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MULTI-BULLET MACHINE GUN BARREL

Filed April 2, 1951

3 Sheets-Sheet 1

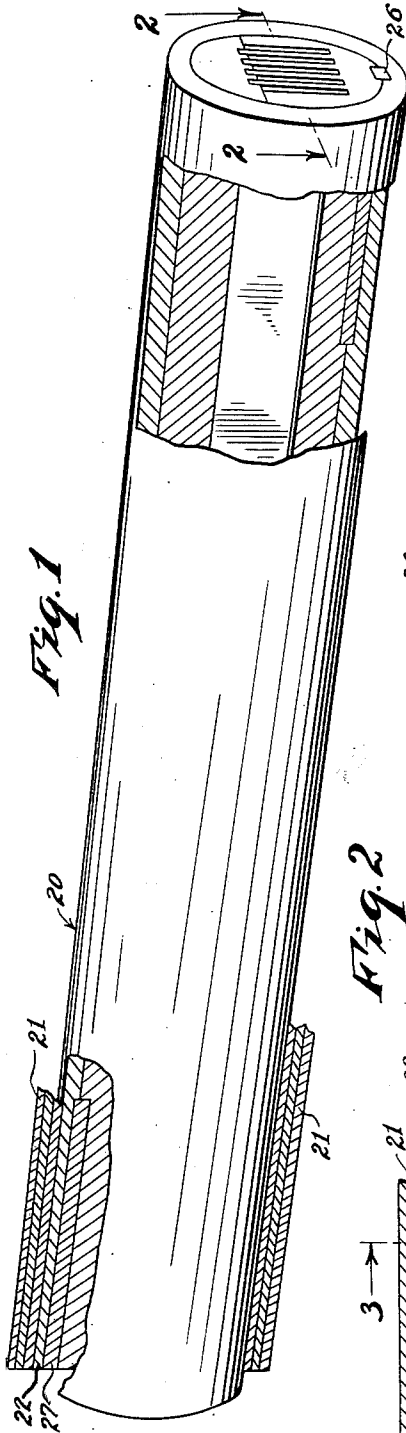


Fig. 1

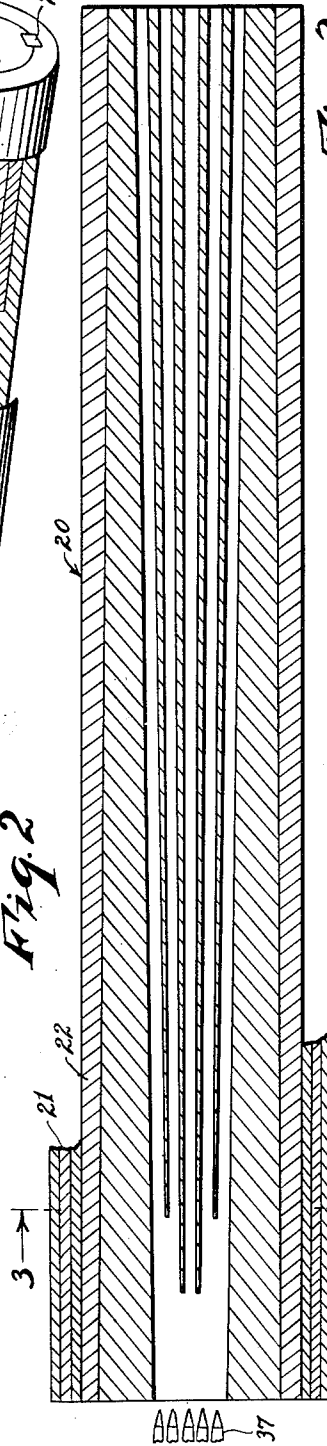


Fig. 2

Fig. 3

Fig. 2a

Fig. 6

Fig. 5

Fig. 4

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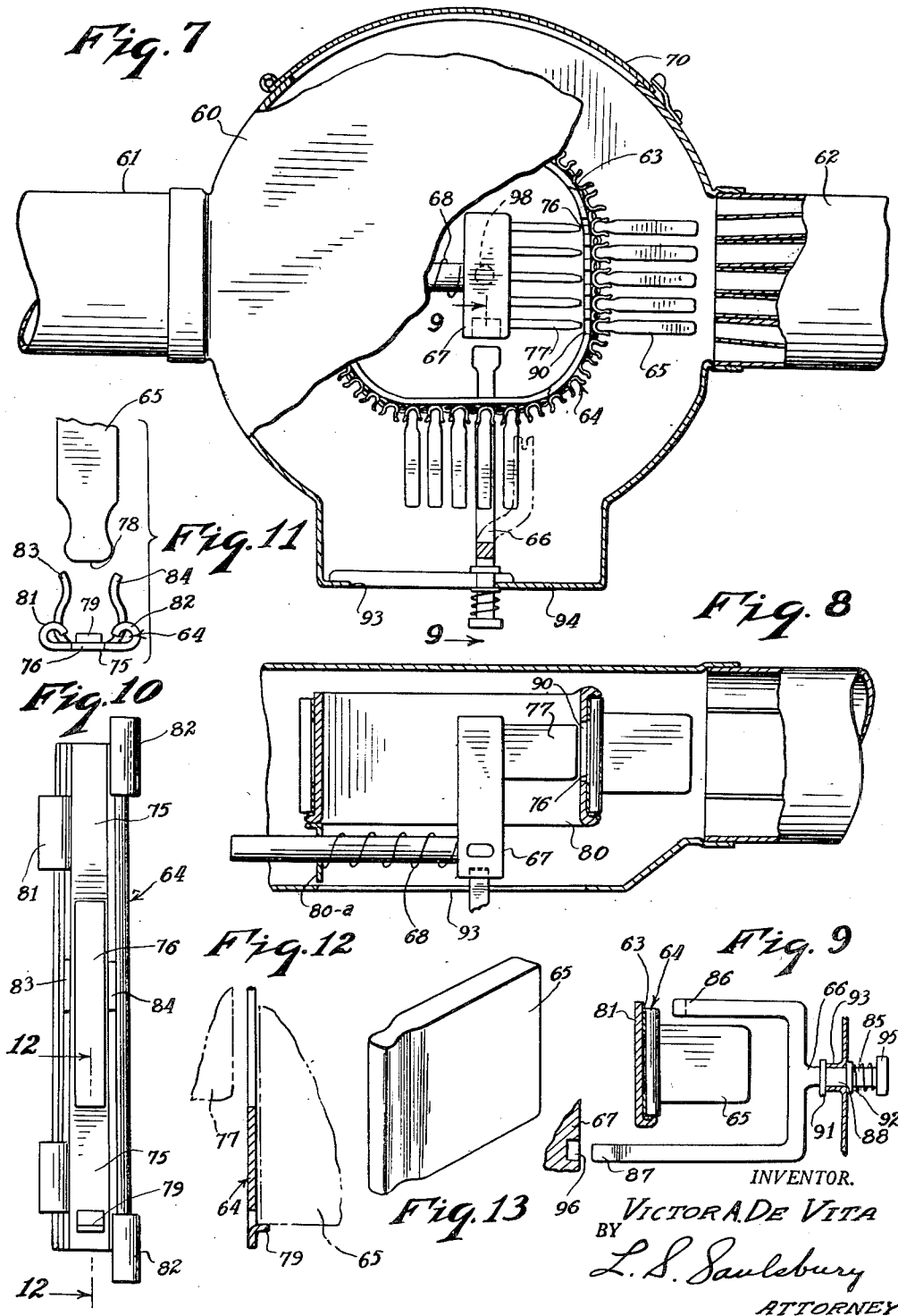
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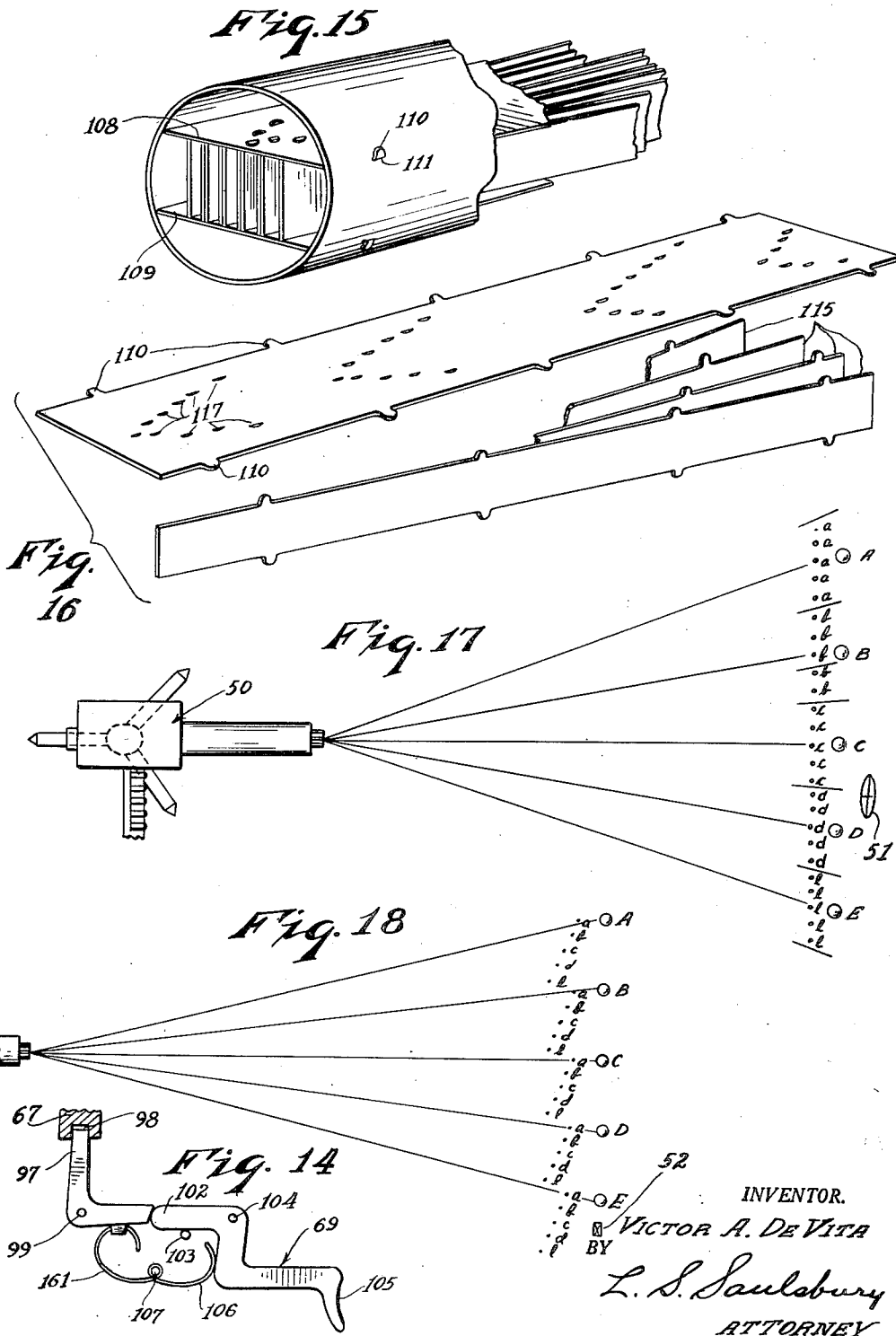
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MULTI-BULLET MACHINE GUN BARREL

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3 Claims. (Cl. 42—76)

This invention relates to machine guns and particularly to a machine gun having a modified barrel construction to permit the use of a multi-section projectile.

One object of the invention is to provide a simple barrel construction which serves to function with a multi-bullet projectile in such manner as to separate the multi-unit projectile into its separate elements, each of which consists of a separate bullet, and then to guide each of the separated bullets in its respective path in order to fan or spray; the individual bullet units of one projectile will subdivide and cover or spread more completely than is done with present types of machine guns that fire individual single bullets.

Another object of this invention is to provide a multi-unit projectile in which several bullet elements are held together as a unit to be impelled by a single powder charge in a single shell, with a construction that holds the bullet units tightly together against any tendency to separate from each other, or to impose a loosening stress on the shell body.

Another object of the invention is to provide a gun barrel of simple construction that will permit easy and ready assembly, with a suitable construction for separating the bullet elements of one projectile, and for then guiding them in slightly deviating paths so they will be spread over a pre-determined angle from the front of the gun barrel.

Another object of the invention is to provide a toy gun utilizing some of the principles of construction of the machine gun barrel, in order to permit the similar firing of several projectile elements as a group.

The construction of the devices embodying the principles of the invention and their manner of operation, are illustrated in the accompanying drawing, in which:

Fig. 1 is a side perspective elevation of the gun barrel, with portions broken away to show the construction and arrangement of the gun barrel assembly;

Fig. 2 is a longitudinal horizontal sectional view of the barrel taken along the line 2—2 in Fig. 1;

Fig. 2a is an enlarged fragmentary view illustrating the partition alignment within the bore entrance;

Fig. 3 is a vertical sectional view taken through the barrel in a plane indicated by the line 3—3 of Fig. 2;

Fig. 4 is a back elevational view of the compound projectile;

Fig. 5 is a side elevational view of the compound projectile;

Fig. 6 is a front elevational view of the projectile of Fig. 5;

Fig. 7 is a plan view with a portion broken away to show the operating mechanism and the barrel construction of the toy gun involving the principle of this invention;

Fig. 8 is a side view, partially in elevation, and with part of the casing broken away to provide an elevational and sectional view of the operating mechanism of the toy gun;

Fig. 9 is a side elevational view with portions in section, of the triggering handle, taken in the direction of the arrows 9—9 in Fig. 8;

Fig. 10 is a front elevational view of an individual projectile support, mounted on a common carrier as shown in Figs. 7 and 8;

Fig. 11 is a schematic planned view showing a portion of a projectile in the projectile holder in separated position;

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Fig. 12 is a side vertical sectional view of a portion of the holder taken along the plane 12—12 in Fig. 10; Fig. 13 is a perspective view of a projectile used in this toy gun;

Fig. 14 is a side elevational view of the trigger for releasing the gun;

Fig. 15 is a side perspective of a portion of the barrel to illustrate the detail disposition of the separating partitions in the barrel;

Fig. 16 is an exploded perspective of the separator partitions of the barrel;

Figs. 17 and 18 are schematic illustrations of the theory of operation of the devices disclosed herein.

As shown in the drawings, a gun barrel 20 is illustrated as consisting of an outer casing 21, an inner casing 22, both of substantially cylindrical form, and with longitudinal passages 23 formed as longitudinal grooves on the outer surface of the inner casing 22 to provide a tortuous passage for a cooling medium, such as air or water, to keep the barrel cool during operation. The inner casing 22 fits snugly and tightly in the outer casing 21 to form a rigid barrel structure, and thereby limits and defines the path for the air or water coolant through the slotted passages 23.

The outer casing is shown as formed of three concentric cylinders superposed in the usual manner by being assembled in heated expanded condition and then being permitted to cool and freeze tightly upon each inner cylinder.

The central bore of the inner casing 22 is provided with a tight cylindrical plug consisting of a longitudinal bottom portion 24 with a cross section of substantially U-shape, and a top or cover portion 25, which fits together with the bottom portion 24 to provide a substantially cylindrical outer contour so the two sections 24 and 25 may be fitted into the central bore of the inner casing 22. The two plug sections 24 and 25 are then locked or keyed into position in the inner casing 22 by two keys 26 and 27.

The lower plug section 24 is shown as embodying four partitions 28 that subdivide the space between the two side walls or side portions into five high narrow passages 29. The partitions 28 may be made integral with the lower plug section 24, or they may be inserted in suitably positioned and formed grooves in the bottom wall of the U-shaped surface 31. For the purpose of this illustration, they are shown as being integral with the lower plug section 24 and as being of sufficient height to rise above the top level surface 32 of the plug section 24. The top edges 33 of those partitions 28 fit into correspondingly shaped and spaced grooves in the under-surface of the top plug section 25, so the partitions will be rigidly supported in desired fixed position in order to maintain the proper spacing between them, to keep the spaces 29 always at proper width.

The partitions 28, as shown somewhat exaggerated in Fig. 2, are sufficiently tapered to cause the respective passages 29 to be slightly angularly displaced from the adjacent passage so the projectiles that are forced through these passages will be guided to move through an angular path or spray. The angular spacing of those passages 29 may be obtained as indicated by the tapering of the partitions, or by the use of uniform partitions merely angularly shifted. In the latter case, the two side walls of the U-shaped bottom section 24 of the inner plug will then be sufficiently inclined to accommodate those angularly displaced passages 29, as also shown in somewhat exaggerated form in Fig. 2.

The projectile to be used with this gun barrel is indicated in Figs. 4, 5, and 6, and is shown as consisting of a shell body 35 with an inside chamber 36 for receiving and holding a charge of explosive powder for projecting a projectile body 37 which consists, in the illustration here shown, of five individual slugs or bullet units 38 which are held together against casual displacement by a holding ring 39 that encircles the slug bodies and holds them against relative movement that would otherwise impose a stress on the shell body 36 and thereby loosen the slug bodies in the shell body 36.

The ring 39 is part of the shell body 36 and is crimped

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to form the two gripping beads 41 and 42 to grip and hold the slug bodies.

When the shell is fired, all five slugs are forced out of the shell and into the back end of the barrel, as shown in Fig. 2, whereupon the individual projectile slugs are separated and then guided down through the respective passages 29 between the partitions 28.

The principle underlying this invention may be appreciated upon referring to Figs. 17 and 18.

As shown in Fig. 17, a machine gun 50 is aiming and shooting at a target 51. The machine gun 50 is firing single cartridge shells. In operating the gun, the machine gunner sweeps the gun through an angle in the hope that one of the bullets in the sweep will strike the target 51. Since he is relying upon the single bullet to hit the target, the gunner swings his gun barrel through an angle, back and forth across the target in the hope of hitting it. During operation, the machine gun is a very unstable thing and it is not quite possible actually to aim it directly at the target. Thus, in the swing of the gun to sweep the target, the successive bullets of a spray might well take the positions shown in Fig. 17 by the bullets A, B, C, D and E. In spite of the sweep of the gun barrel through an angle including the target, the target has been missed. If each of the individual bullets A, B, C, D and E consisted, instead, of a group of slugs properly spaced to be a certain distance apart, for example, 30 inches, at a distance of 100 yards from the gun, the spray could then be made to take the form shown in Fig. 17 with a spacing substantially as indicated in the row of elements identified by the lower case letters a, b, c, d and e. With a gun barrel of the type disclosed herein, the gunner would know that the bullets would form what might be called a "spray within a spray," and that it would not be necessary, therefore, to swing the barrel back and forth through the angle indicated. The barrel could be advanced progressively through the angle with the assurance that a "spray within a spray" would form a progressive row of bullet slugs that would cover the entire zone, as shown, for example, in Fig. 18, and that would assuredly then strike the target 52.

The principle of the gun barrel, as disclosed herein, may be applied to a toy gun, as shown in the drawings. Fig. 7 shows, for example, the main elements of such a toy gun 60, embodying a handle 61, a multi-passage barrel 62, a track 63 for supporting a chain of clips 64 to hold projectiles 65 in proper position behind the barrel 62, and a cocking actuator 66 to advance the chain of clips 64 and cock a hammer or projector 67 with its energy-storing spring 68, and a trigger 69, as shown in Fig. 14, for latching the projector 67 until it is desired to operate the trigger 69 to release the projector 67 and shoot the projectile 65 into and through the barrel 62. A pivoted door 70 at the side of the toy gun 60 provides access to the inside of the central body to permit used projectiles 65 to be reinserted into the chain clips 64.

The clips 64 that support the projectiles are constructed as shown in Fig. 10 and embody a relatively straight back section 75 having an opening 76 in the middle thereof through which hammers bars 77 of the projector 67 may extend to strike the rear edges 78 of the projectiles 65 to drive those projectiles 65 straight out from the supporting clips 64 into the guide passages of the gun barrel 62. Each supporting clip 64 is shown provided with a short horizontal ledge 79 which may be stamped out of the body of the clip. Each clip is provided with hinge portions 81 and 82 at top and bottom, disposed to permit alignment of hinge loops on adjacent clips for receiving hinge pins, so the series of clips will form a continuous chain. Each clip also has two side fingers 83 and 84, disposed as indicated in Figs. 10 and 11, to hold a projectile 65 in appropriate vertical position while it is supported on the ledge 79, so the propelling bars 77 will strike the projectile 65 substantially along the line behind the central portion of the projectile, with a force that will be substantially horizontal through the centroid of the projectile 65, thereby to prevent any skewing or twisting of the projectile as it is forced out of the spring clips into the associated passages in the gun barrel 62.

The manner in which a projectile is supported on the ledge 79 is indicated in Fig. 12 wherein a striker plate 77 is also illustrated behind the slot 76 in the supporting clip 64.

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When the toy gun is loaded, the door 70 is opened, and several of the projectiles 65 are then disposed on their respective clip supports 64 to the extent that they may be reached through the door in its open position. For simplicity, the chain of clips 64 is supported on a substantially hollow shell or track 80 mounted in an appropriate elevated position on a support structure 80a so the chain may be frictionally shifted around the track to advance the newly loaded projectiles 65 to appropriate firing position, as indicated in Fig. 7, directly behind passages in the barrel 62. The track 80 is provided with several parallel slots 90, vertically disposed, directly in front of the striker plates 77 to permit those striker plates 77 to extend through the slots 90 and then through the slot 76 on the clip 64 to strike the rear edges 78 of the projectile 65.

The striker plates 77 are shown supported in parallel relationship on the projector 67 which is adapted to be moved back to a cocked position to store energy in the spring 68. This latter action is effected by the arm 66. As shown in Fig. 9, the shifting bar 66 is normally biased by a spring 85 to a free position out of engagement with the chain, and the clip 64 at the upper arm 86 and also out of engagement with the projector 67 at the lower edge.

The operating arm 66 embodies, in addition to the bottom and top arms 86 and 87, a short extension shaft 88 which extends between two washer elements 91 and 92 and a slot 93 in the side wall 94 of the housing of the toy. An outer button 95 holds the biasing spring 85 in position between the button and the washer 92 to bias the arm 66 outward out of engagement with the projector 67 and the belt with the clips 64.

The upper arm 86 is provided with a narrow slot in its front face which is adapted to engage one of the front edges of the clip to advance the belt. The front end of the lower arm 87 is adapted to fit into a slot 96 near the bottom of the projector 67 for the purpose of moving the projector backward to its energized position.

The resetting arm 66 may be moved freely backward and forward without resetting or advancing the chain, so long as the button 95 is not pressed home. When it is desired to reset the toy gun, the button 95 is pressed inward to make contact between the arms of the resetting arm 66, and the chain 63 with the upper arms 86 and the projector 67 with the lower arm 87, to move the belt clockwise and to move the projector 67 back to energized position.

When the projector is moved back to its energized position, the trigger latch 97, as shown in Fig. 14, is turned counter-clockwise until the bottom opening 98 in the projector 67 moves over the top end of the latch 97 sufficiently to let the top end of the latch move upward into the slot 98. The latch 97 is a bell-crank pivoted on pin 99 and biased by spring 161 in a clockwise direction, which thereby assures that the latch 97 will enter the slot 98 after the projector 67 has been moved back far enough. The latch is prevented from further clockwise rotation, however, by the pivoted trigger 69 which has a bell-crank arm 102 extending over against the forward edge of the spring biased bell-crank arm of the latch 97. The arm 102 of the trigger 69 is prevented from moving downward in response to the force of the spring biased bell-crank arm, by means of a stop pin 103. The trigger itself is pivoted on the pin 104 and is provided with a finger lug 105 for operation of the trigger. Clockwise pressure on the finger lug 105 rotates the trigger about the pivot pin 104 to move the bell crank arm 102 clockwise out of the way of the lower bell crank arm and the latch 97 whereupon the biasing spring 161 moves the latch 97 clockwise at the same time that the energized projection spring 68 permits movement of the projector 67 forward to strike the projectile 65. The latch 97 thereupon moves out of the space 98 at the bottom of the projector 67, whereby permitting the projector to move freely away from the latch 97. The trigger restores itself under the influence of a second loop 106 on the spring which is fixed on a pin 107. If the pivoted arm of the latch 97 should be below the bell crank arm 102 when the trigger is released, the next restoring movement of the projector 67 will strike the latch arm 97 and move it counterclockwise to move the bell crank arm of that latch and the spring 161 upward counterclockwise against the crank arm 102 which will then pivot clockwise sufficiently against spring 106 to permit latch 97 to assume its fur-

thermost clockwise position, until the latch 97 reenters the slot 98, as previously described.

One form of construction of the multi-channel or multi-spaced barrel is shown in Figs. 15 and 16 wherein two top and bottom parallel plates or sheets of relatively thin metal, indicated by numerals 108 and 109 are provided with appropriate lugs 110 to fit into properly spaced slots 111 in the barrel 62 after which the lugs 110 may be clinched to hold the top and bottom plates 108 and 109 in fixed position.

Plates 108 and 109 are previously assembled with the partition strips 115 which are likewise provided with simple lugs along their top and bottom edges to fit into slots 117 in the top and bottom plates 108 and 109 and the lugs are there also clinched to form a rigid assembly.

In the structure of the barrel shown in Figs. 1 and 2, the casings may be formed with a gradual forward taper to reduce the inner diameter dimensions of each external cylinder, with corresponding taper on the outside dimension of each inner cylinder, to prevent the force of the projectiles from moving any of the cylinders forward. Similarly, cylinder 22 of inner casing may be slightly tapered, as shown, to reduce the diameter forwardly. In the same manner, the outer dimensions of the plug cylinder sections 24 and 25 may be tapered to establish a reduced external diameter.

The partitions may be disposed as shown in Fig. 2, with the two middle partitions extending slightly backward toward the bore entry, so the separation of the bullet slugs will be accomplished progressively along the barrel. The leading edges of the partitions are relatively sharp, so a minimum of resistance is offered to the bullet slugs as they are first separated. The forward extending portions of the partitions are relatively narrow, with their side walls substantially parallel, so the two outer pairs of slugs are not diverted too suddenly at the zone of initial separation.

The view in Fig. 2-a is slightly exaggerated to show the tapered relations of the partitions. The two inner partitions 121 and 122 are shown with their extending portions 121-a and 122-a narrow with substantially parallel side walls for a short distance, before the outer wall surfaces diverge. The two outer partitions 123 and 124 start just at the beginning of the divergence, so the bullet slugs are immediately constrained to the paths in which they will be guided through the barrel passages. The passages are of the same width throughout their entire length in the barrel, and the degree of divergence of the bullet slugs is controlled by the widening tapers on each partition toward the front of the barrel.

I claim:

1. A machine gun barrel comprising an outer casing, an inner casing concentrically fitted within the outer casing and having a central longitudinally extending substantially cylindrical bore therethrough, a longitudinally extending bottom segment of substantially U-shaped cross sec-

tional area within said cylindrical bore of the inner casing, a plurality of rigidly supported longitudinally extending substantially parallel laterally spaced partitions disposed within the U-shaped bottom segment to form individual longitudinally extending chambers within the cylindrical bore, a longitudinally extending top segment on said bottom segment having spaced longitudinally extending grooves therein to provide support for the spaced partitions, and locking means insertable between the inner casing and the top and bottom segments, and to maintain the component parts anchored in true alignment within the barrel and to prevent relative angular displacement between the segments and the inner casing.

2. A machine-gun barrel, as in claim 1, in which the partitions in the multi-passage bore are gradually increasingly tapered toward the mouth of the barrel to establish a slight flare in the paths directed by the several passages.

3. A machine-gun barrel comprising an outer casing consisting of a plurality of cylinders progressively concentrically assembled with a tight press fit between successive superposed cylinders and having a slight internal taper to a reduced diameter towards the front of the barrel, an inner casing concentrically disposed within the outer casing and similarly provided with a slight external forward taper to a reduced diameter towards the front of the barrel a longitudinal bottom segment of substantially U-shaped cross sectional area within the inner casing, a plurality of vertically disposed rectangular partition elements rigidly retained in the bottom segment within the U-shaped area to form several rectangular guide paths through the segment, said partition elements tapered at the breech end of said barrel and foreshortened therefrom to avoid bullet impingement with the partitions, and means for keying the bottom segment to the inner casing thereby maintaining alignment of the segment, casing and partitions and preventing relative angular displacement between the segment and inner casing.

References Cited in the file of this patent

UNITED STATES PATENTS

328,713	Petty	Oct. 20, 1885
566,679	Gledhill	Aug. 25, 1896
588,764	Boss	Aug. 24, 1897
634,826	Masini	Oct. 10, 1899
811,379	Clotz	Jan. 30, 1906
1,685,673	Jones	Sept. 25, 1928
1,748,272	Barnes et al.	Feb. 25, 1930
1,770,996	Rabenschlag	July 22, 1930
1,853,830	Peake	Apr. 12, 1932
2,427,374	Walker	Sept. 16, 1947

FOREIGN PATENTS

9,577	Switzerland	Dec. 1, 1894
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