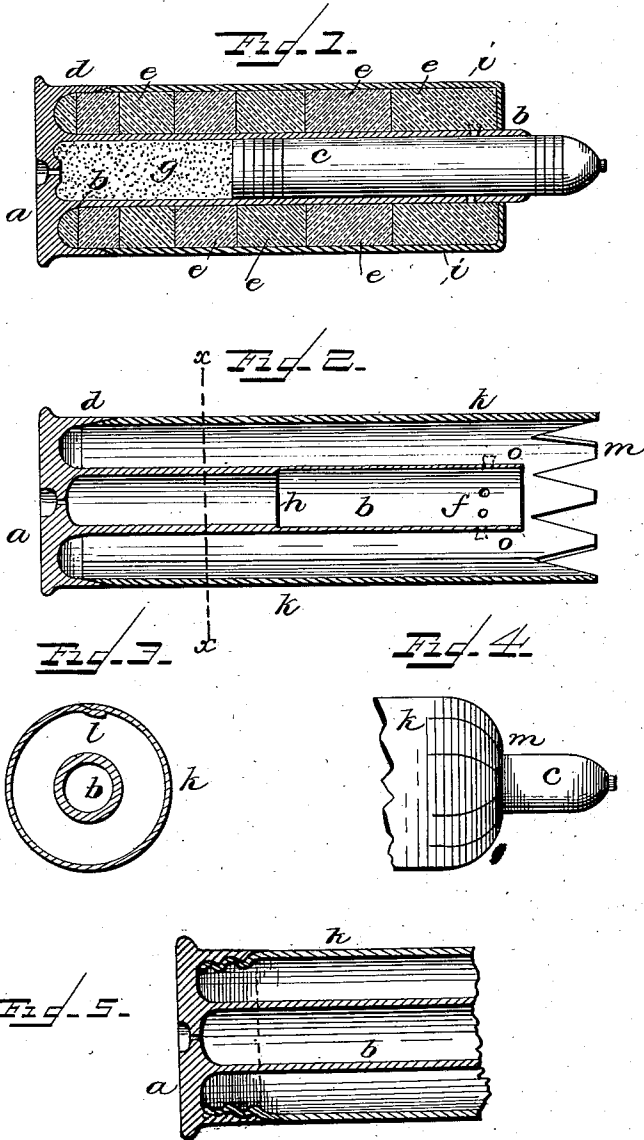


(No Model.)

H. P. HURST.  
ACCELERATING CARTRIDGE.

No. 390,232.

Patented Oct. 2, 1888.



WITNESSES  
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# UNITED STATES PATENT OFFICE.

HARRIS P. HURST, OF SUMMIT, MISSISSIPPI, ASSIGNOR TO THE HURST REINFORCE CARTRIDGE AND ARMS COMPANY, OF NEW JERSEY.

## ACCELERATING-CARTRIDGE.

SPECIFICATION forming part of Letters Patent No. 390,232, dated October 2, 1888.

Application filed December 2, 1887. Serial No 256,795. (No model.)

*To all whom it may concern:*

Be it known that I, HARRIS P. HURST, residing at Summit, in the county of Pike and State of Mississippi, have invented certain new and useful Improvements in Cartridges, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to cartridges for small-arms or artillery.

The invention consists in the construction of parts and combination of elements, herein-after described.

The object of the invention is to produce, primarily, an improved accelerating-cartridge, and, secondarily, to produce an improved cartridge-shell which may be expanded by the explosion of the charge, and which will afterward contract, so as to be easily removable from the bore of the gun.

Figure 1 is a longitudinal section of a cartridge made after the manner of this invention, the outer charge consisting of rings of compressed powder. Fig. 2 is a longitudinal section of a metallic cartridge-shell. Fig. 3 is a section of Fig. 2 on the line *x x*. Fig. 4 is an elevation of the front end of the cartridge-shell, Fig. 2, crimped in onto the projectile. Fig. 5 is a sectional detail showing a manner of connecting exterior shell with the base of the cartridge.

The reference-letter *a* indicates the metallic head of an accelerating-cartridge, preferably of steel or some very strong metal. This head has a tube, *b*, forming the inner charge-chamber and receptacle for the projectile *c*. The head *a* has an outer tubular portion, *d*, which extends a little way forward into the bore or chamber of the gun when the cartridge is in firing position in the gun. This portion *d* serves as a gas-check when the piece is fired. Surrounding the tube *b*, I place a number of rings, *e e*, of compressed powder. These rings may be of different qualities of powder, the rings nearest the base being preferably of the quickest powder. The rings are shown in the drawings as differing in size; but this is not necessary in practice, although such may be used. Fig. 1 is intended to represent diagrammatically the fact that the rear ring, although

smaller in size, may contain as many units of explosive energy as the large rings at the front.

The tube *b* has perforations *f* near its front end, through which the fire passes from the inner to the outer charge when the cartridge is fired. The inner powder charge, *g*, is in rear of the projectile. The projectile may rest against a shoulder, *h*, in the tube.

The compressed powder-rings or outer powder-charge may be covered by a coating, *i*, of water-proof material—as paper—but is preferably surrounded by a lapped metallic tube, *h*, the joint *l* of the lapped tube being lightly soldered, so as to be ruptured when the outer charge explodes.

The front end of the case *k* is notched, as at *m*, Fig. 2, so as to crimp it onto the projectile, as in Fig. 4. The points of the cartridge-shell, when crimped down onto the projectile, as in Fig. 4, are lightly soldered together and to the projectile.

The casing *d*, which projects forward from the solid head *a*, may be internally screw-threaded, and the casing *k* attached thereto by a screw-thread, as in the detail section, Fig. 5; or the parts may be soldered together or held by crimping, as common in cartridges.

The holes *f* may be stopped with lead or similar plugs, *o*, or bits of solder, which plugs *o* will be blown out when the base of the projectile passes these holes.

The outer charge may be composed of high explosives in whole or in part, or in combination with the powder packed in thin sheets or blocks or sticks, and the holes in the inner tube may be filled with a detonating powder or composition or primers to explode the high explosive in the outer charge.

When the cartridge is fired, the charge *g* drives the projectile forward into the bore of the gun. The outer charge is not ignited until the base of the projectile passes the holes. When the flame reaches these holes *f*, the gas-pressure blows out the stoppers, if such be used, and the front ring of the outer charge is ignited. The flame then burns backward on the rings, the intensity of combustion due to the different qualities of powder gradually increasing.

The explosion of the charge, &c., will tear

the projectile loose from the points *m*, and if the first charge does not the second charge will throw out the points *m* as far as the chamber of the gun will permit, and at the same time the solder at the joint *l* will be burst apart, and the cylindrical portion of the casing *k* will expand to fill the bore or chamber of the gun. As soon as the gas pressure is removed, this casing *k* will contract to about its normal position, so that the entire shell can be readily removed from the gun.

A great advantage of the rings of compressed powder and of the expansible outer shell is that the entire cartridge can be made smaller than the chamber of the gun in which the cartridge will be seated in firing. The forward end of the projectile will preferably extend into the bore proper of the gun, thus serving the double purpose of centering the front end of the cartridge and seating the projectile in the grooves of the gun. The cartridge will thus be surrounded by an air space. When the second or re-enforcing charge explodes, the additional air space around the casing cushions the explosion and gives a little room for the expansion of gases, aside from the space in the bore proper of the gun. The strain on the walls of the chamber of the gun is thus diminished.

The rings of compressed powder, referred to in the preceding description, are not mere layers of granular powder compacted inside the shell or casing, but are caked powder, each ring being a cake or washer capable of sustaining itself without breakage in ordinary handling or transportation.

I claim—

1. An accelerating-cartridge having a base, a strong interior tube containing a light charge and inclosing the base of the projectile, and an outer charge consisting of annular cakes of compressed powder surrounding the inner tube, substantially as described.

2. The combination, with the base and inclosed charge of a cartridge, of a shell surround-

ing said charge, the edges of the shell overlapping and lightly soldered, so that the solder will be ruptured and the shell permitted to expand when the charge is fired, substantially as described.

3. In a cartridge, the combination of the base-piece, the shell or casing overlapping at the edges and lightly soldered, and a projectile lightly soldered to the shell or casing, substantially as described.

4. In a metallic cartridge, the shell or casing having a notched front portion, the front notched portion being crimped in to embrace a projectile of much smaller caliber, the edges of the notched portion being lightly soldered together and to the projectile, so as to hold the projectile firmly and close the joints, all combined substantially as described.

5. An accelerating-cartridge having an inner tube to contain the base of the projectile, said tube having an interior shoulder against which the base of the projectile rests, substantially as described.

6. An accelerating-cartridge having a strong interior tube in which a powder-charge and the base of the projectile are inclosed, perforations in said tube forward of the base of the projectile, and an outer charge surrounding said tube and covering said perforations, in combination, substantially as described.

7. An accelerating-cartridge having a strong interior tube containing a powder-charge and the base of the projectile, said interior tube being perforated forward of said powder-charge, an outer charge surrounding said tube, and primers, plugs, or stoppers in said perforations, all in combination, substantially as described.

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

HARRIS P. HURST.

Witnesses:

JOSEPH HARPER,  
SAML. C. MILLS.