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(58) Field of search
F3A
F3C

(54) Decoy systems

(57) A decoy system for aircraft effective to provide alternative targets for missiles which may be directed at the aircraft comprises a carrier 3 in which is detachably fixed a replaceable magazine 4 comprising an array of pyrotechnic cartridges 5 each having an electrical detonator and a load consisting of radar chaff and/or infrared flare material. A plug and socket connection 11, 12 enables a micro processor 14 to selectively fire the cartridges. The sequence of firing may be pre-set by switches 15.

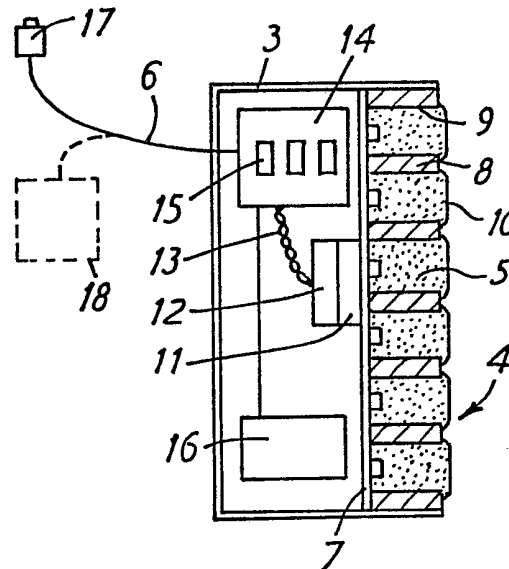


FIG. 2

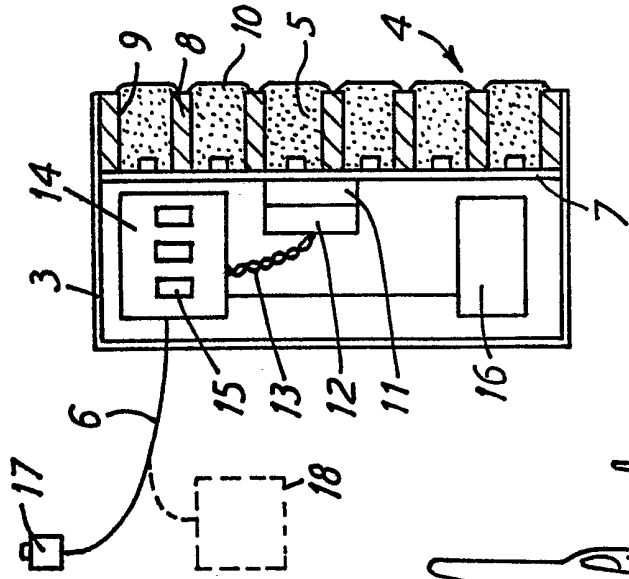


FIG. 2

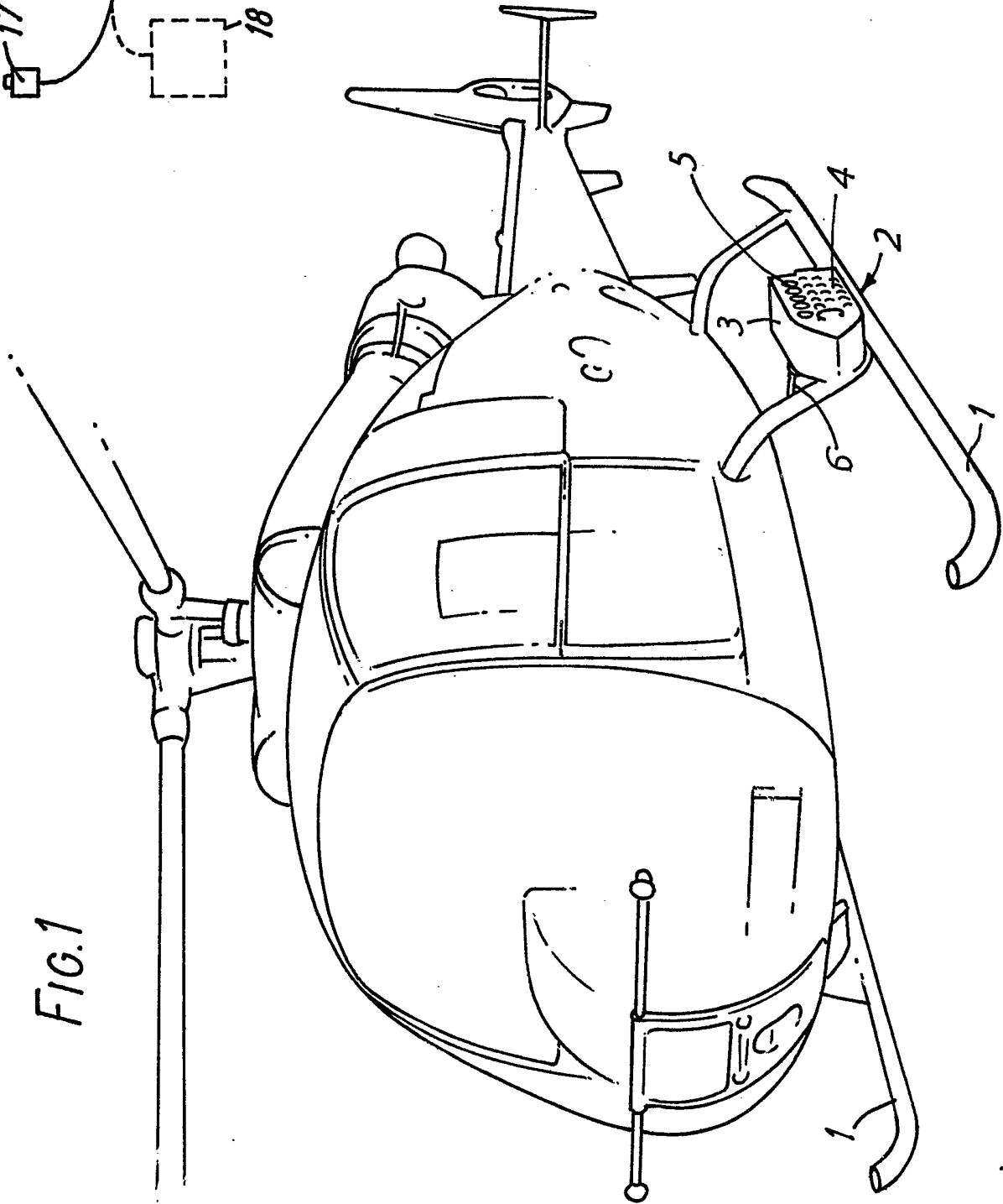


FIG. 1

SPECIFICATION

Decoy system for aircraft

The invention relates to a decoy system for aircraft which is particularly suitable for use by
 5 helicopters. Decoy systems are effective to provide alternative targets for missiles which may be directed at the aircraft. Such missiles may be radar-directed or may be heat-seeking. Thus, it is necessary to be able to deploy from the aircraft
 10 alternative radar targets in the form of clouds of chaff or infra-red targets in the form of high intensity infra-red flares. It is possible to provide a decoy system for an aircraft which consists of a battery of pyrotechnic cartridges, some including
 15 chaffs and some including infra-red flares composition. However, such a battery of cartridges is cumbersome and is time consuming and difficult to recharge. It is vitally important to be able to re-plenish a decoy system in the
 20 minimum possible time in order to allow rapid turn around of the aircraft under combat conditions. The present invention seeks to provide an improvement.

According to the invention there is provided a
 25 decoy system for an aircraft which comprises a carrier adapted to be fixed to the aircraft; a replaceable magazine comprising an array of pyrotechnic cartridges, each cartridge having its own electrical detonator; quick-release means for
 30 detachably fixing the magazine in the carrier; a set of electrical contacts which releasably connect connections in the carrier to connections in the magazine, the latter connections being connected to the detonators; and a programme device
 35 connected to the carrier connections for initiating firing of one or more of the cartridges in a predetermined pattern in response to receipt of a trigger signal; and means for setting the programme device to adjust the firing pattern.

Generally, the generation of the trigger signal will be under control of the pilot of the aircraft. However, it is envisaged that the system might be automatic and might generate a trigger signal in response to detection of an incoming missile.
 45 Preferable the programme device is a micro-processor and preferably it is housed in the carrier. Preferably the carrier houses electric batteries to power the system.

A system of the kind described is particularly
 50 suitable for use with helicopters since it can be made small and unobtrusive and can be bolted to the helicopter under-carriage or armaments pylon.

Rapid turn-around of the helicopter is enabled by the fact that a fresh and fully loaded magazine
 55 can be quickly fixed into place and, if necessary, the firing pattern can be reset in a matter of seconds.

It is envisaged that the cartridges will contain
 60 infra-red composition and radar chaff individually and a magazine will contain generally a mixture of the two types of cartridge. The caps of the cartridges may be colour coded so as to enable the ground staff to identify that the required type of decoy is being loaded. Some magazines may

65 comprise all chaff, some all infra-red, and some mixtures of various ratios.

While it is envisaged that several of the cartridge detonators may be wired together for simultaneous firing, it is preferred that each
 70 detonator is individually connected to be fired by the programme device. Preferably, the manner of mounting with different types of cartridge will be such that the cartridges are symmetrical so that it makes no difference whether the magazine is
 75 mounted one way up or the other. The manner of making the electrical connections, by plug or socket and perhaps by printed circuit wiper connections would allow appropriate connections to be made whichever way up the magazine was
 80 loaded.

The invention will further be described with reference to the accompanying drawings, of which:—

Figure 1 is a perspective view of a helicopter
 85 fitted with a decoy system in accordance with the invention; and

Figure 2 is a block diagram of the decoy system of Figure 1; and

Referring to Figure 1 there is shown a
 90 helicopter having landing skids 1. To one of the skids is bolted a decoy system 2 which comprises a casing 3 and a removable magazine 4 of pyrotechnic cartridges 5. The magazine is held in place by quick-release catches (not specifically
 95 shown) so that it can be removed from the casing and exchanged with another very quickly. A control cable 6 leads to the helicopter cabin where a control button can be used to trigger the firing of the cartridges.

Referring now to Figure 2 there is shown a
 100 schematic block diagram of the system. The magazine 4 comprises a base 7 which has printed-circuit connections and a body 8 having cylindrical chambers 9 which constitute the cartridges 5.
 105 Each chamber is filled with an appropriate composition comprising a pyrotechnic charge and a load of chaff or infra-red flare material. In each chamber a detonator is fixed at the base 7 and is electrically connected to the printed circuit. Each
 110 chamber is sealed by an end cap 10 which is colour-coded in accordance with the contents of the containers.

The back of the base 7 carries a multi-pin plug
 115 11 which is fitted to a socket 12 which is on a cable 13 in the casing 3. The cable allows the socket to be withdrawn and fitted to the plug before the magazine is withdrawn and fitted to the plug before the magazine is inserted. Also, the cable allows the magazines to be inserted
 120 regardless of orientation ("correct" way up or "upside-down") the attachment clips for the magazine also allow for this reversal.

The cable 13 is connected to a micro-processor
 125 14 which has a set of thumb-wheel switches 15. A battery 16 is housed in the casing 3 to power the system. The micro-processor is connected via the control cable 6 to a push-button 17 which may be operated by the pilot to trigger the system. Alternatively, or in addition, there may be provided

a radar detector 18 sensitive to tracking radar transmissions from a pursuing missile to trigger the decoy system automatically. On receipt of a trigger signal via cable 6, the micro-processor 5 initiates a firing sequence for some or all of the cartridges.

This sequence, or pattern, may be adjusted by means of the switches 15 when the system is being re-loaded, access to the switches being by virtue of removal of the magazine.

The invention is not restricted to the details of the foregoing description of one embodiment thereof. For example, the cartridges 5 may be pre-packed in cylindrical cardboard or plastics casings so as to slot in to holes in the magazines, instead of the compositors being packed directly into the magazine block. Electrical contact with the detonators would be by spring contacts with the printed circuit. With such an arrangement the magazines would be easily rechargeable although nevertheless exchangeable in the casing 3.

CLAIMS

1. A decoy system for an aircraft which comprises a carrier adapted to be fixed to the aircraft; a replaceable magazine comprising an array of pyrotechnic cartridges, each cartridge having its own electrical detonator; quick-release means for detachably fixing the magazine in the carrier; a set of electrical contacts which releasably connect connections in the carrier to connections in the magazine, the latter connections being connected to the detonators; and a programme device connected to the carrier connections for initiating firing of one or more of the cartridges in a predetermined pattern in response to receipt of a trigger signal; and means for setting the programme device to adjust the firing pattern.

2. A decoy system according to claim 1, including a radar detector sensitive to tracking radar transmission for generating said trigger signal.

3. A decoy system according to claim 1 or claim 2, wherein the programme device is a micro processor.

4. A decoy system according to claim 3, wherein the micro processor is housed within the carrier.

5. A decoy system according to any one of the preceding claims, wherein the carrier comprises batteries for powering the system.

6. A decoy system according to any one of the preceding claims, wherein at least some of the cartridges contain an infra-red flare material.

7. A decoy system according to any one of the preceding claims, wherein at least some of the cartridges contain radar chaff.

8. A decoy system according to any one of the preceding claims, wherein at least some of the cartridges contain a mixture of an infra-red flare material and radar chaff.

9. A decoy system according to any one of claims 6 to 8, wherein the cartridges comprise caps which are colour coded for indicating the nature of the contents.

10. A decoy system according to any one of the preceding claims, wherein the magazine is adapted to be inserted and fixed in the carrier regardless of orientation.

11. A decoy system according to any one of the preceding claims, wherein the magazine comprises a body having chambers which constitute the cartridges.

12. A decoy system according to any one of claims 1 to 10, wherein the cartridges comprise pre-packed casings.

13. A decoy system for an aircraft substantially as hereinbefore described with reference to the accompanying drawings.