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J. R. BIRD

3,444,813

CARRIER FOR FIN STABILIZED PROJECTILES

Filed March 16, 1954

Fig. 1.

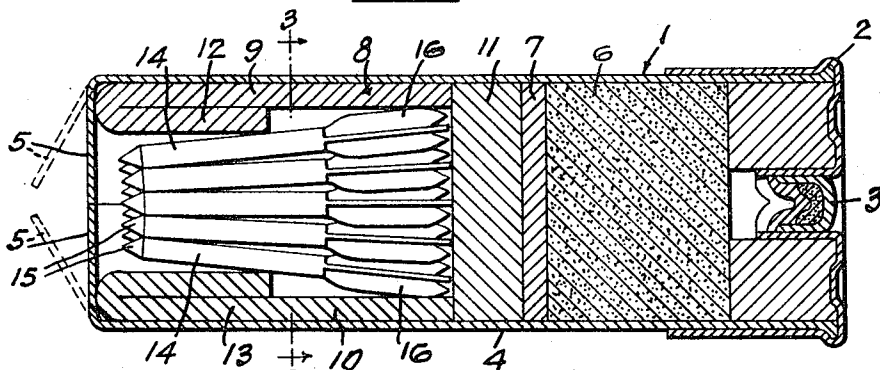


Fig. 2.

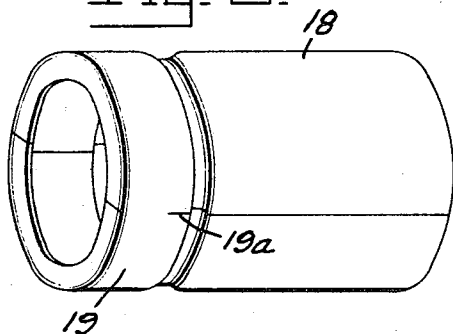


Fig. 3.

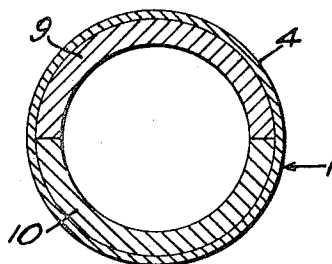


Fig. 4.

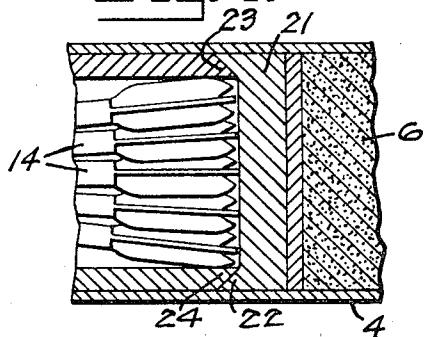


Fig. 5.

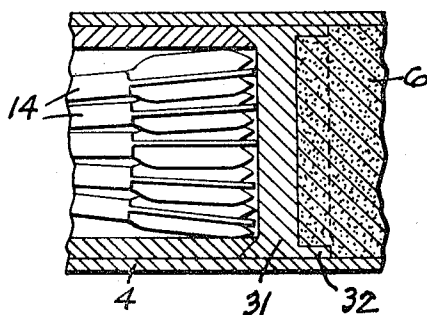
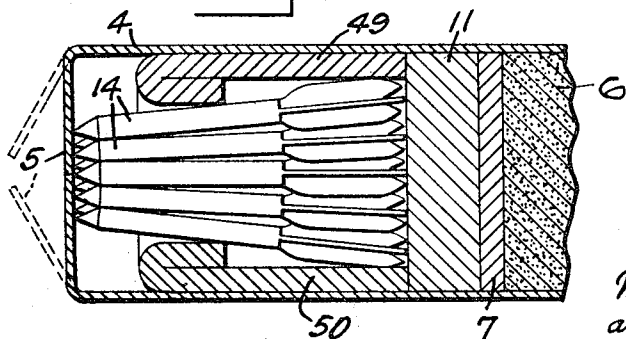


Fig. 6.



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3,444,813

CARRIER FOR FIN STABILIZED PROJECTILES

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U.S. Cl. 102—42

14 Claims

The invention described herein may be manufactured and used by or for the Government for governmental purposes without the payment to me of any royalty thereon.

This invention relates to certain new and useful improvements in a canister cartridge for launching a closely integrated plurality of finned pointed shafts or missiles, the purpose being to provide a cartridge having a great range of penetration for a given amount of propellant and which will concentrate the finned shafts or missiles and prevent them from unduly scattering at maximum ranges.

In the ordinary canister cartridge the projectiles begin to separate almost instantaneously upon emergence from the muzzle of the gun and each projectile is thereafter subject to individual air resistance which retards the range thereof. Moreover, due to the turbulence of muzzle blast together with incomplete stabilization at that time, the projectiles begin to scatter on emergence and as a result the spread at the target may be so great as to result in an insufficient number of the projectiles being effective on the target.

Accordingly, a primary object of the invention is the provision of an anti-personnel canister cartridge provided with a plurality of finned shafts or missiles and carrier means which hold the missiles in a package after emergence from the gun barrel until the relative wind has acquired a steady state and each missile is fully stabilized.

A further object of the invention is the provision of a canister cartridge containing a plurality of finned shafts or missiles which are held together in a group by a carrier which releases the missiles for individual flight after the carrier clears the muzzle blast.

A still further object is to provide a missile of novel construction which permits a closely integrated plurality of such missiles.

Another object is to provide a missile casing with novel means to aid in holding the missile carrier about the grouped missiles during the initial portion of flight until the carrier base drops off.

Additional objects, advantages, and features of the invention reside in the structure, arrangement, and combination of parts as may be understood from the following description and accompanying drawings, wherein:

FIGURE 1 is a longitudinal sectional view through a preferred form of the complete cartridge.

FIGURE 2 is a perspective view of a modified form of the assembled halves of a missile carrier forming a component part of the invention.

FIGURE 3 is a cross sectional view of the cartridge with the missiles removed, and taken along line 3—3 of FIGURE 1.

FIGURES 4, 5 and 6 are fragmentary sectional views of additional or modified forms of the missile carrier.

Referring specifically to details shown in the drawings, there is illustrated in FIGURE 1 a cartridge shell 1, which mainly conforms to structure generally in use, and may embody the heretofore familiar stamped metal head 2 and conventional primer 3. In the head there is fixed a tubular casing or carrier 4 which may be composed of any well known material, such, for instance, as a fibrous composition like pasteboard or papier-maché. The forward end of the cartridge may be closed by any conventional method,

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one of which is to cut in the end sector shaped points 5 adapted to be turned inward to meet and form a flat end wall. A suitable charge of propellant 6 is arranged within the cartridge immediately forward of the primer. A wad 7 separates the explosive from the three piece missile carrier 8.

The missile carrier comprises two mating separate semi-cylindrical sections 9 and 10 and a disc-shaped separable base 11 positioned at the rear end of the sections. The forward ends 12 and 13 of the mating sections are bent or crimped inwardly and rearwardly to extend a sufficient distance substantially as shown, to hold the missiles snugly together in a conical formation in a manner obvious from inspection of FIGURE 1. The cylindrical portion of the carrier is so dimensioned as to be of greater length than the missiles after completion and thus project beyond the end of the missile cluster, whereby the inturned portion is adapted to open the crimp of the casing 1 upon firing of the shell.

Each missile is a one-piece item and consists of a narrow elongated shaft 14, of substantially constant diameter throughout, having a pointed front end 15 and plurality of exterior longitudinally disposed fins 16 formed by stamping or pressing to extend from the rear end at right angles to each other. In the missiles shown there are four equiangularly spaced fins. This particular shape of the missile not only gives it an unusual range and effectiveness, owing to the reduced resistance to its passage through the air and through the body of the target, but it also causes it to assume and maintain an effective head-on position throughout its flight, keeps air resistance at a minimum and increases penetration at any given effective range.

Referring to the modified form of missile carrier shown in FIGURE 2, the forward end of the carrier 18 is provided with a narrow continuous band or adhesive tape 19, this band or tape is partially split in two or more places from its rearward edge forwardly, as indicated at 19a, FIGURE 2. The splits are equi-distantly spaced from each other.

Other modifications of the missile carrier are shown in FIGURES 4 and 5 wherein the carrier base is shown modified. In FIGURE 4 there is disclosed a base 21 having a peripheral rim 22 with an outwardly and forwardly extending taper as indicated at 22. The rear ends 23 and 24 of the missile carrier sections are rearwardly and inwardly tapered to fit within the tapered rim of the base whereby these ends are initially held together. In FIGURE 5 the difference consists in that the periphery of the rear surface of the carrier base 31 is provided with a rearwardly extending rim 32 adapted to be expanded against the gun barrel by gas pressure to obturate against gas leakage. This configuration provides a light base portion with little momentum when fired since separate obturating wads or thick base portions may be eliminated.

Referring to the modification shown in FIGURE 6 the general configuration of the missile carrier is the same as that shown in FIGURE 1 except that the length of the semi-cylindrical sections 49 and 50 is less than that of the missiles resulting in the pointed end of the missiles tearing through the crimp ahead of the forward end of the missile carrier when the cartridge is fired. When a cartridge embodying the invention is fired the carrier containing the finned missiles is projected forcing the sector shaped points of the crimped end of the casing aside as they emerge. The carrier and the missiles travel through the air together during the initial portion of the flight. As the carrier and its package of missiles emerges from the barrel the base 11, 21 or 31 as the case may be, drops off, allowing air to flow through and between the grouped missiles effecting their stabilization. The two semi-cylindrical halves of the carrier are then forced apart after

which each of the missiles proceeds individually along generally parallel trajectories to the target.

With prior art canister cartridges, the missiles emerge substantially individually from the muzzle of the gun. At the instant of emergence, the velocity of the missiles is a maximum. But due to turbulence of the muzzle blast together with the fact that it takes an appreciable time and distance after emergence for the air flow about the missiles to become steady and uniform, the missiles are unduly scattered. As a result the missiles are usually too dispersed at the target range and too few of them are effective upon the target.

With my invention the missiles are retained in a cluster, group or package for an appreciable time after leaving the muzzle and for an appreciable distance therefrom. At this distance, the base of the carrier has dropped off, the air has begun to flow through the carrier halves and over and about the missiles and, in fact, has reached a substantially steady state. The carrier halves then separate and drop away from the cluster. Thereafter each missile proceeds individually along a trajectory generally parallel to the others; and since each has become fully stabilized by the relative wind, dispersion is reduced and a more concentrated pattern of hits on the target is effected.

It is therefore desirable and one of the principal objects of the invention to delay separation of the carrier halves from the grouped missiles until the base or wad has dropped off and thereafter until the air flow over and along the missiles has acquired a steady state. The modifications of FIGURES 2, 4 and 5 present means for delaying the time of opening of the cylindrical portion of the carrier. In order to prevent the front end of the carrier from opening prematurely, a band or tape 19 is provided, as shown in FIGURE 2. It has sufficient strength in tension to withstand internal air pressure until the rear of the sections comprising the carrier are released by and separate from the base 21 or 31. Thereafter the opening of the rear of the carrier causes the band or tape 19 to tear allowing the sections of the cylinder to separate. This action is facilitated by slits 19a. The base shown in FIGURES 4 and 5 is provided with the tapering rim 22 which engages the tapered portions 23 and 24 of the carrier and prevents the rear of the carrier from opening until pressure of the propellant gas on the base has substantially ceased and the base has dropped off. The carrier halves then begin their separation along the rear portion of their contacting edges. Increasing separation from rear to front results in tearing of the band 19 at slits 19a and separation of the carrier from the cluster, in the manner previously explained. In FIGURE 5, the rearward flange 32 on base 31 provides for an increased propellant charge, reduces the mass of the parts which must be accelerated, improves obturation of propellant gases and therefore increases muzzle velocity and affords greater range for the missiles. In all cases the missiles are retained in grouped or packaged relation until each is fully stabilized by the relative wind and as a result, flies a true path without excessive dispersion.

I claim:

1. A canister cartridge comprising a casing having a closed rear end, a base fitting said casing to confine a propellant charge in said rear end, first and second discrete semi-cylindrical sections fitting said casing and abutting said base, a frusto-conical shaped cluster of finned missiles fitting within the chamber jointly formed by said sections, said sections having inwardly thickened portions jointly defining an internal circumferential band encircling and confining said missiles forwardly of the fins thereof to form said frusto-conical cluster.

2. A canister cartridge as defined in claim 1, said casing being closed at the forward end and the front end of said sections extending beyond the forward end of said missiles, whereby said carrier opens the closed front end of said casing ahead of said missiles on firing the cartridge.

3. A canister cartridge as defined in claim 1, wherein the forward ends of said missiles extend beyond the front end of said sections, whereby the forward ends of said missiles pass through the closed end of said casing before said sections.

4. A canister-type cartridge comprising a casing, a circular base fitting within said casing, a pair of semi-cylindrical separable mating sections fitting said casing and conjointly with said base, forming a missile carrier, a plurality of finned missiles forming a generally frusto-conical cluster having its rearward end fitting said carrier and in contact with said base, and peripheral thickened portions fixed with said sections internally thereof and conjointly defining band means encircling and confining said cluster forwardly of the fins thereof.

5. A canister-type cartridge as recited in claim 4, said sections being crimped inwardly and rearwardly to form said thickened portions.

6. A canister-type cartridge as recited in claim 5, the forward ends of said sections lying in a transverse plane forwardly of the forward pointed ends of said missiles, whereby said sections open the crimped forward end of said casing on firing of the cartridge.

7. A canister-type cartridge comprising a casing, a missile carrier fitting within said casing and including a base and two mating semi-cylindrical discrete sections abutting the forward face of said base, said sections being crimped inwardly and rearwardly to define an internally thickened forward end of said sections, and a frusto-conical shaped cluster of finned missiles confined by said thickened end within the chamber conjointly formed by said sections.

8. A canister cartridge comprising a casing containing an explosive therein, a split cylindrical carrier in said casing and separable therefrom, said carrier having a separable base at its rear end and an internally thickened open front end, and a closely integrated plurality of finned shafts having pointed front ends, said shafts being positioned in said carrier with their longitudinal axes inclined inwardly at an angle with respect to the central longitudinal axis of said casing, said internally thickened front end grouping said shafts together at said angle.

9. In a carrier for a canister-type cartridge, a circular base, a pair of semi-cylindrical mating sections resting on said base at their rear ends, a generally frusto-conical cluster of finned missiles fitting within said sections with their finned ends against said base, the forward ends of said sections being internally thickened to contact the periphery of said cluster between the tips and fins thereof to confine said cluster during an initial portion of the trajectory and release said missiles inclined inwardly at an angle to the direction of flight.

10. A carrier as recited in claim 9, said base having a forwardly extending rim internally tapered, said sections having their rearward edges complementarily tapered, to fit within said rim whereby separation of said sections during firing, is retarded.

11. A carrier as recited in claim 10, and a band encircling and confining said sections at the forward ends thereof, said band being partially split from its rear edge forwardly in substantial coincidence with the separable edges of said sections.

12. A carrier for the missiles of a canister-type cartridge comprising, a circular base, first and second semi-cylindrical separable mating sections having their rearward ends contacting said base, a generally frusto-conical cluster of contacting finned missiles confined within the chamber conjointly defined by said sections, said missiles having their forward ends rearwardly of the forward end of said sections, each said section having an inwardly thickened circumferential portion peripherally contacting and confining said cluster between the ends thereof and forwardly of the finned ends thereof.

13. A carrier for the missiles of a canister-type cartridge comprising, a circular base, first and second semi-cylindrical separable mating sections resting on said base,

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a generally frusto-conical cluster of finned projectiles confined by and within said sections with their finned ends contacting said base, said sections being crimped rearwardly and inwardly to define a thickened forward rim portion contacting and confining said cluster between the ends thereof to form said frusto-conical cluster.

14. In a canister cartridge a missile carrier comprising a pair of semi-cylindrical separable mating sections having an open forward end and a separable base closing the rearward end, said open end being circumferentially internally thickened, a plurality of finned missiles contained within said carrier and held with their longitudinal axes inclined inwardly at an angle to the longitudinal axis of said carrier by said thickened end, and having their finned ends resting against said base, a frangible band means secured about said sections to hold the same in

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mated position for a short period after said base separates from said sections when the carrier is in flight, whereby air flows through said carrier over said missiles prior to said sections separating therefrom.

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U.S. Cl. X.R.

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