(No Model.)

H. MAXIM.

GAS CHECK FOR PROJECTILES.

No. 548,884. Patented Oct. 29, 1895.

Fig. 1.

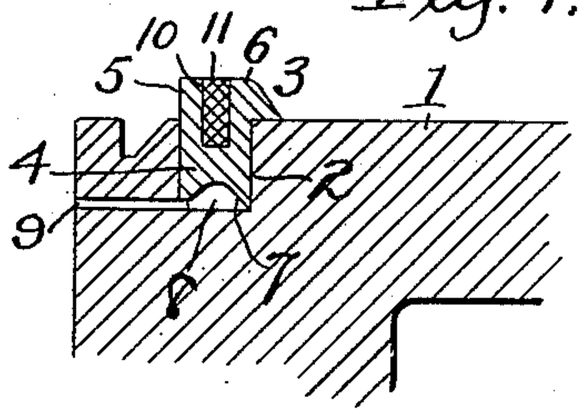


Fig. 2.

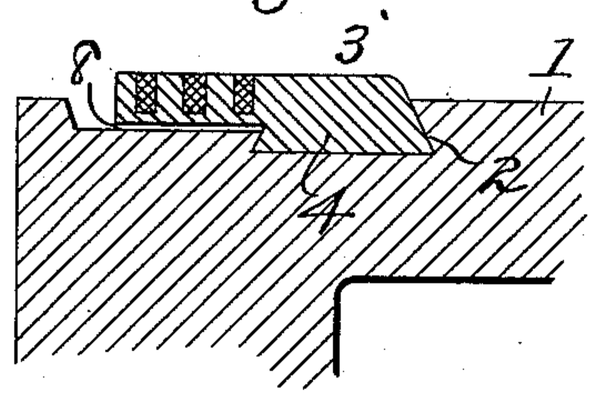


Fig. 3.

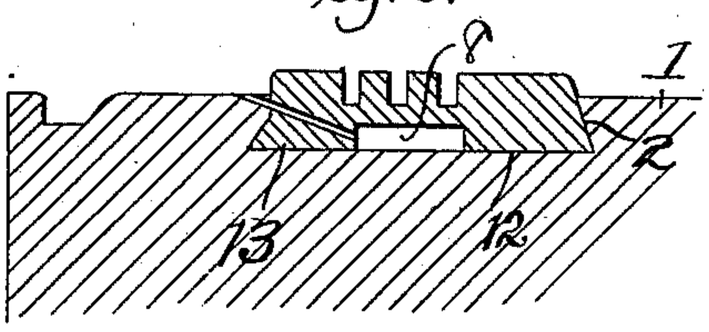


Fig. 4.

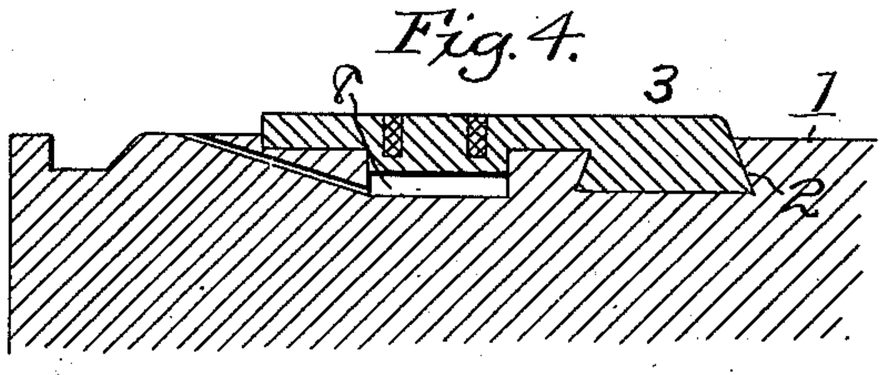


Fig. 5.

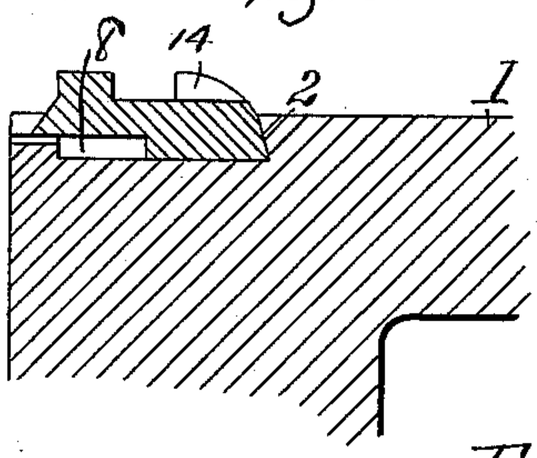


Fig. 6.

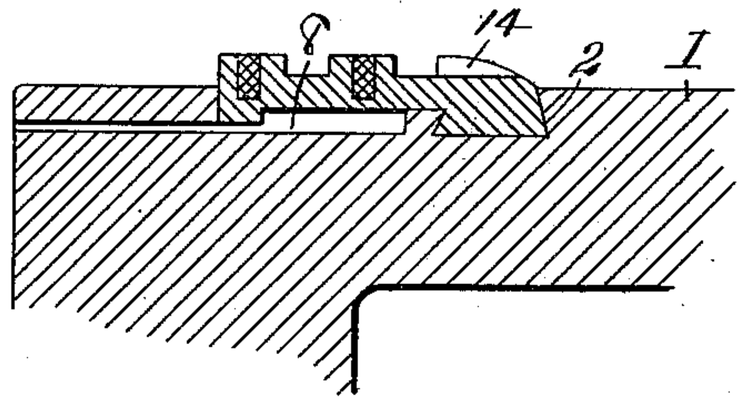


Fig. 7.

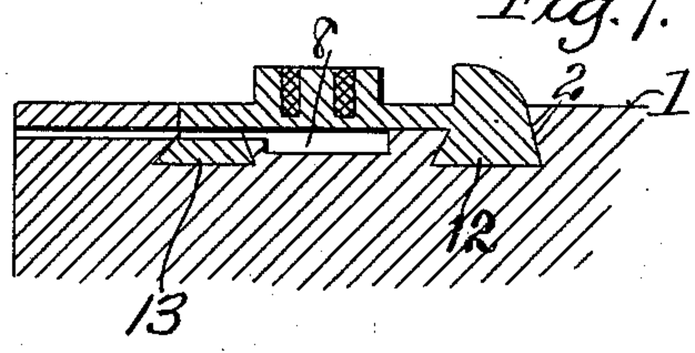


Fig. 8.

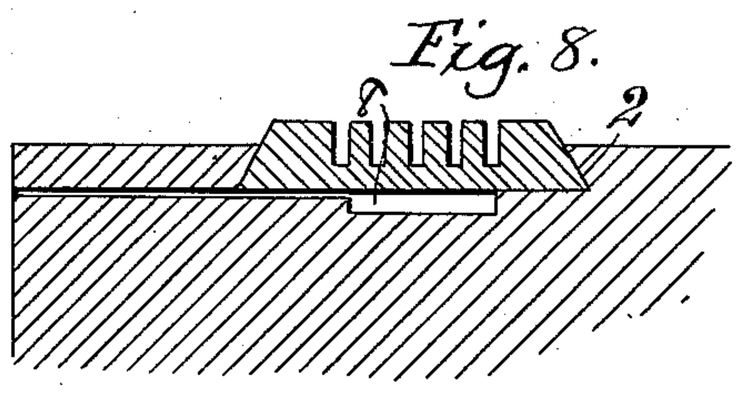
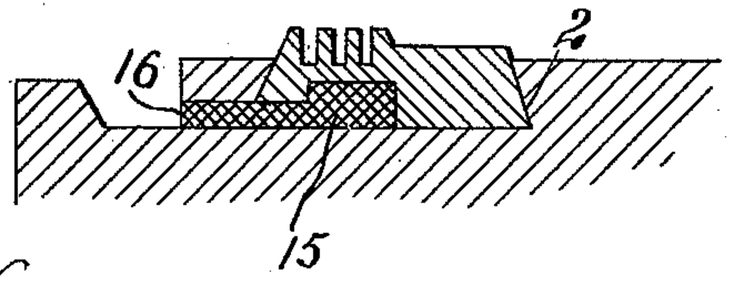


Fig. 9.



WITNESSES:

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GAS-CHECK FOR PROJECTILES.

SPECIFICATION forming part of Letters Patent No. 548,884, dated October 29, 1895.

Application filed May 4, 1895. Serial No. 548,148. (No model.)

To all whom it may concern:

Be it known that I, HUDSON MAXIM, a citizen of the United States of America, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Gas-Checks, of which the following is a specification.

My present improvements relate to gas-checks for ordnance-projectiles, having for their object to more promptly and effectually close the space or windage between the shell or other projectile and the walls of the bore of the gun, thereby preventing erosion of the bore by the rushing of the gases past the projectile.

To this end I provide a gas-check which will upon firing be forced against and between the lands of the gun with a pressure of greater degree than that of the explosive charge.

In order that the gas-check may have this mode of operation, I construct and arrange it relative to the projectile, so that its inner surface, which is presented to the propelling gases of the explosive charge, receives an unbalanced outward pressure over an area which is greater than that external area of the gas-check which engages the lands of the gun. Said external area, the contact of which with the bore of the gun forms the barrier to the passage and erosive action of the gases, is thus forced and held against the walls of the bore with very great pressure and rendered most effective for the purpose.

With such object in view, and having the mode of operation above briefly described, my invention consists in the parts and combinations thereof hereinafter set forth and claimed.

In order to make the invention more clearly understood I have shown in the accompanying drawings means for carrying it into practical effect, without limiting my improvements in their useful applications to the particular constructions which, for the sake of illustration, I have delineated.

In said drawings, Figure 1 is a sectional view of a portion of a projectile having a gas-check embodying my invention. Figs. 2 to 9 are similar views showing other slightly different forms of gas-checks also embodying my invention.

Referring to the drawings, 1 indicates the body of the projectile, that illustrated being a shell of ordinary form. At or near its rear end said projectile is formed with a peripheral groove 2, which may have straight walls, as shown in Fig. 1, or undercut or dovetailed, as seen in the other figures.

The gas-check is indicated at 3, consisting of an annulus of metal, such as copper, and formed on its inner surface with a ring 4, which is shaped to fit the groove 2, by which the gas-check is rigidly connected to the projectile and the rotation thereof effected. Formed with the driving-ring 4 is the outwardly-movable part 5 of the gas-check, having an outer surface 6, adapted for contact with the lands of the gun and to be forced into the grooves thereof, and having an inner gas-pressure-receiving surface 7 of greater area than the said surface 6. The surface 7 is preferably not in contact with the projectile, but the more ready access of the gases thereto is permitted by forming beneath the part 5 an annular chamber or recess 8. This is done either by removing a portion of the interior of the gas-check or of the exterior of the projectile. Leading to the space between the projectile and check portion 5 is or are one or more gas-passages 9, which may be bored or formed in the gas-check or in the projectile, or partly in each. Through such passages 9 the propelling-gases, immediately upon the firing of the gun, act upon the surface 7, the aggregate of which internal pressure is at once communicated, through a yielding of the malleable material of which the gas-check is composed, to the check portion 5 and surface 6 thereof. The latter surface being considerably less than the interior surface 7—for instance, of half the area—it is forced against and between the lands of the gun with a greater degree of pressure—for instance, twice as great—than the degree of gas-pressure in the gun.

In order to give a certain degree of plasticity to the check portion 5, so that it may more readily enter and fill the grooves of the gun-bore, I prefer to form in it chambers, recesses, or a groove or grooves 10, of considerable width and of a depth extending below the surface of the projectile, so that the bottoms of the grooves will never meet the lands of the gun and the metal of the projections between the grooves will never be sufficiently

mashed down into the grooves to materially change the normal exterior area of the gas-check, whereby the internal area of the gas-check will always exceed that of its external area, which grooves may be left empty or filled with a metal or alloy which is softer than copper, such as an alloy of lead and tin, as indicated at 11. This soft metal offers little resistance when the check is forced against the lands of the gun, so that its area is not considered in estimating the amount of surface 6 and its degree of pressure on the bore of the gun. By making the surface 7 concave, as shown, with comparatively-thin edges 12, the pressure of the propelling-gases in the chamber 8 will cause the ring 4 to pack the groove 2 against any outward escape of gases from said chamber.

The part of the gas-check which fits within the groove 2 of the projectile may be dovetailed, as already mentioned, and held from outward movement where it is so overhung by portions of the projectile. In such case a neighboring portion of the gas-check is left free to move outward, and such free portion has the bore-engaging surface 6, and beneath it is arranged the pressure space or chamber 8. In Figs. 2, 4, and 6 such free part of the check is situated at one side of (at the rear of) the ring 4. In Figs 5, 8, and 9 the middle part of the gas-check between its dovetailed and overhung edges is adapted to buckle or yield outward under the pressure from within the chamber 8. The front and rear portions of the gas-check may be formed with separate rings 12 and 13, each dovetailed and fitting in a corresponding groove in the projectile and having between them the chamber 8. Such constructions are shown in Figs. 3, 7, 8, and 9.

The gas-openings into the chamber 8 may lead from the rear of the shell, Figs. 1, 5, 6, 7, and 8, or from points at the side of the latter behind the gas-check, Figs. 2, 3, and 4, or entirely through the body of the gas-check.

The exterior of the gas-check may be made in various forms, as illustrated.

The check portion 5 may be situated at the rear of the interior surface 7, so as to cut off from the exterior of the gas-check the direct or exterior gas-pressure which might otherwise tend to press the gas-check inward and balance the outward pressure in the chamber 8. The check portion 5 is thus more effectually left unbalanced, as between exterior and interior pressures, and acts under the full effect of the latter.

In order to obviate any possibility of downward or balancing pressure on the outer surface of the check portion 5, by reason of the forward driving-ring being forced against the lands of the gun and confining the gases behind it, I prefer to form in the said driving-ring openings or grooves 14, Figs. 5 and 6, which will permit the free passage of gases from the space over the chamber 8.

Instead of admitting direct gas-pressure to the under surface of the gas-check such force may be transmitted through the medium of a soft-metal or equivalent yielding material adapted to flow under pressure. This construction is illustrated in Fig. 9, in which 15 is a body or ring of such soft substance confined in the pressure-chamber beneath the gas-check and having an exposed surface or surfaces 16 adapted to be acted upon by the force of the propelling-gases to cause the flow of the body 15 and the expansion of the gas-check.

I claim—

1. A gas-check for projectiles having an inner area for receiving gas pressure, and a check-portion having a surface for engaging the lands of the gun of less area than said inner surface, substantially as set forth.

2. A gas-check for projectiles having an inner area exposed to gas pressure, and a projecting check-portion having a surface for engaging the lands of the gun of less area than said inner surface, substantially as set forth.

3. A gas-check for projectiles having an inner area exposed to gas pressure, a check portion having a surface for engaging the lands of the gun of less area than said inner surface, and a driving ring portion, substantially as set forth.

4. A gas-check for projectiles having an inner area exposed to gas pressure, a check portion having a surface for engaging the lands of the gun, and a driving ring portion forward of said check-portion and formed with openings for the escape of gases, substantially as set forth.

5. In a gas-check the combination with a projectile, of a ring having its inner surface adapted to receive the propelling gas pressure, and its outer surface consisting of two metals one more yielding than the other, substantially as set forth.

6. A gas-check for projectiles having an inner area exposed to gas pressure, a check-portion having a surface for engaging the lands of the gun grooved and filled with soft metal, and a driving ring portion, substantially as set forth.

In witness whereof I have hereunto signed my name in the presence of two witnesses.

HUDSON MAXIM.

Witnesses:
GEO. H. GRAHAM,
E. L. TODD.