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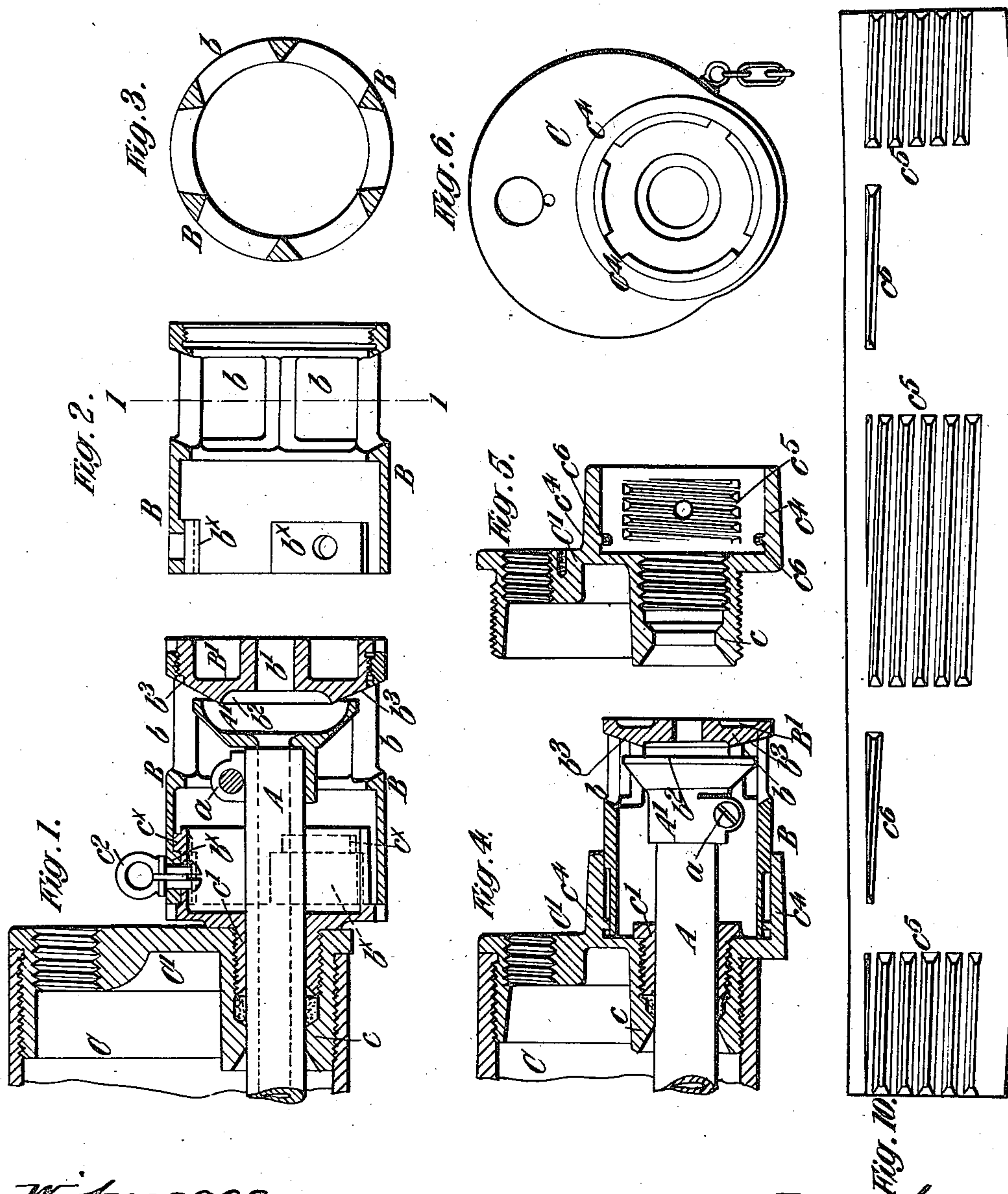
PATENTED NOV. 5, 1907.

A. T. DAWSON & J. RAMSAY.

MUZZLE ATTACHMENT FOR AUTOMATIC GUNS.

APPLICATION FILED MAR. 15, 1905.

2 SHEETS—SHEET 1.



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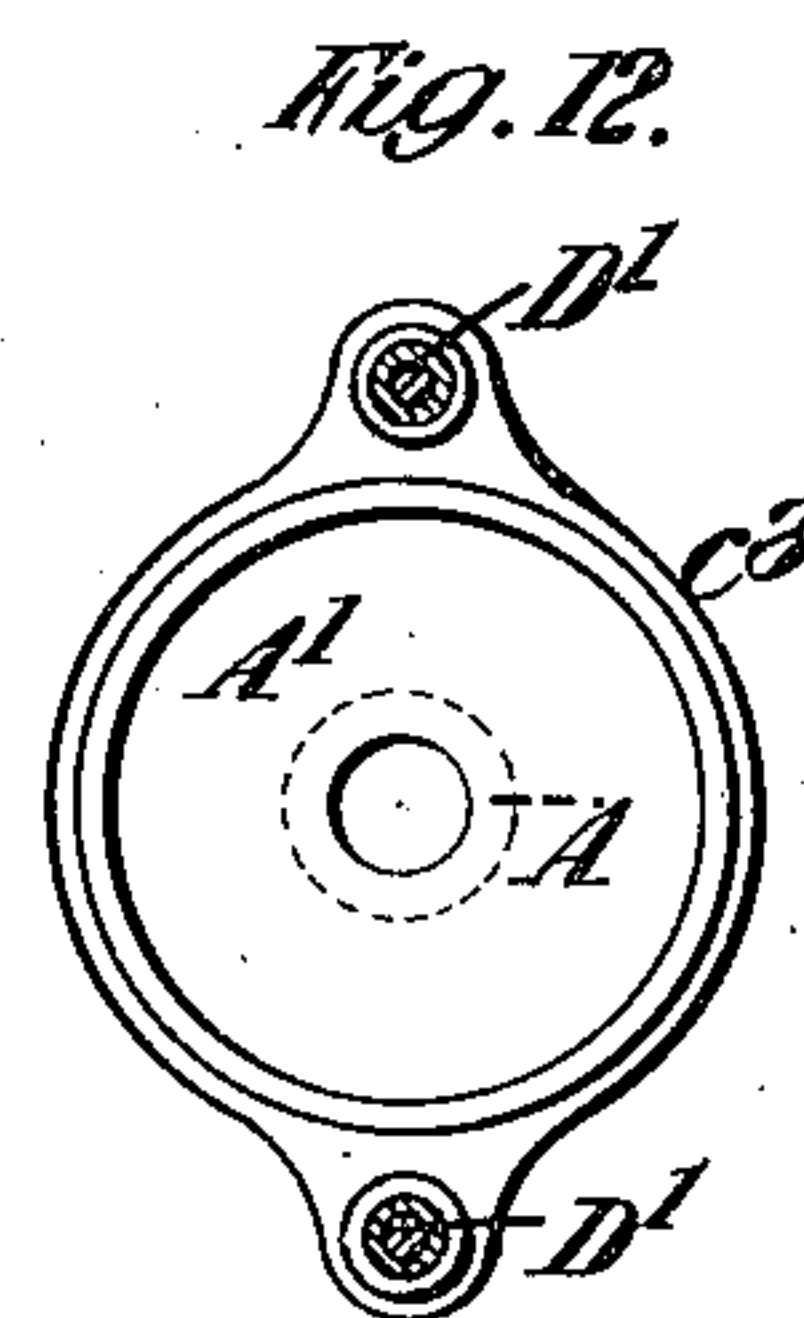
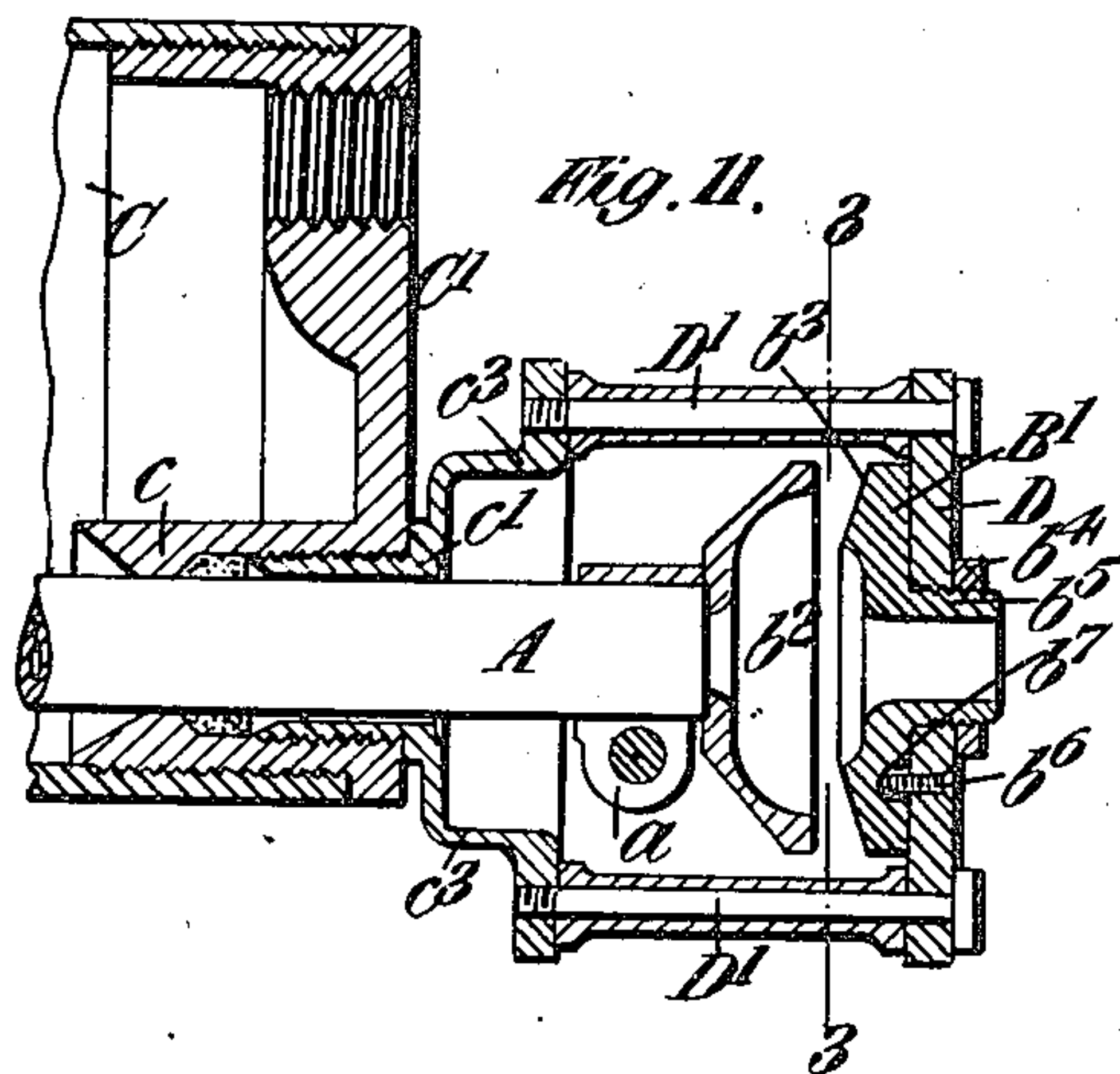
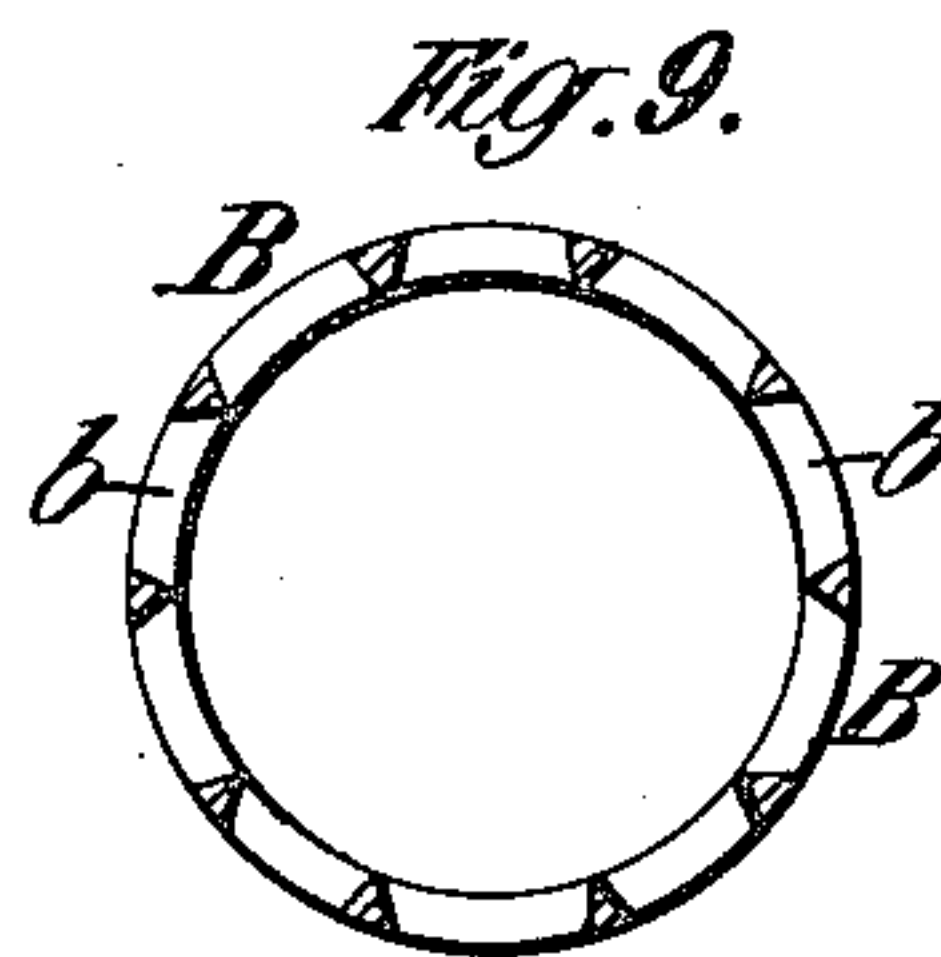
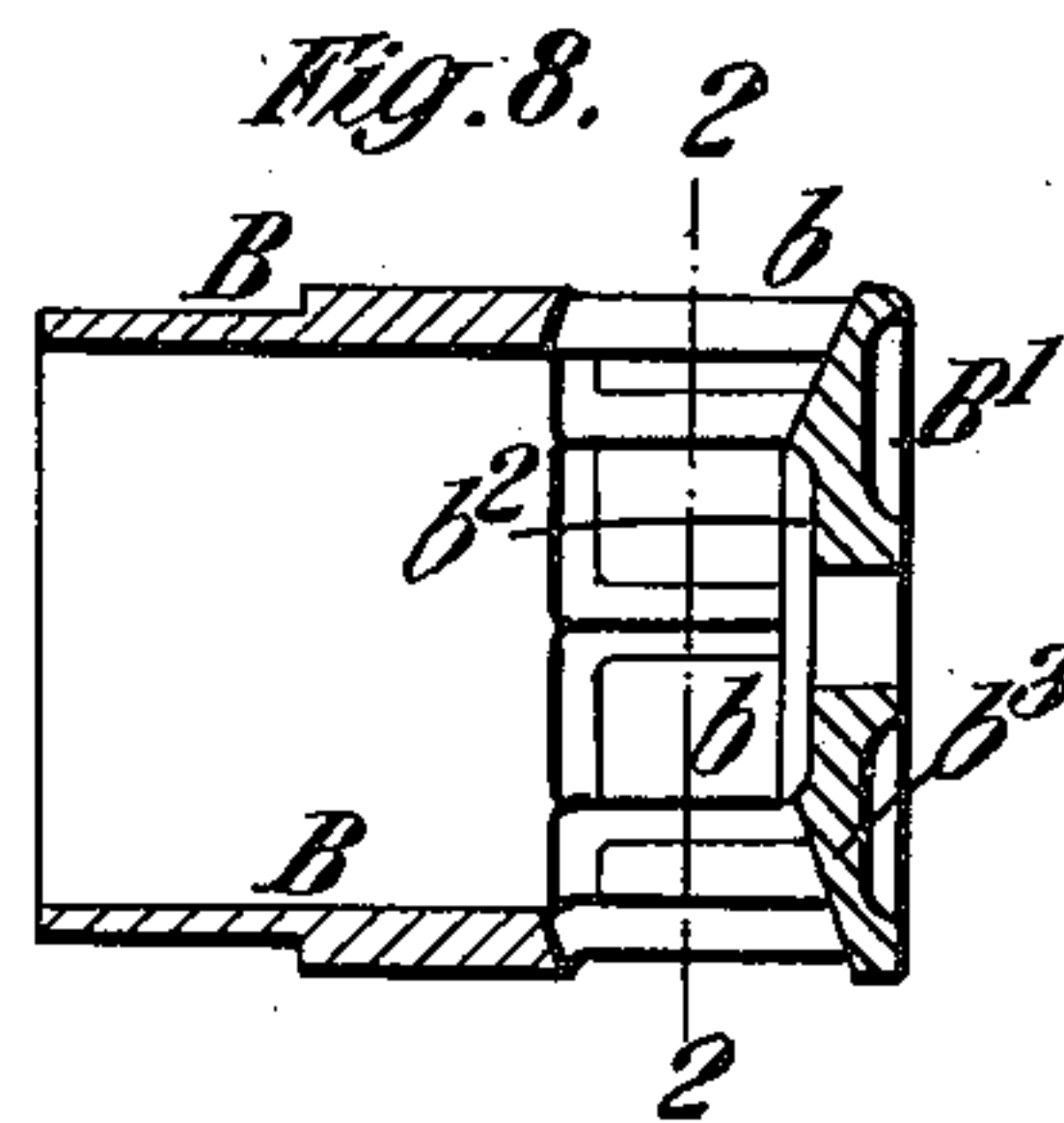
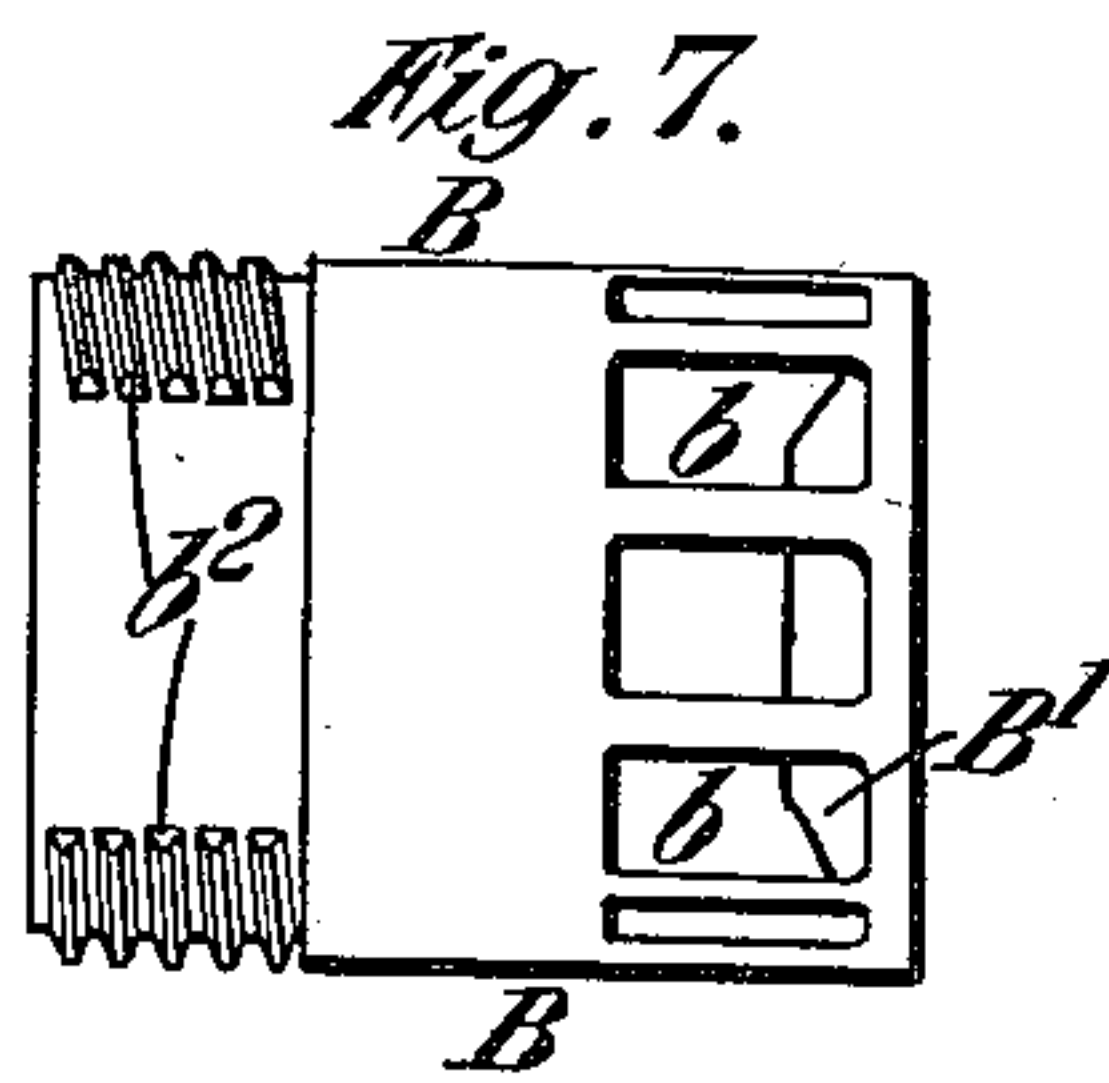
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2 SHEETS—SHEET 2.



Witnesses.

Dennis Sumby,  
Alfred Conitt,

Inventors.  
Arthur T. Dawson.  
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# UNITED STATES PATENT OFFICE.

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## MUZZLE ATTACHMENT FOR AUTOMATIC GUNS.

No. 870,497.

Specification of Letters Patent.

Patented Nov. 5, 1907.

Application filed March 15, 1905. Serial No. 250,284.

*To all whom it may concern:*

Be it known that ARTHUR TREVOR DAWSON, lieutenant of the Royal Navy, director and superintendent of ordnance works, and JAMES RAMSAY, engineer, both subjects of the King of Great Britain, residing at 32 Victoria street, Westminster, in the county of London, England, have invented certain new and useful Improvements in Muzzle Attachments for Automatic Guns, of which the following is a specification.

Our improvements relate to apparatus for attachment to the muzzle of a "Maxim" or other automatic gun for enabling the gases of discharge to actuate or assist in actuating the breech-mechanism.

The said improvements are particularly advantageous for a gun with a recoiling barrel that slides to and fro in a water jacket.

Automatic guns in which the action of the breech mechanism has been effected or assisted by apparatus at the muzzle are already well-known. This apparatus as commonly arranged is characterized by a fixed part or disk which is carried by a radially perforated sleeve connected with the front end cap of the water jacket and which is located in front of the muzzle with a hole for the projectile to pass through, in combination with a disk shaped part or piece fixed on the end of the barrel. The gas escaping from the muzzle at each discharge of the gun enters the gas space existing between said disks and exerts pressure between the said front part or sleeve-disk and the barrel-disk and thus assists the barrel in the recoil movement required for energizing the recoil spring and actuating the breech mechanism. A gland and stuffing box are provided for making a water tight joint where the barrel slides in the said end cap of the water jacket. In muzzle attachments of this kind the gases are not able to freely escape radially outward from the gas space between the two disks until after the barrel has recoiled a considerable distance whereupon they escape from the sleeve into the atmosphere mostly through the hole in the front part or sleeve disk. With such attachments after the gun has been firing for some time considerable carbonaceous deposit or fouling occurs in the neighborhood of the barrel where the latter slides in the stuffing box, with the result that the sliding motion of the barrel becomes so much impeded that it fails to properly actuate the breech mechanism and the gun ceases firing.

It is the chief object of the present invention to overcome this fouling by providing abundant freedom for the escape of the gases from the gas space between the disks and also from the sleeve otherwise than through the aforesaid hole in the front part or sleeve-disk and by utilizing the kinetic energy of the gases rather than their expansive force for actuating the barrel-disk. This object is attained by making the sleeve with

large radial openings and little metal between contiguous openings, or by dispensing altogether with the sleeve and connecting the front part or sleeve-disk with the end-cap or the stuffing box gland of the water-jacket by rods, pillars or distance pieces, so as to offer as slight impediment to the radial escape of the gases as practicable. Also by making the sleeve-disk and the barrel-disk of a suitable conformation to insure that the gases shall be able to at once commence escaping radially outward from the gas space between the disks when the gases enter the said space from the barrel and shall be effectually deflected from the sleeve-disk on to the barrel-disk, so as to utilize their kinetic energy to the best advantage for assisting in the recoil movement of the barrel. The said sleeve disk is also advantageously made with a beveled or chamfered periphery for enabling the gases to escape from the attachment in a forward direction for the purpose of avoiding as far as possible the liability of their blowing back into the face of the gunner.

We also provide the attachment with means for securing it and the barrel-disk in their respective places, so that they can be readily removed and replaced at any time.

In order that our said invention may be clearly understood and readily carried into effect we will describe the same more fully with reference to the accompanying drawings in which:—

Figure 1 is a longitudinal section of the muzzle end of an automatic rifle caliber gun, provided with one form of the improved muzzle attachment. Fig. 2 is a longitudinal section of the sleeve employed in this arrangement, and Fig. 3 is a transverse section thereof on the line 1. 1. Fig. 4 is a longitudinal section of a similar muzzle attachment provided with a different mode of connecting the sleeve in place. Fig. 5 is a longitudinal section and Fig. 6 is a front end elevation of the water jacket end-cap. Fig. 7 is a side elevation and Fig. 8 a longitudinal section of the sleeve. Fig. 9 is a cross-section of the sleeve on the line 2. 2. Fig. 10 is a development of the interior cylindrical surface of the socket of the aforesaid water jacket end-cap. Fig. 11 is a longitudinal section of a modification of the muzzle attachment in which the sleeve is dispensed with. Fig. 12 is a cross section on the line 3. 3.

Referring more particularly to Figs. 1 to 10. A is the barrel and A' the barrel-disk mounted thereon. B is the radially perforated sleeve and B' the front part or sleeve-disk thereof, upon which and the said barrel-disk, the kinetic energy of the powder gases is exerted and the recoil movements of the barrel are thereby obtained or augmented at each discharge of the gun. C' is the front cap of the water-jacket C having on it the stuffing box or bearing c and gland c' through which the barrel slides in its to and fro movements. The said



sleeve B is connected either to this gland or to the end-cap of the water-jacket as hereinafter explained.

In the apparatus illustrated in Figs. 1 to 3 the muzzle end of the barrel A has the disk A' attached to it by a screw-clamp *a*. The gland *c'* of the stuffing box *c* which forms part of the front cap C' is enlarged outside the stuffing box and has the sleeve B secured to it by means of a kind of bayonet joint consisting of a series of segmental fillets or lugs *b<sup>x</sup>* on the sleeve arranged to interlock with similar fillets or lugs *c<sup>x</sup>* on the front cap when the sleeve is angularly turned, the said sleeve being made fast when properly locked to the aforesaid front cap by a spring split pin *c<sup>2</sup>* engaging with holes in the said sleeve and enlarged gland that coincide by the angular movement of the sleeve. The sleeve B surrounds the said front disk B' and the space around the barrel disk A', and said sleeve is formed with the large radial apertures or perforations *b* for the escape of the powder gases. The bars of metal which unite the forward and rear portions of the said sleeve are V-shaped or beveled and of small width as shown at Fig. 3, so that they present the smallest possible surface for the deposit and accumulation of the residue of the powder gases inside the sleeve and also offer little impediment to the escape of the gases from the latter. The front disk B has the part surrounding its central aperture *b* cupped or made concave as shown at *b<sup>2</sup>*, and the barrel-disk A is of cup-shape thus forming a gas space between them. These two disks lie quite close to each other when the barrel is in its fully advanced position but their relative position is such that they do not prevent the gas from immediately escaping radially outward from the gas space between the disks when said gas enters the gas space from the barrel. The gas in entering the gas space impinges upon the cup-shaped surface *b<sup>2</sup>* of the disk B' and is thereby deflected rearwardly against the cup-shaped barrel disk A', thus forcing the barrel to the rear after each discharge; the forward or return movement of the barrel being provided for by the ordinary recoil spring or in any other usual or convenient manner. The periphery of the front disk B is beveled at *b<sup>2</sup>* so that the gases escaping through the apertures *b* after striking the barrel-disk will be directed forwardly as aforesaid.

In the arrangement shown in Figs. 4 to 10; instead of locking the sleeve B and the gland *c'* together by means of a kind of bayonet joint, we provide the front cap C' with the socket *c<sup>4</sup>* having internal interrupted screw threads *c<sup>5</sup>* and we provide the exterior of the sleeve B with corresponding interrupted screw threads *b<sup>2</sup>*, thereby enabling the said parts to be locked and unlocked as in the case of a breech screw. The screw threads may be of any usual formation *i. e.*, either square or angular and of any convenient pitch and there may be as many threads as will be consistent with the required strength and security of the apparatus, but the chief peculiarity of this mode of attachment of our device is the employment in combination with the ordinary threads of a single separate thread *c<sup>6</sup>* between the series of the interrupted threads on the aforesaid socket *c<sup>4</sup>* as best seen in the developed view (Fig. 10). These single threads serve as a guide and stop in uniting the two parts. That is to say we arrange the said single thread in such a position on the one part that when the end of the other part, in being interlocked therewith,

comes into contact with the said single thread, it will be certainly in the correct position to be turned about its axis to lock the threads of the two parts together. As hereinbefore described the sleeve B and front cap socket *c<sup>4</sup>* when properly locked together can be secured by a spring split pin passed through coinciding holes in the two parts. The formation and arrangement of the barrel-disk A and the front disk B are similar to those set forth in connection with Figs. 1 to 3.

In the modification shown in Figs. 11 and 12, we detachably secure the front disk B' to the flange *c<sup>3</sup>* of the stuffing box or gland by a plate D and small rods pillars or distance pieces D', instead of using the sleeve for the support of the front disk as in the apparatus shown in the preceding figures, this arrangement providing for readier escape of the powder gases after their action on the disks A' B' and also obviating the necessity of displacing any other parts of the attachment when it is desired to remove the said disk and barrel. The said small rods D' are arranged diametrically opposite each other so as to give ample space for the removal and replacement of the barrel disk and front disk. When it becomes necessary or desirable to remove the said front disk, this can be readily effected by unscrewing the nut *b<sup>4</sup>* from the screw threaded perforated stem *b<sup>5</sup>* of the front disk B' which is restrained from turning in said plate D by a stop pin *b<sup>6</sup>* entering a notch or recess *b<sup>7</sup>* in the front disk. In this case also the disks A B' are of a similar form to that hereinbefore described.

What we claim and desire to secure by Letters Patent of the United States is:—

1. In a muzzle attachment for an automatic gun having a reciprocating barrel, the combination with the barrel, of a disk movable therewith, an imperforated annular stationary disk surrounding an aperture co-axial with the barrel and of greater diameter than the movable disk, overlapping the latter and forming therewith a gas space from which the powder gases are free to escape radially outward, as they enter between said disks but are prevented from escaping axially by the overlapping of the stationary disk, and means for connecting said stationary disk to a non-recoiling part of the gun and for affording a free radial escape of the powder gases from the disks to the atmosphere without resorting to apertures in the stationary portion facing said movable disk, other than the aforesaid co-axial aperture, for the purpose specified.

2. In a muzzle attachment for an automatic gun having a reciprocating barrel, the combination with the barrel, of a disk movable therewith, an imperforated annular stationary front disk surrounding an aperture co-axial with the barrel and of greater diameter than the movable disk, overlapping the latter and forming therewith a gas space from which the powder gases are free to escape radially outward as they enter between said disks but are prevented from escaping axially by the overlapping of the stationary disk, and a plurality of widely spaced longitudinal bars connecting said front disk with a non-recoiling part of the gun so as to afford a free radial escape of the powder gases from the disks to the atmosphere without resorting to apertures in the stationary portion facing said movable disk, other than the aforesaid co-axial aperture, for the purpose specified.

3. In a muzzle attachment for an automatic gun having a reciprocating barrel, the combination with the barrel, of a disk movable therewith, an imperforated annular stationary front disk surrounding an aperture co-axial with the barrel and of greater diameter than the movable disk, overlapping the latter and forming therewith a gas space from which the powder gases are free to escape radially outward as they enter between said disks but are prevented from escaping axially by the overlapping of the stationary disk, and a plurality of widely spaced longitudinal



dinal bars of small sectional area connecting said front disk with a non-recoiling part of the gun so as to afford a free radial escape of the powder gases from the disks to the atmosphere without resorting to apertures in the stationary portion facing said movable disk, other than the aforesaid co-axial aperture for the purpose specified.

4. In a muzzle attachment for an automatic gun having a reciprocating barrel, the combination with the barrel, of a disk movable therewith, an imperforated stationary front disk surrounding an aperture co-axial with the barrel and of greater diameter than the movable disk, overlapping the latter, and forming therewith a gas space from which the powder gases are free to escape radially outward as they enter between said disks but are prevented from escaping axially by the overlapping of the stationary disk, and a plurality of widely spaced longitudinal bars of small triangular section connecting said front disk with a non-recoiling part of the gun and having their apexes directed inwardly so as to afford a free radial escape for the powder gases from the disks to the atmosphere without resorting to apertures in the stationary portion facing said movable disk, other than the aforesaid co-axial aperture, for the purpose specified.

5. In a muzzle attachment for an automatic gun having a reciprocating barrel the combination with the barrel of a concave or dished disk movable therewith, an imperforated annular stationary concave or dished front disk surrounding an aperture co-axial with the barrel and of greater diameter than the movable disk, overlapping the latter, and forming therewith a gas space from which the powder gases are free to escape radially outward as they enter between said disks but are prevented from escaping axially by the overlapping of the stationary disk, and means for connecting said front disk to a non-recoiling part of the gun and for affording a free radial escape of the powder gases from the disks to the atmosphere without resorting to apertures in the stationary portion facing said movable disk, other than the aforesaid co-axial aperture, for the purpose specified.

6. In a muzzle attachment for an automatic gun having a reciprocating barrel, the combination with the barrel, of a concave or dished disk movable therewith, a stationary front disk having an aperture co-axial with the barrel and a concave or dished cavity surrounded by a beveled or chamfered peripheral portion on its active face, and means for connecting said front disk to a non-recoiling part of the gun and for affording a free radial escape of the powder gases from the disks to the atmosphere for the purpose specified.

7. In a muzzle attachment for an automatic gun having a reciprocating barrel, the combination with the barrel, of a concave or dished disk movable therewith, a stationary front disk having an aperture co-axial with the barrel and a concave or dished cavity surrounded by a beveled or chamfered peripheral portion on its active face, and a plurality of widely spaced longitudinal bars of small triangular cross-section connecting said front disk with a non-recoiling part of the gun and having their apexes directed inwardly for the purpose specified.

8. In a muzzle attachment for an automatic gun having a reciprocating barrel, the combination with the barrel of a concave or dished disk movable therewith, a stationary front disk having an aperture co-axial with the barrel and a concave or dished cavity surrounded by a beveled or chamfered peripheral portion on its active face, a sleeve carrying said front disk and surrounding the barrel-disk and having wide radial openings therein separated by narrow bars, and means for detachably connecting said sleeve with a non-recoiling part of the gun substantially as described.

9. In a muzzle attachment for an automatic gun having a reciprocating barrel, the combination with the barrel, of a concave or dished disk detachably connected therewith, a stationary front disk having an aperture co-axial with the barrel and a concave or dished cavity surrounded by a beveled or chamfered peripheral portion on its active face, a sleeve detachably carrying said front disk and surrounding the barrel-disk and having wide radial openings therein separated by narrow triangular bars, and means for detachably connecting said sleeve with a non-recoiling part of the gun substantially as described.

10. In a muzzle attachment for an automatic gun having a reciprocating barrel; the combination with the barrel, of a concave or dished disk detachably connected therewith, a stationary front disk having an aperture co-axial with the barrel and a concave or dished cavity surrounded by an outwardly beveled or chamfered peripheral portion on its active face, a sleeve detachably carrying said front disk and having wide radial openings therein separated by narrow triangular bars, and means for detachably connecting said sleeve with a non-recoiling part of the gun substantially as described.

11. In a muzzle attachment for an automatic gun having a reciprocating barrel; the combination with the barrel, of a concave or dished disk detachably connected therewith, a stationary front disk having an aperture co-axial with the barrel and a concave or dished cavity surrounded by a beveled or chamfered peripheral portion on its active face, a sleeve detachably carrying said front disk and having wide radial openings therein separated by narrow triangular bars, interrupted fillets on the said sleeve, and corresponding interrupted fillets on a non-recoiling part of the gun for engagement therewith substantially as described.

12. In a muzzle attachment for an automatic gun having a reciprocating barrel; the combination with the barrel, of a concave or dished disk detachably connected therewith, a stationary front disk having an aperture co-axial with the barrel and a concentric concave or dished cavity surrounded by a beveled or chamfered peripheral portion on its active face, a sleeve detachably carrying said front disk and having wide radial openings therein separated by narrow triangular bars, interrupted screw threads on the said sleeve, corresponding interrupted screw threads on a non-recoiling part of the gun for engagement therewith, and stop pieces on the interrupted portions of said non-recoiling part substantially as described.

13. In a muzzle attachment for an automatic gun having a reciprocating barrel, the combination with the barrel, of a water jacket surrounding said barrel, a stuffing box and gland in the front cap of said water jacket in which said barrel reciprocates, a concave or dished disk detachably connected with the barrel, a stationary front disk having an aperture co-axial with the barrel and a concentric concave or dished cavity surrounded by a beveled or chamfered peripheral portion on its active face, a sleeve detachably carrying said front disk and having wide radial openings therein separated by narrow triangular bars, and means for detachably connecting said sleeve with said front cap of the water jacket substantially as described.

In testimony whereof we have hereunto set our hands in presence of two subscribing witnesses this first day of March 1905.

ARTHUR TREVOR DAWSON.  
JAMES RAMSAY.

Witnesses:

HENRY KING,  
EUSTACE H. BARKER.