PORTABLE DECOY LAUNCHER SYSTEM AND ROUNDS THEREFOR

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References Cited
UNITED STATES PATENTS
1,471,063 10/1923 Roganie 89/1.3
2,368,018 1/1945 Groth et al. 89/1.3
2,751,582 6/1956 Kuykendall 102/37.4 X
634,826 10/1959 Maximi 89/1 X
2,421,893 6/1947 Lambert et al. 89/1.7 B X
2,444,334 6/1948 Caulkins 89/37 C
2,717,533 9/1955 Wells 89/1.5
2,961,927 11/1960 Dufour 89/1.7 B

A portable launcher system comprising: a portable support base, said portable support base including extendable-retractable brace members to provide additional support therefor, a portable multi-round container unit removably mounted in said base, said portable multi-round container unit comprising a housing, a plurality of tubes fixedly secured in said housing, said tubes functioning for storage of associated rounds and as the launch base for firing of associated rounds, and electrical wiring operatively secured to said housing and adapted for connection with associated rounds, said support base being provided with means for retaining said container unit therein, a control apparatus for said power supply, said power supply and said control apparatus being positioned within a portable container and remotely located from said portable support base and said portable multi-round container unit, and means for interconnecting the electrical wiring of said container unit with said control apparatus whereby associated rounds may be launched therefrom individually, sequentially or in salvo.

13 Claims, 7 Drawing Figures
Fig. 5.

Fig. 6.

Fig. 7.

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PORTABLE DECOY LAUNCHER SYSTEM AND ROUNDS THEREFOR

This invention relates to countermeasure systems, particularly to systems for providing a protective cover against homing and/or fire control devices operating upon infrared, sonar, or microwave reflected energy, and more particularly to portable decoy launching systems and rounds thereof to confuse the sensing mechanism of such devices and thus decrease the effectiveness thereof.

This invention relates to the invention disclosed and claimed in U.S. Pat. application Ser. No. 389,525, filed Aug. 12, 1964, entitled “Counter Measures System” and assigned to the same assignee. As in the above mentioned application, this invention is directed to a system for dispensing infrared, sonar, or microwave-reflected energy or combinations thereof by firing a projectile or a plurality thereof and dispensing the same at a predetermined point in time or position along its trajectory or path of travel whereby these additional energy sources confuse the sensor system of an incoming missile or the like and divert it from its intended target.

Therefore, it is an object of this invention to provide a portable decoy launcher system.

A further object of the invention is to provide a portable decoy launcher system which is completely self-sustaining.

Another object of the invention is to provide a simple, inexpensive and yet effective system for dispensing disposable decoy material for confusing sensor systems operating on infrared, sonar and/or microwave-reflected energy.

Another object of the invention is to provide a portable decoy launcher system capable of firing individual rounds singly, in sequence or by multiple bursts.

Another object of the invention is to provide decoy rounds adapted for firing in the portable launcher system.

Another object of the invention is to provide a decoy system using low-cost, easily-handled rounds and portable launching equipment which provides added defense and attack support for surface ships, for example.

Other objects of the invention will become readily apparent from the following description and accompanying drawings wherein:

FIG. 1 is a perspective view illustrating an embodiment of the invention;
FIG. 2 is a view of the FIG. 1 embodiment illustrating the removable or combinations thereof by firing a projectile or a plurality thereof and dispensing the same at a predetermined point in time or position along its trajectory or path of travel whereby these additional energy sources confuse the sensor system of an incoming missile or the like and divert it from its intended target.

This invention broadly relates to a portable launcher system for providing a protective cover against homing devices operating upon infrared, sonar and/or microwave-reflected energy. The launcher system includes a base which is easily carried by one man and can be quickly positioned and held for launching by sand bags, lashing, bolting or any conventional retaining method. The base is provided with a removable multiple round container unit which can also easily be inserted or withdrawn by one man. The container unit may be of the disposable or reloadable type. Connected to the round container unit via a cable is a small portable power-control unit which activates the rounds in any sequence desired by the operator.

The decoy rounds produce targets and generate confusion in search, tracking, and homing weapons. The fast reloading capability of the launcher system using spare loaded round containers provides protection both during attack or during retreat. The various types of rounds are designed to operate with respect to a ship, for example: (1) close to the ship to confuse the ranging elements of homing weapons; (2) far enough away to minimize blast damage to the ship from weapons centered on the decoys; (3) low to appear near sea level to long distance search weapons; (4) sufficiently high to have adequate persistence for the tactical encounter; (5) deep enough to cover the distance from the surface of the water to below the first thermal layer; and (6) sufficiently large to duplicate the target size of the smallest fighting unit. Generation of larger targets to simulate larger craft may require several rounds fired at close intervals.

While the launching system of the invention is portable and therefore can be positioned and fired from any desired location for providing protective cover wherever needed, the description of the invention will be directed to the use of the system on surface ships.

Referring now to the drawings, the portable decoy launcher system, as illustrated in FIG. 1, consists generally of a base 10, a multiple-round container unit or launcher-magazine 11, a firing cable 12, and a power-control unit 13. The complete system can be carried aboard and set up in locations compatible with normal ship operations. The base 10 is held in place by appropriate weights such as sandbags or the like (not shown) to dampen the recoil from firing. Rough sea operations may require lashing or bolting the base to the deck of the ship. The round container unit 11 can be protected prior to firing, if desired, by a watertight lid (not shown). As shown in FIGS. 1 and 2, caps are positioned over the round tubes of container unit 11 to protect the rounds from splash during the firing run. The rounds are fired manually by the push buttons (see FIG. 4) in the power-control unit 13. Spacing of the firing sequence of the rounds depends upon the tactical situation.

Referring now to FIGS. 1 – 3, the base 10 may be constructed of steel or other suitable material and is easily carried by one man. Base 10 comprises a housing 14 constructed so that the open top is at a 60° angle with respect to the closed bottom. A pair of supports 15 and 16 are each connected at one end thereof to the bottom of housing 14 at the front and rear sides, respectively, by hinges 17 or other means for allowing the supports to pivot with respect to the housing. Front support 15 is provided with a pair of braces 18 which extend perpendicularly with respect to support 15 and are each provided with a slot 19 which accepts a locking member 20 to hold the support 15 in its extended
position, as shown in FIGS. 1 and 2, for supporting housing 14 in its firing position. Locking members 20 are operatively connected to housing 14 by pins or other suitable means which allow members 20 to move with respect to slots 19 so that support 15 may be moved to its folded position adjacent the front side of housing 14 with the braces 18 extending along the sides of the housing. A pair of latches 21 and 22 are pivotally mounted on the front and rear sides, respectively, of housing 14 and operate to hold the respective supports 15 and 16 in their folded positions. Over-center clamps 23 are mounted on the sides of housing 14 by means such as hinges 24 and are adapted to extend over the open end of the housing and retain the round container unit or launcher-magazine 11 within the housing, as shown in FIG. 1. To prevent the clamps 23 from moving, a latch 25 is mounted adjacent each clamp 23 and serves to hold clamps 23 as shown in FIG. 1. The rear side of housing 14 is provided with a cut-out portion to accept the cable connection assembly of launcher-magazine 11. A handle 26 is mounted via plate 27 on the rear of housing 14 by which the base 10 is carried.

The round container unit or launcher-magazine 11 consists of a frame having a bottom (not shown), top 28 and interconnecting support members 29 as shown in FIG. 2. Top 28 is provided with apertures within which are positioned firing tubes or chambers 30, nine tubes 30 being utilized in this embodiment. Tubes or chambers 30 are supported within the launcher-magazine frame by the bottom member (not shown) and may be connected to the bottom of the frame and to top 28 by any conventional means to prevent movement thereof. Attached to the interconnecting support members 29 on one side of the frame and adjacent top 28 is a support 31 (see FIG. 3) for a quick connect multi-terminal plug or jack 32 for interconnection with the firing cable 12. Pairs of wire 33 are provided with connector pins or sockets or the like interconnect plug 32 with each of firing tubes 30. As illustrated in FIGS. 1 and 3, the wires 33 extend through a padded aperture 35 in support 31 and through padded apertures 35' in top 28 of the frame 29, a pair of wires 33 being provided for each of launch tubes 30.

To load the round container unit 11, rounds such as those illustrated, for example, in FIGS. 6 and 7 are inserted in the tubes 30. Spring clips on the squib wires from the rounds are connected to the pin sockets of wires 33. Any excess wire is positioned inside the tubes 30 and caps 36 are placed over each of the tubes 30 (see FIG. 1), caps 36 being constructed of material such as plastic which will not damage the wires 33 when placed over the tubes. The loading operation can be accomplished in less than 2 minutes. The round container units 11 are reusable and can be interchanged in base 10 in less than 1 minute.

Firing cable 12 is provided with an outer sheath which is impervious to water and highly resistant to damage through normal use and consists of a plurality of conductors. Quick connect multi-terminal plugs 37 and 37' are mounted on each end of and connected to said conductors in cable 12. Plug 37 is shown for interconnection with plug or jack 32 of unit 11 and plug 37' with a plug 32' similar to plug jack 32 mounted in power-control unit 13 (see FIG. 5). The plugs 37 and 37' on cable 12 are identical and the associated wiring is arranged so that the cable 12 is reversible.

The power-control unit 13 is mounted in a water-resistant box 38 having a cover or lid 39 with a handle 39' hinged at 40, box 38 being provided with fastener mechanism 41 for retaining cover 39 in the closed position. Box 38 contains the power supply, such as a standard 6 volt battery, a control panel generally indicated at 41', a multi-terminal plug 32' similar to plug 32, and the associated wiring (see FIG. 5).

Control panel 41' includes a switch 42 having SAFE and ARM positions, a switch guard 43, a red indicator light 44, a push button 45 of the test circuit, a green test light 46, and push buttons S1 – S9 corresponding to the number of round chambers or tubes 30 in unit 11. The battery is located under control panel 41' and is accessible by removing the panel. The switch guard 43 has to be down, thus throwing the switch 42 to the SAFE position, to close the cover 40 of the box 38, assuring a visible safety check when changing round container units 11.

While the electrical system will be described in detail hereinafter with respect to FIG. 5, the operation of the power-control unit 13 is briefly as follows: (1) the cover 40 is raised by releasing fasteners 41; (2) button 45 of the test section is pushed which illuminates green light 44 if the battery has enough power to fire the rounds; (3) the switch guard 43 is lifted, as shown in FIG. 4, and the switch 42 is thrown from the SAFE to the ARM position which illuminates red light 44 and places the system ready for firing; and (4) the rounds are fired manually by depressing the push buttons S1 – S9 which provides an electric impulse from the battery and ignites the launch charge in the corresponding rounds in unit 11. For example, when button S3 is pushed, round 3 in unit 11 is fired.

An embodiment of an electrical system for the FIGS. 1 – 4 portable launcher system is schematically illustrated in FIG. 5 and indicates the general units of the system, namely, the power-control assembly, the cable assembly, and the launcher assembly. Like elements will be referenced to correspond with FIGS. 1 – 4.

The power-control assembly consists essentially of four sections, namely, power, test, arm, and fire. The power supply section such as a 6 volt battery is indicated at 47.

The test section of the power-control assembly includes push button 45, green indicator light 46, resistors 48, 49, and 50, a silicon controlled rectifier (SCR) and associated conductors 48, 49, and 50, operatively connected with battery 47. To test the condition of the battery, button 45 is pushed which interconnects conductors 48 and 49, thus applying the battery voltage across resistor Rs, resistors R1 and R, and the SCR and light 46, thereby completing the circuit through conductor 50. If the light 46 lights, it is an indication that the battery 47 has the minimum amount of voltage, for example 4.3 volts, required to fire the decays rounds because the bias network of resistors in combination with the SCR simulates the firing load.

The arm or ready section of the power-control assembly includes switch 42, red indicator light 44, a current limiting resistor Rs, a common lead or bus bar 51, and associated conductors 48, 52, 53, and 56. Light 44, resistor Rs and common lead 51 are connected to conductor 52. With the voltage of battery 47 being sufficient, as determined by the test section, switch guard 43 (see FIG. 4) is raised and switch 42 moved from the SAFE to the ARM position which interconnects con-
ductors 48 and 52, thus applying the battery voltage across the red indicator light 44, thereby completing the circuit through conductors 53 and 50 and illuminating light 44.

The fire section of the power-control assembly includes press-to-activate push button switches 51 through 59 connected as shown in FIG. 5 between a common lead or bus bar 54 and terminals A through J, respectively, of a plug or jack 32', similar to the jack 32 in FIG. 3, and a conductor 55 interconnecting a terminal L of jack 32', bus bar 54, and conductor 50.

The cable assembly as shown in FIG. 5 includes the plurality of conductors 12' contained within the firing cable 12 and the plugs 37 and 37', one at each end of cable 12, as described above with respect to FIGS. 1 - 4. Plugs 37 and 37' include terminal members adapted to connect with the terminals A - L of 32' of the power-control assembly and with terminals A through L of jack 32 of the launcher assembly. As set forth above, cable 12 is reversible and thus plugs 37 and 37' on the ends thereof will cooperate with either of jacks 32 or 32'.

In addition to the jack 32 having terminals A - L, the launcher assembly, as schematically illustrated in FIG. 5, includes decoy rounds 1 through 9 positioned in unit 11 and the pairs of wires 33 (see FIGS. 1 and 3) which interconnect the jack 32 with squib wires (see FIGS. 6 and 7) of the rounds 1 - 9.

With the system readied, as above, by movement of switch 42 to the ARM position, the firing of one or more of the rounds 1 - 9 may be accomplished, for example, by pressing button 51 thus interconnecting bus bar 51 with the terminal A of jack 32'. This applies the battery voltage through switch 51, terminal A of jack 32', plug 37', a conductor 12' of cable 12, plug 37, terminal J of jack 32, wire 33, and the squib wires of round 1, thereby igniting a launch or lift charge of the round. The circuit is completed through the other wire 33 of the pair connected to round 1, terminal L of plug 32, a conductor 12' of cable 12, terminal L of plug 32', and conductors 55 and 50. The current limiting resistor R, functions to reduce the amount of current drawn by the squib to the minimum required for firing, thus extending the life of the battery, while additionally functioning to prevent an inadvertent firing of the rounds due to a short circuit in the electrical system.

The rounds 1 - 9 may be fired in any desired sequence or in salvos, depending on the tactical conditions and the types of rounds (infrared, microwave, or sonar) in the round container unit 11.

While the launcher system has been illustrated as utilizing a nine round container unit or magazine, the number of rounds is subject to variation, being dependent upon the portability desired for the system and the weight involved. However, the nine round embodiment is such that one man can easily remove and insert round container units in the base of the system, while larger embodiments, such as the 25 round portable unit disclosed in the above mentioned patent application, are considerably heavier and thus require more manpower to handle. Also, while this embodiment has been illustrated as having its own power supply, it is within the scope of this invention to use another power supply, such as that of a ship on which it is positioned, provided proper voltage limitations are maintained.

While the above cited patent application discloses embodiments of decoy rounds and illustrates rounds having multiple dispersion sections therein, both of which may be utilized in this embodiment of the launcher system, FIGS. 6 and 7 illustrate individual microwave (chaff) and under-water (sonar) decoy rounds, respectively.

The microwave (radar chaff) decoy round illustrated in FIG. 6 comprises phenolic tubing 60 and 61, tubing 60 being positioned within tubing 61 and designed to retain, for example, bagged flash powder 62 which disperses the aluminum chaff 63 contained in tubing 61. End covers or caps 64 and 65 enclose the ends of tubing 61 to retain the chaff 63 therein, end cover 64 being provided with a plug 66 which is positioned in one end of tubing 60 and in abutment with flash powder 62 while end cover 65 is provided with an aperture 67 through which a time delay fuze 68 extends and abuts against flash powder 62. Connecting time delay fuze 68 to an electric squib 69 is an igniting powder fuze 70, squib 69 being provided with wires 71 which, as described above, are connected to the wires 33 of the round container unit 11. Also connected to electric squib 69 is an igniting powder fuze 72 which extends into a lift or launch charge 73 within container 74, container 74 being separated from tubing end cover 64 by a pair of discs 75 of suitable material such as cardboard. Another pair of discs 75 are positioned adjacent end cover 65. The round as shown in FIG. 6 is then sealed within layers of heavy paper, lacing, and glue as required.

By way of example only, the rounds shown in FIGS. 6 and 7 may possess the following characteristics: length of approximately 6 inches, diameter of approximately 3 inches, with a total weight of approximately 2 pounds. The specific weight of the decoy material, the weight of the lift charge and the electrical requirements of the squib will vary with specific applications.

The underwater (sonar) decoy round illustrated in FIG. 7 is of essentially the same configuration as the FIG. 6 chaff round and like elements will be given the same reference numerals. The FIG. 7 round comprises a tubing 76 which may be made of cardboard or like closed by end caps or covers 77 and 78, end cover 78 being provided with an aperture 79 through which a time delay fuze 68 extends. Tubing 76 is filled with a lithium hydride and powdered lead mixture 80, for example, with a black powder charge 81 positioned in the center thereof and in abutment with time delay fuze 68. As in the FIG. 6 round, an igniting powder fuze 70 interconnects time delay fuze 68 with electric squib 69, squib 69 being provided with wire leads 71 for activation thereof, and connected through igniting powder fuze 72 with the lift charge 73 contained in container 74 and separated from end cover 77 by discs 75. Also adjacent end cover 78 are another pair of discs 75. As in the FIG. 6 round, the amount of flash powder and the size of the lift charge may be varied to meet different requirements.

In the firing sequence described above with respect to FIG. 5, the electrical impulse from battery 47 is received by electric squib 69 via lead wires 71 which are connected to wires 33 of unit 11, squib 69 simultaneously ignites both of the powder fuzes 70 and 72 which ignite the time delay fuze 68 and the lift or launch charge 73. The lift charge 73 propels the round from the tube 30 of unit 11 in a ballistic trajectory. The time fuze 68 burns for 3 to 6 seconds, for example, de-
pending on the type of round and ignites the burst or flash charge 62 of FIG. 6 or 81 of FIG. 7 which disperses the payload. In the case of the microwave (radar chaff) rounds the chaff is dispersed near the peak of the trajectory while with the underwater (sonar) rounds the payload may be dispersed near the surface of the water or under the water. The squib lead wires 71 are connected to wires 33 in such a manner that the lead wires 71 are separated from the wires 33 when the round is fired without damage to the wires 33.

The portable decoy launcher system thus provides rounds for use against radar, infrared, and/or underwater search, tracking, and homing weapons. Application of the decoy rounds is as follows:

Radar Chaff (RF) — has payload of radar reflective material effective against search, tracking, and homing weapons operating in specified radar bands;

Infrared (IR) — has payload for duplicating IR target signals of various size surface ships, etc;

Underwater (U) — the rounds disperse tablets of lithium hydride over the surface of the water to produce bubble columns as they sink; affects sonar and acoustic homing devices.

While specific embodiments of the various units comprising the portable decoy launcher system of the invention have been illustrated and described, it is not intended to limit the invention to the specific embodiments illustrated. For example, the magazine or round container unit 11 may have various and different types of construction, both as to configuration and material used. The base unit 10 may be modified whereby the rear side can be opened so that the round container unit 11 can be inserted or withdrawn with the tubes pointing away from the operator, thus increasing the safety, even though the power-control unit 13 is disconnected.

It has thus been shown that this invention provides a simple, inexpensive, but yet effective system for providing protective cover against detection.

Although specific embodiments of the system have been illustrated and described, modifications and changes will become apparent to those skilled in the art, and it is intended to cover in the appended claims all such modifications and changes as come within the true spirit and scope of the invention.

What we claim is:

1. A portable launcher system comprising: a portable support base, said portable support base including extendable-retractable brace members to provide additional support therefor, a portable multi-round container unit removably mounted in said base, said portable multi-round container unit comprising a housing, a plurality of tubes fixedly secured in said housing, said tubes functioning for storage of associated rounds and as the launch base for firing of associated rounds, and electrical wiring operatively secured to said housing and adapted for connection with associated rounds, said support base being provided with means for retaining said container unit therein, a control apparatus for said power supply, said power supply and said control apparatus being positioned within a portable container and remotely located from said portable support base and said portable multi-round container unit, and means for interconnecting the electrical wiring of said container unit with said control apparatus whereby associated rounds may be launched therefrom individually, sequentially or in salvo.

2. The portable launcher system defined in claim 1, wherein said power supply is of the direct current type.

3. The portable launcher system defined in claim 1, wherein said means for interconnecting said container unit with said control apparatus includes a cable having identical means on each end thereof so that either end of said cable can be connected with said container unit or with said control apparatus.

4. The portable launcher defined in claim 1, wherein said portable support base includes a housing having an upper end thereof at an angle with respect to the lower end thereof, and wherein said portable container is provided with a hinged cover member.

5. A portable system for launching decoy rounds comprising: a housing having an open upper end and at an angle with respect to the lower end thereof, a multi-round container unit removably positioned in said housing, said multi-round container unit including an individual launch chamber for each round and electrical wiring operatively mounted thereon for each individual launch chamber, a remotely located power-control unit positioned within a portable container, electrical cable means interconnecting said power-control unit and said electrical wiring of said multi-round container unit, and rounds of suitable decoy material positioned in at least a portion of said individual launch chambers of said container unit and operatively connected to said electrical cable means.

6. The portable system defined in claim 5, wherein said housing is provided with a pair of support members pivotably mounted thereon, means for retaining said support members in an extended position with respect to said housing, means for retaining said support members adjacent said housing, and means for retaining said multi-round container unit in said housing.

7. The portable system defined in claim 5, wherein said electrical wiring for the individual rounds is connected to said rounds and to a common jack, said common jack being connected to said electrical cable means.

8. The portable system defined in claim 5, wherein said rounds are each composed of dispersible decoy material, and each round includes electrical wiring interconnecting said electrical wiring of said individual launch chamber of said container unit with means for igniting a launch charge and with means for igniting a dispersing charge of said round.

9. A decoy launcher mechanism including a portable container means defining a support base, a decoy launcher magazine removably positioned in said container, said launcher magazine being provided with a plurality of cells, each of said cells being provided with a decoy round and providing a launch base for said decoy round, a portable power supply for activating said decoy rounds positioned in said cells, and control apparatus for said power supply, said control apparatus including means for firing said decoy rounds singly, in sequence, or by salvo, said power supply and said control apparatus being a self-contained unit and remotely positioned in a portable container.

10. A portable launcher system comprising: a portable support base, said portable support base including extendable-retractable brace members to provide additional support therefor, a portable container unit re-
movably mounted in said base, said portable container unit being of a multi-round configuration and provided with electrical wiring adapted for connection with associated rounds, said support base being provided with means for retaining said container unit therein, a power supply, control apparatus for said power supply, said power supply and said control apparatus being remotely located within a portable container, and means for interconnecting the electrical wiring of said container unit with said control apparatus, whereby associated rounds may be launched therefrom individually, sequentially or in salvo, said control apparatus including means for testing the power supply, means adapted to fire rounds from said container unit, activation means for interconnecting said power supply with said firing means, and guard means for said activation means to prevent inadvertent interconnection of said power supply and said firing means.

11. The portable launcher system defined in claim 10, wherein said control apparatus includes means for preventing the inadvertent firing of rounds from said container unit due to a short circuit in the system.

12. The portable launcher defined in claim 10, wherein said portable container is provided with a cover member, said cover member retaining said guard means such that same cannot be moved and thus prevent actuation of said activation means when said cover member is in the closed position.

13. A portable system for launching decoy rounds comprising: a housing having an open upper end and at an angle with respect to the lower end thereof, a multi-round container unit removably positioned in said housing, a remotely located power-control unit positioned within a portable container, electrical cable means interconnecting said power-control unit and said multi-round container unit, and rounds of suitable decoy material positioned in said container unit and operatively connected to said electrical cable means, said power-control unit being a self-contained unit and including a direct current power supply and control apparatus including: means for testing said power supply, means for firing the rounds from the container unit launch chambers, said firing means including electrical wiring connected to a common jack, means for connecting said power supply to said firing means, said electrical cable means interconnecting said common jacks, and guard means for said firing means to prevent inadvertent interconnection between said power supply and said firing means.