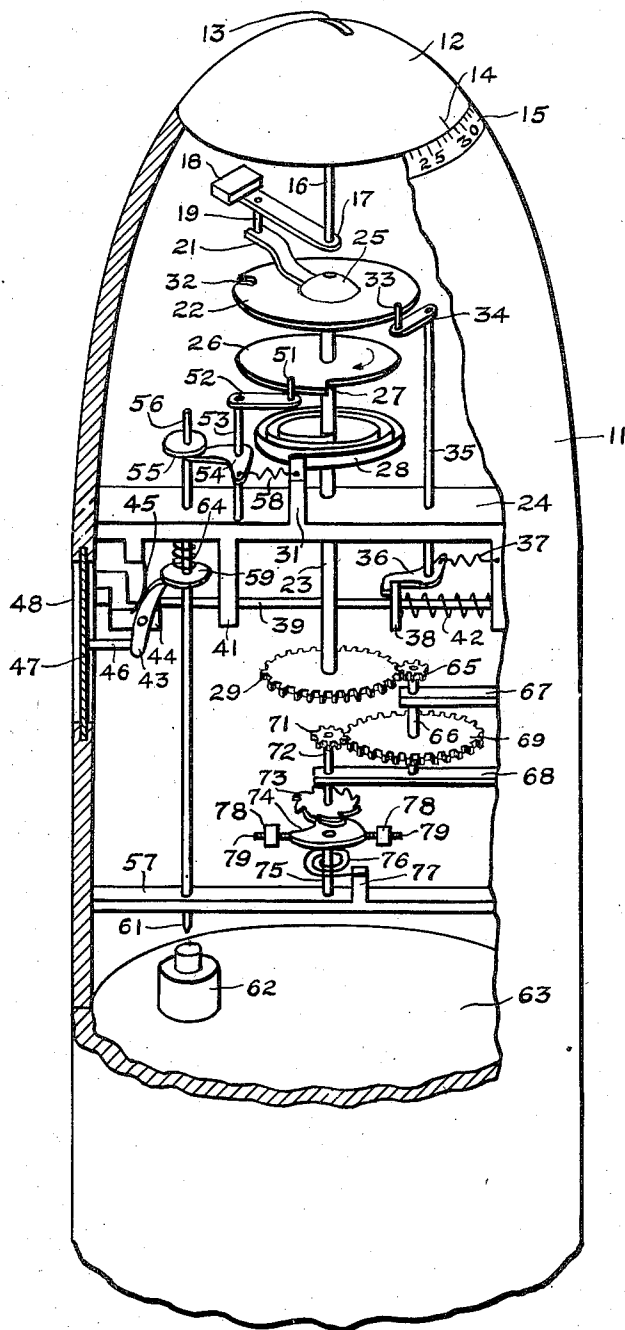


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BOMB DETONATING MECHANISM

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BOMB DETONATING MECHANISM

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1

This invention relates to projectiles and more particularly to bombs provided with concussion detonating devices.

An object of this invention is to provide a bomb with a device which will cause the bomb to explode by the concussion produced by the explosion of another bomb.

A further object of the invention is to provide a bomb with a delay action device which will make the concussion operated mechanism inactive for a predetermined time after the bomb has struck its target.

Another object of the invention is to provide means for exploding the bomb a predetermined time after it has struck the target irrespective of the operation of the concussion operated mechanism.

The invention also consists in certain new and original features of constructions and combinations of parts hereinafter set forth and claimed.

Although the novel features which are believed to be characteristic of this invention will be particularly pointed out in the claims appended hereto, the invention itself, as to its objects and advantages, the mode of its operation and the manner of its organization may be better understood by referring to the following description taken in connection with the accompanying drawings forming a part thereof, in which

The single figure is a side elevation, partly in section, of a bomb constructed in accordance with the invention.

In the following description parts will be identified by specific terms for convenience, but they are intended to be as generic in their application to similar parts as the art will permit.

Referring to the accompanying drawing a bomb 11 is provided with a rotatable cap 12 having a slot 13 and a mark 14 which registers with a scale 15 graduated in seconds. Secured to the rotatable cap 12 is a shaft 16 to which is attached an arm 17 made of material which will be permanently deformed when bent. Fastened to the arm 17 is a weight 18 and a pin 19, the latter engaging a slot in an arm 21 which is secured to a disc 22. The disc 22 is rotatably mounted on a shaft 23 which has a bearing in a cross member 24. A friction cap 25 is mounted on the shaft 23 and tends to hold the disc 22 in any desired position.

Also secured to the shaft 23 are a gear 29 and a cam 26, having a notch 27, a coiled spring 28 is attached between the shaft 23 and a projection 31 on the cross member 24.

The disc 22 is provided with a notch 32 which

2

at suitable times is engaged by a pin 33 mounted on an arm 34. The arm 34 is secured to one end of a shaft 35, which has a bearing in the cross member 24 and carries on its lower end a detent 36. A tension spring 37 is attached to the detent 36 and tends to rotate it, together with the arm 34, in a clockwise direction as seen from above.

The detent 36 engages a collar 38 attached to a rod 39 which is slidably mounted in a bracket 41 on the cross member 24. A compression spring 42 is provided which tends to move the rod 39 to the left. The rod 39 engages a pawl 43 which is rotatably mounted on a bracket 44. A spring 45 presses against the pawl 43 and tends to hold it in engagement with the rod 39 and with a stud 46 which is mounted on a diaphragm 47. The diaphragm 47 is mounted in an opening 48 provided in the side of the bomb 11.

Co-operating with the cam 26 is a pin 51 secured to an arm 52 which is mounted on the end of a shaft 53. The shaft 53 is rotatably mounted in the cross member 24 and carries a detent 54 which engages a collar 55 secured to a rod 56 which is slidably mounted in cross members 24 and 57. A tension spring 58 tends to rotate the arm 52 and detent 54 in a counterclockwise direction as seen from above. A second collar 59 is secured to the rod 56 the lower end of which forms a firing pin 61, which when released fires the primer 62 which in turn detonates the explosive charge 63. A compression spring 64 mounted between the collar 59 and the cross member 24 tends to move the rod 56 downward.

Meshing with the gear 29 is a pinion 65 secured to a shaft 66 which is rotatably mounted in brackets 67 and 68. Secured to the shaft 66 is a second gear 69 which meshes with a second pinion 71 mounted on a shaft 72 which is journaled in the bracket 68. Attached to the shaft 72 is an escapement ratchet 73 which co-operates with an escapement pawl 74 mounted on a shaft 75 which is journaled in the cross member 57. Attached to the shaft 75 is one end of an escapement spring 76 the other end of which is secured to a lug 77 on the cross member 57. Weights 78 are screwed on to threaded extensions 79 of the escapement pawl 74.

In the operation of the bomb shown in the accompanying figure the cap 12 is rotated in a counterclockwise direction by inserting a tool in the slot 13 until the mark 14 registers with the designation on the scale 15 of the number of seconds time delay that it is desired to have. The rotation of the cap 12 causes the arm 17 to be

rotated which in turn causes the arm 21 and disc 22 to be rotated a like amount. The disc 22 is allowed to rotate with respect to the shaft 23 due to the action of the friction cap 25.

When the bomb is dropped and strikes its target the weight 18 will bend the arm 17 which will remain bent, thus releasing the pin 19 from the arm 21. The shaft 23 is then free to turn in a clockwise direction, as seen from above under the action of the spring 28, carrying with it the discs 22 and 26 and the gear 29. The gear 29, by means of the gear train 65, 69, 71 drives the escapement 73—74 in a well-known manner; so that the shaft 23 rotates at a predetermined speed dependent on the position of the weights 78 on the threaded arms 79.

After the cam 26 has rotated thru a small angle the pin 51 will drop into the notch 27 which will allow the detent 54 to be rotated in a counter-clockwise direction under the action of the spring 58. This will release the collar 55 but the shaft 56 will not move as it is prevented from so doing by the pawl 43 engaging the collar 59.

If an adjacent bomb explodes the concussion transmitted thru the air will force the diaphragm 47 inward which by means of the stud 46 will cause the pawl 43 to be rotated in a counter-clockwise direction thus releasing the collar 59. The rod 56 will then be forced downward under the action of the spring 64 which will cause the firing pin 61 to strike the detonator 62 thus exploding the explosive charge 63.

If no adjacent bomb explodes the shaft 23 will continue to slowly turn until the pin 33 drops into the notch 32 of the disc 22. This will allow the detent 36 to be rotated in a clockwise direction under the action of the spring 37, thus releasing the collar 36. This will allow the rod 39 to be moved to the left under the action of the spring 42 which will push the pawl 43 out of engagement with the collar 59. This as previously described causes the detonation of the explosive charge 63.

It is thus seen that this invention provides a bomb which will be held inactive for a predetermined time after it strikes the target after which it will be exploded by the concussion produced by the exploding of adjacent bombs. If no adjacent bombs explode the bomb itself will explode after a second predetermined interval of time.

It has been found in bombing that the greatest effect is produced when a salvo of bombs explode simultaneously. This effect is produced by the present invention for when a salvo of bombs is dropped the time mechanism of the first bomb to strike the target is started and as the successive bombs strike their time mechanisms are successively started. Each of the bombs then becomes alive in succession and lies on the target until the time mechanism of the first bomb causes it to explode, as already described. The concussion of the explosion of the first bomb will, therefore, cause the explosion of all the bombs in the salvo simultaneously thus producing the maximum destructive effect.

Although only a specific embodiment of this invention has been shown herein, it is to be understood that the invention is not limited thereto but may be embodied in various forms without departing from the spirit of the invention as defined by the appended claims.

I claim:

1. A bomb firing mechanism comprising detonating mechanism, restraining means to prevent actuation thereof, mechanism responsive to

external compressional waves, means actuated by said last mechanism to release said restraining means for firing said bomb, holding means rendering said detonating mechanism inoperative, timed means to release said holding means for rendering said bomb responsive to said compression responsive mechanism, and means responsive to impact connected to start said timed means in operation.

2. A bomb firing mechanism comprising detonating mechanism, locking means for said detonating mechanism, timed means to release said locking means, additional holding means to hold said detonating mechanism against operation, a diaphragm responsive to external compressional waves, and means actuated by said diaphragm to release said holding means for firing said bomb, and means responsive to impact connected to start said timed means in operation.

3. A bomb firing mechanism comprising detonating mechanism, restraining means to prevent actuation thereof, mechanism responsive to external compressional waves, release means actuated by said last mechanism to release said restraining means for firing said bomb, timed means to actuate said release means independently of said last mechanism, and means responsive to impact connected to start said timed means in operation.

4. A bomb firing mechanism comprising detonating mechanism, restraining means to prevent actuation thereof, mechanism responsive to external compressional waves, means actuated by said last mechanism to release said restraining means for firing said bomb, additional holding means rendering said detonating mechanism inoperative, timed means to release said holding means for rendering said bomb responsive to said compression responsive mechanism, timed means to release said restraining means for firing said bomb after a predetermined time, and means responsive to impact connected to start both of said timed means in operation.

5. A bomb firing mechanism comprising detonating mechanism, restraining means to prevent actuation thereof, mechanism responsive to external compressional waves, means actuated by said last mechanism to release said restraining means for firing said bomb, additional holding means rendering said detonating mechanism inoperative, timed means to release said holding means for rendering said bomb responsive to said compression responsive mechanism, timed means to release said restraining means for firing said bomb after a predetermined time, means setting said last timed means for controlling the extent of time delay produced thereby, and means responsive to impact connected to start both of said timed means in operation.

6. A bomb firing mechanism comprising detonating mechanism, locking means for said detonating mechanism, timed means to release said locking means, additional holding means to hold said detonating mechanism against operation, a diaphragm responsive to external compressional waves, means actuated by said diaphragm to release said holding means for firing said bomb, means actuated by said timed means to release said holding means for firing said bomb after a predetermined time, and means responsive to impact connected to start both of said timed means in operation.

7. A bomb firing mechanism comprising detonating mechanism, locking means for said detonating mechanism, timed means to release said

locking means, additional holding means to hold said detonating mechanism against operation, a diaphragm responsive to external compressional waves, means actuated by said diaphragm to release said holding means for firing said bomb, means actuated by said timed means to release said holding means for firing said bomb after a predetermined time, means setting said last means to control the time delay introduced thereby, and means responsive to impact connected to start said timed means in operation.

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