No. 660,567. Patented Oct. 30, 1900.

E. GATHMANN.

EXPLOSIVE CHARGE AND POWDER THEREFOR.

(Application filed Nov. 8, 1899.)

(No Model.)

Fig. 1.

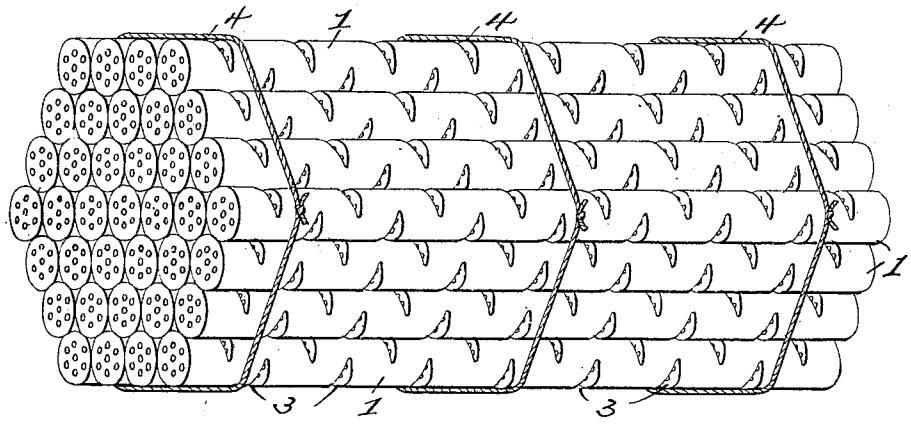


Fig. 2.

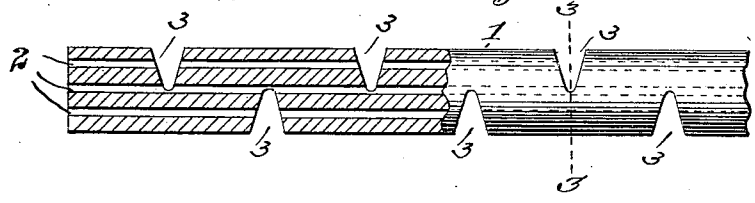
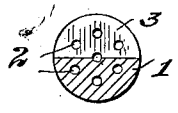


Fig. 3.



Witnesses

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UNITED STATES PATENT OFFICE.

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EXPLOSIVE CHARGE AND POWDER THEREFOR.

SPECIFICATION forming part of Letters Patent No. 660,567, dated October 30, 1900.

Application filed November 8, 1899. Serial No. 736,220. (No specimens.)

To all whom it may concern:

Be it known that I, EMIL GATHMANN, of Washington, in the District of Columbia, have invented certain new and useful Improvements in Explosive Charges and Powder Therefor, of which the following is a specification.

My invention relates to explosive charges and powder therefor, and is more particularly applicable to those powders in which the principal ingredient is nitrocellulose or a mixture of nitrocelluloses, and has for its object to provide for a uniform distribution of the charge in the powder-chamber of the gun, having such a construction of the units or grains forming the charge that they will resist the tendency to fly into small fragments during the combustion of the charge, thereby causing a sudden rise in the pressure, and for the rapid and uniform ignition of the entire charge by such a construction as will allow the flames of the priming or ignition to have unobstructed passage to every portion of each unit or grain of which the charge is composed.

To these ends my invention consists in certain novel features which I will now proceed to describe and will then particularly point out in the claim.

In the accompanying drawings, Figure 1 is a perspective view of a fagot or charge embodying my invention in one form. Fig. 2 is an enlarged detail view, partly in elevation and partly in central longitudinal section, of a portion of one of the rods or units of which the charge shown in Fig. 1 is composed. Fig. 3 is a transverse sectional view taken on the line 3 3 of Fig. 2.

I have determined from numerous experiments that an efficient powder charge which will develop a high velocity, accompanied by relatively low bore-pressure, should possess the following requisites: first, uniform distribution of the charge in the powder-chamber of the gun; second, such a construction of the units which form the charge as will prevent any tendency to fly into small fragments during the combustion of the charge, thereby occasioning a sudden rise in pressure, and, third, such a construction of the charge as will insure a rapid ignition thereof in its entirety by allowing the flames of the priming or ignition charge to have a free and unobstructed passage to every portion of the elements of which the charge is composed.

To obtain these ends, I employ powder in the form of rods having not only longitudinal perforations, but also radial perforations, these rods being constructed of a suitable colloid explosive material having, preferably, a maximum toughness. In the particular embodiment of my invention illustrated in the drawings these rods, which are indicated at 1, are preferably of a length substantially equal to that of the powder-chamber in which they are to be used and are provided with a plurality of longitudinal perforations 2, extending through said rods from end to end. In rods thus constructed, but without any provision other than the longitudinal apertures just referred to for permitting the ignition-flames to communicate with the more distant portions of the rods, the gases are generated within the longitudinal apertures in such great volume that these passages cannot accommodate their flow, and the rods are therefore burst open and broken into fragments, thereby causing a sudden and dangerous rise in the pressure in the bore of the gun, and the consequent liability of bursting the gun. In order to obviate this difficulty, I provide radial as well as longitudinal perforations or apertures, and in the particular construction shown in the drawings these radial apertures or perforations are in the form of cuts or grooves 3, preferably V-shaped in outline and extending from the center of the rod radially outward, each with its apex at about the center and with its widest portion at the periphery. It will be observed that these radial apertures or perforations intercept the longitudinal perforations 2, and as they are preferably arranged in alternating series on opposite sides of the rods, as shown in the drawings, all of the longitudinal perforations will be intercepted at intervals. These intercepting cuts or grooves will be of such dimensions and number, according to the varying conditions of loading required and the varying sizes of the powder-chambers, as to give ample vent to the gases generated in the longitudinal perforations of the rods, thereby allowing free flow of these gases and

insuring even and rapid combustion of each rod, and consequently of the entire charge, and giving a reliable and even pressure in the powder-chamber and bore of the gun.

In making up a charge of this powder a plurality of rods of the proper character are placed with their axes parallel with each other in such a way as to form a fagot or bundle, as illustrated in Fig. 1 of the drawings, and the fagot or bundle is held in permanent form, so as to facilitate handling, by means of flexible ties 4, of cord or the like, surrounding the same at suitable intervals. Powder charges of this class are usually composed of a great number of comparatively short pieces or blocks which are placed promiscuously within a suitable inclosing bag or envelop, so that uniformity of distribution or arrangement of the charge is lacking, while at the same time the bag or envelop being constructed of silk or other similar material in order that it may be readily destroyed by the combustion of the charge is extremely expensive. Not only is this expense done away with by the construction above described, but regularity and uniformity of the distribution and arrangement of the charge within the powder-chamber of the gun are insured.

The density of colloid powders is comparatively great, being on an average about 1.64, and since the force of these powders is nearly treble that of the ordinary charcoal and niter variety the density of loading in the powder-chamber of the gun is generally below thirty-five one-hundredths of the capacity of this chamber in water. Thus the powder-chamber of modern ordnance is not nearly filled, even when the heaviest allowable charge is used, when the charge is made up of the ordinary cylindrical grains now in common use and herein referred to.

By varying the size of the transverse or radial apertures of the rods according to the weight of charge required and the capacity of the powder-chamber, I am enabled to build up a fagot or bundle charge which will evenly and uniformly distribute a charge of the proper size and weight through the entire powder-chamber. In this way the three requisites hereinbefore referred to are fulfilled, since the proper charge is uniformly distributed throughout the powder-chamber, the tendency of the rods to fly into small fragments is prevented, and the flames of the priming charge have a free and ready access to every portion of the powder charge, and an even combustion of this latter is assured.

Without limiting myself to the precise details of construction and arrangement hereinbefore described, I claim—

A longitudinally-multiperforated powder rod having alternate cuts or grooves on its opposite sides, each pair of said cuts or grooves intercepting the several longitudinal perforations.

EMIL GATHMANN.

Witnesses:
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