

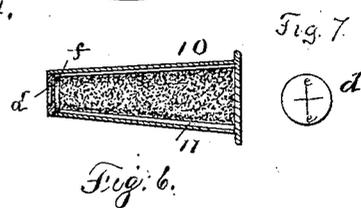
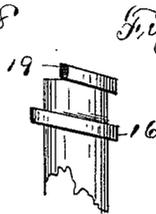
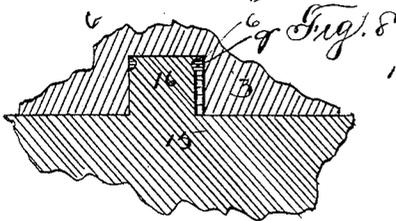
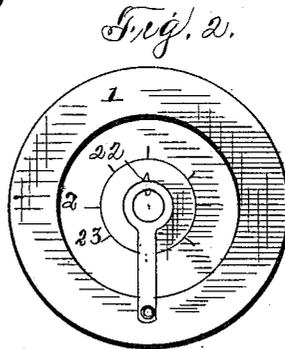
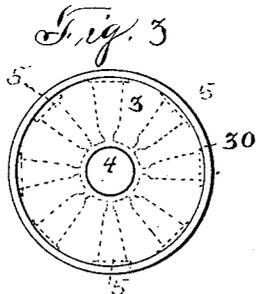
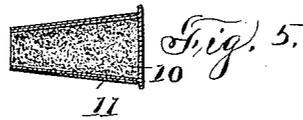
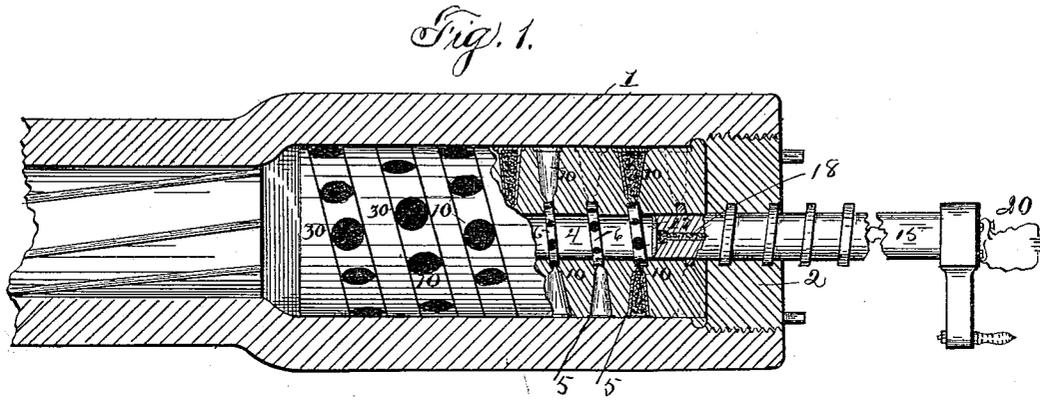
(No Model.)

E. L. ZALINSKI.

METHOD OF FIRING GUNS AND CHARGE THEREFOR.

No. 537,882.

Patented Apr. 23, 1895.



Witness:  
O. W. Johnson.  
J. R. Nottingham

Inventor  
E. L. Zalinski  
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# UNITED STATES PATENT OFFICE.

EDMUND L. ZALINSKI, OF THE UNITED STATES ARMY.

## METHOD OF FIRING GUNS AND CHARGE THEREFOR.

SPECIFICATION forming part of Letters Patent No. 537,882, dated April 23, 1895.

Application filed November 6, 1890. Serial No. 370,436. (No model.)

To all whom it may concern:

Be it known that I, EDMUND L. ZALINSKI, of the United States Army, residing at Washington, District of Columbia, have invented certain new and useful Improvements in Methods of Firing Guns and Charges Therefor, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to a method of firing heavy guns, and a powder charge or cartridge therefor.

The object of the invention is to regulate the burning of a powder charge in a gun so that the gas pressure produced may be proportioned to the work to be performed, and to place it within the power of the gunner to vary the pressure produced, after the cartridge is in the gun; also to produce a cartridge adapted to carry out said method.

Figure 1 is a central longitudinal section of the rear portion of a gun, with cartridge in place, the cartridge being partly in elevation and partly in section. Fig. 2 is a rear end elevation of gun. Fig. 3 is a front end view of cartridge. Fig. 4 is a broken end of follower or plunger. Fig. 5 is a central section of shell for charge section. Fig. 6 is a section of shell with diaphragm, and Fig. 7 is a plan of the diaphragm. Fig. 8 is a detail of gas check screw thread.

The numeral 1 indicates the barrel of a large gun, of any suitable or usual construction.

2 denotes the breech block shown to be a screw breech, but the breech may close in any suitable manner.

The cartridge casing or body 3 is a strong cylinder, having a longitudinal passage or developing chamber 4 extending from end to end. A large number of radial chambers 5, extend from the surface of the body 3 to the central passage of the developing chamber 4. These chambers 5 are preferably tapered, the large end being outward. The chambers 5 are arranged spirally, and their inner ends open into the bottom of a deeply cut female screw thread 6, the groove of the thread being at least as wide as the diameter of the mouths of chambers 5. The chambers 5 are of the shape to receive tapering cartridge shells 10, which may be like the shells used in

small arms, but without bullets. The shells 10 if metallic may be covered or lined with paper or other non-conducting material 11 and can be applied to the chambers 5 as they are usually applied to the chamber of a gun or cylinder of a revolver, and extracting means of suitable character may be used, as for instance, wires or strips 30 in spiral grooves about the cartridge body.

The shells 10 are filled with a powder cake compressed into the shell so hard that it will not crumble under the pressure developed in firing, and the ends of the shells need not be closed, as the powder will remain in the shells, but the end of the shell may be covered with a combustible water-proof material.

A certain proportion of the shells, as alternate ones for instance, may be closed by a diaphragm or shield *d*, of brittle material, which will rupture when the pressure in chamber 4 reaches a predetermined amount, but will protect the charge until such pressure is reached. The shield may be weakened along the lines *e, e*, and by lengthening these lines, or making them deeper, the breaking strain of the diaphragm will be determined. The diaphragms are held a little away from the powder charge, as by a ring *f*. A plunger or cut off 15 extends into the central chamber 4 from the rear. This plunger is provided with a broad male screw thread 16, which enters the threads of the passage 4. The plunger 15 may be turned forward or backward, to cover more or less of the charged shells 10. The front end of the plunger is cupped or otherwise shaped at 17 to form a gas check, and the end of the thread terminates abruptly, and may have a gas check, such as an elastic plate, attached, as at 19, (Fig. 4.) The plunger 15 passes through the breech block 2, and may be screw threaded therein, or may pass loosely, as the engagement with the cartridge body should be enough to hold the plunger from blowing out to the rear. The thread may have its front edge or both edges under cut as at *g* Fig. 8 throughout a considerable part of its length, as shown at *g*, Fig. 8, thus making an effective gas check. The front of the plunger or cut off will carry a small igniting charge 18, which can be fired by an electric primer connected to wires 20, or the igniting charge can be fired with a primer in any usual manner.

The object of dividing the powder charge, instead of using the contents of all the shells 10 as a single charge, is to produce uniformity of combustion and pressure. The object of 5 tapering the charge sections is to give increased combustion surface as the projectile moves forward in the gun.

The cartridge body 3 is charged by loading 10 a shell 10 into each chamber 5. Then if it be desirable to produce the maximum effect, the front of the plunger 15 is left at the rear of the chamber 4, so that all the charges 10 are 15 ignited and burn at once when charge 18 is fired; but if it is desirable to fire with less pressure, the plunger 15 may be screwed in by means of crank 21, and caused to cover 20 more or less of the charges 10. The gas check at the front of the plunger should prevent the ignition of the charges 10 covered by the plunger, and the non-conducting covering to said charges prevents the ignition by heat.

It is frequently desirable to change the 25 pressure, as when firing with a gun at a fixed elevation. By the cartridge or charge described I am able to reduce or increase the effective firing charge with great exactness.

The plunger 15 bears a pointer 22, which 30 indicates on a scale on the breech how many cartridges are exposed to fire. Other indicating devices may be readily substituted.

I indicate the screw plunger as merely one 35 of many devices for reaching the result. A plunger actuated by hydraulic means would have the same effect. In fact many ways will readily suggest themselves to the expert mechanic for charging the effective powder charge without removing it from the gun, 40 when once the subject is investigated.

What I claim is—

40 1. That improvement in the art of gunnery, which consists in loading the gun with the maximum explosive charge, and if desirable, before firing, cutting off or neutralizing a part 45 of the explosive charge without removing it from the gun, so that less than the maximum effect may be produced on the projectile, substantially as described.

50 2. A cartridge having a plurality of charge sections, and a movable cut off under control of the gunner in position to cover or shut off from combustion more or less of said sections, substantially as described.

3. The combination with a cartridge having a plurality of charge sections, and a movable cut off whereby some of the sections can be 55 shut out from communication with the developing chamber and retained unburned, of an indicator showing the position of the cut off.

4. The combination with the cartridge case 60 having a plurality of charge sections, communicating with a screw threaded developing chamber, of a screw plunger engaging the thread in the developing chamber.

5. The combination with a cartridge body 65 having a number of charge sections communicating with a single developing chamber, of a movable plunger in said chamber and provided with a gas check.

6. The combination with the cartridge body 70 having a central passage and screw thread therein, and side chambers opening into the bottom of said threads, of a screw plunger moving in said central chamber, and a gas check at the end of said plunger.

7. The combination with the cartridge body 75 having a developing chamber and a plurality of charge chambers communicating therewith, of separate cartridge shells for these chambers, and a non-conducting material separating the powder charge in said charge 80 chambers from the main cartridge body, to prevent heat radiation, substantially as described.

8. The combination with the cartridge body 85 having a developing chamber and a plurality of charge chambers all communicating therewith, of separate cartridge cases entering said charge chambers, and an extractor engaging said shells, all substantially as described.

9. The combination with the screw threaded 90 cartridge body, of the screw threaded plunger having its threads under-cut, substantially as described.

10. The combination with the cartridge body, of separate charge sections therein, a 95 proportion of said charge sections being protected from ignition by a shield which breaks at a predetermined pressure.

In testimony whereof I affix my signature in presence of two witnesses.

EDMUND L. ZALINSKI.

Witnesses:

W. A. BARTLETT,  
PHILIP MAURO.