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(54) A CARTRIDGE CLIP AND A MACHINE FOR FILLING THE CLIP WITH CARTRIDGES

(71) We, ETAT FRANCAIS, represented by le DELEGUE MINISTERIEL POUR L'ARMEMENT, of 4, Avenue de la Porte d'Issy, 75 — Paris (15eme), France, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a cartridge clip and to a machine for filling the clip with cartridges.

Cartridge clips are used for holding in a common plane a group of individual cartridges to be subsequently introduced into the magazine of an automatic or semi-automatic weapon. Such clips comprise a channel-shaped body for receiving a rim end of a cartridge and having longitudinal side walls provided along their free edges with respective flanges which extend towards one another.

A group of cartridges (for instance 3, 5 or 10 cartridges) are retained in the clip by the engagement of the flanges in a groove formed at the rim end of each cartridge. The cartridges in the clip are introduced into the magazine of the weapon by exerting a thrust on one end of the group of cartridges in the longitudinal direction of the clip to slide the cartridges from the clip into the magazine. This introduction is usually performed using a guide one end of which fits on the magazine and into the other end of which the clip is inserted.

Cartridge clips enable identical groups of cartridges to be made up for easy storage and handling preceding firing and further enable a quicker filling of a magazine by a simple action amounting merely to a thrust exerted on the cartridges in the longitudinal direction of the clip. The clip is never introduced into the magazine and thus merely forms a temporary sliding support to be thrown away once it has been emptied of its cartridges.

A known cartridge clip of this kind is constructed in two parts and comprises a rigid metal channel-shaped body and a backing spring in the form of a resilient strip arranged on the base of the body to exert a pressure on the rim ends of the cartridges so that the cartridges are gripped at their rim ends between the backing spring and the flanges of the body.

Such a known cartridge clip is filled by introducing the cartridges one after another at one end of the clip and sliding the cartridges along the clip in a movement similar to that imparted to the cartridges during their transfer from the clip to the magazine.

The known cartridge clip described above has, inter alia, the disadvantage that it is made of two separate metal members, the channel-shaped body and the backing spring, which must be assembled. A construction of this kind has relatively high cost price, and moreover the cartridge clip has to be filled from one or other of its ends.

It is an object of the invention to provide a cheaper and improved cartridge clip which is better adapted for automatic filling using a machine adapted to introduce into the clip simultaneously all the cartridges which the clip is to contain.

The invention also aims to provide a filling machine which enables all the cartridges which a cartridge clip is to contain to introduce into the clip simultaneously.

Accordingly, in a first aspect, the present invention provides a cartridge clip comprising an elongated channel-shaped body for receving rim ends of cartridges to be held in the clip, such body being made of a single piece of resilient plastics material and having longitudinal side walls extending from a base of the body and provided along their free edges with respective flanges which extend towards one another for engaging in a groove provided at the rim end of each cartridge, in which clip the longitudinal side walls of the body have a considerable resilience so that they are resiliently separable to enable the rim ends of the cartridges to

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be introduced into the clip transversely of the body by a snap action, and means are provided to rigidify the base of the body in the longitudinal direction.

In a preferred embodiment of the invention, the side walls of the body of the clip are made of a material which is resilient enough, having regard to the thickness of such walls, to allow the transverse introduction of each cartridge into the clip by first presenting the cartridge to the clip in an inclined position to enable a portion of the rim end to be engaged beneath one of the flanges and by then forcibly tilting the cartridge towards a position at right angles to the base of the clip body, such tilting forcing the other flange to be resiliently displaced away from the one flange to allow the rim end of the cartridge to snap into position in the clip with the two flanges engaged with the groove at the rim end of the cartridge.

Preferably, the means for rigidifying the base of the body comprises a longitudinal rib extending over the whole length of an outer surface of the base.

Advantageously, the flanges provided on the side walls of the clip body have free edges which are chamfered inwardly of the body and towards the base of the body to facilitate the introduction of a cartridge into the clip.

Advantageously, the clip is made from a plastics material of the poly-carbonate or polyamide kind, for instance, of polyamide 11 such as the commercially available "Rilsan".

To reduce the frictional forces acting on the rim ends of the cartridges when they are slid from the clip, an inner surface of the base of the clip body may have a central longitudinal depression, so that the rim end of each cartridge engages the base only over two limited zones disposed symmetrically one on each side of the depression.

At each end of the clip body there may be provided a pair of lateral stops attached to the side walls, such lateral stops acting to prevent accidental escape of the cartridges during handling preceding filling of the magazine of a weapon whilst permitting discharge of the cartridges from the clip into the magazine by a longitudinal thrust exerted on the cartridges and causing resilient separation of the stops.

According to another preferred feature of the invention, a pair of longitudinally spaced abutments are provided on an outer surface of each of the side walls of the body, such abutments serving to limit the insertion of the body into a magazine or magazine guide of a weapon whichever end is inserted therein.

Having regard to the foregoing, the cartridge clip may advantageously be made in a single moulding operation if the clip, as already indicated, is made of a plastics material such as "Rilsan", which is suitable for moulding under pressure. Clearly, this procedure enables the cost of the cartridge clip to be substantially reduced in comparison with that of conventional clip constructed from a metal body and spring.

In accordance with a second aspect of the present invention, there is provided a machine for filling cartridge clips embodying the invention, such machine comprising an annular drum mounted for intermittent rotation in a predetermined sense about its axis and provided with radial bores each for receiving a cartridge with a nose end and a rim end of the cartridge projecting respectively inside and outside the drum, the bores being arranged in radial rings disposed to define axial sets of bores each for receiving a group of cartridges for filling a cartridge clip; a first dispensing station disposed adjacent to an upper ascending zone of the drum for dispensing a group of cartridges in respective bores of each axial set when the set reaches the first dispensing station; a second dispensing station disposed adjacent to the upper ascending zone of the drum and downstream of the first dispensing station for depositing a cartridge clip on the rim ends of the group of cartridges in each axial set of bores when the set reaches the second dispensing station; a pressure station disposed adjacent to an upper descending zone of the drum and operative to press a cartridge clip onto the rim ends of the group of cartridges in each axial set of bores as the set reaches the pressure station to introduce the rim ends of the cartridges into the clip by a snap action; and a discharge station disposed adjacent to a lower descending zone of the drum for discharging filled cartridge clips outwardly from the drum.

Clearly, cartridge clips can be much more quickly filled by an automatic machine in this way and also more cheaply, even despite the cost of the machine, than was the case with the previous method of filling known cartridge clips from one end. The increased speed of filling is mainly due to the fact that the cartridges are introduced transversely into the clip, thus enabling all the cartridges of one group, or even several groups, to be introduced simultaneously.

In order that the invention may be readily understood, embodiments thereof will now be described in more detail, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of a cartridge clip embodying the invention, with one end cartridge in place and the other cartridges indicated diagrammatically by their tips;

Figure 2 is a fragmentary plan view, on an enlarged scale, of the cartridge clip illustrated in Figure 1, with a portion of the clip sectioned;

Figure 3 is a cross section, taken along the line III—III of Figure 2, through the base of the cartridge clip showing in chain-dot lines the inclined position occupied by a cartridge during an initial phase of its introduction into the cartridge clip;

Figure 4 is a cross section, similar to Figure 3, showing the base of the cartridge fully engaged in the cartridge clip; and

Figures 5 and 6 illustrate diagrammatically, in cross section and plan respectively, a machine for filling cartridge clips embodying the invention with cartridges.

The cartridge clip 1 illustrated in Figures 1 to 4 is adapted to receive a group of 10 cartridges 2, and comprises a channel-shaped body having longitudinal side walls 1*a* extending upwardly from a base 1*b*. Inwardly directed flanges 1*c* are formed at the top of the side walls 1*a* and are adapted to engage in a groove 2*a* provided at the rim end of a case 2*b* of each cartridge 2. The clip 1 is made of polycarbonate or polyamide and its side walls 1*a* have transverse resilience, so that the channel of the clip can be opened to some extent by transverse forces tending to separate the side walls.

Each flange 1*c* is bevelled at C inwardly and towards the base 1*b* to facilitate the introduction of the cartridges into the clip as will be described hereinafter. The base 1*b* of the clip 1 is rigidified in the longitudinal direction by an axial rib 1*d* extending over the whole length of the external surface of the base 1*b*. Also to help the cartridges slide in the clip, the base 1*b* is formed with a central longitudinal depression D. Immediately above this depression the rim ends of the cartridges 2 do not contact the base of the cartridge clip, so that such rim ends only contact the base 1*b* over two limited longitudinal zones disposed on respective sides of the depression.

To prevent the cartridges 2 accidentally escaping from the clip, each end of the base 1*b* of the clip has a pair of lateral stops 1*e* projecting from the resilient side walls 1*a*, such stops being disposed at the ends of lateral slideways formed in the clip by the facing surfaces of the base 1*b* and the longitudinal lugs 1*c*. Externally, each side wall 1*a*, the clip 1 presents a pair of abutments 1*f* which serve to limit the insertion of the cartridge clip into the magazine or magazine guide, whichever end thereof is presented for introduction into the magazine or guide.

The cartridge clip 1 is made by moulding under pressure in a mould so shaped as to obtain in a single operation a one-piece cartridge clip comprising all the elements 1*a* to 1*f* described above.

Figures 3 and 4 illustrate the insertion of cartridges 2 into a cartridge clip 1. Each cartridge 2 is initially presented to the clip 1 in an inclined position, so that a portion of its rim end engages under one of the flanges 1*c*, and the other part of the rim end bears against the bevel C of the other flange (this initial position being shown in Figure 3). The cartridge is then righted by a transverse tilting which causes the flanges 1*c* to move apart, as a result of the transverse force applied to the bevel C, to allow the rim end of the cartridge to enter the channel of the clip where it is held in position by the resilient engagement of the lugs 1*c* in the groove 2*a* of the cartridge (the position illustrated in Figure 4).

Although the cartridges may be inserted one after another in the cartridge clip 1, it is preferable to take advantage of the way in which the cartridges are inserted in the clip 1 by filling the clip using a machine which presents to the clip simultaneously all the cartridges making up the group (10 cartridges for the clip in the drawings).

A suitable filling machine is illustrated in Figures 5 and 6 and includes an annular drum 3 which rotates intermittently in the sense indicated by the arrow and has rings of radial bores 4 forming axial sets of bores each adapted to receive a group of cartridges (ten cartridges per group as shown in the drawings). When received in a bore 4, a cartridge has its nose and rim ends projecting respectively outside and inside the drum 3. A first dispensing station 5 for distributing groups of cartridges 2 to the sets of bores is disposed adjacent an upper ascending region of the drum 3 and comprises an inclined plate 6 to which groups of cartridges are supplied by a conveyor (not shown), the plate 6 being surmounted by a pivotable rack 7 which is urged by a spring 8 into an operative position (shown in chain-dot lines in Figure 5) in which it retains a group of cartridges on the plate 6: A peripheral abutment 9 borne by the drum 3 in advance of each set of recesses 4 causes, when it arrives at the level of the dispensing station 5, the withdrawal of the rack 7 to the position shown in solid lines in Figure 5 so that, the drum having stopped at that moment, a group of cartridges is allowed to slide by gravity from the plate 6 into the radial recesses 4 disposed opposite the plate 6 at that moment. A second distributing station 10 for depositing cartridge clips 1 on the drum is disposed upstream of the station 5 in the same ascending upper zone of the drum. The station 10 comprises a supply chute 11 housing a stack of cartridge clips and depositing an individual cartridge clip onto each group

of cartridges 2 as the group reaches the station 10. A retaining rocking bar 12 disposed at the bottom of chute 11 and articulated on a pivot 13 is controlled by a sensing roller 14 which, when raised by the projecting rim end of a cartridge, tilts the rocking lever 12 so that, after the release of the lowermost cartridge clip in the stack, the upper arm of lever 12 forms a retaining stop for the stack of remaining cartridge clips, as illustrated in Figure 5. A pressing station 15 is disposed opposite a descending upper region of the drum 3 and comprises a pressure roller 16 formed with notches 16*a* to force a cartridge clip 1 previously deposited on a group of cartridges 3 at the station 10 to tilt transversely (by the action of the notches 16*a*) so as to be partially engaged in the grooves 2*a* of the cartridges of the group, then to right itself (by the action of the camming surfaces 16*b* connecting the notches 16*a*) and be completely engaged by the resilient deformation of the flanges 1*a* in such grooves, by a transverse tilting movement ensuring a relatively correct final positioning of the group of cartridges and its cartridge clip. A guard deflector 17 extends from the end of the descending upper region and the start of the descending lower zone of the drum 3, the deflectors 17 being adapted to prevent any accidental discharge of the filled cartridge clips from the drum by centrifugal effects. A discharge station 18 is disposed immediately beyond the deflector 17 adjacent the descending lower region of the drum 3, the station 18 comprising a fixed cam 19 inside the drum which co-operates with the front ends of the cartridges in the same group to urge the filled cartridge clip into an outlet chute 20 from which the filled cartridge clips are sent for packing, for instance, in the form of a string of cartridge clips enclosed in transparent packing, so that the user can release the clips individually as he needs them.

WHAT WE CLAIM IS:—

1. A cartridge clip comprising an elongated channel-shaped body for receiving rim ends of cartridges to be held in the clip, such body being made of a single piece of resilient plastics material and having longitudinal side walls extending from a base of the body and provided along their free edges with respective flanges which extend towards one another for engaging in a groove provided at the rim end of each cartridge, in which clip the longitudinal side walls of the body have a considerable resilience so that they are resiliently separable to enable the rim ends of the cartridges to be introduced into the clip transversely of the body by a snap action, and means are provided to rigidify the base of the body in the longitudinal direction.

2. A cartridge clip according to claim 1, wherein the means for rigidifying the base of the body comprises a longitudinal rib extending over the whole length of an outer surface of the base.

3. A cartridge clip as claimed in claim 1 or 2, wherein the flanges are provided on the side walls of the body have free edges which are chamfered inwardly of the body and towards the base of the body to facilitate the introduction of a cartridge into the clip.

4. A cartridge clip according to any one of the preceding claims, wherein the clip is made of a plastics material of the polycarbonate or polyamide kind, for example, a polyamide 11.

5. A cartridge clip according to any one of the preceding claims, wherein the base of the body has an inner surface formed with a longitudinal central depression, whereby the rim end of each cartridge engages the base of the body only over two limited zones disposed symmetrically one on each side of the depression.

6. A cartridge clip according to any one of the preceding claims, wherein a pair of lateral stops are attached to the side walls at each end of the body, such lateral stops acting to prevent accidental escape of a cartridge from the clip during handling preceding filling of a magazine of a weapon from the clip whilst permitting discharge of the cartridges from the clip into the magazine by a longitudinal thrust exerted on the cartridges and causing resilient separation of the stops.

7. A cartridge clip according to any one of the preceding claims, wherein a pair of longitudinally spaced abutments are provided on an outer surface of each of the side walls of the body, such abutments serving to limit the insertion of the body into a magazine or magazine guide of a weapon whichever end of the clip is inserted therein.

8. A machine for filling with cartridges a cartridge clip according to any one of the preceding claims, which machine comprises: an annular drum mounted for intermittent rotation in a predetermined sense about its axis and provided with radial bores each for receiving a cartridge with a hose end and a rim end of the cartridge projecting respectively inside and outside the drum, the bores being arranged in radial rings disposed to define axial sets of bores each for receiving a group of cartridges for filling a cartridge clip; a first dispensing station disposed adjacent to an upper ascending zone of the drum for dispensing a group of cartridges in respective bores of each axial set when the set reaches the first dispensing station; a second dispensing station disposed

of cartridges 2 as the group reaches the station 10. A retaining rocking bar 12 disposed at the bottom of chute 11 and articulated on a pivot 13 is controlled by a sensing roller 14 which, when raised by the projecting rim end of a cartridge, tilts the rocking lever 12 so that, after the release of the lowermost cartridge clip in the stack, the upper arm of lever 12 forms a retaining stop for the stack of remaining cartridge clips, as illustrated in Figure 5. A pressing station 15 is disposed opposite a descending upper region of the drum 3 and comprises a pressure roller 16 formed with notches 16*a* to force a cartridge clip 1 previously deposited on a group of cartridges 3 at the station 10 to tilt transversely (by the action of the notches 16*a*) so as to be partially engaged in the grooves 2*a* of the cartridges of the group, then to right itself (by the action of the camming surfaces 16*b* connecting the notches 16*a*) and be completely engaged by the resilient deformation of the flanges 1*a* in such grooves, by a transverse tilting movement ensuring a relatively correct final positioning of the group of cartridges and its cartridge clip. A guard deflector 17 extends from the end of the descending upper region and the start of the descending lower zone of the drum 3, the deflectors 17 being adapted to prevent any accidental discharge of the filled cartridge clips from the drum by centrifugal effects. A discharge station 18 is disposed immediately beyond the deflector 17 adjacent the descending lower region of the drum 3, the station 18 comprising a fixed cam 19 inside the drum which co-operates with the front ends of the cartridges in the same group to urge the filled cartridge clip into an outlet chute 20 from which the filled cartridge clips are sent for packing, for instance, in the form of a string of cartridge clips enclosed in transparent packing, so that the user can release the clips individually as he needs them.

WHAT WE CLAIM IS:—

1. A cartridge clip comprising an elongated channel-shaped body for receiving rim ends of cartridges to be held in the clip, such body being made of a single piece of resilient plastics material and having longitudinal side walls extending from a base of the body and provided along their free edges with respective flanges which extend towards one another for engaging in a groove provided at the rim end of each cartridge, in which clip the longitudinal side walls of the body have a considerable resilience so that they are resiliently separable to enable the rim ends of the cartridges to be introduced into the clip transversely of the body by a snap action, and means are provided to rigidify the base of the body in the longitudinal direction.

2. A cartridge clip according to claim 1, wherein the means for rigidifying the base of the body comprises a longitudinal rib extending over the whole length of an outer surface of the base.

3. A cartridge clip as claimed in claim 1 or 2, wherein the flanges are provided on the side walls of the body have free edges which are chamfered inwardly of the body and towards the base of the body to facilitate the introduction of a cartridge into the clip.

4. A cartridge clip according to any one of the preceding claims, wherein the clip is made of a plastics material of the polycarbonate or polyamide kind, for example, a polyamide 11.

5. A cartridge clip according to any one of the preceding claims, wherein the base of the body has an inner surface formed with a longitudinal central depression, whereby the rim end of each cartridge engages the base of the body only over two limited zones disposed symmetrically one on each side of the depression.

6. A cartridge clip according to any one of the preceding claims, wherein a pair of lateral stops are attached to the side walls at each end of the body, such lateral stops acting to prevent accidental escape of a cartridge from the clip during handling preceding filling of a magazine of a weapon from the clip whilst permitting discharge of the cartridges from the clip into the magazine by a longitudinal thrust exerted on the cartridges and causing resilient separation of the stops.

7. A cartridge clip according to any one of the preceding claims, wherein a pair of longitudinally spaced abutments are provided on an outer surface of each of the side walls of the body, such abutments serving to limit the insertion of the body into a magazine or magazine guide of a weapon whichever end of the clip is inserted therein.

8. A machine for filling with cartridges a cartridge clip according to any one of the preceding claims, which machine comprises: an annular drum mounted for intermittent rotation in a predetermined sense about its axis and provided with radial bores each for receiving a cartridge with a hose end and a rim end of the cartridge projecting respectively inside and outside the drum, the bores being arranged in radial rings disposed to define axial sets of bores each for receiving a group of cartridges for filling a cartridge clip; a first dispensing station disposed adjacent to an upper ascending zone of the drum for dispensing a group of cartridges in respective bores of each axial set when the set reaches the first dispensing station; a second dispensing station disposed

adjacent to the upper ascending zone of the drum and downstream of the first dispensing station for depositing a cartridge clip on the rim ends of the group of cartridges in each axial set of bores when the set reaches the second dispensing station; a pressure station disposed adjacent to an upper descending zone of the drum and operative to press a cartridge clip onto the rim ends of the group of cartridges in each axial set of bores as the set reaches the pressure station to introduce the rim ends of the cartridges into the clip by a snap action; and a discharge station disposed adjacent to a lower descending zone of the drum for discharging filled cartridge clips outwardly from the drum.

9. A machine according to claim 8, wherein the first dispensing station comprises an inclined plate for receiving a group of cartridges, a pivotable rack mounted above the inclined plate, and spring means for urging the pivotable rack into an operative position in which the rack retains a group of cartridges on the inclined plate, the drum comprising peripheral stops disposed in advance of each axial set of recesses for moving the pivotal rack to an inoperative position in which the group of cartridges are released to slide by gravity from the inclined plate into the axial set of recesses in the drum.

10. A machine as claimed in claim 8 or 9, wherein the second dispensing station comprises a supply chute for receiving a stack of cartridge clips, a pivotal rocking bar mounted at the bottom of the supply chute and having an inoperative position in which it retains the stack of cartridges in the supply chute, and a sensing roller for sensing the arrival of a group of cartridges at the second dispensing station and thereupon tilting the rocking bar to release the lowermost cartridge clip from the stack onto the rim ends of the group of cartridges.

11. A machine as claimed in claim 8, 9 or 10, wherein the pressure station comprises a pressure roller mounted for rotation about its axis in the opposite sense to the drum, the pressure roller having notches and pressure surfaces interconnecting the notches, the notches of the pressure roller being for receiving a cartridge clip to partially engage the cartridge clip with the rim ends of the respective group of cartridges by tilting the clip about a direction parallel to the axis of the drum, the pressure surfaces of the pressure roller being for applying pressure to the cartridge clip radially of the drum to complete the engagement of the clip with the rim ends of the group of cartridges.

12. A machine as claimed in any one of claims 8 to 11, further including a guard deflector disposed adjacent to the lower descending upper zone of the drum upstream of the discharge station, the deflector being arranged to prevent any accidental centrifugal escape of the full cartridge clips from the drum before the full cartridge clips reach the discharge station.

13. A machine as claimed in any one of claims 8 to 12, wherein the discharge station comprises a fixed cam disposed within the drum and a discharge chute disposed outside the drum, the fixed cam being arranged to engage the nose ends of the cartridges of a full cartridge clip to discharge the clip outwardly from the drum into the discharge chute.

14. A cartridge clip substantially as hereinbefore described with reference to, and as illustrated in, Figures 1 to 4 of the accompanying drawings.

15. A machine for filling cartridge clips substantially as hereinbefore described with reference to, and as illustrated in, Figures 5 and 6 of the accompanying drawings.

FORRESTER, KETLEY & CO.,
Chartered Patent Agents,
Forrester House,
52 Bounds Green Road,
London N11 2EY,
and
Rutland House,
Edmund Street,
Birmingham 3.
Agents for the Applicant.

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