least one mould (4) having at least one mould cavity (5) defined by a forming surface (6), corresponding to the shape to be given to at least one portion of a magazine (1) of a firearm; positioning at least one forming material (10) at the mould cavity (5); pressing the forming material (10) against the forming surface (6) of the mould cavity (5) so as to deform the latter according to the configuration of the forming surface (6). The positioning of the forming material (10) consists of positioning at least one tube (11) at the mould cavity (5); and the step of pressing the forming material (10) against the forming surface (11) of the mould cavity (5) is carried out by pressing the tube (11) from the inside towards the outside, through the action of at least one pressurised liquid.
The present invention refers to a process for making magazines of firearms, in particular pistols and/or the like.

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

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.

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 band, as well as the use of moulds, welding machines and taping machines.

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.

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.

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.

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.

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.
The overall production costs unavoidably affect the overall commercialisation costs of the magazines. 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. A further purpose of the present invention is to obtain a high quality magazine. Another purpose of the present invention is to provide a magazine without joints and/or welding. A further purpose of the present invention is to obtain a magazine with precious materials. Yet another purpose of the present invention is to reduce the production time of the magazines. Finally, another purpose of the present invention is to reduce the overall production and/or commercialisation costs of the magazines. 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.

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.

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:

- figure 1 is a perspective view of a magazine for firearms, in particular pistols and/or the like, in accordance with the present invention;

- figure 2 is a side view of the magazine according to the previous figure;

- figure 3 is a front view of the magazine according to the previous figures;

- figure 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;

- figure 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;

- figure 6 is a longitudinal section view of the tube of forming material according to figures 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;

- figure 7 is a longitudinal section view of the tube of forming material according to figures 4 to 6, represented during a step of injecting a fluid inside the tube of forming material;
figure 8 is a longitudinal section view of the tube of forming material according to figures 4 to 7, represented during a step of total closure of the mould and of axially locking the tube of forming material;

figure 9 is a longitudinal section view of the tube of forming material according to figures 4 to 8, represented during a deformation step obtained through the increase in pressure of the fluid present inside the tube of forming material;

figure 10 is a schematic perspective representation in section of the tube of forming material according to figures 4 to 9, engaged in a half-mould and deformed by the pressurised fluid;

figure 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,

figure 12 is a perspective view of a tube of forming material suitably deformed.

With reference to figures 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 figures 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 3 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 3 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 figures 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 one advantageous aspect of 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 5 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
canals 8 which extend between the latter and the
respective sides of the mould 4.
As visible in figures 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 figure 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
defines the partial locking of the latter at the mould cavity 5 (figure 6).

As represented in the diagram of figure 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 figure 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 (figure 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 10 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 (figure 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 (figure 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 substantially 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.

Once the deformation has finished, the fluid 13 is removed, from inside said deformed tube 11, preferably through suction, through the axial holes of the closing caps 12. The half-moulds 7 are moved away so as to free the deformed tube 11 that is removed so as to undergo further processes.

In detail, once the deformed tube 11 has been removed, the latter undergoes a finishing step that is advantageously carried out through one or more laser cutting operations.

The laser cutting of the deformed tube 11 creates a respective magazine 1 like that illustrated in figures 1 to 3. Advantageously, the laser cutting comprises the finishing cutting of the ends of each magazine 1, as well as making the aforementioned openings 2c and/or of windows and/or holes in accordance with the desired configurations.

Moreover, in situations of deformation of the tube 11, such as to create two magazines joined together, as represented in figure 12, the laser cutting makes it possible to separate the latter.

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 through 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. First of all, the magazines obtained with the aforementioned process have a high quality. In particular, the process ensures the making of monoblock magazines that do not require delicate welding operations of parts to be joined together. The elimination of any welding ensures the perfect correspondence between the overall desired dimensions and the overall real dimensions of the magazines obtained.

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.

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. 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.

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.

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.
CLAIMS

1. Process for making magazines of firearms, in particular pistols and/or the like, comprising the steps of:

   providing at least one mould (4) having at least one mould cavity (5) defined by a forming surface (6) configured according to a predetermined shape, corresponding to the shape to be given to at least one portion of a magazine (1) of a firearm, in particular a pistol;

   positioning at least one forming material (10) at said mould cavity (5);

   pressing said forming material (10) against said forming surface (6) of said mould cavity (5) to deform said forming material (10) according to the configuration of said forming surface (6),

   characterised in that:

   the positioning of said forming material (10) at said mould cavity (5) consists of positioning at least one tube (11) of forming material (10) at such a mould cavity (5); and,

   in that the step of pressing said forming material (10) against said forming surface (11) of said mould cavity (5) is carried out by pressing said tube (11) from the inside towards the outside, through the action of at least one pressurised fluid (13), in particular a liquid, in particular water.

2. Process according to claim 1, wherein the step of
providing said mould (4) comprises:

providing a first and a second half-mould (7), at least one of said half-moulds (7) having at least one cavity (5) and at least one communication channel (8), in particular two opposite communication channels (8), extending between said cavity (5) and a side (9) of said half-mould (7), said communication channel (8) being, at least in part, counter-shaped to said tube (11) of forming material (10);

the coupling of said half-moulds (7) to define said mould cavity (5) and the corresponding communication channel (8).

3. Process according to claim 1 or 2, wherein the step of providing said mould (4) comprises:

providing 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), extending between the respective half-cavity (5a) and a side (9) of said half-mould (7), each communication half-channel (8a) being counter-shaped to at least one respective portion of said tube (11) of forming material (10), in particular to a half-part of the latter;

the coupling of said half-moulds (7) to join the respective half-cavities (5a) and the respective communication half-channels (8a) and define the mould.
cavity (5) and the corresponding communication channel (8) extending between the latter (5) and a respective side (9) of said mould (4).

4. Process according to claim 2 or 3, wherein the step of positioning said tube (11) of forming material (10) comprises the interposition of the latter between said half-moulds (7), the interposition of said tube (11) of forming material (10) consisting of positioning a portion of the latter against said communication channel (8), and locking said half-moulds (7) against one another and both against said tube (11) of forming material (10).

5. Process according to claim 4, also comprising the step of axially locking the tube (11) of forming material (10), the axial locking being carried out through the insertion of a closing cap (12), axially perforated, along the communication channel (8), in particular according to a position abutting against said tube (11) of forming material (10) interposed between said half-moulds (7).

6. Process according to claim 5, wherein before the step of axially locking the tube (11) of forming material (10) there is a step of injecting said fluid (13) in said communication channel (8) to fill the inside of said tube (11) of forming material (10).

7. Process according to claim 6, wherein the pressure of said forming material (10) against said forming surface (6) of said mould cavity (5) is obtained by
increasing the pressure of said fluid (13) inside said tube (11) of forming material (10), the increase in pressure of said fluid (13) deforming said tube (11) of forming material (10) against said forming surface (6) of said mould cavity (5).

8. Process according to claim 7, wherein after the deformation of said tube (11) of forming material (10), the process comprises the following steps:
   - removing said fluid (13) from inside said deformed tube (11) through the closing cap (12);
   - taking apart said half-moulds (7) to free said deformed tube (11);
   - removing said deformed tube (11) from said half-moulds (7).

9. Process according to claim 8, also comprising a step of finishing the deformed tube (11), the finishing step being carried out through one or more laser cutting operations through which said deformed tube (11) is finished into a magazine (1) for firearms.

10. Process according to claim 9, wherein the laser cutting comprises transversally cutting said deformed tube (11) to make at least two magazines (1).

11. Process according to claim 9 or 10, wherein the laser cutting comprises cutting the ends of each magazine (1).

12. Process according to any one of claims 9 to 11, wherein the laser cutting also provides the step of making openings (2c) and/or windows and/or holes.
equipped on each magazine (1) being manufactured.

13. Process according to claim 9 to 12, also comprising a step of completing the geometry of the magazines (1) through the finishing of lips and/or of respective bottom tabs and/or of other similar elements, said completion step being carried out through at least one pressing operation.

14. Magazine (1) for firearms, in particular pistols and/or the like, comprising a body (2) made from plate defining internally a housing space (3) for at least one bullet, said body (2) being open at an end (2a) to allow the expulsion of at least one bullet from said housing space (3),

characterised in that said body (2) of said magazine (1) is a monoblock and has no joining welds and/or similar joining means of plates and in that said magazine (1) is obtained through a process according to any one of the previous claims.
A. CLASSIFICATION OF SUBJECT MATTER

According to International Patent Classification (IPC) or to both national classification and IPC:

INV. B21D26/033 F41A9/61

ADD.

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols):

B21D F41A

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched:

Electronic data base consulted during the international search (name of data base and, where practical, search terms used):

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Further documents are listed in the continuation of Box C. See patent family annex.

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Date of the actual completion of the international search: 9 January 2012

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Fax: (+31-70) 340-3016

Authorized officer:

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