E. S. BROWER.

BOMB HOPPER FOR AERIAL CRAFT.

APPLICATION FILED MAY 29, 1917.

1,310,053.

Patented July 15, 1919.

2 SHEETS—SHEET 1.

Fig. 1.

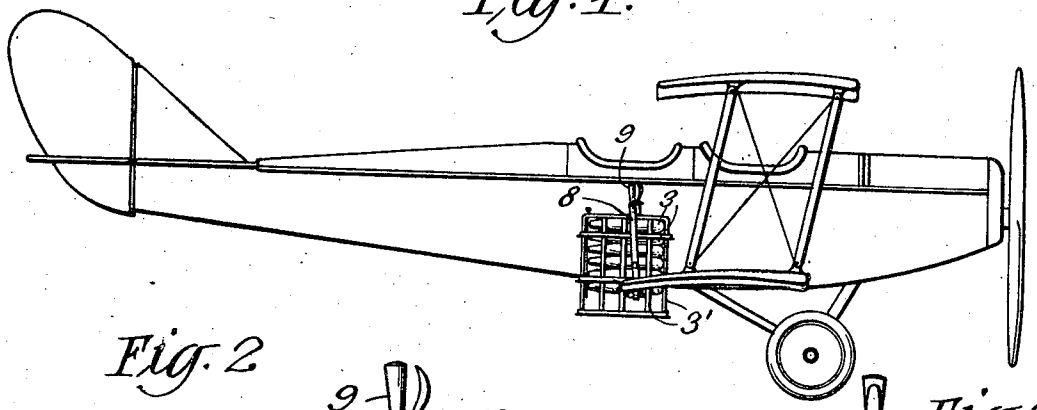


Fig. 2

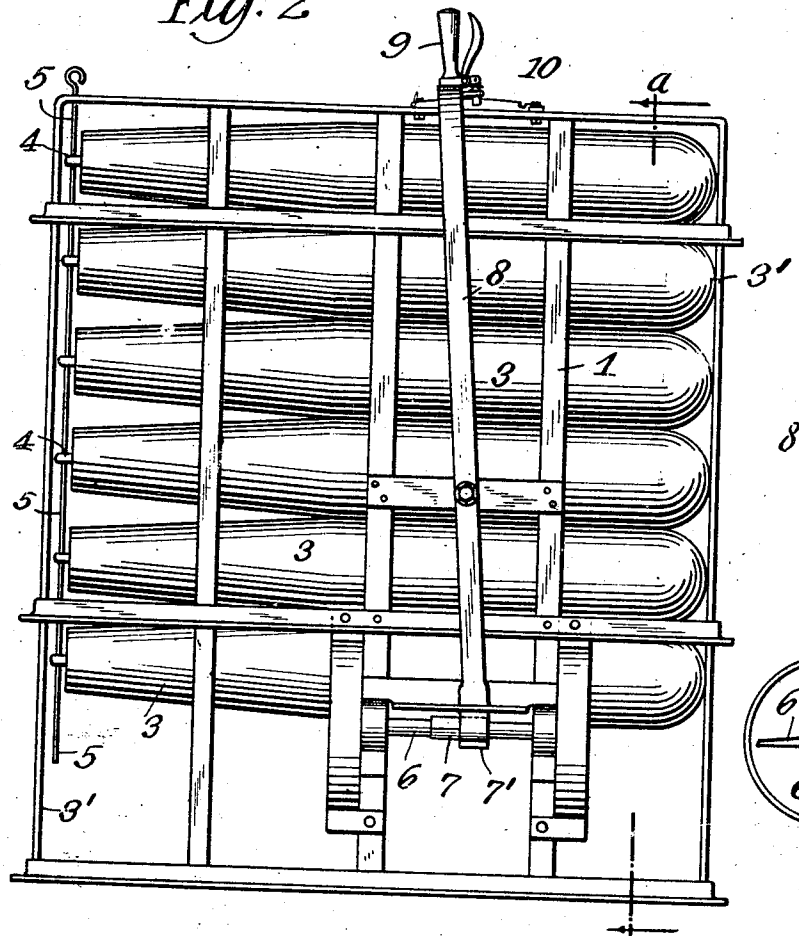
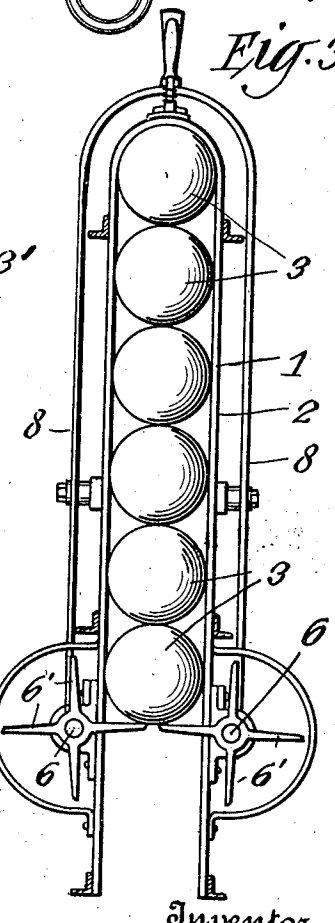


Fig. 3.



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2 SHEETS—SHEET 2.

Fig. 4.

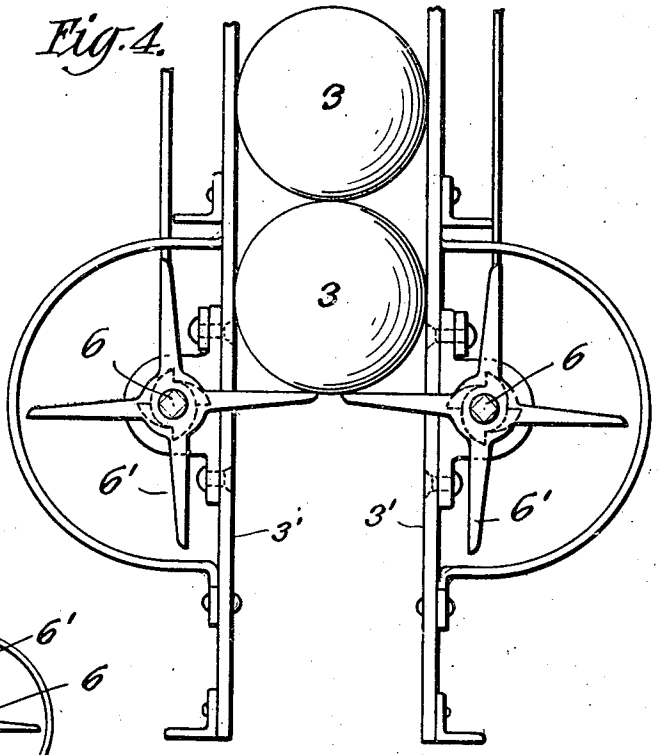


Fig. 7.

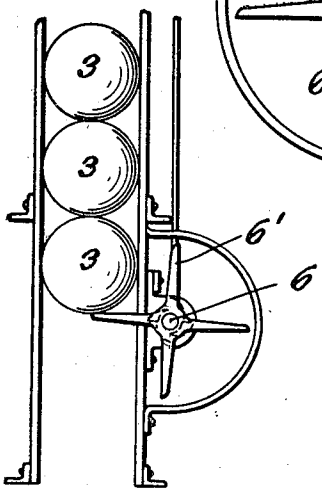


Fig. 6.

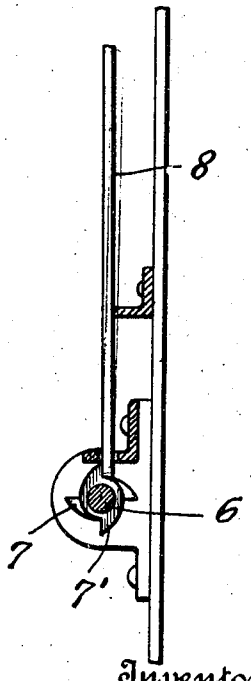
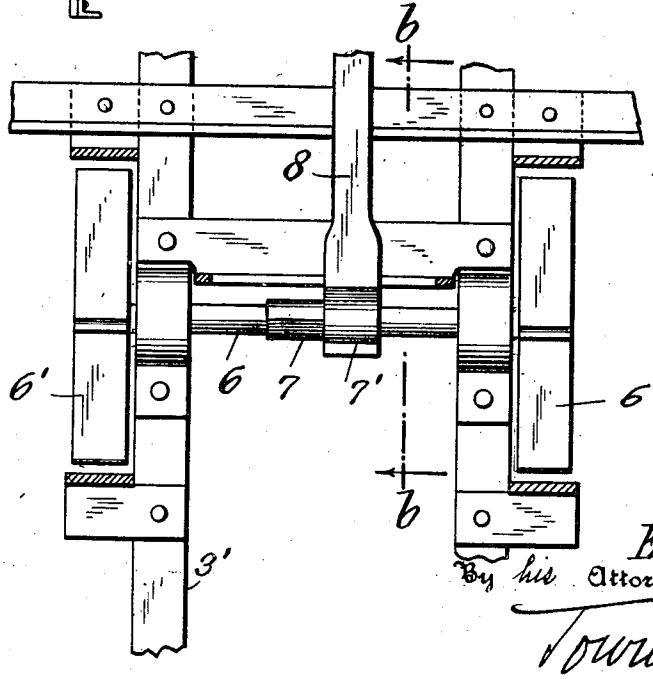


Fig. 5.



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UNITED STATES PATENT OFFICE.

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BOMB-HOPPER FOR AERIAL CRAFT.

1,310,053. Specification of Letters Patent. Patented July 15, 1919.

Application filed May 29, 1917. Serial No. 171,636.

To all whom it may concern:

Be it known that I, EDWARD S. BROWER, a citizen of the United States, and a resident of Ridgewood, in the county of Bergen and State of New Jersey, have invented certain new and useful Improvements in Bomb-Hoppers for Aerial Craft, of which the following is a specification.

My invention relates to the construction of magazines or hoppers adapted to be carried by aeroplanes or other aerial craft and to permit the release of bombs as desired by the aviator.

The object of my invention is to provide means whereby the bombs may be released from the magazine singly or all at once.

My invention further relates to a construction of magazine or hopper suitable for use with bombs having means whereby the exploding devices may be held in inoperative relation during transit and until the time arrives for use of the bomb, and may be released and allowed to assume operative relation when the bomb is to be discharged.

The object of this part of my invention is to so construct the hopper or magazine that, as each bomb is freed from the hopper, the means for holding its explosive devices in normally inoperative relation will be automatically released to permit them to assume an operative relation so that when the bomb strikes the object it will be exploded by impact.

To these ends my invention consists in the construction of apparatus and combinations of devices a preferred form of which is shown in the accompanying drawings from which those skilled in the art will readily understand the principles of the invention and the manner in which the details of construction may be modified, retaining however said principles.

Figure 1 is a side elevation showing the magazine mounted on an aeroplane.

Fig. 2 is an enlarged side elevation of the magazine or hopper embodying my invention.

Fig. 3 is a cross-section on the line *a*—*a* of Fig. 2.

Fig. 4 is an enlarged detail of the discharge end of the hopper.

Fig. 5 is an enlarged side view of Fig. 4 and shows the release mechanism for releasing the bombs one at a time.

Fig. 6 is a sectional view on the line *b*—*b* of Fig. 5.

Fig. 7 is a detail view of a modified form of the discharge magazine.

1 indicates the outside frame of the device in which is mounted a hopper or magazine 2 carrying the assembly of bombs marked 3. The latter in general are of cylindrical form or type and are supposed to be of a construction wherein the nose or head 3′ constituting the impact end of the bomb is suitably weighted so that, as each bomb is released from the longitudinal position of assembly shown, it will assume a vertical position either by the action of gravity alone upon the head or, if need be, by suitable air vanes at its rear end whereby the impact of the head may be utilized in exploding the bomb's charge.

As indicated in Fig. 2, each bomb is provided with a pin or rod 4 projecting rearwardly therefrom and connected to a detonator and serves as a means whereby said detonator may be held at the rear end of the bomb away from the impact end or head until the rod or projection 4 attached to the detonator is released, whereupon said detonator is free to move forward through or in a guide extending to the impact end and to thereby come into suitable proximity to a cap or detonator which is fired on impact, and by acting on the detonator causes the latter to detonate and explode the charge. Each said pin or projection 4 is perforated as herein indicated when used in the manner herein described and a suitable pin or rod 5 extending vertically through said pins normally holds the detonators at the rear of the bomb so that no impact of any nature upon the head or firing devices therein will explode the bomb. Upon the movement, however, of the bomb from its lowermost horizontal position, which occurs as soon as the bomb is released from the hopper, the pin 4

frees itself from the locking or detaining pin or rod 5 and the detonator is then free to move forward to the firing position so that the bomb, which immediately assumes the vertical position in dropping, will be exploded on impact.

To free the bombs one at a time or in mass, the following devices are employed:

6 indicates a horizontal shaft mounted at one side of the hopper in suitable bearings as shown and provided with a series of arms 6′ extending into the mouth of the hopper and adapted to be engaged by the bombs so as to hold them in the magazine so long as the shaft 6 is detained or held from turning. Preferably I employ two similar shafts 6 one at each side of the hopper or magazine, although as indicated in Fig. 7, one only might be used. The shaft 6 is provided with two ratchet or detent wheels 7 7′ mounted beside one another, whereby the shafts and their attached arms may be held normally in position to sustain the bombs in the magazine, or may be freed and allowed to revolve the distance between said arms, to free the lowermost bomb and to bring the next arm into position to meet the next bomb and hold the remaining bombs in the magazine. To govern the action of the shaft and ratchets or detent wheels a suitable detent or catch lever 8 is provided, the lower end of which may be moved in suitable guides out of the position for engagement by the teeth of one wheel into position for engagement by the succeeding tooth of the companion or parallel wheel by means of the operating handle 9. When the lever 8 is moved from the position shown to cause its detent end to shift its position, the shaft is freed allowing the shaft to revolve in the space between the arms 6′, and the shaft is immediately stopped by engagement of a tooth of the other detent wheel with the end of the catch lever 8, so that but one bomb will escape. A reverse movement from the position assumed by the lever 8 in the action just describd will release the shaft for another partial turn and automatically lock it again to prevent the escape of more than one bomb.

To hold the catch lever 8 firmly in its two positions a lock segment 10 and latch carried by the lever may be provided. By however freeing the lever and moving it beyond either of the positions referred to so as to carry the catch away from position for engagement by either detent wheel 7 or 7′, the shaft or shafts 6 are left free to rotate without obstruction and the whole contents of the hopper will therefore fall at once.

It will be understood that the magazine or hopper is not limited to use with bombs of any particular construction or type except as may be necessary to carry out the principle of this invention.

What I claim as my invention is:

1. A hopper or magazine for bombs adapted to hold a series of bombs disposed horizontally one above the other and each provided with a rearwardly extending rod connected to a firing portion thereof and means for locking said rods in inoperative position while the bombs are disposed in the hopper, said means being adapted to automatically free the rod of the lowermost bomb as the bomb leaves the hopper whereby it may assume operative position for exploding the charge in the bomb on impact.

2. In a magazine for aerial bombs, the combination with a shaft having arms adapted to release the bombs one at a time, of release mechanism having detent wheels and a detent arm whereby said shaft may be permitted to revolve step by step and be locked in its successive positions.

3. A hooper for aerial bombs comprising a magazine in which the bombs may be disposed horizontally one above the other, a shaft provided with arms adapted to be engaged successively by the lowermost bomb of the series and means for producing a step by step rotation of the shaft to free the bombs successively or for freeing said shaft to allow the contents of the magazine to be discharged together.

4. Means for holding a series of aerial bombs in horizontal position and discharging the same, together or one at a time, said means comprising an armed shaft provided with two detent wheels and a detent adapted to be moved into position for engagement by the teeth of either wheel or to be thrown into position to free both detent wheels as and for the purpose described.

5. The combination with a hopper or magazine and a series of aerial bombs disposed therein in horizontal position, of a detonator in each bomb, a rod projecting rearwardly from the bomb and connected to said detonator and means carried by the hopper for holding the rods and connected detonators in inoperative relation and for freeing the detonators of the series in succession as each lowermost bomb leaves the bottom of the hopper or magazine.

6. In a bomb hopper or magazine, the combination with the hopper or magazine and a series of bombs carried thereby in vertical series and having exploding means the elements of which are normally held in inoperative relation, of means for freeing the lowermost bomb of the series and in succession and means for freeing said elements in each bomb automatically by the release of the bomb from its lowermost position in the hopper or magazine.

7. The combination with a bomb hopper.

or magazine adapted to hold a series of bombs piled vertically therein and each having a detaining rod connected to its detonator and extending rearwardly from the bomb, of a locking rod extending vertically in engagement with said detaining rods and adapted to free the detaining rod of each bomb as it leaves its lowermost position.

Signed at New York, in the county of New York and State of New York, this 28th day of May, A. D. 1917.

EDWARD S. BROWER.

Witnesses:
F. B. TOWNSEND,
W. R. WARNER.