Feb. 25, 1969 W. L. KINCHELOE ET AL 3,429,262

MULTI-PELLET CARTRIDGE

Filed Oct. 24, 1966 Sheet 1 of 3

FIG. 3

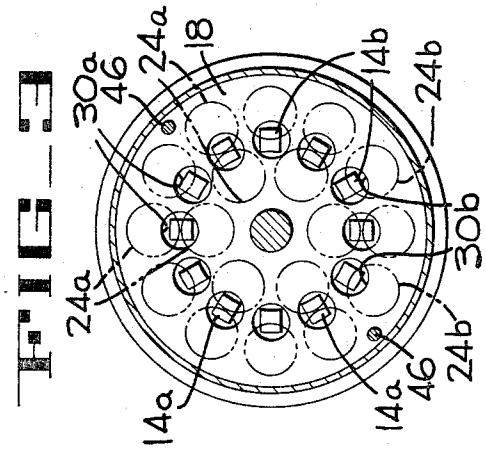


FIG. 2

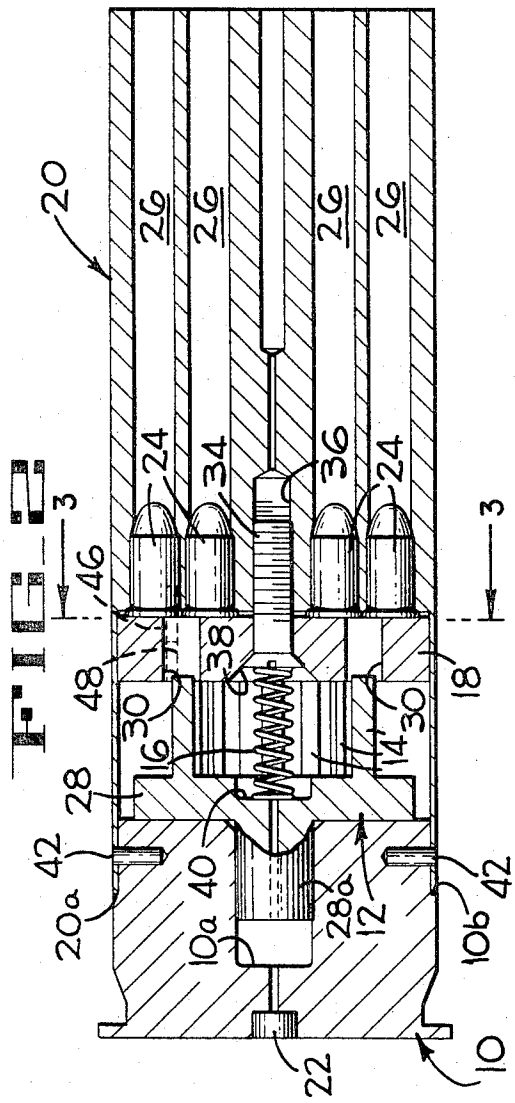
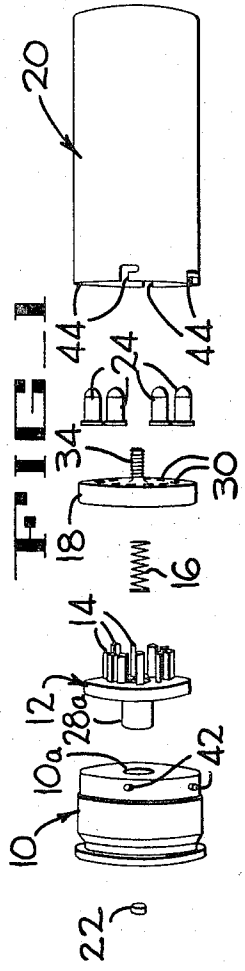


FIG. 1



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MULTI-PELLET CARTRIDGE

Filed Oct. 24, 1966 Sheet 2 of 3

FIG_4

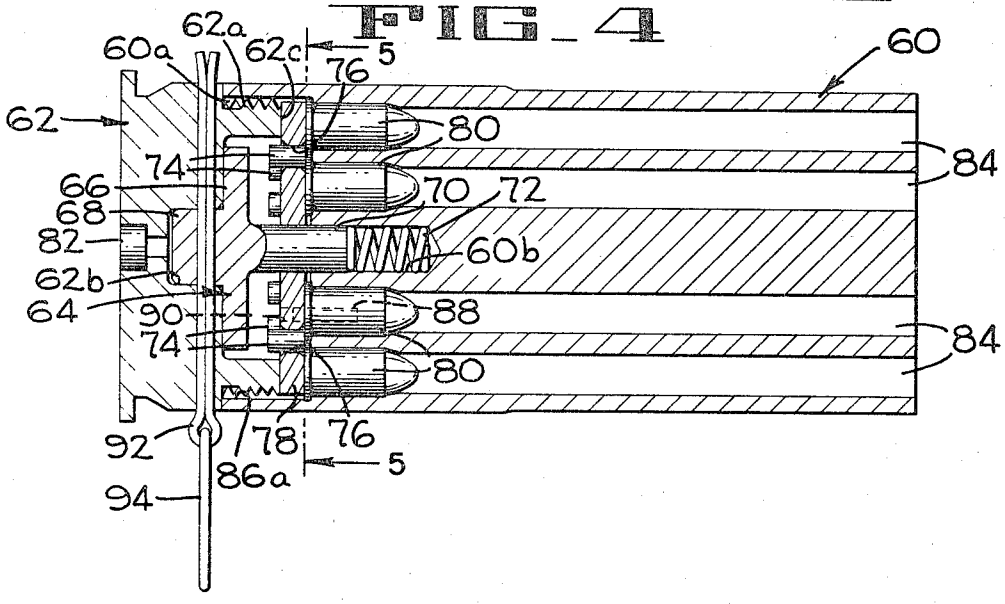
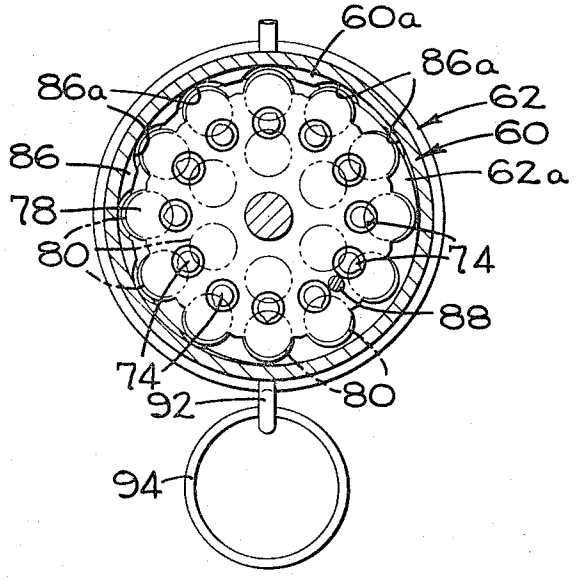


FIG_5



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MULTI-PELLET CARTRIDGE

Filed Oct. 24, 1966 Sheet 3 of 3

FIG_6

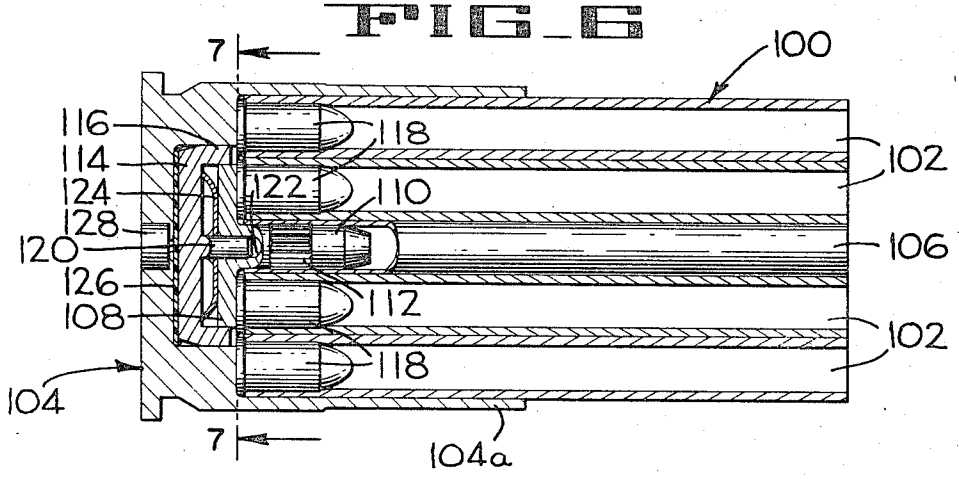


FIG_7

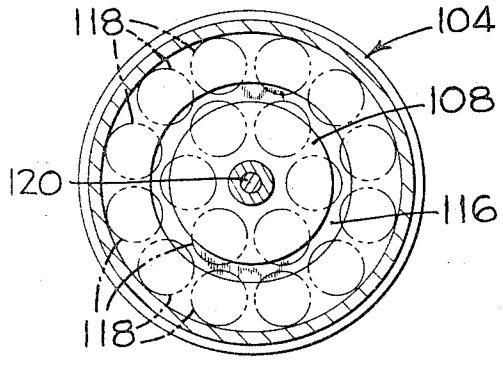
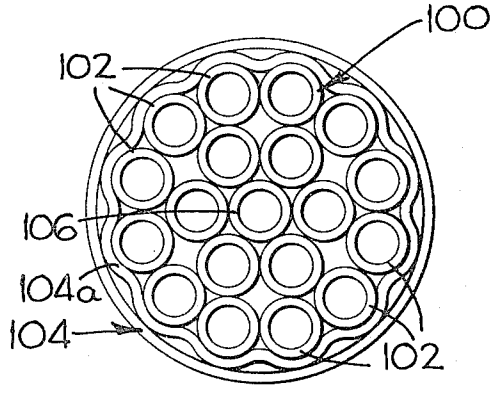


FIG_8



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3,429,262

MULTI-PELLET CARTRIDGE

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U.S. Cl. 102—38 15 Claims
Int. Cl. F42b 5/02, 9/04

ABSTRACT OF THE DISCLOSURE

A multi-pellet cartridge for single-shot and repeating firearms, with a barrel-like body containing a plurality of discrete bores for loading with standard sub-caliber cartridges and a self-contained mechanism for firing all the sub-caliber cartridges simultaneously.

This invention relates to ammunition for firearms, and more particularly to a multi-pellet cartridge that can be substituted for a standard round in a conventional, unmodified, single projectile-type weapon to multiply its lethality at close range.

Providing a weapon adequate for protecting the foot soldier in all of the various combat situations that might be encountered is a task as yet defying solution. One of the devices available for this purpose is the M–79 grenade launcher, a light-weight shoulder-fired 40 mm. weapon that resembles an oversize sawed-off shotgun. In order to protect the grenadier, the grenades contain delay fuses which become armed only after they have traveled at least 35 feet from the launcher. This "dead zone" so reduces the effectiveness of this weapon, especially in jungle combat or an ambush such as is frequently encountered in South Vietnam, that the grenadier must rely on other weapons for his defense. Furthermore, having to contend with this "dead zone" greatly limits the support the grenadier can supply to a close-in assault.

Previous attempts to eliminate these problems have proved unsatisfactory for one reason or another. Providing the grenadier with an additional short-range weapon burdens him with too much to carry and use efficiently, though it is better than requiring him to look to other troops for protection at close range. Replacing the grenades with other ammunition more effective in close combat would do the job nicely, but until the present invention was made no such ammunition had been developed that did not either require undesirable modification of the launcher or involve too much expense to manufacture.

Accordingly, one of the objects of the present invention is to provide ammunition that can be used interchangeably in place of grenades in an unmodified M–79 grenade launcher to give it effective lethality from the muzzle out.

Another object of the present invention is to provide a new close-range cartridge for the M–79 grenade launcher which is sufficiently inexpensive to justify discarding it after a single use.

Another object of the present invention is to provide a new, highly lethal, close-range M–79 grenade launcher cartridge capable of extensive reloading.

Another object of the instant invention is to provide a new form of multi-pellet cartridge for other 40 mm. weapons, including single-fire and automatic types, such as the XM75 and modifications thereof.

Another object of the instant invention is to provide a new type of multi-pellet cartridge for other shoulder or hand-fired weapons of other calibers, that is interchangeable with the weapon's standard cartridge.

Still another object of the instant invention is to provide a multi-pellet cartridge for greatly increasing the close range effectiveness of a relatively long range firearm.

Yet another object of the present invention is to provide a multi-pellet cartridge that is easily and quickly reloadable entirely by hand.

A further object of the present invention is to provide a multi-pellet cartridge for loading with sub-cartridges comprised of standard, smaller-caliber, commercially-available ammunition.

A still further object of the present invention is to provide a firearm cartridge containing a plurality of discrete sub-caliber cartridges arranged such that all of the projectiles can be discharged simultaneously.

Further objects and advantages of the present invention will become apparent from the following description thereof, including the drawings in which:

FIGURE 1 is an exploded view in perspective of a multi-pellet cartridge according to this invention, showing each of the several elements;

FIGURE 2 is a view in section on a longitudinal plane, of the cartridge of FIGURE 1 in its assembled and loaded condition;

FIGURE 3 is a view in transverse section, taken along line 3—3 of FIGURE 2, showing the relationship of the firing pins to the sub-cartridges.

FIGURE 4 is a view in section on a longitudinal plane, of another version of the multi-pellet cartridge of this invention, showing it loaded and all its elements in their assembled position;

FIGURE 5 is a view in transverse section taken along the line 5—5 of FIGURE 4, showing the relative positions of the sub-cartridges and their firing pins;

FIGURE 6 is a view in section on a longitudinal plane, of a throw-away version of the multi-pellet cartridge of this invention;

FIGURE 7 is a view in transverse section taken along the line 7—7 of FIGURE 6, showing the relation of the firing plate to the sub-cartridges, and

FIGURE 8 is a front end view of the cartridge of FIGURES 6 and 7, showing how the cartridge base conforms to the configuration of the barrel assembly.

Broadly considered, and with reference to the version illustrated in FIGURES 1–3, the multi-pellet cartridge of this invention comprises a base **10**, a striker plate **12**, an assembly of firing pins **14**, a striker plate spring **16**, a sub-cartridge retainer plate **18**, and a multi-bore barrel **20**. As shown in FIGURE 2, when this cartridge is assembled and loaded the striker plate **12**, the firing pins **14**, the spring **16**, and the retainer plate **18** are enclosed by the base **10** and the barrel **20** and are so arranged that when the percussion primer **22** is ignited the striker plate **12** and the firing pins **14** are driven forward against the tension of the spring **16** until the pins **14** strike the sub-cartridges **24**, firing them all simultaneously.

The barrel **20** of the multi-pellet cartridge shown in FIGURES 1–3 contains eighteen bores **26**, twelve evenly spaced in an outer circle and six-spaced uniformly in an inner concentric circle. Twelve firing pins **14**, preferably formed as integral extensions of the striker plate base **28**, coincide with an equal number of passages **30** through the retainer plate **18**. In a loaded and assembled cartridge, the striker plate **12** is positioned such that every other passages **30***a* (FIG. 3) partially overlaps a pair of radially spaced sub-cartridges **24***a* (indicated by phantom lines) and alternate passages **30***b* partially overlap the corresponding sub-cartridges **24***b*. Consequently, when the cartridge is fired each of the six pins **14***a* strikes two sub-cartridges **24***a*, and each of the six pins **14***b* strikes a single sub-cartridge **24***b*.

The sub-cartridge retainer plate **18** is held against the sub-cartridges **24** by a screw **34** that is threaded into an

anchor bore **36** in, and coaxial with, the barrel **20**. The screw **34** is countersunk into the retainer plate **18** to provide a recess **38** which coacts with the recess **40** in the striker plate base **28** to hold the striker plate spring **16** between the screw **34** and striker plate **12**. When the cartridge is assembled, the spring **16** is compressed and holds the striker plate base **28** against the cartridge base **10** as shown in FIGURE 2, and the guide portion **28***a* of the base **28** extends into the guide port **10***a* of a base **10**.

A plurality (four are illustrated) of equally spaced pins **42** in the base **10** cooperate with an equal number of generally L-shaped slots **44** in the barrel **20** to provide a secure, yet quickly disengageable, fastening between the base and the barrel. As shown in FIGURE 2, when the barrel **20** and the base **10** are properly assembled, the barrel's rearward portion **20***a* fits snugly around an annular relieved area **10***b* on the outside of the forward end of the base and the pins **42** are flush with the outside surface of the barrel.

Loading and assembling the cartridge of FIGURES 1–3 is a simple procedure that can be carried out by hand very quickly. The sub-cartridges **24** are inserted into the chambers in the barrel bores **26**, the retainer plate **18** is positioned against the sub-cartridges **24** with a guide pin **46** (FIG. 2) projecting into the retainer plate guide port **48**, and the retainer plate screw **34** installed and turned tight. The striker plate **12** and its spring **16** are then positioned with the firing pins **14** aligned with the retainer plate passages **30** and the spring extending between the recesses **38** and **40**. The base **10**, containing a primer **22**, is then inserted into the barrel **20** with the striker plate guide **28***a* fitting into the base guide port **10***a*, and then rotated to lock the pins **42** into their slots **44**. Disassembly is accomplished by just the reverse of this procedure.

Another version of the multi-pellet cartridge of this invention is illustrated in FIGURES 4 and 5. In this version the barrel **60** and the base **62** are threaded at **60***a* and **62***a*, respectively, to form a screw-type joint which also can be easily manipulated by hand. The striker plate **64** has a base **66** with axial extensions forming guides **68** and **70**, the guide **68** projecting into the base guide port **62***b* and the oppositely extending guide **70** disposed in the barrel guide port **60***b* when the cartridge is assembled. A striker plate spring **72** extends between the end of the striker plate guide **70** and the bottom of the port **60***b* to pressure the striker plate base **66** against the cartridge base **62**.

The cartridge of FIGURES 4 and 5, shown bored for eighteen sub-cartridges, contains twelve firing pins **74** slidably held in the sub-cartridge retainer plate **78** and positioned with respect to the sub-cartridges **80** in the same way as are their counterpart pins **14** in the version of FIGURES 1–3. The pins **74** are staked at both ends to prevent them from coming out of the retainer plate passages **76**, and both ends of the passages **76** are chamfered to accommodate this staking so that the retainer plate will fit flush against the sub-cartridges regardless of which side faces them. When the percussion primer **82** is ignited, the striker plate **64** is driven forward and strikes the firing pins **74** which transmit this force to the sub-cartridges **80** to fire them.

In order to insert sub-cartridges in the outer ring of bores **84**, the threads **86** in the barrel **60** are relieved at **86***a*, forming a rosette-shaped pattern as shown in FIGURE 5, and the periphery of the retainer plate **78** is shaped correspondingly to provide a backing to cover substantially all of the heads of the sub-cartridges. This configuration also aids in properly positioning the retainer plate over the sub-cartridges, which positioning is finally assured by the pin **88** in the barrel **60** and its cooperating bore **90** in the plate **78**.

For the purpose of preventing the striker plate **64** from accidentally striking the firing pins **74** as a result of a sudden jolt during handling or shipping, this cartridge is provided with a safety pin **92** that extends through the base **62** and the guide **68** of the plate **64**. This pin also positively identifies the cartridge as different from the standard round, and is easily withdrawn by pulling on the ring **94** when the cartridge is to be used.

In loading and assembling the cartridge illustrated in FIGURES 4 and 5, sub-cartridges **80** are inserted into their chambers in the barrel bores **84**, the spring **72** placed in the bore **60***b*, and the retainer plate **78** positioned against the sub-cartridges. A primer **82** is fitted into the base **62**, the safety pin **92** inserted through the base **62** and the guide **68**, and the base **62** then threaded into the barrel **60** and turned tight. As is evident from FIGURE 4, the forward portion **62***c* of the base **62** bears against the sub-cartridge retainer plate **78** to hold it against the sub-cartridge when the cartridge is fully assembled.

FIGURES 6, 7 and 8 illustrate yet another multi-pellet cartridge according to this invention which, in this case, is designed for discarding after a single use. In this version the barrel **100** comprises a plurality of distinct sub-barrels **102** that extend into the cartridge base **104** and are tightly held by the base skirt **104***a* which has been pressed or otherwise formed around them. As shown best in FIGURE 8, in a cartridge of this type designed for firing eighteen sub-cartridges, the individual sub-barrels **102** will fit snugly together when arranged with twelve in an outer ring and six in an inner ring. A center tube **106**, which can be made from sub-barrel stock, provides a central support for the sub-barrels **102** and a place for anchoring the sub-cartridge retainer plate **108**. The retainer plate's anchor shaft **110** is sized to fit tightly inside the center tube **106**, and preferably splined at **112**.

The striker plate **114** has an annular peripheral flange **116** (FIGS. 6 and 7) that serves as a firing pin for each of the sub-cartridges **118**, and a guide **120** that extends into a guide port **122** in the sub-cartridge retainer plate **108**. A generally star-shaped spring **124** bears against the sub-cartridge retainer plate **108** and holds the strike plate **114** against a seal **126** that prevents power loss from the percussion primer **128**. In a manner analagous to that of the other versions of the cartridge, ignition of the primer **128** drives the striker plate **114** forward, causing the ring-like firing pin **116** to strike the sub-cartridges **118** and fire them simultaneously.

Loading and assembling this disposable-type cartridge is carried out as follows. The sub-barrels **102** and the center tube **106** are grouped together as shown in FIGURE 8, the sub-cartridges **118** inserted in their chambers, and the retainer plate **108**, the spring **124**, and the striker plate **114** installed in that order. The base **104** containing the seal **126** then is placed over these elements to enclose them as shown in FIGURE 6, the base skirt **104***a* deformed around the barrel **100**, and a primer **128** pressed into place in the base **104**.

Although only barrels with smooth bores have been illustrated in the drawings, part or all of the bores can be rifled if desired. Extensive test firing of 40 mm. multi-pellet cartridges, some with all bores rifled and others with both rifled and smooth bores, indicates no significant difference in projectile dispersion pattern on targets at 50 yards.

From a weight viewpoint, the multi-pellet cartridges of this invention compare very favorably with alternative ammunition or weapons which they can supplant. For example, a 40 mm. cartridge of the type shown in FIGURES 4 and 5 weighs but 11 ounces when fully loaded with eighteen .22 short rimfire cartridges and a No. 2½ Remington large pistol primer, with the three-inch barrel and the base fabricated of 7076–T6 aluminum, and the firing pins, striker plate, and sub-cartridge retainer plate fabricated of SAE 1018 steel. A 40 mm. cartridge of the type illustrated in FIGURES 6–8, when constructed of the same material and loaded with the same type cartridges and primer, is even lighter, weighing but 8 ounces.

The recoil from the 40 mm. multi-pellet cartridge, loaded with eighteen .22 short rimfire cartridges, is approximately the same as that from a standard .30 caliber cartridge with a 180-grain bullet fired in an M1 rifle or a standard 7.62 mm. cartridge fired from an M14 rifle. Tests have shown the recoil of the 40 mm. multi-pellet cartridge to only slightly exceed that experienced when firing a standard M406 grenade in the M79 grenade launcher.

Since the length and diameter of the 40 mm. size multi-pellet cartridge preferably are the same as that of conventional rounds for the M–79 grenade launcher, this this cartridge is interchangeable with these rounds. Accordingly, no modification of this or other 40 mm. weapons using similar ammunition, such as the XM75 or developments thereto, is needed in order for them to accept this cartridge.

Although they are especially valuable for swiftly converting a 40 mm. grenade launcher into a close combat weapon, it also should be understood that the multi-pellet cartridges of this invention can be fabricated in sizes both smaller and larger than 40 mm. for use in other weapons, including single-fire, semi-automatic and automatic, and for other purposes than warfare.

Multi-pellet cartridges designed for eighteen sub-cartridges have been illustrated here only for purposes of explanation, and it should be understood that the invention includes similar cartridges designed and adapted for firing more or less than eighteen sub-cartridges. Furthermore, munitions other than .22 short rimfire cartridges can be used as sub-cartridges; for example, .22 longs and .22 long rifles can be interchanged with .22 shorts, and cartridges of smaller and larger calibers, Gyrojets (tradename of M. B. Associates, San Ramon, Calif.), and other types of projectiles that contain their own propellant and that can be fired by a firing pin, all can be used with appropriate modification of the number and size of the cartridge barrel bores and the position of the firing pins.

Though a No. 2½ Remington large pistol primer has been found very satisfactory for 40 mm. size multi-pellet cartridges loaded with eighteen .22 short sub-cartridges, other primers such as a No. 120 large rifle primer also can be used within the scope of this invention.

Although the best mode contemplated for carrying out the present invention has been herein shown and described, it will be apparent that modification and variation may be made without departing from what is regarded to be the subject matter of the invention as set forth in the appended claims.

Having completed a detailed description of the invention so that those skilled in the art could practice the same, we claim:

1. An expendable multi-pellet cartridge suitable for cyclic use in repeating firearms for firing simultaneously a plurality of projectiles through a plurality of bores, comprising:

(1) a cartridge base adapted to receive a percussion primer,

(2) a cartridge barrel secured to said base and having a plurality of bores for holding sub-cartridges and conducting projectiles fired from said sub-cartridges,

(3) sub-cartridge retainer means spaced rearwardly of said sub-cartridges and engageable with portions of the opposed outer ends thereof for holding the same in said bores of said barrel,

(4) sub-cartridge firing means adapted to intercept the plane of said retainer means and directly engage said sub-cartridges for percussion firing the same in said bores of said barrel,

(5) striker means for forcing said sub-cartrigde firing means to strike and fire sub-cartridges, and

(6) flexible means for retaining said sub-cartridge firing means spaced from said cartridge barrel and any sub-cartridges which said barrel may contain,

said cartridge base, cartridge barrel, sub-cartridge retainer means, sub-cartridge firing means, strike means, and flexible means inter-associated so that when said multi-pellet cartridge is loaded with at least one sub-cartridge and a percussion primer, the ignition of said primer causes said striker means to overpower said flexible means and force said sub-cartridge firing means against said sub-cartridge to fire it, said multi-pellet cartridge when assembled having external dimensions commensurate with a standard cartridge for the particular firearm in which it is to be used.

2. The multi-pellet cartridge of claim **1** wherein said cartridge barrel is removably secured to said cartridge base to facilitate reloading of said cartridge.

3. The multi-pellet cartridge of claim **1** wherein said sub-cartridge firing means is integral with said striker means.

4. The multi-pellet cartridge of claim **1** wherein said sub-cartridge retainer means is removably secured to said cartridge barrel by rotatable locking means.

5. The multi-pellet cartridge of claim **1** wherein said cartridge barrel is comprised of a plurality of individual sub-barrels rigidly and non-removably secured to said cartridge base.

6. The multi-pellet cartridge of claim **5** wherein said sub-cartridge firing means is integral with said striker means.

7. The multi-pellet cartridge of claim **1** wherein said cartridge barrel contains bores for firing eighteen sub-cartridges.

8. The multi-pellet cartridge of claim **7** wherein said firing pin system comprises twelve firing pins annularly spaced such that every other pin strikes two sub-cartridges and the remaining pins each strike one sub-cartridge when the said cartridge is fully loaded and fired.

9. The multi-pellet cartridge of claim **8** wherein said cartridge barrel is removably secured to said cartridge base by interlocking slots and pins, said firing pins are integral with said striker plate, and said retainer plate is removably secured to said cartridge barrel.

10. The multi-pellet cartridge of claim **7** wherein said cartridge barrel comprises eighteen substantially tubular sub-barrels rigidly and non-removably enclosed in part by said cartridge base, and said firing pin system comprises an annular flange extending from said striker plate toward said cartridge barrel.

11. An expendable multi-pellet cartridge suitable for cyclic use in repeating firearms for firing simultaneously a plurality of projectiles through a plurality of bores, comprising:

(1) a cartridge base adapted to receive a percussion primer,

(2) a cartridge barrel secured to said base and having a plurality of bores for holding sub-cartridges and conducting projectiles fired from said sub-cartridges,

(3) sub-cartridges retainer means for holding sub-cartridges in said bores of said barrel,

(4) sub-cartridge firing means for percussion firing sub-cartridges in said bores of said barrel, said firing means being carried by said retainer means, and movable therewith,

(5) striker means for forcing said sub-cartridge firing means to strike and fire sub-cartridges, said striker means before ignition of said percussion primer being spaced from said firing means, and

(6) flexible means for retaining said sub-cartridge firing means spaced from said cartridge barrel and any sub-cartridges which said barrel may contain,

said cartridge base, cartridge barrel, sub-cartridge retainer means, sub-cartridge firing means, striker means, and flexible means inter-associated so that when said multi-pellet cartridge is loaded with at least one sub-cartridge and a percussion primer, the ignition of said primer causes said striker means to overpower said flexible means and force said sub-cartridge firing means against said sub-cartridge to fire it, said multi-pellet cartridge

when assembled having external dimensions commensurate with a standard cartridge for the particular firearm in which it is to be used.

12. The multi-pellet cartridge of claim **11** wherein said sub-cartridge firing means is separate from said striker means and held by said sub-cartridge retainer means in movable relationship therewith.

13. The multi-pellet cartridge of claim **11** wherein said sub-cartridge retainer means is removably secured against sub-cartridges by said cartridge base.

14. The multi-pellet cartridge of claim **11** containing removable safety means for holding said striker means to said cartridge base in spaced relation to said sub-cartridge firing means when said striker means is pressured toward said cartridge barrel.

15. The multi-pellet cartridge of claim **11** wherein said cartridge barrel contains bores for firing eighteen sub-cartridges and said firing pin system comprises twelve firing pins annularly spaced such that every other pin strikes two sub-cartridges and the remaining pins each strike one sub-cartridge when said cartridge is fully loaded and fired, said barrel being removably threaded to said cartridge base, and said firing pins being separate from said striker plate and held by said retainer plate in movable relationship therewith.

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ROBERT F. STAHL, *Primary Examiner.*