P. FABIANI & C. AGNELLI.

PERCUSSION SHELL.

APPLICATION FILED APR. 21, 1913.

1,207,520.

Patented Dec. 5, 1916.

2 SHEETS—SHEET 1.

FIG. 1.

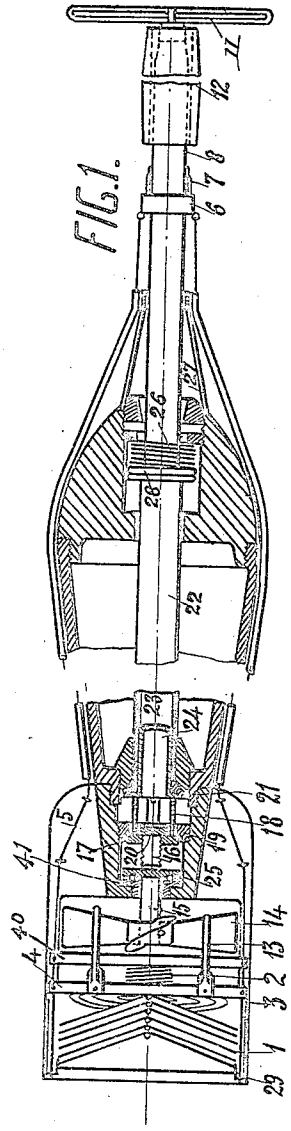


FIG. 2

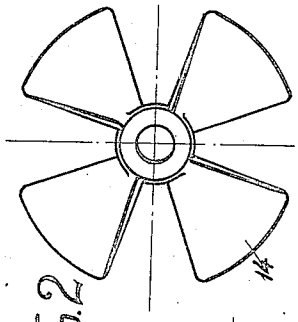


FIG. 3

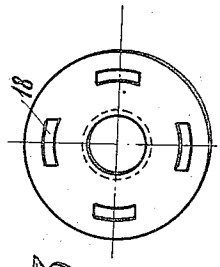


FIG. 4

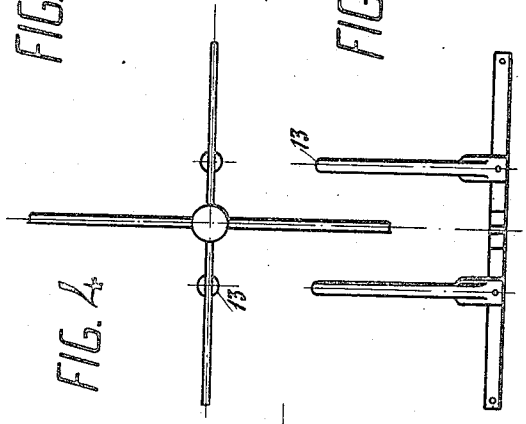
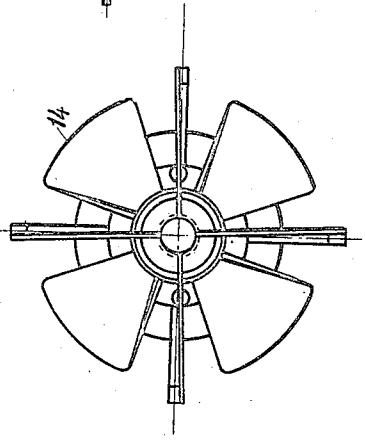


FIG. 5



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2 SHEETS—SHEET 2.

FIG. 7

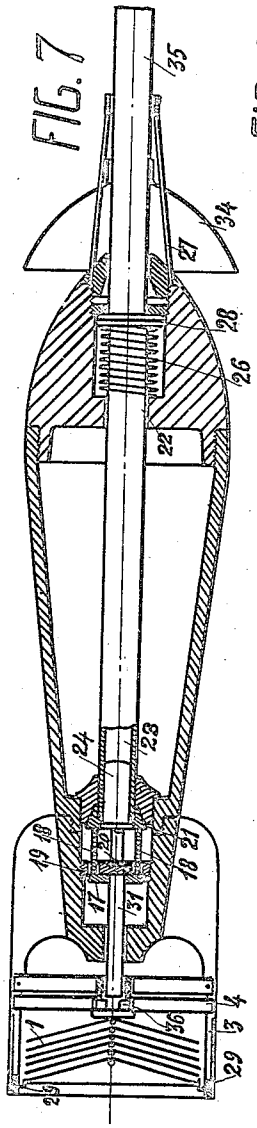


FIG. 9

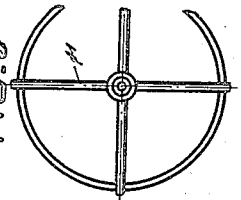


FIG. 8

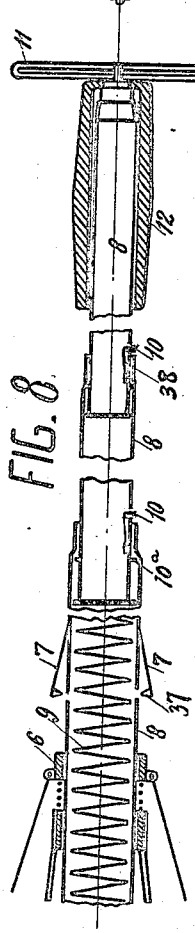
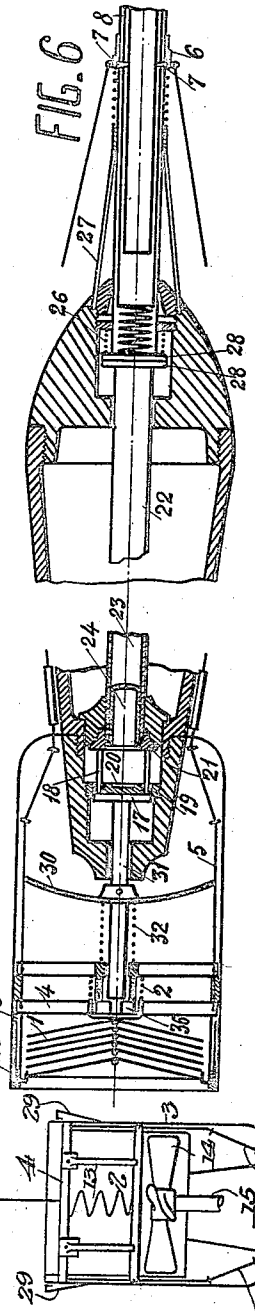


FIG. 6



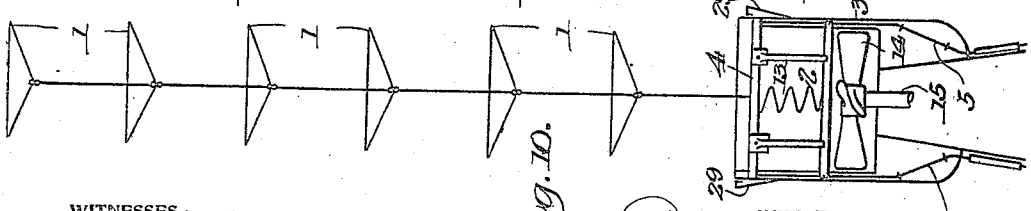


Fig. 10.

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UNITED STATES PATENT OFFICE.

PIETRO FABIANI AND CARLO AGNELLI, OF GENOA, ITALY.

PERCUSSION-SHELL.

1,207,520. Specification of Letters Patent. Patented Dec. 5, 1916.

Application filed April 21, 1913. Serial No. 762,716.

To all whom it may concern:

Be it known that we, PIETRO FABIANI and CARLO AGNELLI, both subjects of the King of Italy, residing at Genoa, Italy, respectively, have invented certain new and useful Improvements in Percussion-Shells, of which the following is a specification.

This invention relates to percussion bombs and more particularly to those which are intended to be dropped from an aerial machine when steady or in flight.

The invention also relates to bombs which can only burst after a certain distance has been covered in its passage through the air, and which bursts immediately on impact before sinking appreciably into the ground, and of the kind in which during flight, after the bomb has acquired a certain speed, the firing pin is brought from its safety position into contact with the primer without shock and keeps such position until impact explodes the bomb.

The accompanying drawings illustrate three different forms of bombs constructed according to the invention.

In the drawings, Figure 1 is a longitudinal section of parts of one form of bombs. Figs. 2, 3, 4 and 5 illustrate details. Figs. 6 and 7 are longitudinal sections of parts of modified forms of bombs. Fig. 8 is a longitudinal section of the impact transmitting device which comprises a number of telescoping or folding members, the members being in the extended position. Fig. 9 is a detail. Fig. 10 shows the parachute devices in use.

Referring to Figs. 1, 6 and 8, when the bomb is in flight, parachute devices 1 are forced by a spring 2 and by air pressure out of a tube 3 and spread open, and when the bomb has acquired a certain speed the pressure exerted by the air on these parachute devices acts upon and lifts the cross member 4 which, in its turn, through the wires 5, lifts a ring 6 and releases the springs 7 which are provided with teeth 37 engaging with corresponding holes in the members of the telescopic impact transmitting device in order to hold them together, whereupon the telescopic impact transmitting device 8 driven by the spring 9 will extend to its full length, its members being arrested in any known manner such as for example, by teeth 10^a, and prevented from again collapsing by teeth 10 arranged on springs 38 which teeth extend through the holes in the telescopic members when the latter are extended and thus prevent same from again sliding into one another, the device thus being held stiffly. The lower end of the lowest of these telescopic members will necessarily be the part first coming into contact with the target owing to the action of the parachute devices and of the weight 12 fitted immediately behind the disk 11. As shown in Fig. 6, the hammer member 22 and the rod 8 are separate and have the disks 28 arranged between the two parts at their abutting ends. As the bomb falls the cross member 4 rises as far as it can, and the fingers 13 thereon are withdrawn from between the blades of the screw propeller 14, which is left free to rotate under the influence of air. The rotation of this propeller causes the rotation of the shaft 15 on which it is mounted. The shaft 15 at its lower end is formed with a screw 16 on which there is arranged a nut the disk 17 fitted with four small rods 18 which project through holes in a fixed diaphragm 19, carrying the primer 20. The rods 18 bear against the ring 21, of the rod 22, which latter carries a detonator 23 and a strengthening primer 24 and in the safety position keep the firing pin carrier on the end of the rod 22 at a distance from the primer 20. Owing to the rotation of the shaft 15 and to the inability of said shaft to fall (the diaphragm 19 inside the fuse preventing this), and owing to the disk 17 being unable to rotate, being held fast by the four small rods 18 running through the fixed diaphragm 19, the disk 17 will gradually rise, and the rod 22 driven by the spring 26 will follow the small rods 18 in their movement, its ring 21 keeping in constant touch with them, until the firing pin comes into contact with the primer without shock and therefore without causing ignition. On reaching the ground or other object the lower point of the rod or the like 8, fitted with the disks 11 or with any other suitable member not less in diameter than the bomb itself, will first receive the impact and the shock will be transmitted to the rod 22 forcing the firing pin against the primer 20, the ignition of which will cause the strengthening primer 24 to ignite and thereby explode the detonator 23.

If the bomb, when the impact occurs, happens to be inclined to the surface it strikes, the wires 27 will bend and allow the rod 8 to take up an inclined position

relative to the longitudinal axis of the bomb, the shock being transmitted through the two disks 28 before the rod 8 can snap, the firing pin being already in contact with the primer.

The parachute devices are held back in the tube 3 by springs 29 by means of their hooked ends which penetrate through the corresponding slots in said tube 3 of the parachute devices. The parachute devices are arranged at a suitable distance apart on wiring or the like, or on metal strips formed of jointed links in order to be collapsible when the parachutes are arranged within the tube 3. To allow said parachute devices to emerge from the tube 3 when the bomb passes through the air, they must be released from the hooks of the springs 29 before the bomb is dropped which hooks engage the holes provided in the outermost parachute. This is effected by pressing the parachutes 1 inward by hand against the spring 2, consequently the springs 29 which tend to spring out take up the position as shown in Fig. 10, whereby by means of the spring 2 and the air pressure the parachutes 1 are expelled out of the tube 3 when the bomb is dropped.

Referring to Fig. 6, the bomb is constructed on the same principles. During the passage of the bomb through the air the pressure of the air on the parachute devices will cause the cross member 4 to rise thereby releasing the springs 38, which tend to spring out, and clearing a passage for the shaft 31. The air pressure can then lift, against the action of a spring 32, a surface plate 30 which is fastened to the safety shaft 31. With the shaft 31, the plate 17 and the rods 18 also rise, aided by the pressure of the hammer rod 22 driven by the spring 26 and by the air pressure upon the disk 11, until the rear of the hammer carrying the firing pin will be gradually carried into contact with the primer 20, whereon it will exert a pressure which will increase with the speed of the bomb, so that the greater the speed of the bomb, the greater also the pressure exerted on the primer, and therefore the more sensitive will the action be on the impact.

Another mode of construction is shown in Fig. 7, according to which the gradual rise of the hammer rod 22 is brought about by air pressure incidental to the passage of the bomb through the air acting upon the surface 34 fitted to the pin 35, which is shown in Fig. 7, as a single piece and in loose contact with the hammer rod 22, but which may also be formed, if desired, of several telescopic members, operating as hereinbefore described with reference to Figs. 1, 6 and 8, with the only exception that the spring 26, instead of exerting a pressure on the primer, will exert a pressure on the pin in the opposite direction to the air pressure on the surface member 34, the pin and the hammer being thereby caused to rise gradually.

In each construction described the impact transmitting rod or the like is carried through a ring connected with the nose of the bomb by means of slender flexible rods which are easily bent before the rod breaks. In each of the three constructions referred to, it will be understood, that if desired, the primer and the firing pin may interchange their respective positions.

We claim:

1. An aerial percussion shell comprising in combination, a hammer, primer and shock receiver, a parachute device, and means coacting with said shock receiver and parachute device for allowing said hammer and primer gradually to come into contact during the descent of the shell, and to keep such position until impact explodes the bomb.

2. An aerial percussion shell comprising in combination, a hammer, a primer, parachute devices, and means coacting with said parachute devices for allowing said hammer and primer to gradually come into contact during the descent of the shell and to keep such position until impact explodes the bomb.

3. An aerial percussion shell comprising in combination, a hammer, a primer, parachute devices, and means coacting with said parachute devices for allowing said hammer and primer to gradually come into contact during the descent of the shell, and means for locking the mechanism by means of which the hammer is gradually brought into contact with the primer, said locking means being adapted to be withdrawn by the action of said parachutes during the flight of the bomb, substantially as described.

4. An aerial percussion shell comprising in combination, a hammer, a primer, a parachute device, a shock receiver, and a means arranged within the rear portion of the shell adapted to allow by its outward movement, the hammer to gradually approach the primer and come into contact with it, said means comprising a rod and retaining springs for normally holding said rod immovable, said springs being released by the pressure of air upon the parachute device.

5. An aerial percussion shell comprising in combination, a hammer, a primer, a parachute device, a shock receiver, and means arranged within the rear portion of the shell adapted to allow by its outward movement, the hammer to gradually approach the primer and come into contact with it, said means comprising a rod, retaining springs for normally holding said rod immovable, said springs being released by pressure of air upon the parachute device, and a ring, a

cross member on said ring operated by the pressure of the air upon the parachute devices for raising said ring and for releasing said retaining springs, substantially as described.

6. In a percussion shell of the character described, a sliding impact transmitting device formed in two parts, a strengthening primer and a detonator, a firing pin upon one of said parts within the shell, the second part being in contact with the first part and extending outside of the shell and being capable of a suitable amount of swivel motion for taking up an inclined position relative to the first part while preserving its contact with the latter and thus transmitting the impact before breaking when the direction of the impact is not axial to the bomb, a disk on said second part of a diameter not less than that of the bomb, said diameter being determined by the resistance of the objective.

7. In a percussion shell of the character described, in combination parachute devices, a bi-partite sliding impact transmitting device, one portion of which being located outside the bomb, and being adapted to assume an inclined position relative to the axis of the bomb without losing contact with the upper member of the transmitting device so that the former is able to transmit the impact before breaking, when the direction of the impact is not axial, the said outer part being telescopic and being adapted to extend mechanically, for instance by means of a spring, upon the release of a retaining device operated by the air pressure exerted on the parachute devices.

8. A percussion bomb of the character described comprising in combination, a hammer, primer, shock receiver and parachute devices, said parachute devices constituted by a set of surfaces acting upon the air on the side of their convex part instead of on that of their concave part.

In testimony whereof we affix our signatures in presence of two witnesses.

PIETRO FABIANI.
CARLO AGNELLI.

Witnesses:
PIO NINSLDINI,
A. BORAGINA.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."