

J. O. NYGAARD.
ATTACHMENT TO THE BARRELS OF FIREARMS.
APPLICATION FILED SEPT. 1, 1906.

Fig. 1

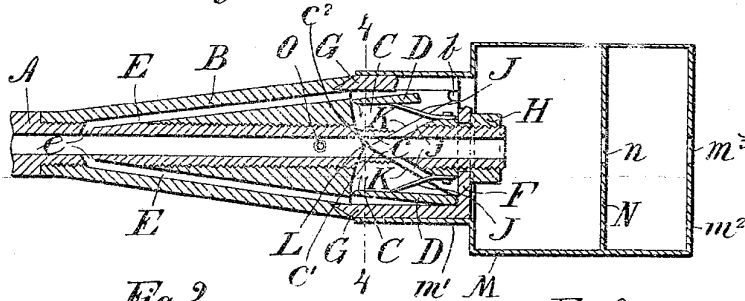


Fig. 2

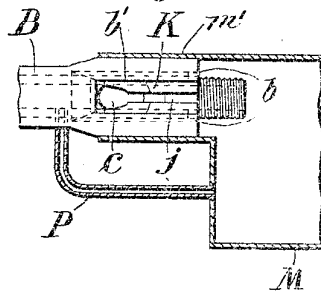


Fig. 3

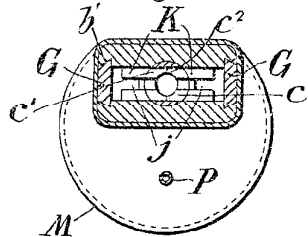
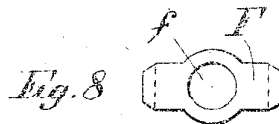
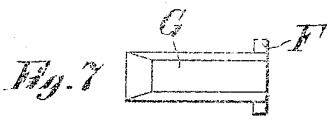
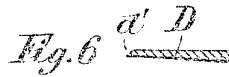
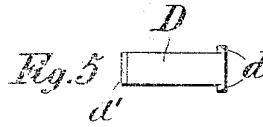
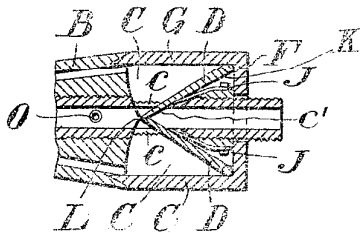


Fig. 4



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UNITED STATES PATENT OFFICE.

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ATTACHMENT TO THE BARRELS OF FIREARMS.

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To all whom it may concern:

Be it known that I, JOHAN OLSEN NYGAARD, a subject of the King of Sweden and Norway, residing at the city of Christiania, in the Kingdom of Sweden and Norway, have invented a new and useful Attachment to the Barrels of Firearms, of which the following is a full, clear, and exact description.

The invention relates to improvements in ordnance, and has for its object the provision of an improved muffling device for deadening the report accompanying the firing of a charge; and the invention also has for its object the arrangement of such a device whereby smoke and gases accompanying the discharge of the weapon are prevented from issuing from the muzzle with and subsequent to the passage of the projectile.

According to my invention there is provided mechanical instrumentalities adapted to be acted upon by the gases accompanying the firing of a charge in a manner to temporarily close the bore of the gun to the outwardly-traveling gases, and thereby muffle the report of the charge.

To this end the invention consists in providing the barrel with lateral valve-chambers located adjacent the muzzle and communicating with the bore by suitably-disposed closable ports and in the provision within the chambers of valves adapted when seated to close the bore, said valve-chambers communicating with the bore by means of channels adapted to admit the gases in a manner to close said valves, the latter being normally held in an open position. In combination with the above there may be provided on stationary ordnance a smoke or gas chamber adapted to form a receiver for the gases and smoke and connected with an outlet of the muffler.

In the drawings, Figure 1 is a longitudinal horizontal section of a gun, showing the device of my invention applied thereto. Fig. 2 is a side elevation of the muzzle end of the barrel, showing the improved smoke and gas chamber in section. Fig. 3 is a vertical sectional view on line 4 4 of Fig. 1. Fig. 4 is a vertical fragmentary end section of the muzzle end of the barrel, showing the valves in

closed position. Fig. 5 is a detail of one of the valves. Fig. 6 is a sectional view of the valve shown in Fig. 5. Figs. 7 and 8 are side and end views of a structural detail.

Like parts are designated by similar characters of reference throughout the different figures of the drawings.

A designates the barrel of the gun, provided with the usual bore. The exterior of the barrel is reduced from the muzzle inwardly a suitable distance and is provided with exterior screw-threads.

B designates a sleeve internally threaded and adapted to fit on the threaded outer end of the barrel and preferably extending throughout the length of the threaded portion thereof. Said sleeve B is provided adjacent the muzzle with laterally-disposed chambers C, which communicate with the barrel by ports *c*. The chambers C are provided with oppositely-facing converging surfaces K, adapted to form valve-seats, which surfaces register with and are continued by inclined faces *c'*, formed in the barrel of the gun, the latter surfaces converging to a line *c''*, intersecting the axis of the bore. Said valve-seats extend inwardly from the upper and lower walls of the chambers a sufficient distance to form an effective contact-surface and are centrally recessed at *j*.

Valves D are provided which consist of flat plates of a width substantially equal to the height of the chambers C and have an operative fit therein. Said valves are provided with trunnions *d*, adapted to seat in recesses *b*, formed in the outer end of the sleeve B. Said valves D are chamfered at their inner ends, as shown at *d'*, at which point said valves engage each other when closed, the chamfered surface being of sufficient area to form an effective contact-surface. In order to maintain the valves normally in an open position, springs J are provided and, as shown, are seated in the recesses *j* and anchored therein to the sleeve B, the free ends of said springs engaging the inner faces of the valves D and normally holding the same in the position shown in Fig. 1.

In order to render the valve-chambers readily accessible and in order to enable the

valves D to be quickly replaced in case of injury or for purposes of cleaning the same, the sleeve B is provided with lateral openings or passages *b'*, adapted to be closed by removable plates G. Such plates are beveled on their end and lateral margins and have a dovetailed fit with the overhanging margins of said openings *b'*.

I preferably connect the plates G by an end piece F, the latter being preferably greater in width than the valves D and their trunnions and adapted to cover the recesses *b* and hold the trunnions in place therein and likewise to close the outer ends of the valve-chambers C. The end piece F is centrally apertured at *f* to accommodate the outer muzzle end of the barrel. When the valves D are inserted in place, the connecting end piece F and plate G are inserted in place endwise of the sleeve B, the plates G closing the openings *b'* and the end piece F closing the outer end of the sleeve B and surrounding the barrel A, as clearly shown in Fig. 1. A nut H serves to securely hold the parts in an assembled position.

The sleeve B is provided with passages E, which communicate at *e* with the bore at one end and with the chambers C at their opposite ends and preferably at the outer lateral portions of said chambers and at a point laterally beyond the normal position of the valves D, as clearly shown in Fig. 1.

The bore is provided with an outlet O for the gases which may communicate with the outer air or with any suitable form of receiver. As shown and in cases where the invention is applied to heavy ordnance the outlet O communicates by a by-pass P with a smoke-chamber M. Said chamber M consists of a casing provided with a flange *m'*, adapted to fit over the outer end of the sleeve B and to be secured in place thereto in any desired manner. The chamber M is provided with a partition N and with an end wall *m*². The partition N is apertured at *n* and the wall *m*² at *m*³ to accommodate the projectile.

The operation will be obvious from the foregoing, but may be briefly described as follows: When the charge is fired, the accompanying gases, after the projectile has passed the point designated by *e*, pass through the passages E and engage the outer faces of the valves D. By reason of the fact that the valves D substantially fill the valve-chambers the pressure of the incoming gases forces the valves down upon their seats, serving to close the bore and prevent the gases issuing from the muzzle. This action serves effectively to muffle the usual report accompanying the firing of a charge. The remaining gases are free to pass out through the opening O into the chamber M or into any other suitable receiver. The gases accompanying

the projectile and passing out therewith before the valves D are closed are practically all retained in the smoke-chamber M, there being no draft to carry off the contents of said chamber.

It will be obvious that the smoke-chamber M is not an essential feature of the invention and that it will be used only in connection with heavy ordnance.

It will be further understood that all of the advantages of the invention may be realized by the employment of my improved muffling device independent of the chamber M, as the latter performs no function in muffling the report of the fired charge.

I claim—

1. An attachment to the barrel of firearms consisting of a piece securely fixed to the muzzle of the gun and comprising two chambers located one on each side of the bore and containing two clacks, which are held in open position by springs and in closed position meet in the center line of the bore, said chambers on the one side of the said clacks communicating with the front end of the bore or with an extension of the same, and on the other side of the clacks the said chambers communicate with channels branching off from the bore at a point located at a suitable distance from the closing-point of the said clacks, substantially as shown and for the purpose specified.

2. A muffler for ordnance comprising in combination, a barrel provided with a bore, a sleeve secured to the barrel, valve-chambers formed in said sleeve and communicating with the bore by ports, said chambers also communicating with the bore by passages, and a plurality of valves located in said chambers and serving, when acted upon by the discharging gases, to close said bore.

3. A muffler for ordnance comprising in combination, a barrel provided with a bore, a sleeve secured to the barrel, chambers formed in said sleeve and communicating with said bore by ports, said chambers also communicating with said bore by passages, and spring-actuated valves located in said chambers between the terminals of said passages and ports and serving to close said bore when acted upon by the discharging gases.

4. A muffler for ordnance comprising in combination, a barrel provided with a bore, two valve-chambers communicating with said bore, said chambers also communicating with said bore by passages, and valves located in said chambers and serving to close said bore when acted upon by discharging gases.

5. A muffler for ordnance comprising in combination, a barrel provided with a bore, a sleeve secured to the muzzle end of the barrel, chambers formed in said sleeves and commu-

5 communicating with said bore by ports, said chambers also communicating with said bore by passages, spring-actuated valves located in said chambers between the terminals of said passages and ports and serving to close said bore when acted upon by the discharging gases, a smoke-chamber divided into two compartments and having apertures for the

discharge of the projectile, and a by-pass leading from said bore to said chamber. 10

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

JOHAN OLSEN NYGAARD.

Witnesses:

N. G. FAUDBERG,
HENRY BORDEWICH.