

April 13, 1943.

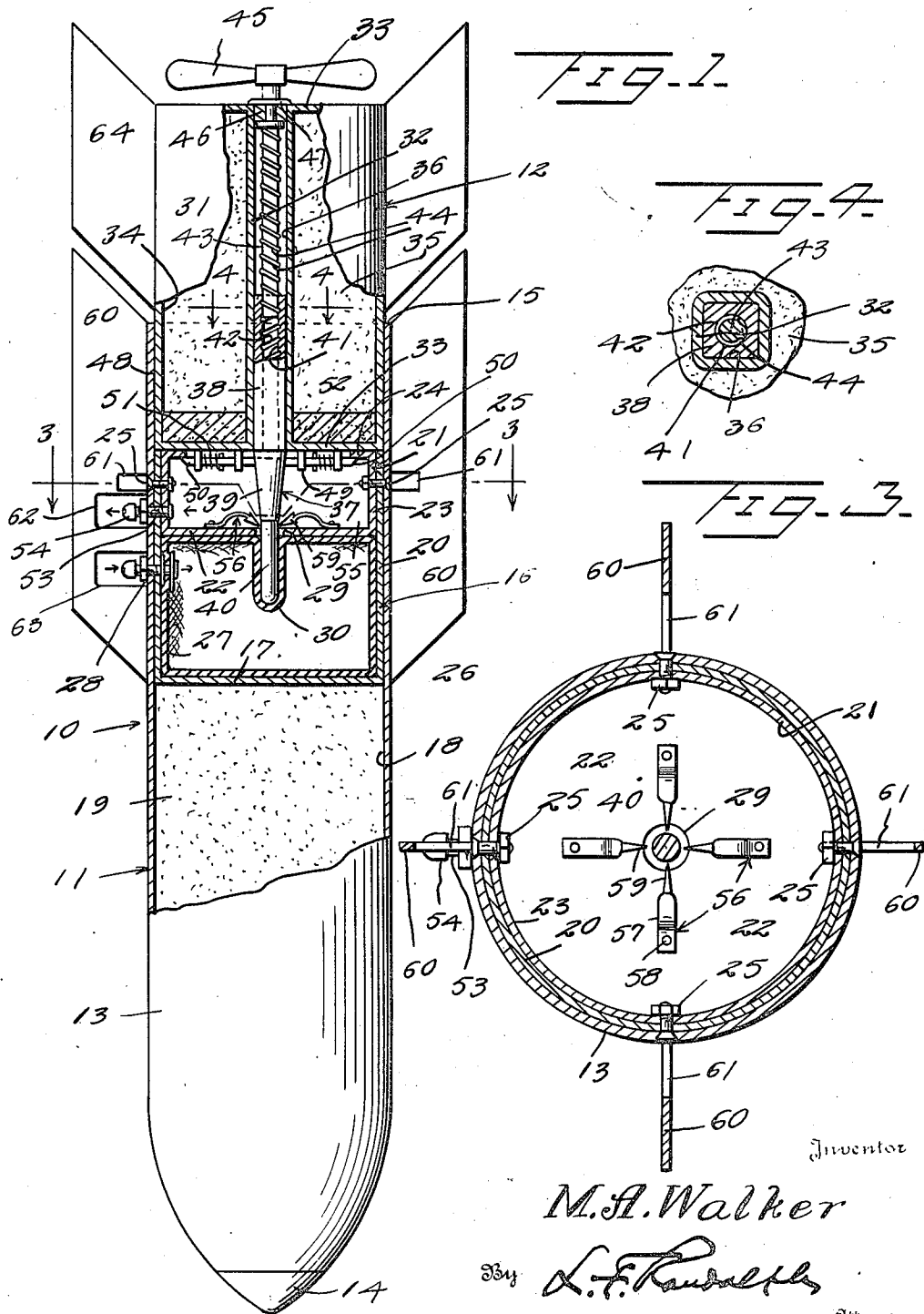
M. A. WALKER

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TANDEM AERIAL TORPEDO

Filed March 12, 1942

2 Sheets-Sheet 1



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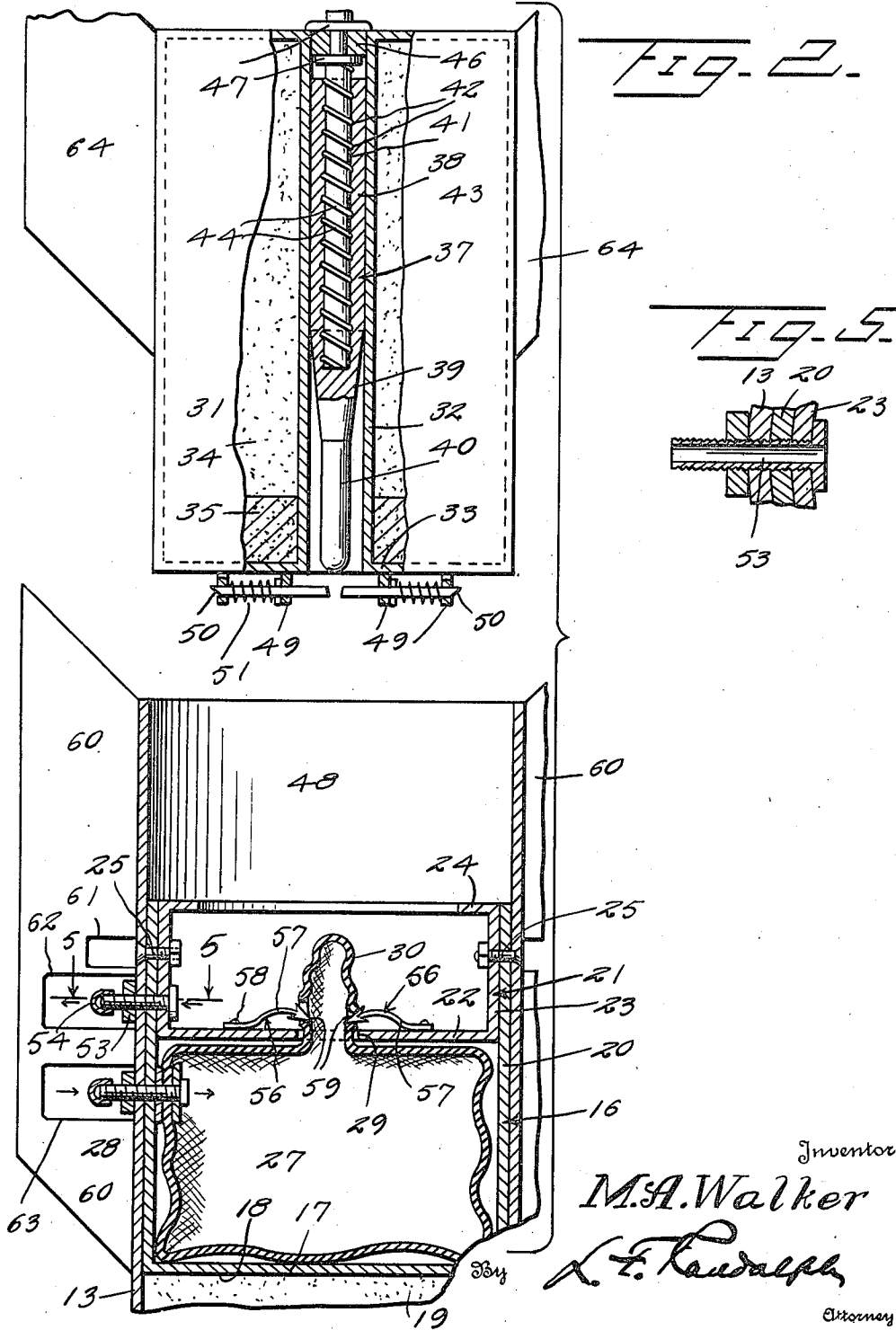
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UNITED STATES PATENT OFFICE

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TANDEM AERIAL TORPEDO

Milton A. Walker, San Jose, Calif.

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8 Claims. (Cl. 102—6)

This invention relates to improvements in aerial torpedoes, and more particularly to a torpedo composed of two sections arranged in tandem, one of which contains the demolition charge and the other of which contains a charge of incendiary material or composition.

It is a primary aim of this invention to provide a torpedo formed of sections having means, whereby at a predetermined time after the torpedo has been launched, means constituting a part of the torpedo, will be operated for disconnecting the sections so that they will strike a target in different positions and at different times.

Still another object of the invention is to provide an inflated sack which is adapted to be ruptured for forcing the torpedo sections apart, and means actuated by the travel of the torpedo through the air for allowing a portion of the sack to move in engagement with the rupturing means, for releasing the air from the sack.

Still a further aim of the invention is to provide latch means for normally holding the sections connected and which are released by the means, actuated by the travel of the torpedo, before the sack is ruptured.

Other objects and advantages of the invention will hereinafter become more fully apparent from the following description of the drawings, which illustrate a preferred embodiment thereof, and wherein:

Figure 1 is a plan view, partly in section, showing the torpedo assembled and with the parts in the position that they will assume at the time that the torpedo is launched.

Figure 2 is an enlarged, fragmentary, horizontal sectional view, partly in plan, and showing the torpedo sections detached.

Figure 3 is an enlarged, cross sectional view taken substantially along the plane of the line 3—3 of Figure 1.

Figure 4 is an enlarged, cross sectional view taken substantially along the plane of the line 4—4 of Figure 1, and

Figure 5 is an enlarged sectional view taken substantially along the plane of the line 5—5 of Figure 2.

Referring more particularly to the drawings, wherein like reference characters designate like or corresponding parts throughout the different views, 10 designates generally the improved aerial torpedo in its entirety and which includes a forward, demolition section 11 and a rear incendiary section 12, which sections are disposed in tandem.

The forward section 11 includes a hollow, substantially cylindrical shell 13 which is provided

with a closed, tapered forward end 14 which forms the nose or leading end of the torpedo 10. The opposite rear end 15 of the shell 13 is open. A cup-shaped member 16 is disposed within the shell 13 and near but spaced from the open rear end 15 thereof. The closed end 17 of the member 16 is disposed toward the nose 14 and forms a dividing wall which separates the forward and the rear part of the shell 13 and which forms a chamber 18 and the forward part of the shell 13 which is adapted to contain any suitable demolition or explosive charge 19. The cylindrical wall 20 of the member 16 fits snug against the inner side of the cylindrical wall of the shell 13.

A smaller, cup-shaped member 21 is mounted in the rear part of the member 16 and has a bottom or closed end 22 disposed toward but spaced from the closed end 17. The cylindrical wall 23 of the member 21 fits snug within the rear end of the cup-shaped member 16. The cup-shaped member 21 at its open end is provided with an annular, inwardly extending flange 24, for a purpose which will hereinafter be explained. A plurality of nut and bolt fastenings 25 extend through the shell 13, the wall 20 and the wall 23 for assembling the cup-members 16 and 21 within the shell 13 and in the position as seen in Figure 1.

The end wall 22 combines with end wall 17 and a portion of the cylindrical wall 20 to form a chamber 26 which contains a sack 27 formed of rubber, similar to the rubber used in conventional inner tubes of pneumatic tires. The sack 27 is provided with a conventional, one way, inwardly opening valve 28 which projects outwardly through the wall 16 and shell 13 and which affords means for inflating the pneumatic sack 27. Wall 22 is provided with a centrally disposed opening 29 and the sack 27 is provided with an integral projection or finger 30, for a purpose which will hereinafter be described.

The rear, incendiary section 12 comprises a casing composed of a cylindrical outer wall 31, a polygonal inner wall 32, which is disposed concentric to the wall 31, and end walls 33 which combine to form an annular chamber 34 which is adapted to contain a conventional incendiary charge 35 including any conventional combination of elements or ingredients together with suitable means for detonating the charge, which, like the explosive charge 19, constitutes no part of the present invention.

The inner wall 32 forms a polygonal shaped bore 36, which extends longitudinally through the section 12. A rod, designated generally 37, is provided with an enlarged, upper end 38 which is

likewise polygonal shaped in cross section and which is sized and shaped to slidably but not turnably engage the bore 36, as best seen in Figure 4. Rod 37 is provided with a tapered intermediate portion 39 and a restricted opposite end 40 which is adapted to normally extend through the opening 29 and into the extension or finger 36 to hold said extension or finger 30 in a position projecting into the sack 27 when the sack is inflated, as shown in Figure 1. Rod portion 38 is provided with a longitudinal bore 41 which is circular in cross section and which opens outwardly of its opposite end and which is provided with an internal thread 42. A propeller shaft 43 is provided with a thread 44 for engagement with the thread 42 and has one end thereof disposed in the recess or bore 41 and in threaded engagement therewith. Shaft 43 extends rearwardly through the bore 36 and therebeyond and has a propeller 45 keyed to its outer end and disposed to the rear of the chamber 34. The rear end of the bore 36 is provided with a bearing 46 for journaling the shaft 43, and said shaft carries collars 47 which engage opposite ends of the bearing 46 to prevent longitudinal movement of the shaft 43 relatively to the bore 36.

The rear end of the shell 13, beyond the rear ends of the cup-shaped members 16 and 21, forms a recess portion 48 for receiving the forward end of the section 12, which forward end bears against the flange 24 and the outer end of the wall 20. The cylindrical wall 31 is of substantially the same diameter as the wall 20 so as to snugly fit within the shell 13, as seen in Figure 1. The inner end wall 33 is provided with radially aligned guides 49 in which are slidably mounted latch bolts 50. Each of the latch bolts 50 carries an expansion coil spring 51, one end of which bears against a guide 49 and the other end of which bears against an abutment 52 on the said bolt 50, so that the springs 51 urge the latch bolts 50 inwardly or toward retracted positions. When the sections 11 and 12 are assembled, as in Figure 1, the inner ends of the latch bolts 50 bear against the tapered portion 39 which forms a cam for projecting said bolts. The bolts 50, when in projected positions, engage under the flange 24 for latching the sections 11 and 12 together. It will be readily apparent that by manually turning the propeller 45 that the bar 37 can be retracted to retract the latch bolts 50, so that the section 12 can be inserted into the recess 48, after which the propeller 40 can be turned in the opposite direction for projecting the rod 37 to move the latch bolts 50 to projected positions by the cam action afforded by the tapered portion 39. An externally threaded pipe 53 extends through the shell 13 and walls 20 and 23 and is provided with a closure cap 54 at its outer end. This closure cap 54 can be removed when the sections 11 and 12 are being assembled so that air can be released from the chamber formed by the wall 23, wall 22 and the inner end wall 33. After the sections 11 and 12 have been connected cap 54 is again applied, for a purpose which will hereinafter become apparent.

Mounted in this last mentioned chamber, which is designated 55, are a plurality of rupturing elements 56, as best seen in Figure 3, each of which comprises a strip or plate 57 secured at one end by a fastening 58 to the wall 22 and having an opposite pointed end 59 disposed over the opening 29 and adjacent the rod portion 40.

Shell 13 is provided with a plurality of fins 75

60 which project outwardly and radially therefrom and which extend longitudinally thereof for guiding the torpedo while in flight through the air. The fastenings 25, the valve stem 28 and the tube or pipe 53 may be disposed in radial alignment with certain of the fins 60, as illustrated, and the fins 60 are therefore provided with cut out portions 61 into which the fastenings 25 extend. Also, one of the fins is provided with a cut out portion 62 into which tube 53 extends and a cut out portion 63 into which the valve stem 28 extends. The rear portion of the section 12 is provided with similar guiding fins 64 which are preferably disposed in alignment with the fins 60.

From the foregoing description the manner in which the torpedo 10 can be assembled, as seen in Figure 1, is considered to be readily apparent. After the torpedo 10 has been launched through the air, the air striking the blades of the propeller 45 will turn said propeller to revolve the shaft 43 in a direction for screwing it into the recess 41. This will retract the rod 37 to first allow the bolts 50 to move to retracted, released positions and thereafter to permit the extension or finger 30 to be projected, by the air pressure within the sack 27, outwardly through the opening 29 and into engagement with the pointed ends 59 of the rupturing elements 56. These pointed ends 59 will rupture the extension or finger 30, as seen in Figure 2, to release the air from the sack 27 and into the chamber 55 which will thus cause the section 12 to be projected out of the recess portion 48 and thus disconnected from the section 11. Therefore, the section 11 can continue in its flight and strike a target and function in a normal manner as an aerial torpedo and the section 12 will likewise continue in its flight but at a different speed so as to strike the target at a different location and at a different time to function as an incendiary bomb. In Figure 2, the sections 11 and 12 are shown in the positions which they will assume just after having been separated.

Obviously, the size of the propeller 45 can be varied to vary the time when the sections 11 and 12 will be separated, after launching, or this can be accomplished by changing the pitch of the threads 42 and 44.

Various other modifications and changes are likewise contemplated and may obviously be resorted to, provided they fall within the spirit and scope of the invention as hereinafter defined by the appended claims, as only a preferred embodiment has been disclosed.

I claim as my invention:

1. An aerial projectile formed of front and rear sections, the front section having a chamber in its forward part containing an explosive charge, a second chamber behind the explosive chamber, an inflated, resilient sack contained in the second chamber, a rearwardly opening recessed portion disposed behind the second chamber and forming the rear part of the front section, said rear section comprising an annular chamber containing an incendiary material, said annular chamber forming a bore which extends longitudinally therethrough, means movably mounted in said bore and extending into the sack containing chamber and engaging a portion of the sack to press said portion inwardly thereof, means actuated by the travel of the projectile through the air for withdrawing the first mentioned means from engagement with the sack, and rupturing means disposed to engage and rupture the parts of

the sack, engaged by said first mentioned means, when the first mentioned means is withdrawn therefrom, so that the air pressure from the sack will be utilized to force the rear section out of said recessed portion to disconnect the sections.

2. An aerial projectile as in claim 1, and latch means for holding the front and rear sections connected, said latch means being released by the first mentioned means moving to a retracted position.

3. An aerial projectile as in claim 1, a valve stem mounted in the sack and extending outwardly from the front section and containing an inwardly opening valve.

4. An aerial projectile as in claim 1, said front section comprising a cylinder having a tapered, closed forward end and an open rear end, a second cylinder disposed in the intermediate portion of the first mentioned cylinder and having a closed forward end and an open rear end, the closed end of the second cylinder combining with the first cylinder to form the explosive chamber, a third cylinder disposed in the second cylinder and having a closed forward end which cooperates with the forward part of the second cylinder to form the sack chamber, and the rear portions of the second and third cylinders forming spacing means for spacing the rear section from the sack chamber.

5. An aerial projectile as in claim 1, the part of the sack which is engaged by said first mentioned means comprising an integral extension of the sack, said extension, when engaged by the first mentioned means, being held in a position extending into the sack, and said extension, when released by the first mentioned means, being projected outwardly by the pressure of the air

in the sack, and into contact with the rupturing means.

6. An aerial torpedo comprising a front section and a rear section detachably connected in tandem, said front section having a chamber containing an explosive charge, said rear section having a chamber containing an incendiary charge, a resilient sack containing air under pressure disposed in the front section and between the chambers, means carried by the rear section and actuated by the travel of the torpedo through the air for releasing a portion of the sack to allow said portion to be projected outwardly by the air pressure within the sack, and a rupturing member positioned to rupture the blister when it is forced outwardly so that the air under pressure thus released will separate the front and rear sections.

7. A torpedo as in claim 6, and latch means for detachably connecting the sections provided with spring means for urging the latch means to a released position, and said first mentioned means being disposed to hold the latch means in an operative position until released by the first mentioned means being actuated by the travel of the torpedo.

8. An aerial projectile comprising a front section and a rear section detachably connected in tandem, said front section having a chamber containing a demolition charge, a resilient sack containing air under pressure disposed in the projectile, and means carried by the rear section for rupturing the sack to cause the sections to be driven apart and thereby separated from each other.

MILTON A. WALKER.