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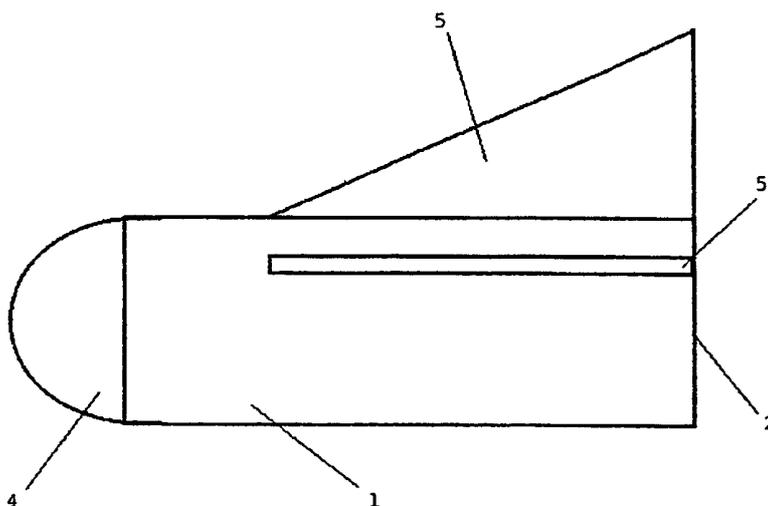
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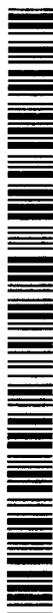
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(54) Title: NONLETHAL PROJECTILE LAUNCHED BY A LETHAL PROJECTILE DISCHARGED FROM A FIREARM



(57) Abstract: A nonlethal projectile is driven to a target by a lethal bullet or shot fired from a conventional firearm. The nonlethal projectile according to the invention includes a hollow cylindrical body which is closed off at one end, and is adapted to be placed over the muzzle of a conventional ballistic weapon, such as a pistol, rifle or shotgun. The cylindrical hollow projectile includes a "bullet trap" which is made of a bullet resistant material, and is disposed across the closed end of the cylindrical hollow body, so that a bullet or shot discharged from the firearm impacts on and is trapped by the bullet trap. The nonlethal projectile in turn is thus propelled forward by the momentum of the lethal projectile. The tip of the nonlethal projectile according to the invention may have a resilient or breakable impact head arranged at the forward exterior area of the cylindrical hollow body, adjacent its closed end.

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NONLETHAL PROJECTILE LAUNCHED BY A LETHAL PROJECTILE  
DISCHARGED FROM A FIREARM**BACKGROUND AND SUMMARY OF THE INVENTION**

5 This application claims priority of co-pending Provisional  
U.S. Patent Application Serial No. 60/148,988, filed August 11,  
1999.

The present invention relates to the field of nonlethal or  
"less than lethal" weapons. And in particular, to a nonlethal  
projectile launched from a conventional firearm.

10 Heretofore, numerous types of nonlethal weapons have been  
known. Such weapons are used, for example for riot control, or  
in other situations in which lethal force is unwarranted. For  
example, nonlethal weapons include so-called "shot-bag shells"  
and rubber, plastic or wooden bullets. These projectiles are  
15 inserted into the chamber of a firearm and are fired in the same  
manner as a lethal bullet or shotgun shell. In addition, other  
types of nonlethal weapons are known, including, for example, so-  
called "stun guns" and electrical devices such as "cattle prods".  
Finally, another type of nonlethal weapon known is the truncheon,  
20 or so-called "night stick" or "billy club", which may be used to  
subdue violent and dangerous subjects when the use of a firearm  
is not indicated or warranted.

Each of the foregoing known nonlethal weapons suffers from  
certain disadvantages. As can be appreciated a substantial  
25 drawback of electrical or chemical incapacitative weapons, or  
night sticks and truncheons, is that their use requires that a  
police officer or military personnel using the weapon must first  
place himself in dangerous proximity to a target individual, who  
may be extremely violent. Also, weapons such as truncheons and  
30 night sticks can themselves produce injuries which, though less  
than fatal, may be quite grievous.

Known less than lethal weapons that work on the ballistic  
principle, such as shot-bag shells and rubber and plastic  
bullets, on the other hand, also suffer from serious  
35 disadvantages. In particular, such weapons can also produce  
grievous, if not deadly, injuries in a target which is only

intended to be incapacitated. In addition, the switch from lethal ammunition to nonlethal ammunition, can also be problematic. That is, because the nonlethal ammunition is chambered in the same manner in which the lethal ammunition is chambered, it is necessary for the user of the weapon to unload one type of ammunition and insert the other, which frequently must be done under highly adverse conditions. Thus, for example, the operator of the weapon may himself be under attack; weather conditions may be adverse, and there may be poor lighting in the area. Finally, since known nonlethal ammunition is chambered and fired in the same manner as lethal ammunition, it is impossible for the operator of the weapon to be absolutely certain which type of ammunition is currently loaded into the weapon without opening the chamber and/or ammunition clip or magazine. The discharge of the weapon with the wrong type of ammunition, of course, is likely to have catastrophic consequences, resulting in the death of the target if lethal ammunition is accidentally fired, and resulting in death or injury to the operator of the weapon if nonlethal ammunition is fired where lethal force is called for. In either case, the result is clearly unacceptable.

One object of the present invention, therefore, is to provide a type of nonlethal weapon which can be quickly and easily activated or removed, without interchanging weapons or ammunition.

Another object of the present invention is to provide a nonlethal projectile that can be placed in an operating position, simply by inserting it over the muzzle of a firearm loaded with conventional lethal ammunition, and can be deactivated by removing it from the muzzle of the firearm.

Still another object of the present invention is to provide a nonlethal projectile which provides the operator of a weapon with the ability to quickly determine whether his weapon will be operated in a lethal or nonlethal mode.

Finally, another object of the invention is to provide a nonlethal projectile which can be launched by means of firing a lethal projectile from a conventional firearm.

5 These and other objects and advantages are achieved by the nonlethal projectile according to the invention, which is driven to its target by the bullet or shot fired by a firearm. The nonlethal projectile according to the invention includes a hollow cylindrical body which is closed off at one end, and is adapted to be placed over the muzzle of a conventional ballistic weapon, such as a pistol, rifle or shotgun. The cylindrical hollow projectile includes a "bullet trap" which is made of a bullet resistant material, and is disposed across the closed end of the cylindrical hollow body, so that a bullet or shot discharged from the firearm impacts on and is trapped by the bullet trap. The nonlethal projectile in turn is thus propelled forward by the momentum of the lethal projectile.

The tip of the nonlethal projectile according to the invention may have a resilient or breakable impact head arranged at the forward exterior area of the cylindrical hollow body, adjacent its closed end. It therefore delivers its kinetic energy onto the target, via the impact head, producing a blunt trauma that is directly proportional to the mass and velocity of the firearm projectile that originates the thrust.

25 In one embodiment of the invention, the impact head comprises a breakable hemisphere which has an enclosed cavity which may be filled with a liquid. At the time of impact, the enclosed cavity will break and release its contents, thus reducing the force of the impact of the device on the target, and limiting the type of injury which is inflicted.

30 According to another embodiment of the invention, the liquid contained in the hollow cavity of the impact head is a marker dye, which may be used to identify an individual who has been impacted by the nonlethal projectile.

35 In still another embodiment of the invention, the liquid contained in the cavity of the impact head may be a caustic

material or irritant, which causes incapacitating discomfort to the target.

Yet another embodiment of the invention further includes a line or string which is wound around, or otherwise attached to the exterior of the cylindrical hollow body, and unwinds during flight.

In still another embodiment of the invention, the cylindrical hollow body has a streamer or ribbon attached to the exterior surface thereof, so that the streamer or ribbon unrolls during flight, providing a marker or visible display.

Finally, the projectile according to the invention can also include an incendiary device, such as a smoke generating material or an explosive charge.

The nonlethal projectile according to the invention has the advantage that law enforcement or military personnel can utilize it in conjunction with the fully functional deadly weapon that they commonly carry with them, loaded with equally deadly ammunition. No blanks, adapters or separate sole-function launchers are required. A law enforcement officer involved in a confrontation that poses a threat, but does not warrant the use of deadly force, can draw his handgun and insert the nonlethal projectile onto its muzzle in one or two seconds, before firing the weapon, activating the nonlethal projectile. Thereafter, he can fire another such nonlethal projectile if the situation calls for it, or he can utilize the firearm immediately as a deadly weapon, should the confrontation escalate to the point where the use of deadly force is necessary.

Another advantage of the nonlethal projectile according to the invention is that there is a continuity in the transition from the less than lethal mode to the lethal mode, and vice versa. Other less than lethal weapon systems do not provide such continuity, in that there is an obviously slow and awkward changeover from the specialty ammunition or other specialty weapon to the holstered handgun.

Another advantage of the present invention is that it can easily and immediately be recognized by an individual against whom it is to be used. That is, a person confronted with a firearm loaded with other types of less than lethal ammunition cannot be aware of the fact that he is threatened only by less than deadly force. Such a person, who believes that his life is in immediate jeopardy may react more violently than a person who perceives that he is being threatened by a nonlethal weapon. Thus, it is important that the nonlethal projectile according to the invention is unmistakably and promptly recognizable.

The invention is also convenient. It may be carried, for example, in a receptacle on a leather belt which is part of a conventional holster for a handgun. When less than lethal force is deemed necessary, the police officer or military personnel may simply draw his handgun and a nonlethal projectile at the same time, insert the latter over the muzzle of the firearm, point it at the target and fire. The nonlethal projectile will incapacitate the subject by kinetic energy transfer, producing a blunt trauma that is relative to the power of the ammunition, the distance, the intermediate light barriers and heavy clothing that the subject may wear.

Other objects, advantages and novel features of the present invention will become apparent from the following detailed description of the invention when considered in conjunction with the accompanying drawings.

#### **BRIEF DESCRIPTION OF THE DRAWINGS**

Figure 1 is a side view of a nonlethal projectile according to the invention;

Figures 2A and 2B are top views of the nonlethal projectile according to the invention;

Figure 3 shows a cross-sectional view taken along the line III-III in Figure 2;

Figure 4a is a perspective view showing the projectile according to the invention immediately after launch from a firearm, and its path to a target;

Figures 4b and 4c are perspective views showing the open end of the cylindrical hollow body, and its relationship to the muzzle of a firearm;

Figure 4d shows a further detail of an insert such as  
5 contained in Figures 4b and 4c;

Figures 5a and 5b show an embodiment of the invention, which includes streamers or ribbons attached to the cylindrical hollow body;

Figure 6 is a cross-sectional view of the cylindrical hollow  
10 body according to the invention, including a string or line wrapped around its exterior; and

Figure 7 is a schematic cross-sectional view of the hollow body according to the invention, including an explosive or percussive charge.

15 **DETAILED DESCRIPTION OF THE DRAWING**

Figures 1 and 2 show a side view and a top view, respectively, of the nonlethal projectile according to the invention, while Figure 3 is a cross-sectional view along line III-III in Figure 2. As can be seen from Figure 3 in particular,  
20 the nonlethal projectile comprises a hollow cylinder 1, which is open on one end 2, and is enclosed at the other end, which includes an impact head 4. The cylindrical hollow body 1, may be made from any of numerous known materials, including, for example, high strength plastic, while the impact head 4 may be  
25 made out of a resilient or breakable material, such as rubber or plastic. As shown in Figure 2B, gas ports 17 are provided on the side of the cylindrical hollow body, to vent gases that propel a projectile fired from a firearm to which the nonlethal projectile is attached. This arrangement avoids a possible  
30 rupture of the cylindrical hollow body and helps therefore to assure a stable flight. It also avoids a deflection of such gases rearward toward a user of the weapon.

A "bullet trap" 3 is arranged at the closed end of the cylindrical hollow body 1, and has a concave opening facing in  
35 the direction of the open end 2 of the cylindrical hollow body.

The bullet trap is made of a bullet resistant material; that is, a material which cannot be penetrated by conventional bullets. It may consist, for example, an aramidic fiber. One such suitable material, for example, is commercially marketed under the trade name Kevlar.

The impact head 4 may be made of a breakable material, which is formed into a generally hemispherical or parabolic shape, and has a closed cavity 6 disposed in its central area. The disclosed cavity may be filled with a liquid.

In use, the nonlethal projectile is placed over the muzzle of a firearm, such as illustrated in Figures 4a, b and c. Upon discharging of the firearm, the bullet or other lethal projectile discharged by the lethal ammunition contained in the firearm exits the muzzle of the firearm and impacts upon the bullet trap 3, which is concave, thus pushing the whole device forward in flight towards the intended target. Stabilizing fins 5 are provided on the exterior surface of the hollow cylinder 1 in order to insure a linear ballistic trajectory. When the device reaches its target, the momentum of the bullet or other lethal projectile fired from the weapon causes the projectile to crash against the bullet trap 3, without penetrating it, and to push against the impact head 4. At this time, the impact head 4 breaks, and releases its contents, thus reducing the force of the impact of the device on the target. In addition, the liquid contained in the cavity 6 may also be a marker dye, useful for identifying individuals who have previously been impacted by a nonlethal projectile according to the invention. Also, the cavity 6 may contain a caustic material or irritant, which incapacitates the target individual.

The result of the ballistic action of the nonlethal projectile according to the invention is the infliction of a nonlethal injury delivered to the living target, resulting in a blunt trauma rather than a penetration wound. The trauma inflicted by the nonlethal projectile is comparable to that

produced by the impact of a bullet against known soft body armor frequently worn by police officers and others.

One advantage of the nonlethal projectile according to the invention is that it is applied to a fully functional deadly  
5 weapon (that is, a firearm), which may returned to its original lethal operating mode after launching the nonlethal projectile, or simply by removing the latter from the muzzle of the firearm. Thus, the nonlethal projectile according to the invention offers the user of the firearm the unique ability to utilize  
10 interchangeably a lethal mode and a less than lethal operating mode of the conventional lethal weapon which he carries along with him.

This embodiment of the nonlethal projectile according to the invention is inert, exploiting the ammunition power that fuels  
15 its flight. Accordingly, the impact of the weapon upon a target individual varies, depending on the type of firearm from which it is launched. That is, the weight and speed of the deadly projectile discharged by the firearm greatly affect the terminal ballistics of the nonlethal projectile according to the  
20 invention. Experiments have shown that relative to the muzzle velocity of the lethal projectile, the nonlethal projectile according to the invention slows by about 10% at a distance of 1.0 meter, and by about 25% at fifteen meters.

The invention will in fact work with weapons which fire both  
25 conventional bullets, as well as shotguns. On the other hand, shotgun ammunition, which carries a greater impact momentum, is better indicated when the subject is covered by heavy clothing.

Different inserts or adapters 7 are provided on the interior of the cylindrical hollow body 1, as can best be seen in Figures  
30 4a, 4b, 4c and 4d. The adapters, which fit snugly inside the cylindrical hollow body, may be made of a hard plastic material, have a shape and size such as to conform and fit to the exterior configuration of the muzzle 8 of a firearm with which the nonlethal projectile is to be used. Thus, different inserts and  
35 adapters can be used, assuring that any service firearm can be

safely utilized in conjunction with the nonlethal projectile according to the invention, and that the muzzle fits tightly and exactly inside the latter in order to gain maximum accuracy. As shown in Figure 4a, the fins 5 on the exterior of the projectile assure a substantially linear trajectory to the target. The insert remains inside the cylindrical hollow body during its flight.

Another embodiment of the invention is illustrated in Figures 5a and 5b. In this embodiment, one end of at least one ribbon or streamer is attached to the exterior of the cylindrical hollow body, with the remainder being wound on a spool or otherwise affixed on the outside of the hollow body, as shown in Figure 5a. After the projectile is launched by discharging the firearm to which it has been attached, the ribbon unwinds as shown in Figure 5b, providing a good daytime signal or marker.

In another embodiment of the invention, shown in Figure 6, the cylindrical hollow body has a spool of line 10 wound thereon. One end of the line is attached to the hollow body, while the other end is loose and can be unwound from the spool. A weighting material, such as a lead covering 11, may be applied to the loose end of the line 10. When the firearm is discharged, and the nonlethal projectile is launched, the bullet pushes forward, while at the same time, inertia and air drag of the loose end of the line causes it to unwind as the bullet travels through the air. In this manner, the nonlethal projectile according to the invention can be used to deploy a string or line for the purpose of rescue operations and the like.

Finally, Figure 7 shows an embodiment of the invention which includes a percussive or smoke generating device. As shown in Figure 7, a primer cap 12 is provided in the impact head of the projectile. Fuses 13 provided inside insulated tubes 14 extend from the primer cap 12 to blasting caps 15, which are disposed in an explosive material or a smoke producing material. When the weapon is fired, the bullet impacts on the bullet trap 4, crushing the primer, which detonates, igniting the fuses. In the

meantime, the bullet has launched the projectile into a trajectory, as the fuse burns. When the fuse burns down to the blasting caps 15, the latter are detonated, causing the explosive or smoke generating material in turn to be detonated. With a  
5 proper timing of the delay effected by the fuse, detonation will occur approximately at the time when the projectile impacts upon its target.

The foregoing disclosure has been set forth merely to illustrate the invention and is not intended to be limiting.  
10 Since modifications of the disclosed embodiments incorporating the spirit and substance of the invention may occur to persons skilled in the art, the invention should be construed to include everything within the scope of the appended claims and equivalents thereof.

15

**WHAT IS CLAIMED IS:**

1. A nonlethal projectile, comprising:
  - a cylindrical hollow body having one open end, one closed end, and an interior configuration adapted to conform to an exterior configuration of a muzzle of a firearm;
  - an impact head arranged at the closed end of the cylindrical hollow body;
  - a bullet trap situated in the cylindrical hollow body at the closed end; and
  - stabilizing fins mounted on an external surface of said cylindrical hollow body.
2. The nonlethal projectile according to Claim 1 wherein said bullet trap comprises a bullet resistant material which is situated inside said cylindrical hollow body, across said closed off end.
3. The nonlethal projectile according to Claim 2 wherein said bullet trap has a concave configuration which is open toward said open end of said cylindrical hollow body, for receiving a bullet fired from a firearm.
4. The nonlethal projectile according to claim 1 wherein said impact head comprises a resilient material.
5. The nonlethal projectile according to Claim 1 wherein said impact head comprises a breakable hemisphere which has an interior closed cavity.
6. The nonlethal projectile according to Claim 5 wherein said cavity contains a liquid.
7. The nonlethal projectile according to Claim 6 wherein said liquid is one of a dye and a caustic material.
8. A nonlethal projectile, comprising:
  - a cylindrical hollow body which is closed at one end and open at another end opposite the closed end;
  - a bullet resistant material arranged in said hollow body across said closed end of said hollow body; and
  - stabilizing fins mounted on an exterior surface of said hollow body.

9. The nonlethal projectile according to Claim 8 wherein said hollow body has an interior configuration adapted to conform to a muzzle of a firearm.

10. The nonlethal projectile according to Claim 9 wherein said interior configuration comprises a resiliently deformable material.

11. The nonlethal projectile according to Claim 9 wherein said bullet resistant material forms a bullet trap disposed at said closed end of said hollow cylinder and having a concave opening facing said open end of said hollow body.

12. The nonlethal projectile according to Claim 8, further comprising at least one supply of an elongated material having one end attached to said hollow body and adapted to unfurl during a flight of said projectile.

13. The nonlethal projectile according to Claim 12 wherein said elongated material is a string or line wound on an exterior of said hollow cylinder.

14. The nonlethal projectile according to Claim 13 wherein an end of said line which is not attached to said hollow cylinder has a weight applied thereto.

15. The nonlethal projectile according to Claim 12 wherein said elongated material is a ribbon or streamer.

16. A percussive projectile comprising:

a cylindrical hollow body having one closed end, and an interior configuration adapted to conform to an exterior configuration of a muzzle of a firearm;

an impact head arranged at the closed end of the cylindrical hollow body;

a bullet trap situated in the cylindrical hollow body at the closed end;

stabilizing fins mounted on an external surface of the cylindrical hollow body; and

a percussive device adapted to detonate approximately at a time of an impact of the impact head.

17. An incendiary projectile according to Claim 16, further comprising:

a primer cap situated in the impact head for detonation by impact of a bullet on the bullet trap; and

a fuse situated adjacent the primer cap, for ignition by said primer cap and detonation of the incendiary device.

18. An incendiary projectile according to claim 17, further comprising at least one blasting cap for detonation by the fuse and for detonating the percussive device.

19. An incendiary projectile according to Claim 16, wherein the percussive device is a smoke generating material.

20. An incendiary projectile according to Claim 16, wherein the percussive device is an explosive charge.

21. A method of launching a nonlethal projectile, comprising:

placing an open end of a nonlethal projectile over a muzzle of a firearm loaded with lethal ammunition, said nonlethal projectile having a cylindrical hollow body, which is closed at an end opposite said open end and is reinforced by a bullet resistant material at said closed end, and said nonlethal projectile having a resilient or breakable impact head on an exterior of said closed end of said cylindrical hollow body;

pointing said firearm at a target person or thing; and  
firing said firearm.

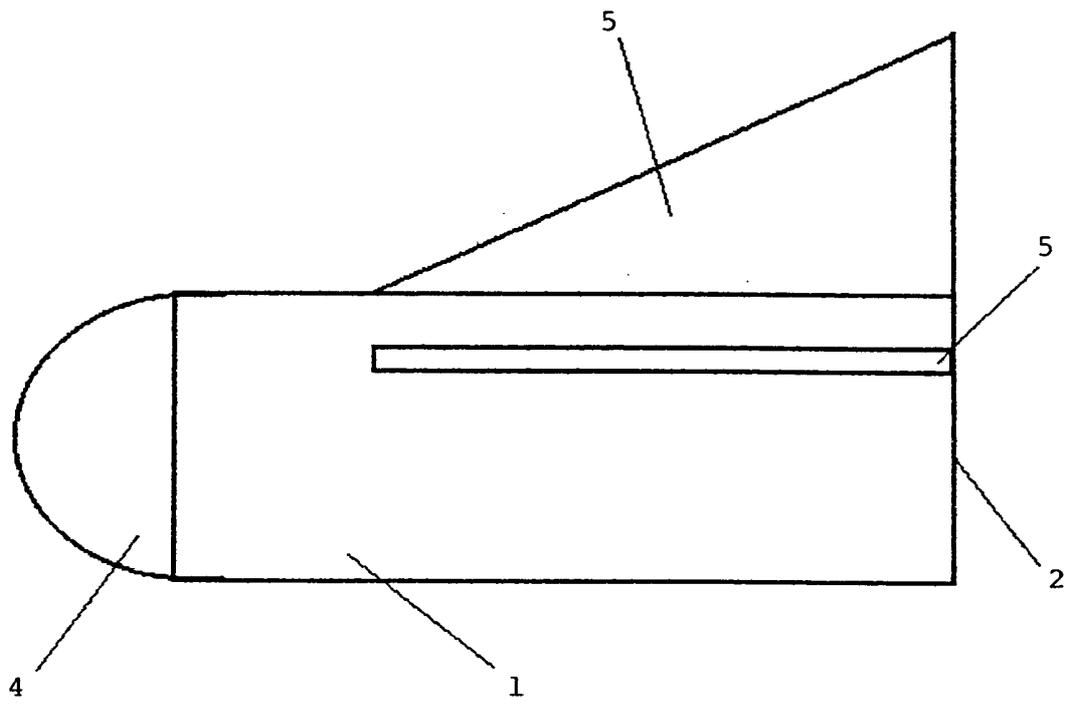


FIG. 1

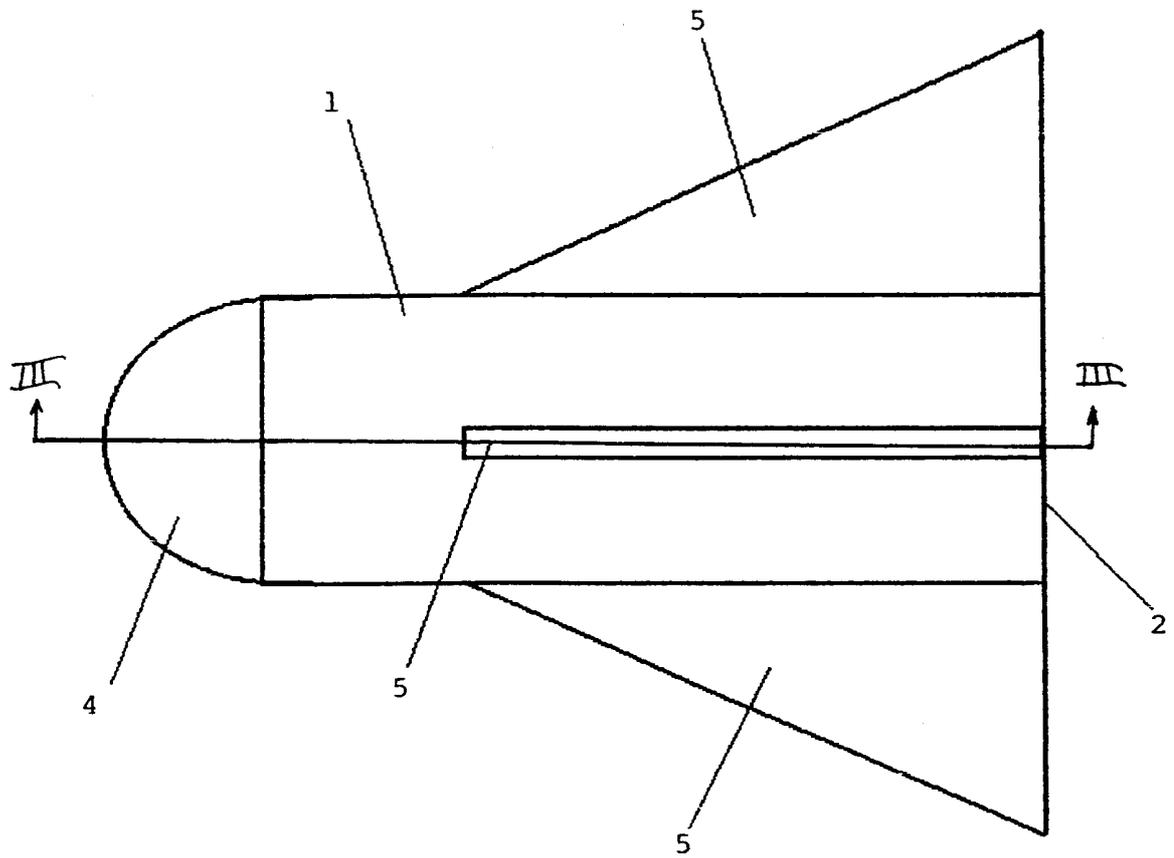


FIG. 2 A

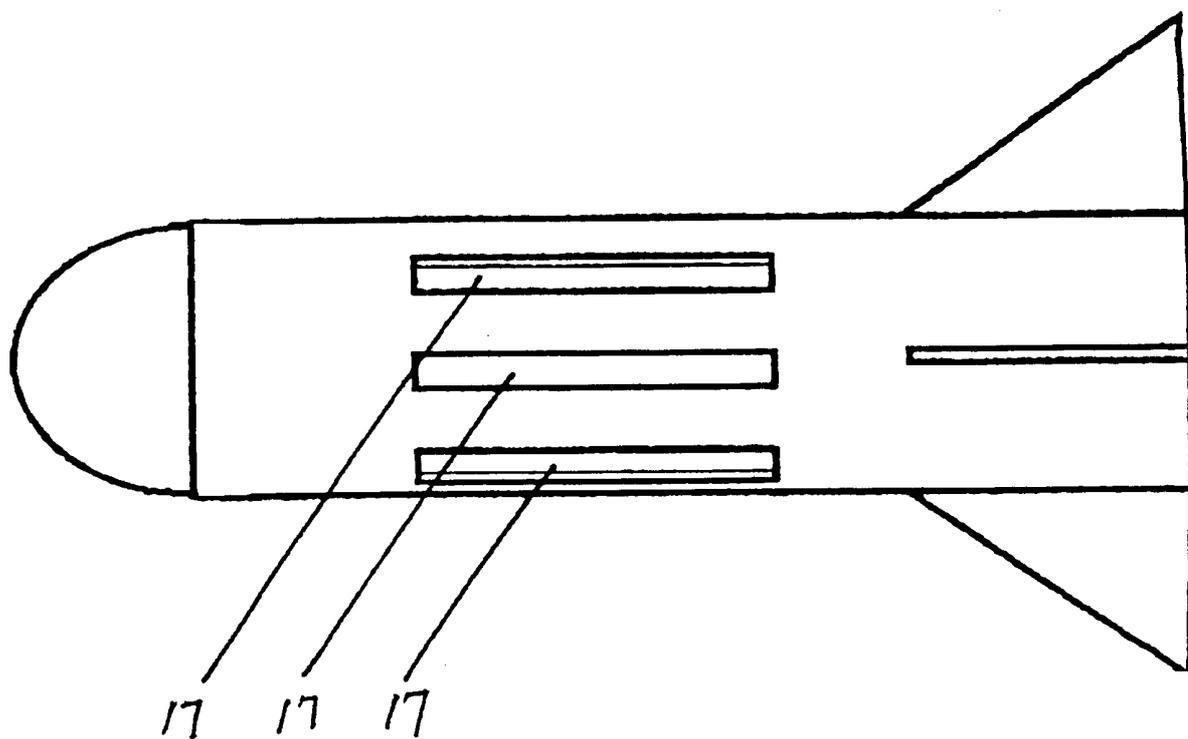


Fig 2B

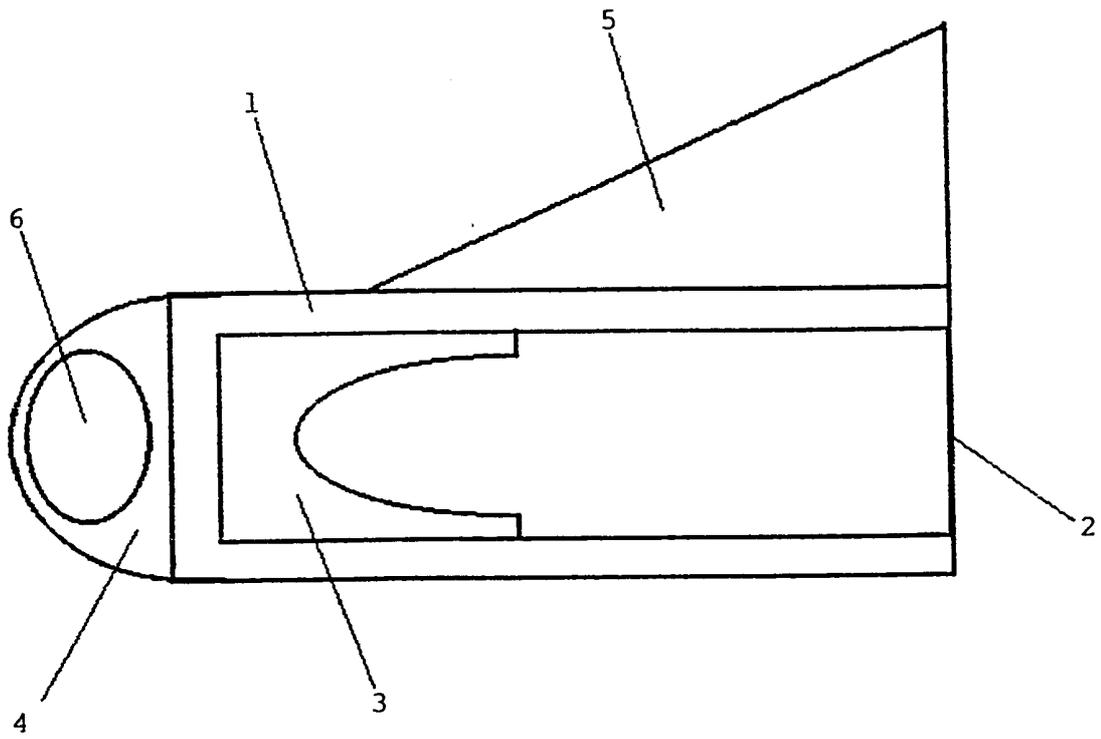


FIG. 3

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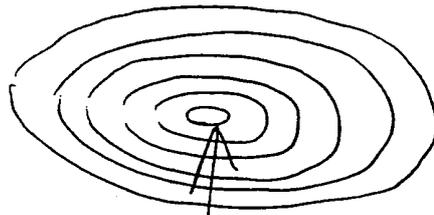
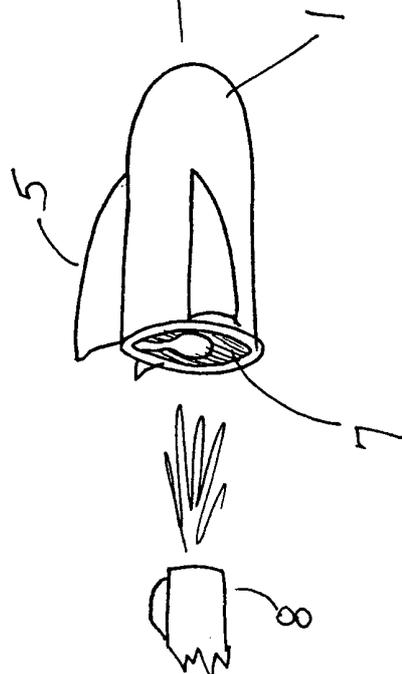


Fig 4A



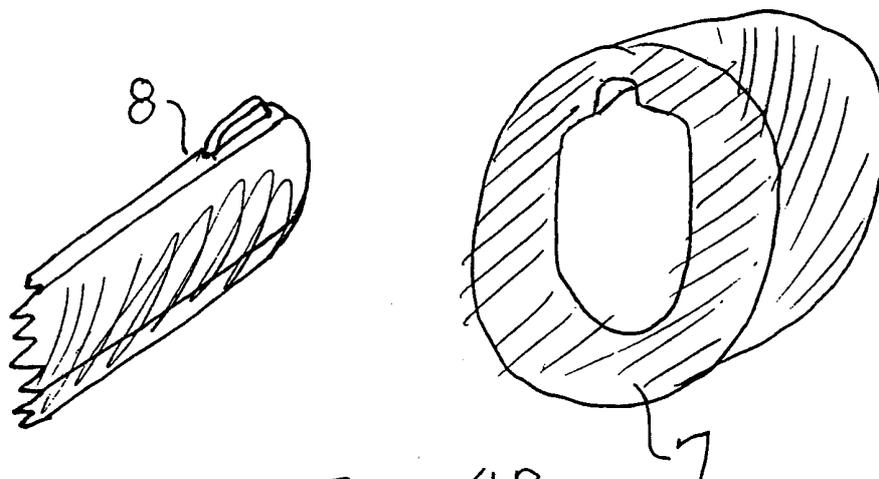


Fig. 4B

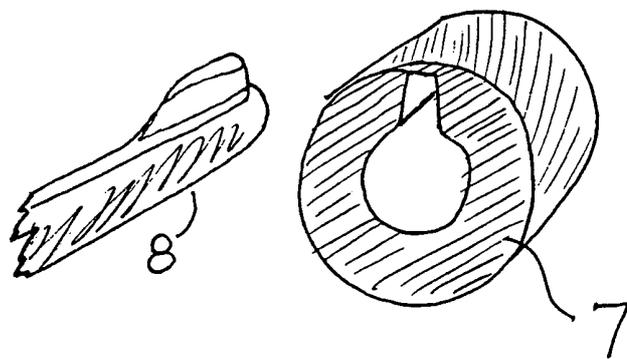


Fig 4.C

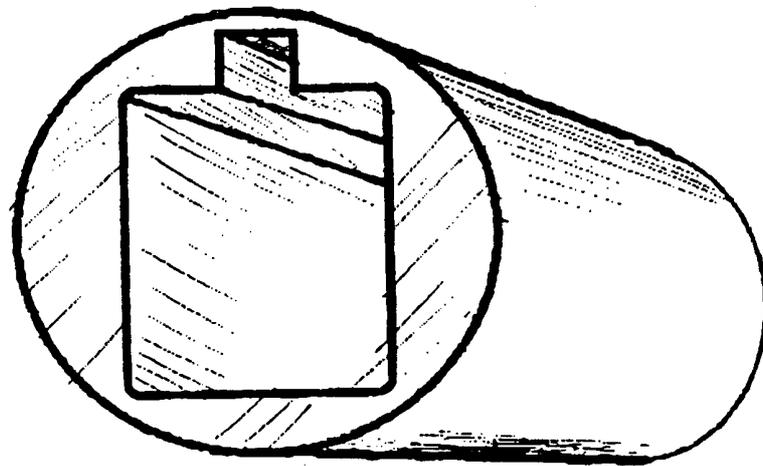


Fig. 4.D

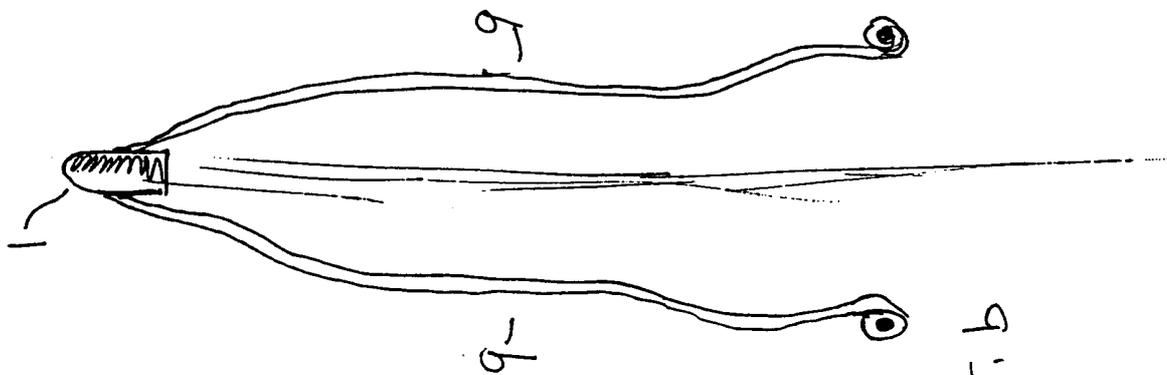


Fig 5.b

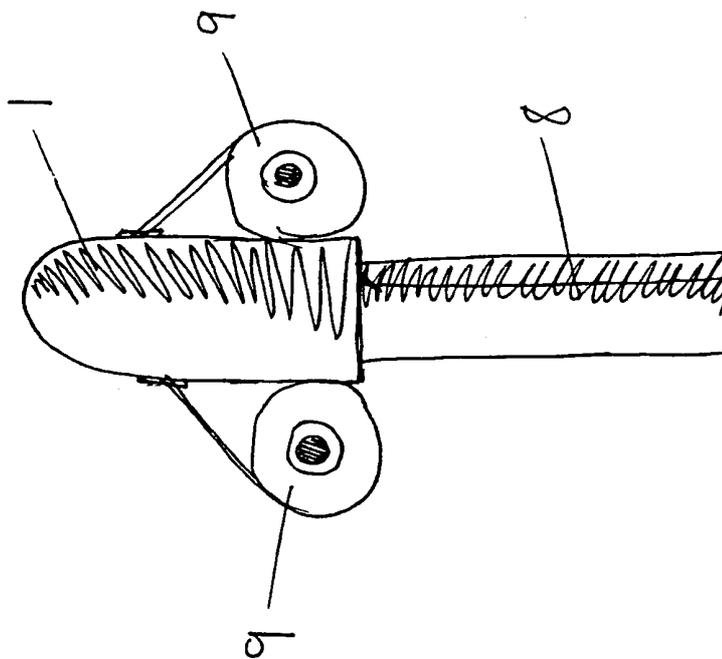


Fig 5a

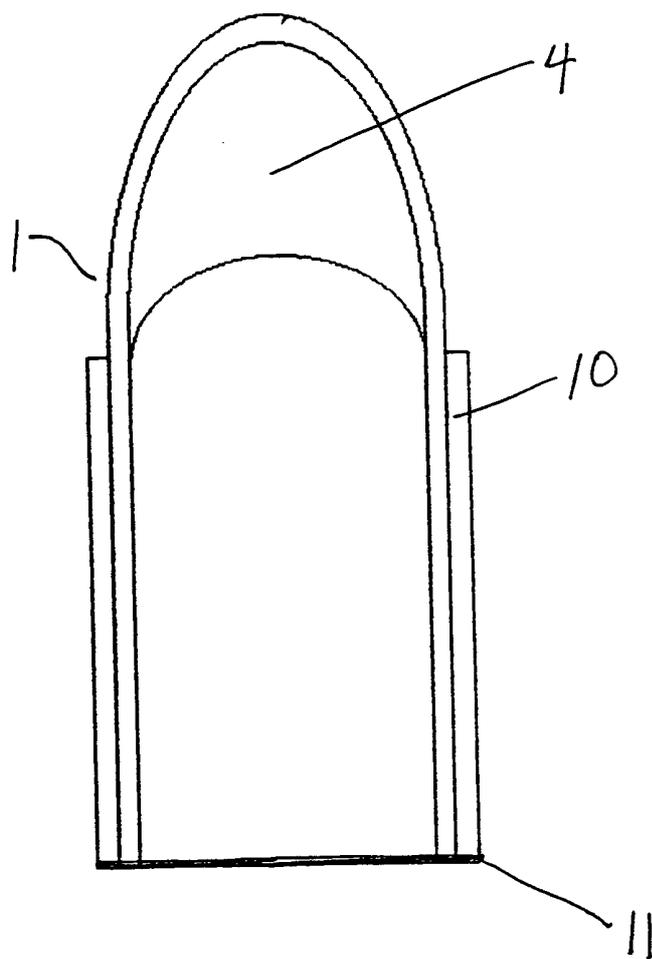


Fig. 6

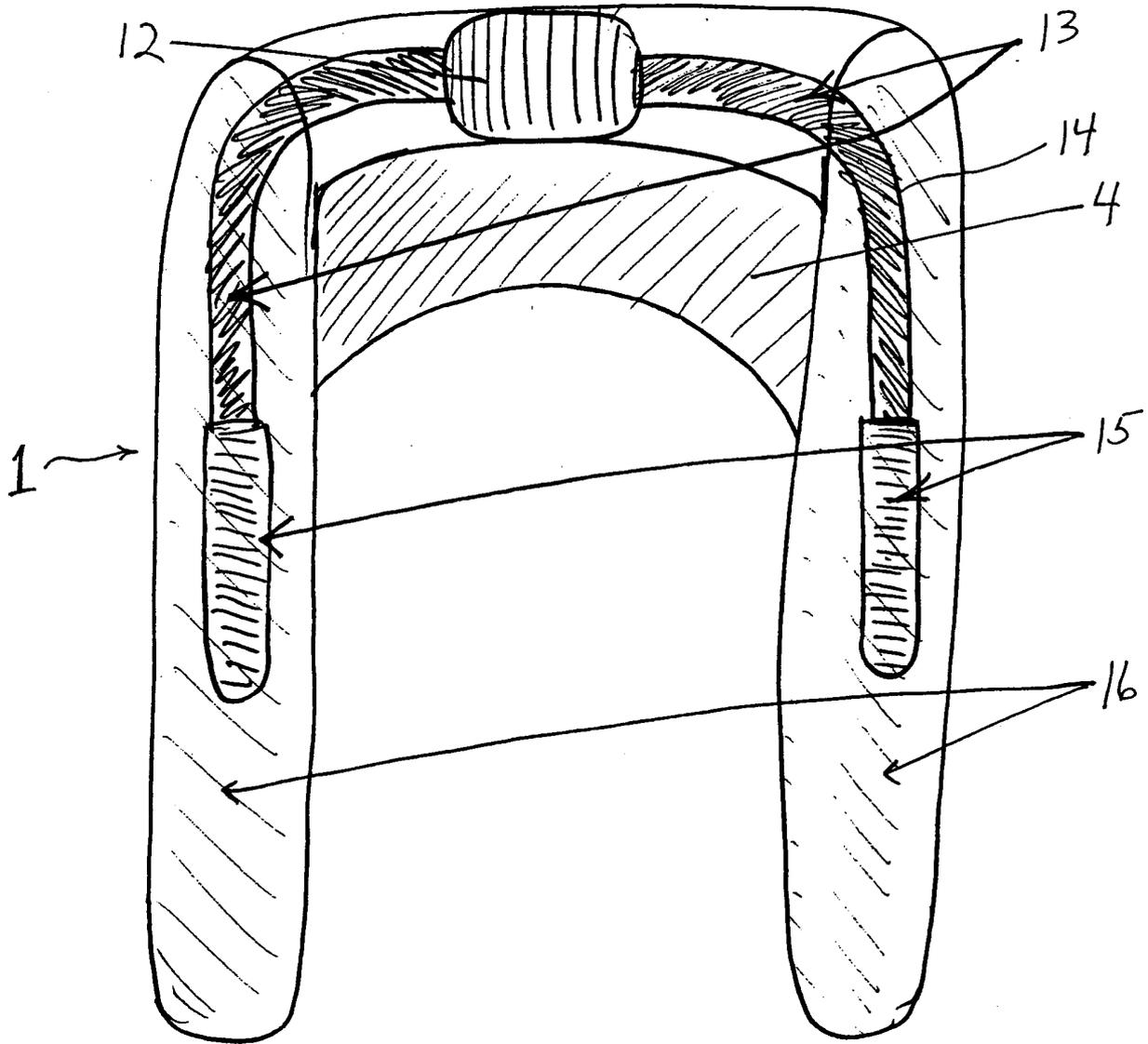


Fig 7