(No Model.) 2 Sheets—Sheet 1.

H. S. MAXIM.

RECOIL CHECK FOR ORDNANCE.

No. 430,214. Patented June 17, 1890.

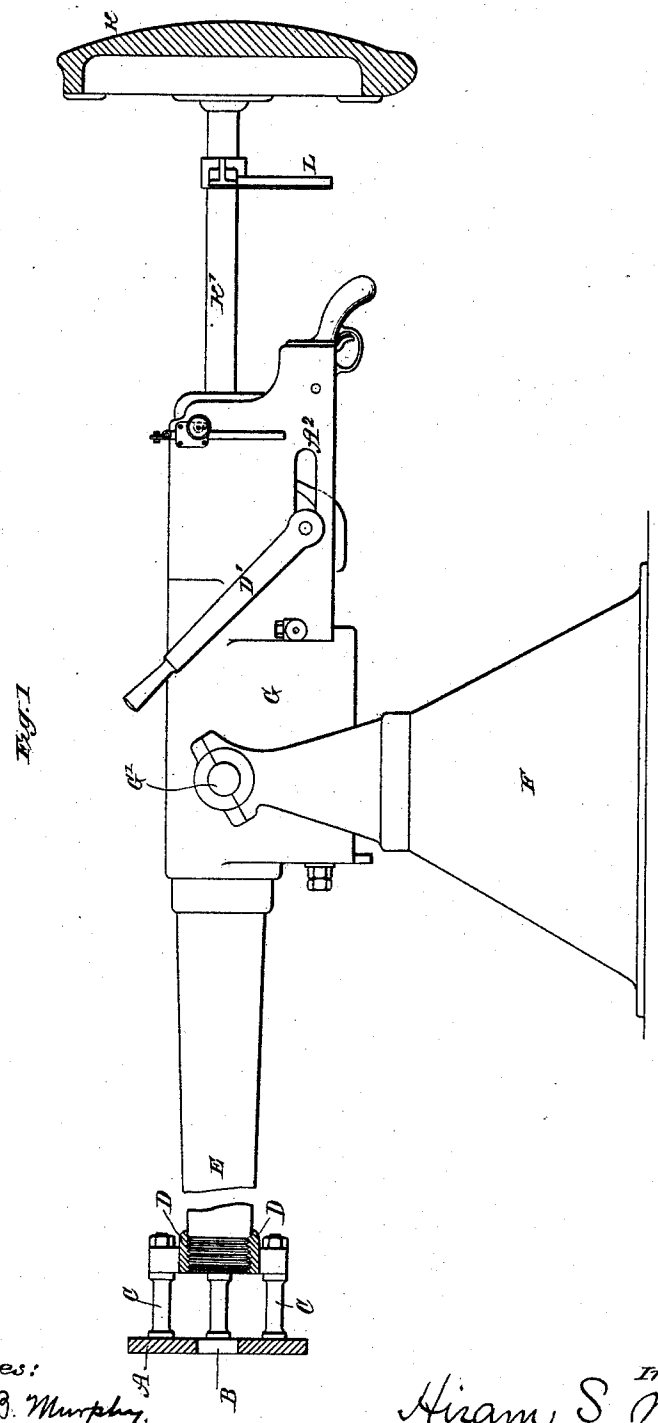


Fig. 1.

Witnesses:
Frank B. Murphy.
Minnie L. Dyer.

Inventor
Hiram S Maxim
By
Duncan, Curtis & Page
Attorneys.

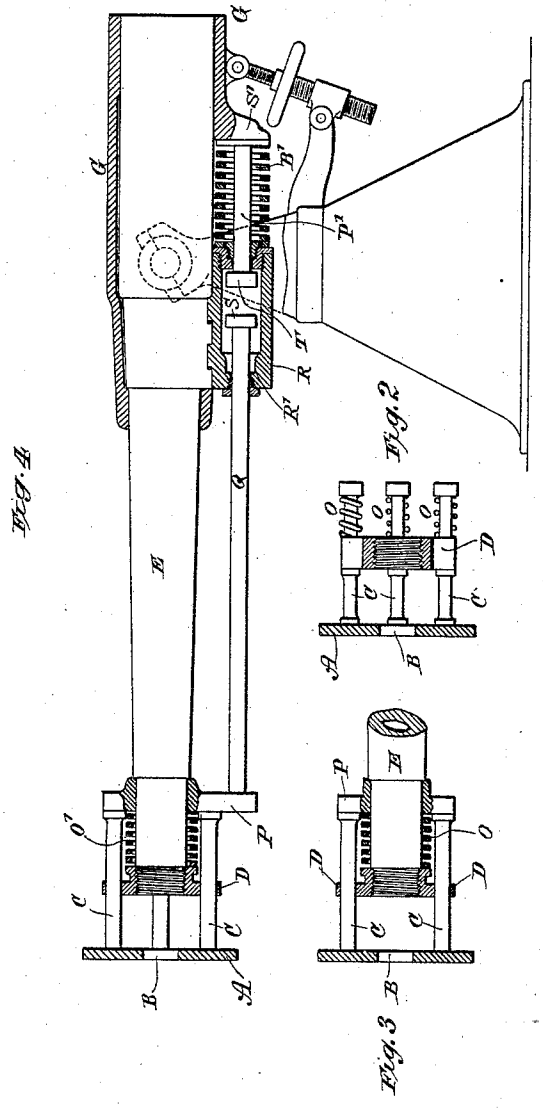
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(No Model.) 2 Sheets—Sheet 2.

H. S. MAXIM.

RECOIL CHECK FOR ORDNANCE.

No. 430,214. Patented June 17, 1890.



Witnesses:
Frank B. Murphy.
Robt F Gaylord

Inventor
Hiram S Maxim
By
Duncan, Curtis & Page
Attorneys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

HIRAM STEVENS MAXIM, OF LONDON, ENGLAND.

RECOIL-CHECK FOR ORDNANCE.

SPECIFICATION forming part of Letters Patent No. 430,214, dated June 17, 1890.

Original application filed September 8, 1888, Serial No. 284,871. Divided and this application filed September 18, 1889. Serial No. 324,337. (No model.) Patented in England March 30, 1887, No. 4,778; in Austria-Hungary June 6, 1888, No. 23,380; in Sweden June 19, 1888; in Italy June 23, 1888, XLVII, 333, and in Belgium July 4, 1888, No. 82,433.

To all whom it may concern:

Be it known that I, HIRAM STEVENS MAXIM, mechanical engineer, a citizen of the United States of America, and a resident of London, England, have invented certain new and useful Improvements in Machine or Automatic Guns, (for which I have obtained patents in the following countries: in Great Britain, No. 4,778, dated March 30, 1887; in Belgium, No. 82,433, dated July 4, 1888; in Austria-Hungary, dated June 6, 1888, No. 23,380; in Italy, dated June 23, 1888, No. 333, Vol. XLVII, and in Sweden, dated June 19, 1888,) of which the following is a specification, reference being had to the accompanying drawings.

This application is a division of an application filed by me in the United States Patent Office September 8, 1888, Serial No. 284,871.

The invention subject of this application is an improvement applicable to machine or automatic guns of the general character described in numerous prior patents granted to me, the object of the invention being to provide means whereby the force or shock of the recoil of the movable portion of the gun may be reduced and the strain thereby lessened upon the carriage or mounting of the gun. This object I accomplish in the present case by utilizing the dynamic forces of the smoke or gases which escape from the muzzle of the gun when fired. In order to apply this force for the purpose of counteracting or diminishing the recoil of the gun, I employ a plate or disk of steel or other metal, which is attached to the gun in such manner that it occupies a position in front of the muzzle thereof. This disk or plate is formed with a hole through it, so that when the gun is fired the projectile will pass through the said hole, while the smoke or gases escaping from the muzzle of the gun will impinge upon and expend their force against the said plate or disk. The force thus exerted by the smoke or gases upon the plate or disk will pull or tend to pull the gun forward before the recoil thereof takes effect upon the mounting or carriage. Therefore the recoil will to a great extent be counteracted and the shock or concussion produced thereby proportionately diminished. The force of the gases or smoke against the plate may be applied to exert a direct pull upon the gun through rigid connections between the said plate and the gun; but the same effect may be utilized and applied in other ways. For example, I may employ spring-connections between the plate and the gun, or I may use in conjunction with the plate or the parts moving therewith a piston and hydraulic cylinder or other means for taking up the force of the recoil and diminishing the shock to the gun-mounting, as will be hereinafter described.

The principle of the construction and operation of this invention I have illustrated in the accompanying drawings.

Figure 1 is a side elevation, partly in vertical longitudinal central section, of a machine-gun supported upon a cone-mounting and equipped with means for diminishing its recoil constructed in accordance with my invention. Figs. 2 and 3 are sectional elevations showing modifications of the part or parts constituting my invention. Fig. 4 is a sectional elevation of a gun equipped with a modified form of my invention.

The details of the construction or mode of operation of the gun proper may be very greatly varied, and a description thereof, inasmuch as they form no direct part of this present invention, is not necessary to an understanding of the present case. I will state, however, that the invention may be applied to guns constructed in accordance with my application above referred to, or others of similar character.

The letter G represents the fixed support or frame of a gun provided with trunnions G′, by means of which it is supported upon a cone-mounting F.

E is the barrel, which is capable of a certain movement or recoil within the frame G.

K is a shoulder-piece or crutch secured by the rod K′ to the frame G, for the purpose of facilitating the pointing and training of the gun.

L represents an adjustable shield secured to the rod K′, which is used for the purpose of protecting the gunner from the empty shells thrown out of the breech of the gun.

D′ is a hand-lever, which may be used in the operation of the gun for opening or closing the breech.

The explosion of a shell in the barrel tends to drive backward the barrel with great force, and in order to diminish and counteract this force I secure in front of the muzzle of the barrel a plate or disk A, provided with an aperture B, through which the projectile may pass. This plate is secured to the barrel in any desired manner. The plate itself may be made in various forms and of any material or materials capable of resisting the force which it is desired to withstand.

In Fig. 1 the means of connection shown are rods or bars C, passing through and bolted to a ring or plate D, screwed to or otherwise securely fastened to the end of the barrel.

In Fig. 2 the rods C are shown as passing through holes in the ring D, and combined with spiral springs O, which surround said rods between the rear of the plate D and heads on the ends of said rods. In the former case the dynamic force of the gases and smoke directed against the plate A exerts a direct power upon the barrel tending to draw or pull it forward against the force or movement of recoil. In the latter case this power is applied through the yielding cushion formed by the interposed springs O, the application of the force being in this instance more gradual and the liability to shock to a great extent avoided.

Instead of the construction shown in Fig. 2, the rod C, passing through the ring or plate D, may all be secured to a sliding ring or sleeve P, between which and the ring D a stout spiral spring O′, surrounding the barrel, is interposed. When springs are thus employed to receive the force of the gases, a disk or plate, it will be observed, will yield at first when the gun is fired and afterward resume its normal position.

In the modification of my invention shown in Fig. 4 a cylinder R, firmly attached to the sliding barrel, is employed and provision made for permitting it to move with said barrel. A piston-rod P′ is secured at its rear end in a lug or projection S′, formed on the stationary frame of the gun, and carries a piston-head within the cylinder R. A stout spiral spring B′ is placed around the piston-rod P′ between the cylinder and the lug S′. A piston S, connected by its rod Q with the ring or annular piece P, movable with the disk A at the muzzle of the gun, is arranged to work in the cylinder R. The forward end of this cylinder is formed with the recess R′, which is gradually contracted toward the end of the cylinder. In the recoil the liquid with which the cylinder is filled is pressed against the rear face of the piston S and tends to drive the same forward, so that at the moment when the projectile passes through the disk A, and the gases issuing from the barrel strike the said disk, the latter is actually moving forward. In the latter part of the recoil and of the forward movement of the piston S the said piston enters the recess R′, and the space around the said piston for the passage of liquid from one side to the other thereof is thus greatly reduced and the movement of the parts arrested without concussion or shock.

Without limiting myself to the details of construction which I have herein shown in illustration of my invention, what I claim is—

1. The combination, with a gun-barrel capable of longitudinal movement in its supports, of a body connected therewith and located forward of the muzzle and presenting a surface upon which the gases issuing from the muzzle impinge, as set forth.

2. The combination, with a gun, of a plate or disk presenting a surface upon which the gases issuing from the muzzle impinge, and a yielding or spring connection between said plate and the barrel.

3. The combination, with a gun-barrel capable of longitudinal movement in its supports, of a perforated plate or disk connected to the barrel and supported by its connections in front of the muzzle in position to receive the impact of the gases issuing from the muzzle.

4. The combination, with a gun-barrel, of the perforated disk or plate, rods for connecting the plate with the barrel in front of the muzzle, and springs interposed between the rods and the barrel, as set forth.

5. The combination, with a gun-barrel and a hydraulic cylinder carried thereby, of a perforated disk or plate, a yielding connection between said plate and the barrel supporting the plate in front of the muzzle of the barrel, and a piston within the hydraulic cylinder connected to the supports of the disk or plate, as set forth.

6. The combination, with a gun-barrel and a brake-cylinder attached thereto, of a perforated disk or plate in position to receive the impact of the gases issuing from the muzzle of the gun, and a piston connected therewith and working in the brake-cylinder, as set forth.

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

HIRAM STEVENS MAXIM.

Witnesses:
DAVID YOUNG,
CHAS. B. BURDON.