Aug. 24, 1948. J. IMBER ET AL 2,447,941

AERIAL BOMBS, PYROTECHNIC DEVICES AND THE LIKE

Filed April 6, 1944

4 Sheets-Sheet 1

Fig. 1.

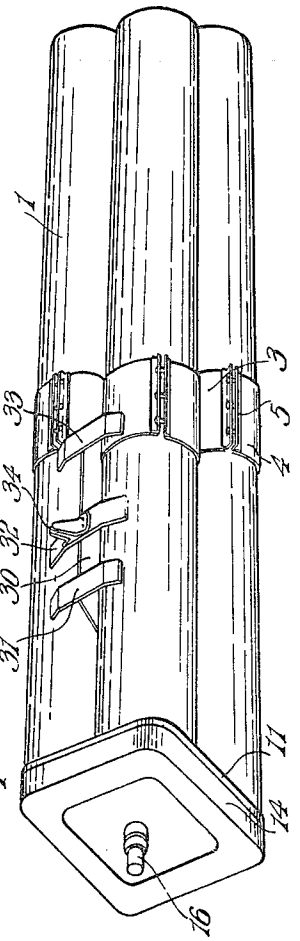
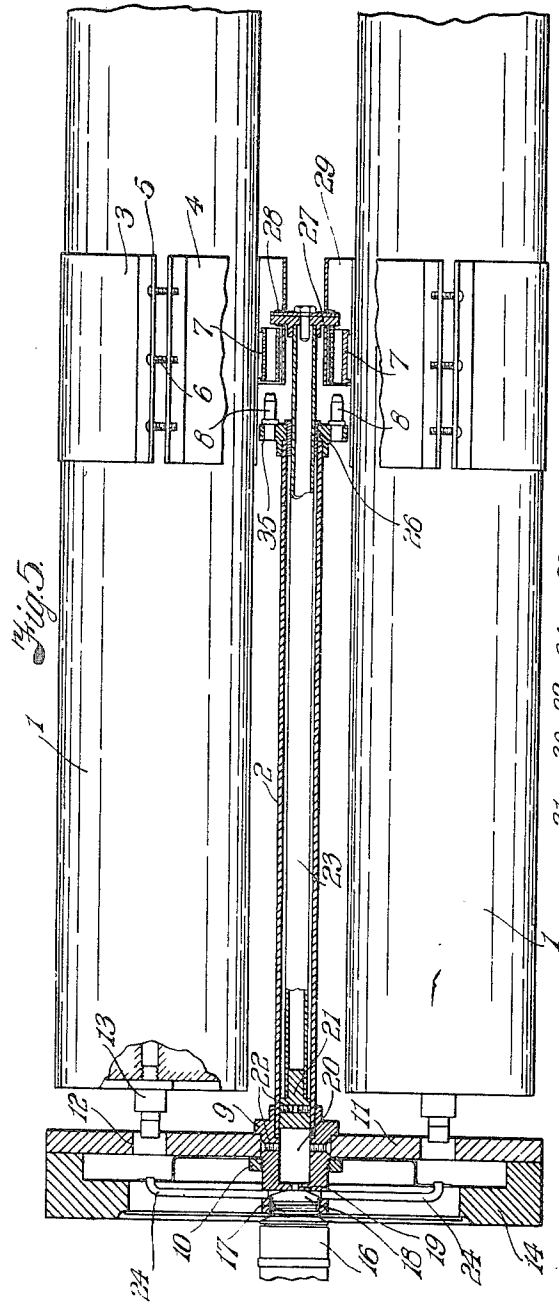


Fig. 5.



Inventor
Jack Imber
Hugh Charles Hebard
By Norris & Patterson
Attorneys

Aug. 24, 1948. J. IMBER ET AL 2,447,941

AERIAL BOMBS, PYROTECHNIC DEVICES AND THE LIKE

Filed April 6, 1944 4 Sheets-Sheet 2

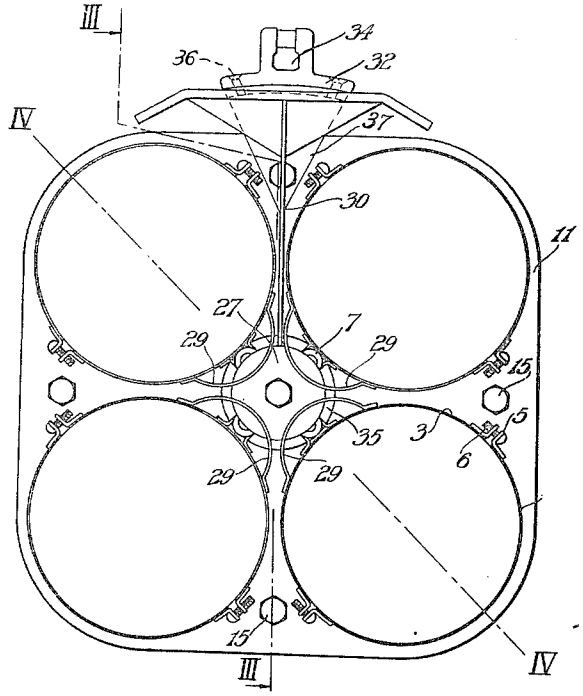


Fig. 2.

Inventor
Jack Imber
Charles Shilland
By Morris L. Patterson
Attorneys

Aug. 24, 1948. J. IMBER ET AL 2,447,941

AERIAL BOMBS, PYROTECHNIC DEVICES AND THE LIKE

Filed April 6, 1944

4 Sheets-Sheet 3

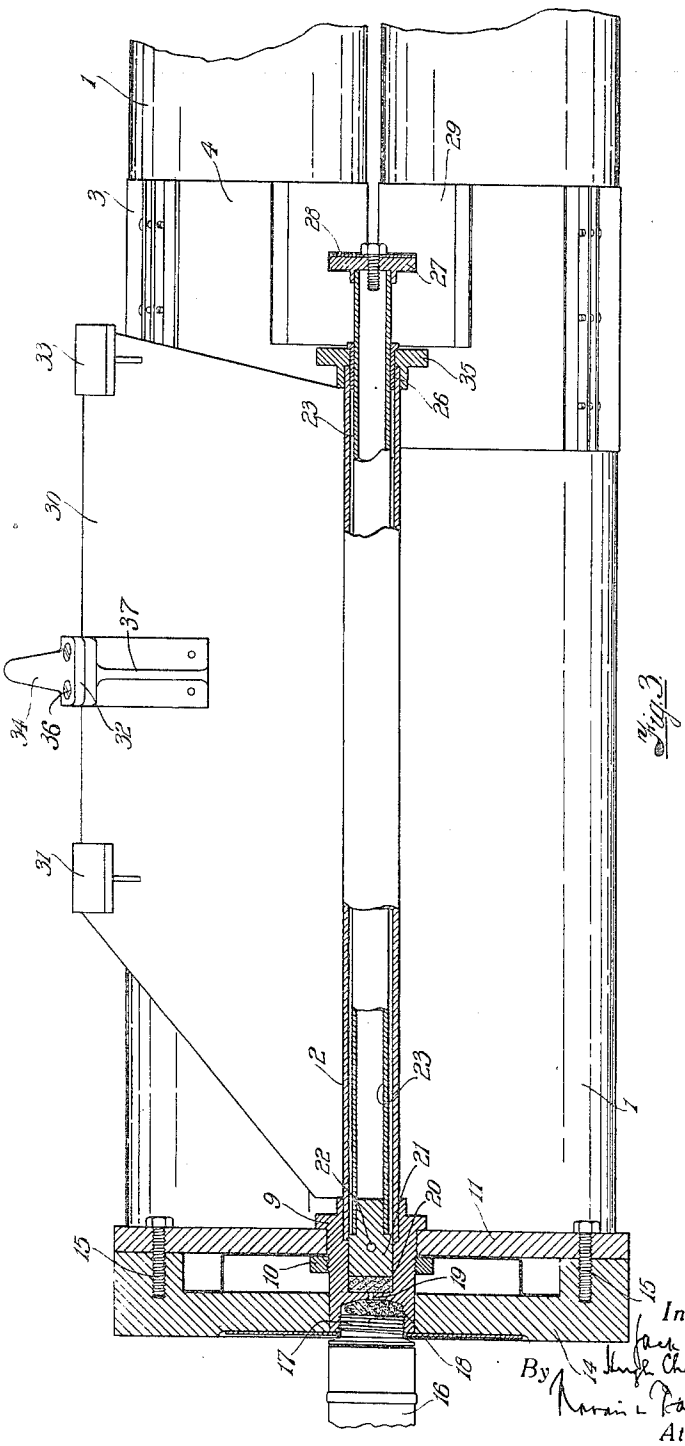


Fig. 3

Inventor

By

Attorneys

Aug. 24, 1948. J. IMBER ET AL 2,447,941

AERIAL BOMBS, PYROTECHNIC DEVICES AND THE LIKE

Filed April 6, 1944

4 Sheets-Sheet 4

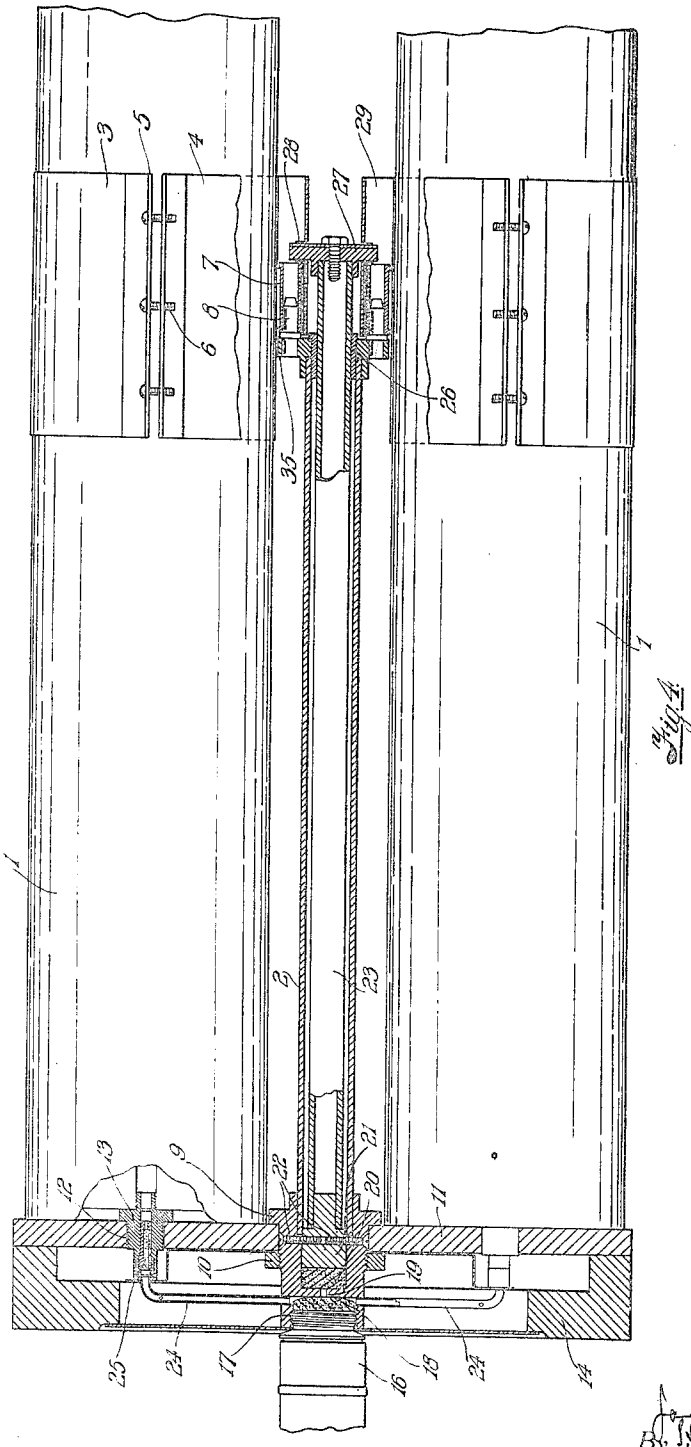


Fig. 4.

Inventor

By: Joseph Imber, Charles Hebard

Kenneth J. Hattman

Attorneys

Patented Aug. 24, 1948

2,447,941

UNITED STATES PATENT OFFICE

2,447,941

AERIAL BOMB, PYROTECHNIC DEVICE, AND THE LIKE

Jack Imber and Hugh Charles Hebard,
Greenford, England

Application April 6, 1944, Serial No. 529,786
In Great Britain May 31, 1943

3 Claims. (Cl. 102—7.2)

1

This invention relates to bombs, pyrotechnic devices and the like constructed for dropping from aircraft. Such projectiles may be secured together in clusters so that when released, the individual projectiles are merely scattered from the height at which the cluster leaves the aircraft. By this method it is extremely difficult to ensure that bombs will strike any particular target or that flares will illuminate a desired area and in a copending application Serial No. 566,460, filed Dec. 4, 1944, now Patent No. 2,434,162, is described means whereby a cluster of bombs, flares or the like can be caused to fall as a unit and to be released for dispersion at a predetermined height above ground.

The object of the present invention is to apply the principle described in said copending application to operate the release of a cluster and at the same instant to ignite any or all of the projectiles forming part of the said cluster. The improved assembly consists of a cluster of projectiles which are mechanically connected to a common support in such manner that a device which ignites the fuzes of the individual projectiles also actuates means for removing the said projectiles from the said support and to disperse them thereby over their target.

The invention also consists in means for use in forming a cluster of bombs, pyrotechnic devices or the like for dropping from aircraft and comprising a central supporting element carrying means for engaging devices mounted on the bombs or the like, means normally preventing disengagement of said devices and a device operated by a propellant explosive to cause detachment of said bombs or the like from their support.

Reference will now be made to the accompanying drawings which illustrate an arrangement of aircraft pyrotechnic devices according to the invention and in which:

Fig. 1 is a perspective view of an assembled flare cluster,

Fig. 2 is an end view of the assembly shown in Fig. 1,

Fig. 3 is a longitudinal sectional view taken on the line III—III of Fig. 2,

Fig. 4 is a longitudinal sectional view taken on the line IV—IV of Fig. 2, and

Fig. 5 is a view similar to Fig. 4 but showing the flares in the positions occupied immediately prior to dispersal.

In the construction illustrated a cluster of aircraft pyrotechnic devices (e. g. flares) 1 is arranged around a central support in the form of a hollow rod 2 extending in a direction parallel

2

to the axes of the flares. Secured around each flare casing is a sleeve formed in two parts 3 and 4 the edges of which have flanges 5 adapted to be connected by bolts 6 for securing the sleeve tightly in position and constructed so that it cannot be readily displaced longitudinally of the flare casing. Carried externally on each sleeve is a small cylindrical socket 7 which is adapted to engage over a pin or stud 8 whose axis lies parallel to that of the flare. These pins are mounted equidistantly around a flange 35 carried by the central hollow rod 2 and enable the assembly of flares to be mounted thereon.

The central rod 2 is mounted at one end in a housing 9 secured by means of a nut 10 centrally in a plate 11 which constitutes the head of the assembly and is formed with apertures 12 constituting locating means adapted to be engaged on assembly by fuze housings 13 in the ends of the flares 1. Mounted on the plate 11 is an end cover 14 (Fig. 1) secured in position by screws 15 (Fig. 3). The housing 9 extends through the cover 14 and in its outer end is mounted a delay action ignition device 16 adapted to be actuated automatically or otherwise in known manner as the assembly leaves the aircraft or at a predetermined time thereafter. The ignition device 16 may consist of any type of fuze designed to ignite and operate during passage through the air and a suitable fuze for this purpose is, for example, that described in a prior application Ser. No. 479,366, filed March 16, 1943, now Patent No. 2,422,548. The ignition device 16 is screw threaded into the housing 9 at 17 and communicates with a chamber 18 in the housing filled with combustible material and in turn communicating through a short passage 19 with a barrel or cylinder 20 also formed within the housing 9 and containing a propellant charge. The inner end of the cylinder 20 is closed by a plunger 21 normally restrained from movement by shear screws 22 passing through the housing 9 and engaging in the plunger. The plunger is carried in one end of a stem 23 mounted concentrically within the hollow rod 2. From the central ignition chamber 18 flash tubes 24 extend in substantially radial directions as shown in Fig. 4, to the fuze housings 13 of the flares, explosive pellets being preferably disposed within the flash tubes 24 to ensure that the flash is transmitted to the flares, in the head of each of which is a delay fuze 25 to ensure that ignition will not take place until a predetermined time interval has elapsed after dispersal of the cluster.

The end of the stem 23 remote from the

plunger 21 passes through a bushing 26 to extend beyond the end of the hollow rod 2 and carries a flange 27 engaging slots 28 in curved members 29 secured to the exteriors of the sleeves 3—4 attached to the flare casings. The members 29 engaged by the flange 27 are shown in Figs. 3, 4 and 5 but their shape can most clearly be seen in Fig. 2 which is a view looking on the end of the flare assembly remote from the cover 14.

In Figs. 4 and 5 the section through the cover 14 is shown along the line of the section line IV—IV in Fig. 2 but for the sake of clearness the flares are shown in outside elevation with parts of the sleeves 3—4.

As the stem 23 is normally held by the shear screws 22 in the retracted position shown in Figs. 3 and 4, the flares are prevented from becoming detached from the assembly on the central support constituted by the hollow rod 2. To enable the flares assembled in a cluster as above described to be suspended from an aircraft, a plate 30 is fixed to the hollow rod 2 and extends radially therefrom as shown in Figs. 2 and 3. This plate carries on its outer edge two transversely extending members 31 and 33 and has a central plate 32 formed or provided with an eye 34 which enables the complete assembly to be carried in the bomb rack of an aircraft. The members 31 and 33 are provided to make engagement with the crutching device fixed on the aircraft. The eye 34 is fixed by screws 36 to flanges forming parts of webs 37 projecting laterally from the plate 30 as shown in Fig. 2.

When the central ignition device 16 is operated, it causes a flash to travel through the tubes 24 and passage 19 and either instantly or after a predetermined time interval, the propellant charge in the cylinder 20 is caused to explode within the head of the central rod 2 which functions as a gun barrel so that the plunger 21 is projected outwardly shearing the screws 22. This movement is transmitted through the flange 27 which is moved towards the right (Fig. 5) taking with it the sleeves 3—4, the flares 1 and the sockets 7 which are thereby drawn off the pins 8. The flares are thus disconnected from their central support and as the movement described has also removed the fuze housings 13 from engagement with the plate 11, the flares are free to disperse so that thereafter they fall individually, although they will not be ignited until their delay action fuzes 25 have operated. According to requirements the fuzes 25 may operate simultaneously or successively. When the flares having become completely detached to fall individually, the cover 14, plate 11, rod 2, plate 30 and parts carried thereby falls as an independent unit.

We claim:

1. A cluster of aerial projectiles having casings provided with sockets and slotted members fixed to their exteriors and fuze housings at the ends thereof, comprising an end cover having sockets to receive the fuze housings at the ends of the projectiles, a central delay ignition device in said end cover, a cylinder containing a propellant charge in said end cover, flash tubes connecting said ignition device with said cylinder and with said fuze housings, a central hollow rod fixed at one end in said end cover, means carried by said rod to engage said sockets on the exteriors of the projectile casings, a stem disposed within said hollow rod, a plunger at one end of said stem disposed within said cylinder and having means for normally restraining it against movement, a flange carried at the opposite end of said stem and engaging the slots in said members on the projectile casings, and means fixed to said hollow rod for suspending the assembled cluster of projectiles from an aircraft.

2. An assembly of projectiles, comprising a central rod, an end cover in which said rod is fixed, means carried by said rod and over which the projectiles are detachably mounted, a cylinder in said end cover to contain a propellant charge, a second rod mounted within the first-mentioned rod and provided at one end with a plunger movable axially in said cylinder by the explosion of a propellant charge therein, shear screws for fixing said plunger in said cylinder, curved elements fixed externally to the projectiles and provided with slots, and means including a flange on the other end of said second-mentioned rod and engaged in the slots in said curved elements to disengage the projectiles from said first-mentioned rod and said end cover.

3. An assembly of projectiles provided at their ends with fuze housings, comprising a central rod, an end cover, a housing mounted centrally within said end cover and in which said rod is fixed, means carried by said rod for detachably connecting the projectiles thereto, a plate fixed to said end cover and having sockets engageable by the fuze housings on the projectiles for locating the ends of the latter relatively to said end cover, a delay action ignition device situated centrally of said end cover, flash tubes connecting said ignition device with the fuze housings on the projectiles, a propellant charge in said housing in the end cover and connected to said flash tubes, and means actuated by explosion of said charge to disconnect the projectiles from said central rod.

JACK IMBER.
HUGH CHARLES HEBARD.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,220,803	Watson	Mar. 27, 1917
2,323,561	Newman	July 6, 1943
2,327,365	Moseman	Aug. 24, 1943
2,346,494	Leland	Apr. 11, 1944

FOREIGN PATENTS

Number	Country	Date
264,762	Italy	May 10, 1929