Nov. 19, 1946. J. IMBER 2,411,432

AERIAL BOMBS, PYROTECHNIC DEVICES, AND THE LIKE

Filed April 10, 1944 4 Sheets-Sheet 1

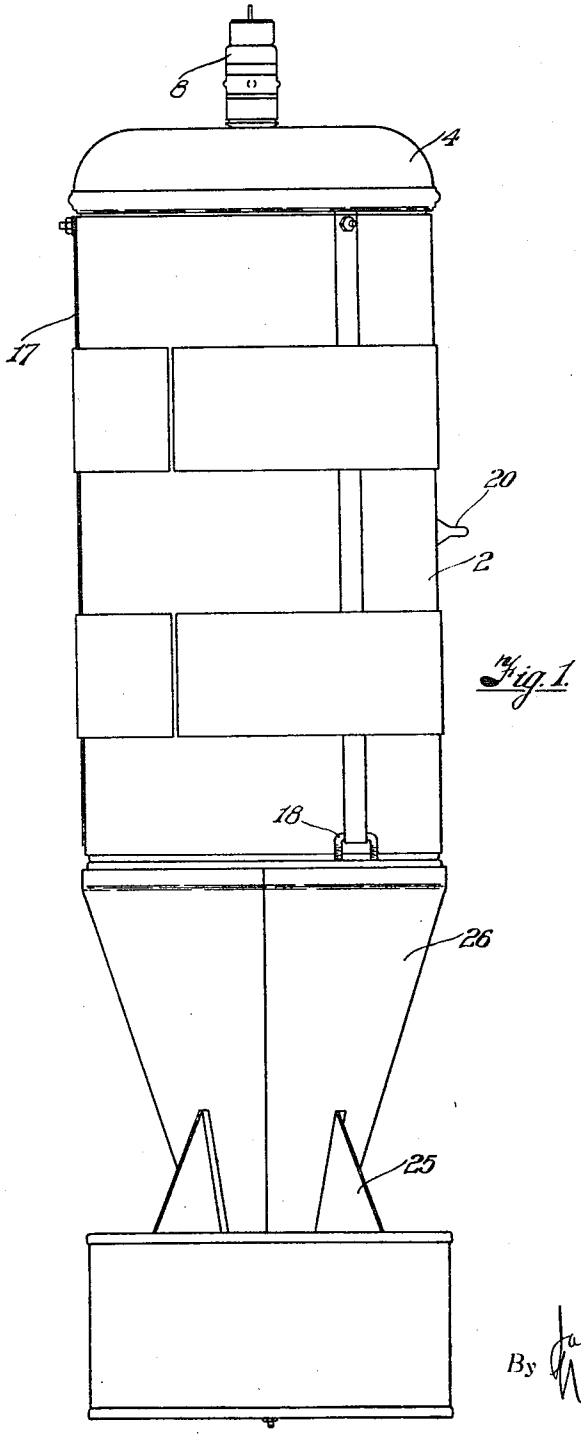


Fig. 1.

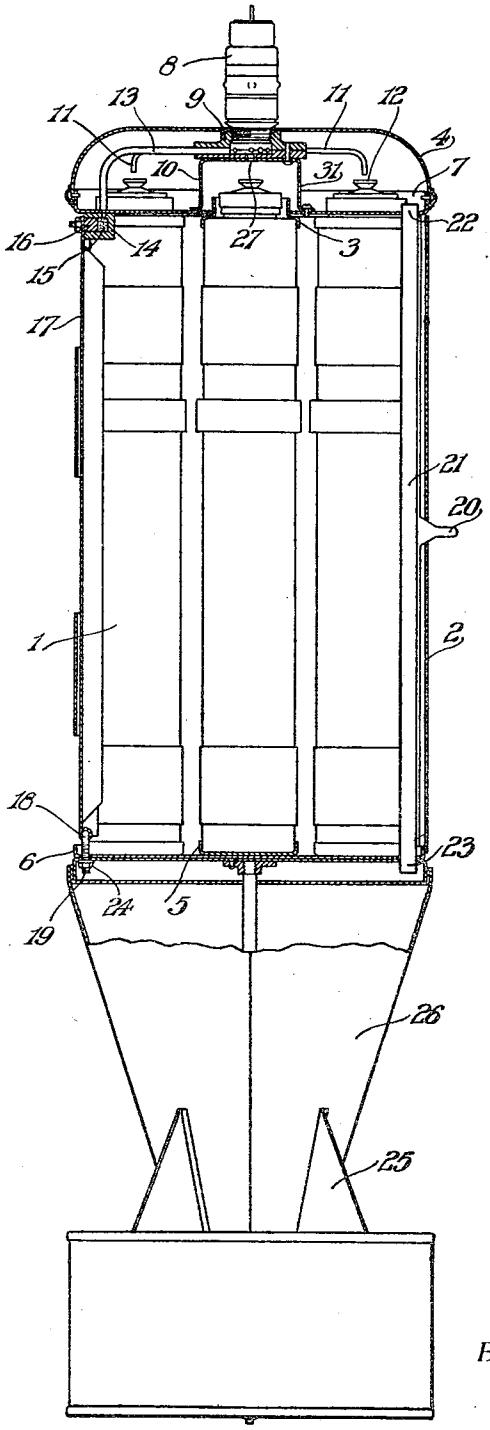
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Fig. 2.



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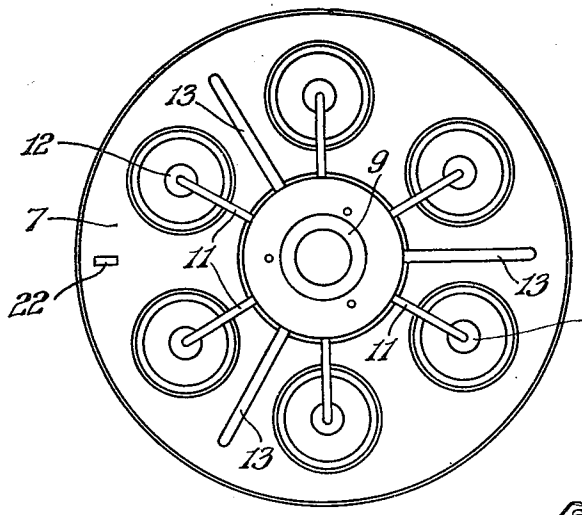


Fig. 3.

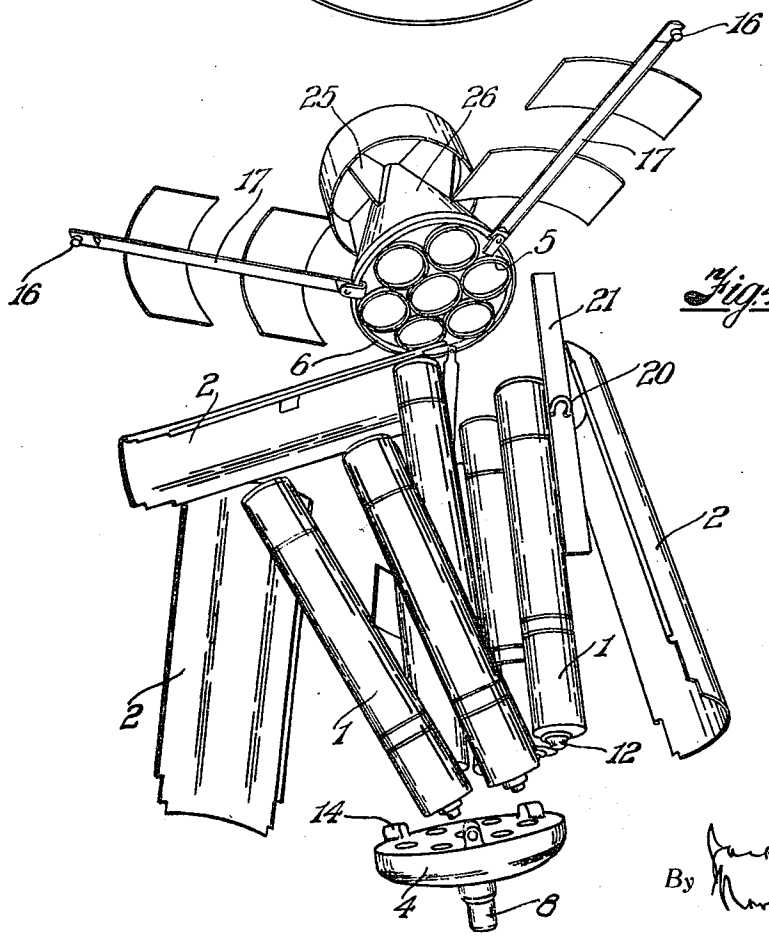


Fig. 4.

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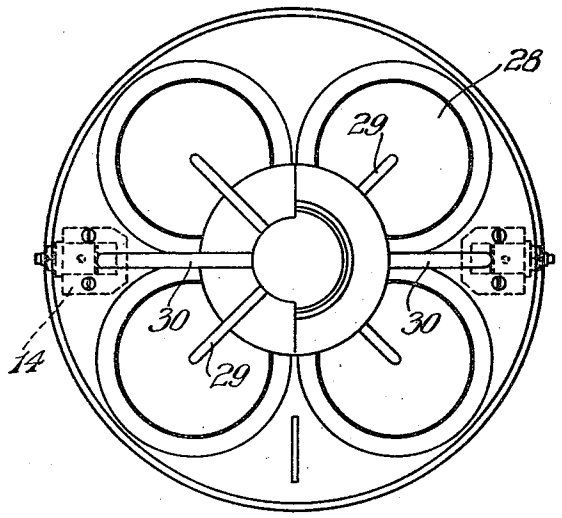


Fig. 5.

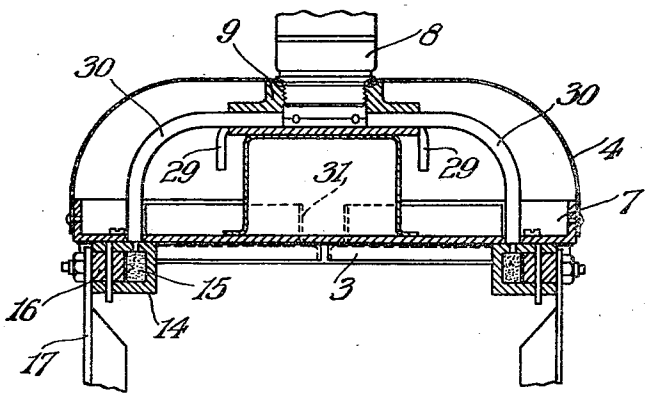


Fig. 6.

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2,411,432

AERIAL BOMBS, PYROTECHNIC DEVICES, AND THE LIKE

Jack Imber, Greenford, England

Application April 10, 1944, Serial No. 530,344
In Great Britain May 31, 1943

9 Claims. (Cl. 102—7.2)

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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 prior application Ser. No. 529,786, filed April 6, 1944, we have 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 our prior 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.

According to the invention an assembly of projectiles includes end retaining elements adapted to engage said projectiles, detachable interconnecting elements disposed between said retaining elements to hold the assembly together as a unit, and a common ignition device adapted to ignite the fuzes of the projectiles and/or actuate means for removing said interconnecting elements to enable the projectiles to be dispersed.

According to the preferred form of the invention means for use in forming a cluster of bombs, pyrotechnic devices or the like are provided comprising head and tail elements formed or provided with means to engage the ends of the bombs or the like, retaining members adapted to connect said elements, devices operated by propellant explosive to disconnect said retaining members and a common delay action ignition device for initiating the release of said retaining members.

Reference will now be made to the accompanying drawings which illustrate examples of constructions according to the invention and in which—

Fig. 1 is an outside elevation of a flare cluster ready for release,

Fig. 2 is a sectional elevation of the arrangement shown in Fig. 1,

Fig. 3 is a plan of the arrangement shown in Figs. 1 and 2 with the top cover removed,

Fig. 4 is a view showing the break-up of the assembly illustrated in Figs. 1 and 2,

Fig. 5 is a part sectional plan of a modified arrangement, and

Fig. 6 is a sectional elevation showing the head of the arrangement shown in Fig. 5.

Referring first to Figs. 1, 2 and 3 seven parachute flares 1 are disposed to form a cluster within a sectional casing made up of a number of partially cylindrical panels 2 which form on assembly a cylindrical casing as shown in Fig. 1,

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which totally encloses the flares 1 whose ends are engaged by sockets 3 in a head 4 of the casing and by sockets 5 fixed to a tail plate 6 of the casing.

The head of the casing consists of a dome-shaped cover 4, as shown in Fig. 2, whose inner portion is fixed around a dished location plate 7 in which the aforesaid sockets 3 are mounted. Fixed centrally in the cover 4 is a delay action ignition device 8 adapted to be actuated automatically or otherwise in known manner as the assembly leaves the aircraft. The ignition device 8 may consist of any known 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. The ignition device 8 is screw threaded into a socket 9 mounted upon a central support 10 fixed at the centre of the plate 7 and surrounding the central socket 3 (see Fig. 3) and from the socket 9 there extends in radial directions, as shown in Fig. 3, a number of flash tubes 11 which terminate immediately above ignition devices 12 mounted in the ends of the flares 1, the arrangement being such that the flash from the ends of the tubes 11 will cross the intervening space and ignite the devices 12. The central ignition device 12 is adapted to be ignited from a flash orifice 27 situated centrally in the underside of the socket 9. Additional flash tubes 13 connect the socket 9 with cylinders 14 fixed to the under or inner side of the plate 7 and each containing a propellant charge 15. The clamping together of the components of the assembly in the manner described forces the heads of the flares 1 into close engagement with the sockets 3 which are formed each with a cylindrical extension 31 passing through the plate 7 to allow the ignition devices 12 of the flares to project into the closed chamber formed within the cover 4. The ends of the flash tubes 11 thereby open into a confined space so that the flashes therefrom cannot affect any other part of the assembly.

A cylindrical plunger 16 engages frictionally in each cylinder 14 and is attached to one end of a bar 17 of which there are three in the construction illustrated extending substantially throughout the length of the cylindrical portion of the assembly with their opposite ends hingedly connected to metal eyes 18 fixed by their ends 19 engaging in the tail plate 6. The assembly illustrated is adapted to be suspended from the aircraft by means of an eye 20 fixed to or formed integral with a T-section bar 21 whose end 22 projects through the plate 7 and whose end 23 projects through the tail plate 6. The bar 21 thus forms a connecting element extending throughout the assembly which is made a rigid one by tightening nuts 24 on the ends 19 of the

eyes 18 after the components have been assembled in the manner shown in Fig. 2. The tail plate 6 is provided with tail fins 25 mounted on a tail unit 26 of ordinary form so that the assembly as a whole, after it leaves the aircraft will fall through the air as though it were a single bomb or flare.

The operation of the arrangement above described is as follows:

The central ignition device 8 is ignited as or after the assembly leaves the aircraft, and is set so that after a predetermined time delay has elapsed since it left the aircraft, an explosion in the fuze chamber of the device 8 will cause a flash to pass through all the tubes 11 and 13 and orifice 27 to ignite the fuzes 12 of the flares and also to explode the propellant charges 15 in the cylinders 14 so that the plungers 16 are forced radially outwards moving the bars 17 also radially outwards about their points of connection to the hinged members 18. This operation disconnects the top cover 4 of the assembly from the tail plate 6 so that the various components of the assembly commence to fall apart. This operation is illustrated by Fig. 4 wherein it will be seen that the bars 17 have swung to approximately horizontal positions, the panels 2, being freed thereby, have fallen away as separate units so that the flares 1 have been released from engagement with the sockets 3 and 5 to fall thereafter and function as independent units. It will be understood that the function of the fuze 8 is to determine the point at which the cluster will disperse while the function of the fuzes 12 is to determine when the individual flares will be ignited. According to requirements the fuzes 12 may operate simultaneously or successively.

The arrangement shown in Figs. 5 and 6 is similar in many respects to that illustrated in Figs. 1–4 except that there is no central flare, and, therefore, no need for the central flash aperture 27. The central ignition device 8 is mounted to operate in the same manner as already described with particular reference to Fig. 2, but in Figs. 5 and 6 only two bars 17 are employed to lock the assembly together for discharge purposes.

The four flares indicated at 28 are simultaneously ignited through flash tubes 29 and there are two flash tubes 30 which cause the ejection of plungers to release the bars 17.

It is to be understood that the function of the casing panels 2 is protective only and that they do not form an essential feature of the invention which could be satisfactorily carried out with only the connecting bars 17 and 21 extending between the head and tail components.

The invention is not restricted to the particular application to parachute flares described above and illustrated as it can equally be applied to a cluster of incendiary bombs, for example, adapted to ignite on impact with an objective. In such an arrangement the flash tubes 11 would be unnecessary and only the flash tubes 13 would be employed to enable the cluster to be dispersed at a predetermined height above the objective.

I claim:

1. A cluster of aerial devices provided with ignition means, and supporting means therefor comprising a head casing having sockets to receive the ends of said aerial devices, a tail plate also provided with reception sockets, a central delay ignition device in said head casing, a number of cylinders containing propellant charges mounted on said head casing, flash tubes connecting said ignition device with said cylinders and with the ignition means of the aerial devices, retaining bars hinged to said tail plate and carrying plungers engaging in said cylinders, cylindrical casing components held in position by said retaining bars, and a bar adapted to connect the head casing and tail plate and carrying means for suspending the cluster from an aircraft.

2. An assembly of aerial devices having fuzes for igniting them and adapted to be dropped from an aircraft, including end retaining elements adapted to engage the ends of said aerial devices, detachable interconnecting elements disposed between said end retaining elements to hold the assembly together as a unit, means for igniting the fuzes of said aerial devices, a propellant explosive carried by the assembly, devices adapted to be actuated by the propellant explosive to remove said interconnecting elements and enable said aerial devices to disperse, and common ignition means for said fuzes and for detonating said propellant explosive.

3. Means for use in forming a cluster of aerial devices having fuzes for igniting them and adapted to be dropped from an aircraft, including head and tail elements adapted to engage the ends of said devices, one of said elements having cylinders formed therein, retaining members hingedly connected to the other of said elements and frictionally engaging the cylinders and normally connecting said elements, propellant charges in said cylinders, and common ignition means for igniting the fuzes of said aerial devices and for detonating the propellant charges to thereby disconnect the retaining members and allow the components of the structure to disperse.

4. An assembly according to claim 2, wherein said common ignition means is operable to cause ignition of said aerial devices simultaneously with release of said retaining members.

5. Means according to claim 3, wherein said common ignition means comprises a delay action ignition device situated centrally of said head element, and flash tubes connecting said ignition device with the fuzes of a number of said aerial devices and with said cylinders to explode said propellant charges therein and thereby disconnect said retaining members from said head element.

6. Means according to claim 3, wherein said retaining members comprise bars hinged to said tail element and extending parallel to the axis of the structure, and plungers carried by the heads of said bars and normally engaging in said cylinders.

7. Means according to claim 3, including a bar extending lengthwise of the structure into engagement with said head and tail elements and carrying means for suspending the structure from an aircraft.

8. Means according to claim 3, wherein said head and tail elements comprise circular plates formed with locating sockets to engage the ends of said aerial devices, and including a cover on said head element to enclose said ignition means, and fins on said tail element.

9. Means according to claim 3, including curved panels carried by said retaining members and maintained in position thereby to form a cylindrical casing which, in conjunction with said head and tail elements, completely encloses said aerial devices.

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