Dec. 2, 1924. 1,517,758

E. SCHNEIDER

APPARATUS FOR LOADING AND RAMMING PROJECTILES IN GUNS

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Fig. 2a.

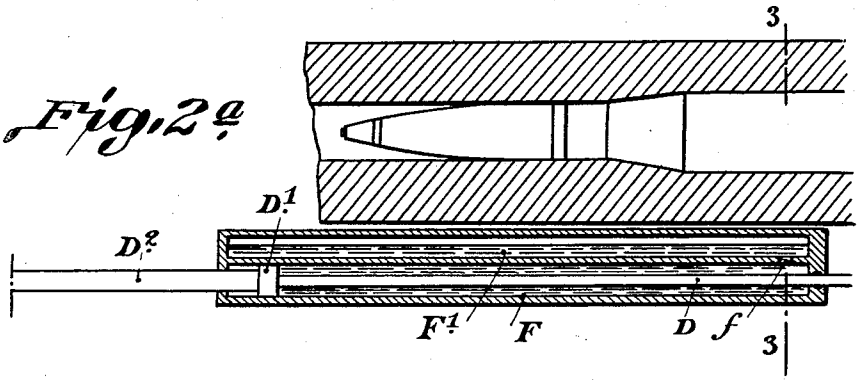


Fig. 1.

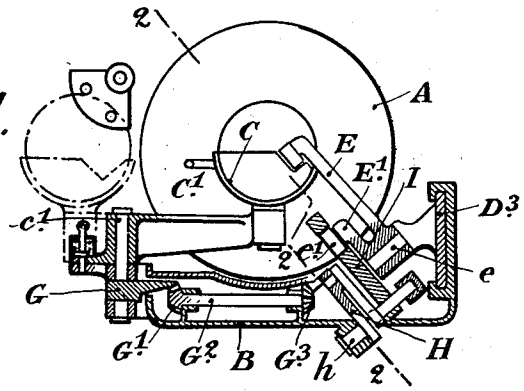


Fig. 5a.

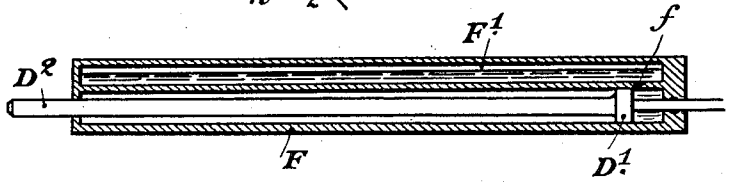


Fig. 3.

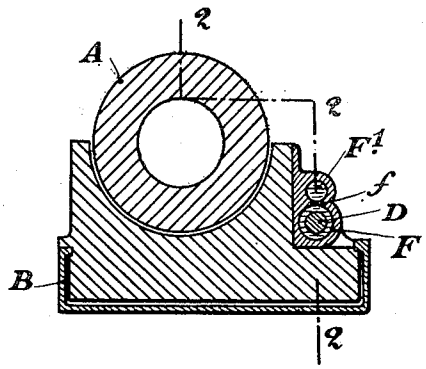
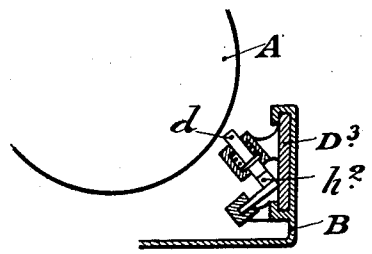


Fig. 9.



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Fig. 2.

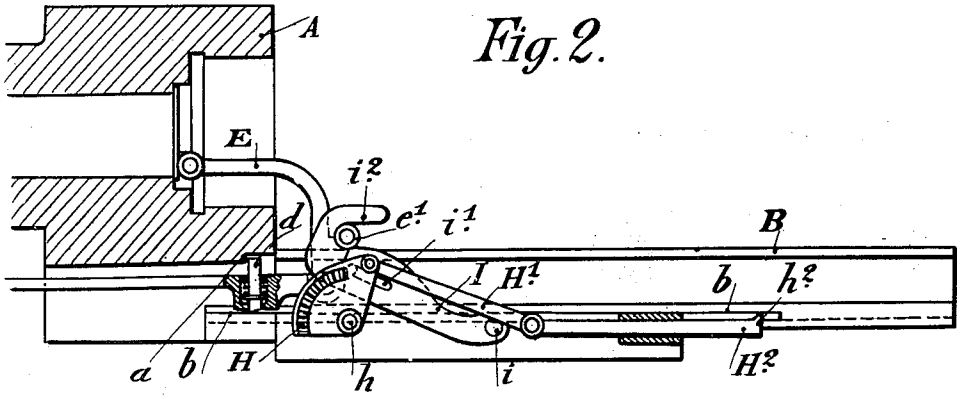


Fig. 4.

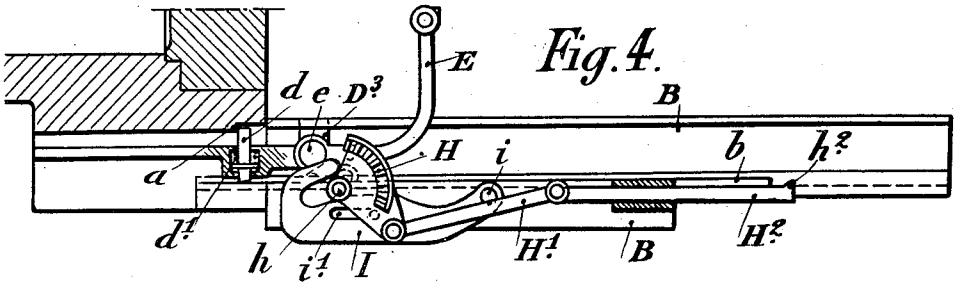


Fig. 5.

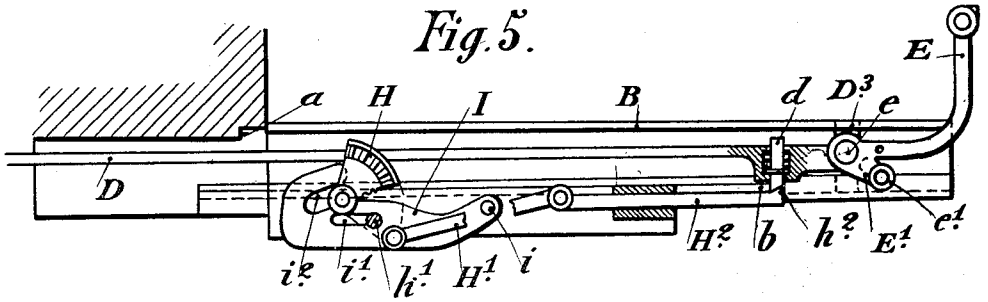
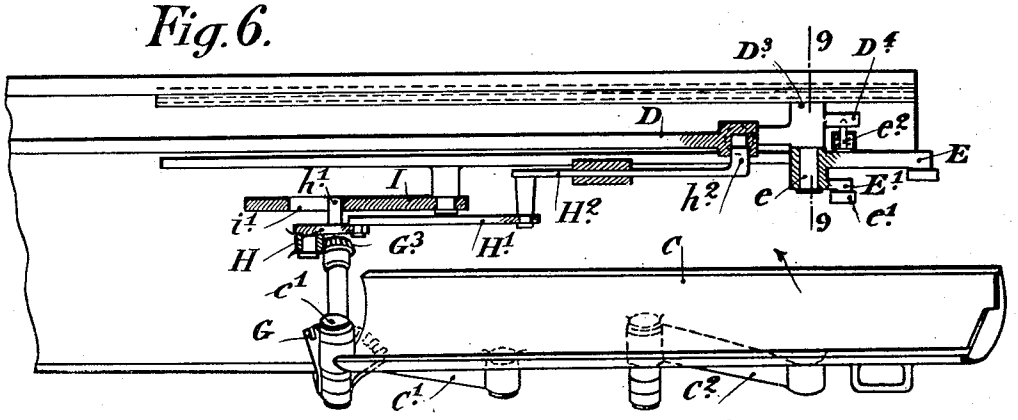


Fig. 6.



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Fig. 7.

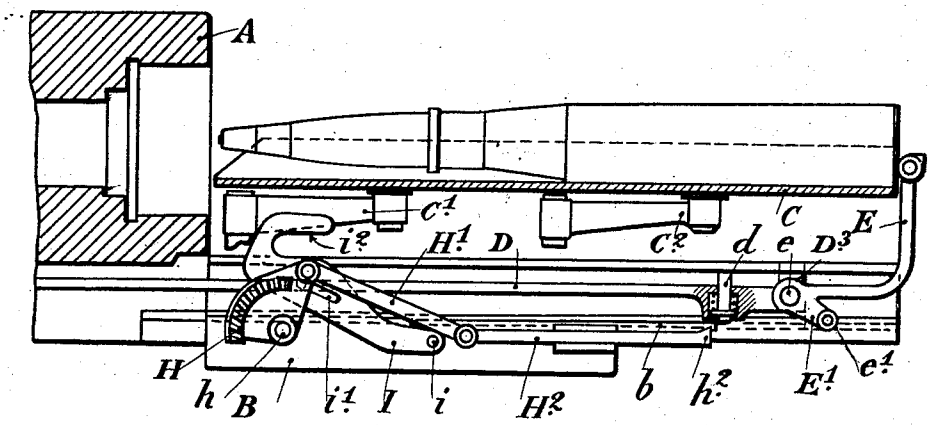
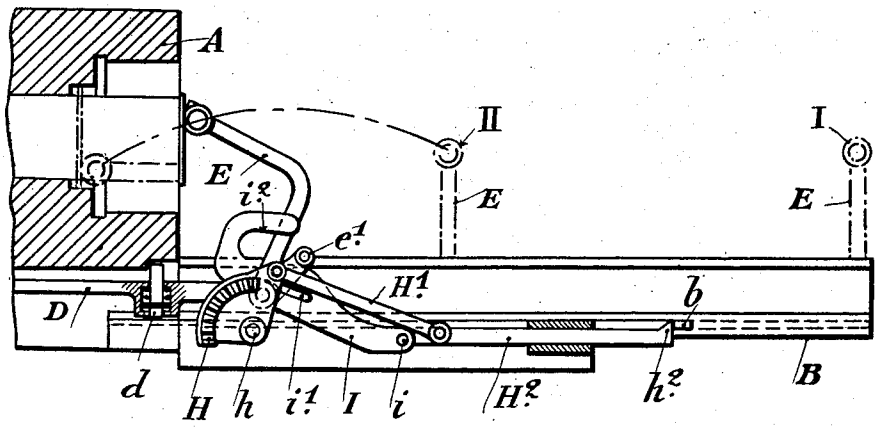


Fig. 8.



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UNITED STATES PATENT OFFICE.

EUGÈNE SCHNEIDER, OF PARIS, FRANCE, ASSIGNOR TO SCHNEIDER & CIE., OF PARIS, FRANCE, A LIMITED JOINT STOCK COMPANY OF FRANCE.

APPARATUS FOR LOADING AND RAMMING PROJECTILES IN GUNS.

Application filed July 3, 1923. Serial No. 649,307.

To all whom it may concern:

Be it known that I, EUGÈNE SCHNEIDER, a citizen of the Republic of France, resident of Paris, France, have invented new and useful Improvements in Apparatus for Loading and Ramming Projectiles in Guns, which is fully set forth in the following specification.

The present invention has for its object to provide an improved apparatus for loading and ramming projectiles in guns, of the known type comprising a loading guide plate or trough pivoted to the gun carriage cradle, and normally effaced and capable of being turned up by hand into position along the axis of the gun barrel combined with a rammer whose operation is automatically assured by means of a recuperator.

The improved apparatus allows of reducing the rectilinear stroke of the rammer, and, if desired, to the length of the projectile to be rammed, whilst ensuring that the rammer proper shall have at the end of its rectilinear inward movement, a pivotal movement in its own plane by means of a device kinematically connected or co-ordinated with the loading trough in such a manner that the said device shall be placed out of operation when the loading trough is moved out of the way, and inversely, the said device is moved into its operative position when the said loading trough has been brought into position along the axis of the gun barrel for the purpose of loading. The reduction of the rectilinear stroke of the rammer allows of arranging the extreme rear position assumed by the rammer in its return movement, close to the rear end of the gun barrel, this movement serving to reduce, when firing at high angles, the super-elevation which is necessary to give to the gun barrel for the required height of the line of fire.

A practical embodiment of this invention is illustrated by way of example in the accompanying drawings in which:—

Figure 1 is an end view in partial section of the improved loading and ramming apparatus, the parts being shown in the position they occupy at the termination of the ramming operation.

Figures 2 and 2^a constitute a longitudinal sectional elevation taken along the line 2—2 of Figures 1 and 3.

Figure 3 is a section taken along the line 3—3 of Figure 2.

Figure 4 is a similar longitudinal sectional elevation showing the parts in the position they occupy when the loading trough has been moved down after the loading has been effected.

Figures 5 and 5^a constitute a longitudinal sectional elevation showing the parts in the position they occupy at the end of the recoil before the loading trough has been turned up into line with the axis of the gun barrel.

Figure 6 is a horizontal section corresponding to Figure 5.

Figure 7 is a sectional elevation taken, like the preceding figures parallel to the plane of the rammer, and showing the loading trough moved together with the projectile in line with the axis of the gun barrel, the rammer being disengaged, and the device for reducing the rectilinear stroke of the rammer having been brought into its operative position.

Figure 8 is a similar sectional elevation showing the projectile incompletely rammed, the rammer being in an intermediate position of pivotation. This same figure indicates in dot-and-dash lines the initial and final positions of pivotation of the said rammer.

Figure 9 is a partial section taken along the line 9—9 of Figure 6.

In these figures: A is the barrel of a gun; B is the gun carriage cradle.

The improved loading and ramming apparatus comprises in the known manner a loading trough C which is pivoted by means of two arms C^1, C^2 to the cradle B, so that it can be moved at will by hand into the position of effacement indicated in dot-and-dash lines in Figure 1 and in full lines in Figure 6, or into the loading position shown in full lines in Figures 1 and 7. The improved apparatus comprises also in the known manner, a rod D movable in a recuperator cylinder F carrying for this purpose a guide D^1 and an extension D^2 having a diameter greater than that of D. The cylinder F communicates through an orifice *f* with a chamber F^1 in which air or a neutral gas is compressed over the free surface of the liquid, when, in the recoil movement, the rod D^2 takes the place of the rod D in the cylinder F.

The rod D is, also in the known manner, engaged at the end of the recoil by a mechanism and by means of a bolt d the disengagement of which is assured automatically by the mere fact of the turning up of the loading trough C into the axis of the gun barrel. This mechanism may comprise for example a toothed sector G fixed on the pivot pin c^1 of the connecting rod C^1 and meshing with a pinion G^1 fixed on a shaft G^2 journalled in the cradle B. This shaft carries a second pinion G^3 meshing with a toothed sector H pivoted at h on the cradle B. The sector H is connected by a rod H^1 to a rod H^2 sliding in the cradle B and carrying a heel h^2 for actuating the bolt for the purpose of disengaging the rod D.

According to the invention the rammer proper E is arranged in such a manner as to receive first a rectilinear movement, and then, at the end of its stroke, a pivotal movement around the axle-pin e of the rod D. For this purpose a guiding member I is pivoted at i to the cradle B and is kinematically connected to the loading trough C in such a manner that it will be effaced with the latter, and, inversely, brought with into its operative position together with the said trough.

In the illustrated example the connection between the guiding member I and the loading trough is effected by means of a guide-slot i^1 formed in the guiding member, and wherein there engages a stud h^1 projecting laterally from the toothed sector H as shown more particularly in Figure 6. The turning up movement of the loading trough C into the axis of the gun barrel thus acts, through the medium of the sector H, to raise the guide member I from the position shown in Figures 4 and 5 into the position shown in Figures 7, 8 and 2. In this raised position the guiding member I constitutes a guide cam for a roller e^1 mounted on the end of a finger E^1 projecting from the hub of the rammer E.

Outside its guidance in the recuperator, the rod D is guided by means of a slide-block D^3 working in grooves in the cradle B.

Normally the rammer E is engaged by a spring stud e^2, in a boss D^4 formed in the end of the rod D.

Assuming the loading trough to be effaced and the gun loaded, the parts will occupy the position shown in Figure 4. When the gun is fired, the gun barrel recoils, the cradle and the recuperator F remaining stationary. In the recoil the gun barrel carries along with it, by means of a shoulder a, the bolt d and by means of the latter the rod $D—D^1—D^2$. By the mere fact of the entrance of the rod section D^2, the liquid is forced through the orifice f into the chamber F^1. Towards the end of the recoil the bolt d which was kept raised by the slide-ramp b formed on the cradle is forced down by its spring d^1 against the end of the said ramp b, and thus assumes a position near the heel h^2 of the rod H^2.

While the rod for operating the rammer remains engaged in the position shown in Figure 5, the gun-server places a projectile into the loading trough C, and then turns the latter by hand up towards the axis of the gun barrel. In this movement the connecting rod C^1 by means of the sector G, operates the transmission $G^1—G^2—G^3$ and through the latter also the sector H. This sector H, in rotating, acts on the one hand to move the rods H^1, H^2 and consequently causes the raising of the bolt d. On the other hand by means of the finger h^1 the rotation of the sector H acts to raise the guiding member I.

When the loading trough carrying the projectile is brought into the axis of the gun barrel the parts occupy the position shown in Figure 7. The raising of the bolt d allows the recuperator F to come into operation and push the rod $D^2—D^1—D$ forwards. In the first portion of the re-entry of the rod D and of the rammer E, the latter moves parallelly to itself until it occupies the position indicated in dot-and-dash lines II in Figures 8. From this moment onwards the roller e^1 encounters the guiding member I, thus producing a rocking movement of the rammer E which will then occupy the position shown in full lines in Figure 8, and which, in rocking rams the projectile into its place in the gun barrel chamber. At the end of its re-entry stroke, the rammer occupies the position shown in Figure 2.

When the ramming operation has ended, the gun-server replaces the loading trough C into its position of effacement. In this movement the ramp i^2 formed on the guiding member I, owing to the descending movement imparted to the latter compels the roller e^1 also to move, whereby the rammer E is swung down out of the position shown in Figure 2 into the position shown in Figure 4.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed we declare that what we claim is:—

1. In an apparatus for loading guns, the combination of a recoiling barrel, a recuperator rammer rod adapted to recoil with said barrel, a rammer head pivotally secured to said rod, a cradle on which the barrel and rammer head move during recoil, a loading tray pivoted to said cradle, means for holding said rammer rod in its position of recoil, means controlled by movement of said tray for releasing said rammer head, and tray controlled means for imparting a pivotal movement to said head.

2. In an apparatus for loading guns, the combination of a gun cradle, a loading tray pivoted to said cradle, a recuperator cylinder, a rammer rod operatively engaging said cylinder, a rammer head pivoted to said rod, a guide member for said head pivoted to said cradle, and means for transmitting movement of the tray to said guide.

3. In an apparatus for loading guns, the combination of a gun carriage cradle, a loading plate pivoted thereto, a recuperator positioned adjacent said cradle, a rammer rod actuated by said recuperator, a rammer head operatively engaging said rod, and means controlled by said plate for imparting a pivotal movement to said head at the end of its stroke.

4. In an apparatus for loading guns, the combination of a gun carriage cradle, a loading plate pivoted thereto, a recuperator positioned adjacent said cradle, a rammer rod actuated by said recuperator, a rammer head operatively engaging said rod and having sliding engagement with said cradle, and means moved into operative position by movement of said plate for imparting a pivotal movement to said head and reduce its rectilinear stroke.

5. In an apparatus for loading guns, the combination of a gun carriage cradle, a loading plate pivoted thereto, a recuperator positioned adjacent said cradle, a rammer rod actuated by said recuperator, a rammer head operatively engaging said rod, and a guiding cam pivoted to said cradle for reducing the usual rectilinear stroke of said recuperator by giving a swinging movement to said head.

6. In an apparatus for loading guns, the combination of a recoiling barrel, a recuperator rammer rod adapted to recoil with the barrel, a rammer head pivotally secured to said rod, a cradle on which the barrel and rammer head move during recoil, a loading tray pivoted to said cradle, a catch on said rod adapted to engage a portion of said cradle to hold the rammer head in its position of recoil, means controlled by movement of said tray for tripping said catch, and a cam member pivoted to said cradle and controlled by movement of said tray for imparting a pivotal movement to the rammer head at the end of its stroke.

7. In combination with a gun, a gun cradle, a loading tray pivoted to said cradle, a recuperator cylinder positioned adjacent the cradle, a rod having operative engagement with said cylinder, a bolt mounted on said rod, a toothed sector pivotally secured to said cradle, bolt-actuating means pivotally secured to said sector, a rammer head pivotally secured to said rod, a guide member pivoted to said cradle and having engagement with said sector, means for transmitting movement of said tray to said sector, and means secured to said cradle for holding said rod in rearward position.

8. In an apparatus for loading guns, the combination of a gun cradle, a loading tray pivoted thereto, a recuperator cylinder secured to said cradle, a rammer rod operatively engaging said cylinder, a rammer head operatively engaging said rod, and tray controlled means for imparting a pivotal movement to said head at the end of its rectilinear movement, said rod being moved rearwardly by the recoil of the gun.

9. A shell rammer having two components in its ramming stroke, one of said components being a rectilinear movement of the rammer and the other component being a swinging movement of said rammer following its rectilinear movement.

10. A shell rammer having a plurality of components in its ramming stroke, said components including a rectilinear movement of the rammer and a swinging movement of the same to complete its ramming stroke.

11. In combination, a gun, a loading tray movable toward and away from the axis of the gun, a shell rammer having two components in its ramming stroke, one of said components being a rectilinear movement of the rammer and the other component being a swinging movement of said rammer following its rectilinear movement, and means for imparting said movements to said rammer.

12. In combination, a gun, a recuperator, a shell rammer pivotally mounted on a moving part of said recuperator and receiving rectilinear movement therefrom through a portion of the ramming stroke, and a device for swinging said rammer to complete its ramming stroke.

13. In combination, a gun, a recuperator, a loading tray pivotally mounted to swing toward and away from the axis of the gun, a shell rammer pivotally mounted on a moving part of said recuperator and receiving rectilinear movement therefrom through a portion of the ramming stroke, and a tray operated device for swinging said rammer to complete its ramming stroke.

14. In combination, a gun, a recuperator, a rammer operatively connected to a moving part of said recuperator and receiving therefrom a movement in the longitudinal direction of the gun through a portion of the ramming stroke, and a device for moving the rammer in the transverse direction of the gun to complete the ramming stroke.

In testimony whereof I have signed this specification.

EUGÈNE SCHNEIDER.

Witnesses:
ANDRÉ MOSTICKER,
LOUIS GARDET.