(No Model.)

J. M. & M. S. BROWNING.

MACHINE GUN.

No. 471,784. Patented Mar. 29, 1892.

Fig. 1

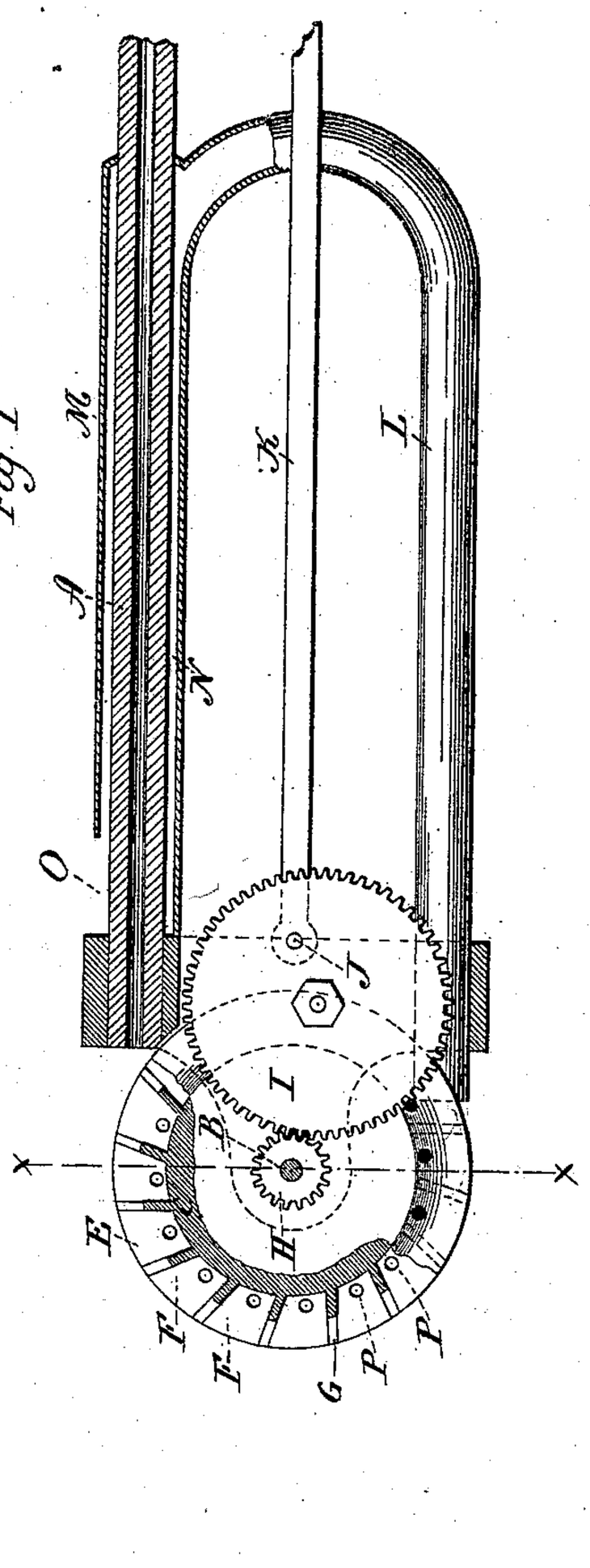


Fig. 3

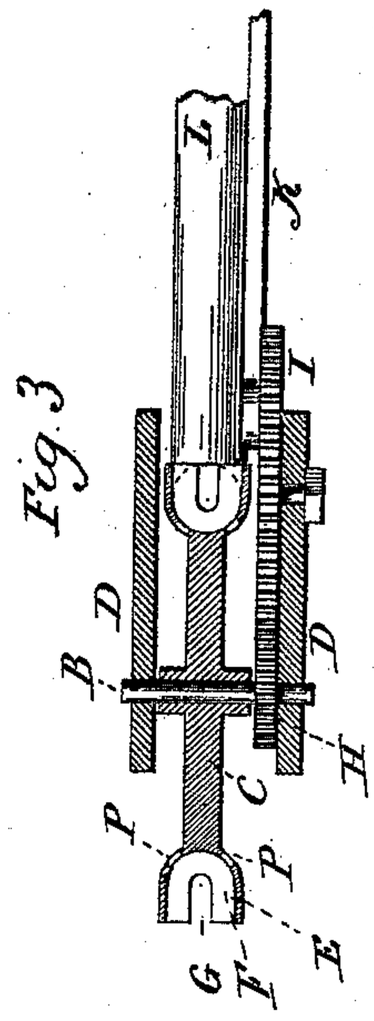
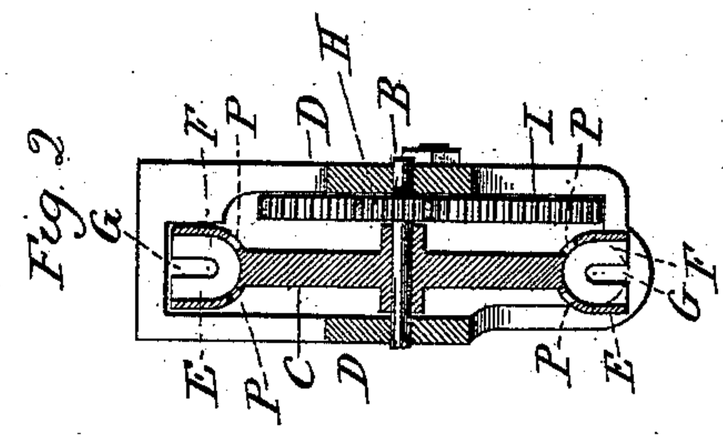


Fig. 2



Witnesses.
J. H. Shumway.
Lillian D. Kelsey

John M Browning
Matthew S. Browning.
Inventors.
By attys Earle & Seymour

UNITED STATES PATENT OFFICE.

JOHN M. BROWNING AND MATTHEW S. BROWNING, OF OGDEN, UTAH TERRITORY.

MACHINE-GUN.

SPECIFICATION forming part of Letters Patent No. 471,784, dated March 29, 1892.

Application filed August 3, 1891. Serial No. 401,576. (No model.)

To all whom it may concern:

Be it known that we, JOHN M. BROWNING and MATTHEW S. BROWNING, of Ogden, in the county of Weber and Territory of Utah, have invented a new Improvement in Machine-Guns; and we do hereby declare the following, when taken in connection with accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a longitudinal sectional side view of a gun-barrel, illustrating the mechanism for automatic firing; Fig. 2, a transverse section cutting on line *x x* of Fig. 1; Fig. 3, an under side view looking upward, showing the wheel C in transverse section and the bracket in partial section.

This invention relates to an improvement in that class of machine-guns in which the firing is made automatic by means of gases escaping from the muzzle of the gun, the object of the invention being to employ a wheel with blades upon which the gases may act to impart rotation to the wheel, the rotation of the wheel being utilized to operate the mechanism of the gun, and also so that the blades of the wheel may serve as a fan to produce a blast for the cooling of the gun-barrel.

The invention consists principally in the arrangement of a wheel carrying blades, the path of the blades in rotation being in line with the muzzle of the gun, and the wheel adapted to revolve upon an axle at right angles to the axis of the barrel, the blades having an opening through them corresponding to the muzzle of the gun for the passage of the bullet, the blades surrounding the said opening being adapted to receive the action of the gases escaping from the muzzle of the gun, whereby rotation may be imparted to said wheel, and the said wheel in connection with the mechanism of the arm, whereby its rotation will operate the said mechanism.

The invention also consists in combining with such a wheel a conductor in line with the revolution of the said blades, and so that the said blades may operate as a fan to throw a blast of air into the said tube, the said tube conducting the blast of air so thrown into it into a jacket surrounding the barrel, and whereby a blast of air is constantly circulated around the barrel when the gun is in operation, and as more fully hereinafter described.

A represents the barrel of the gun.

We do not illustrate the breech mechanism, as the invention may be applied to any of the known mechanisms for guns or arms which may be operated by a reciprocating movement too well known to require description or illustration.

Forward of the barrel and upon an axis B a wheel C is arranged. The axis is supported in suitable bearings, here represented as a bracket attached to the forward end of the barrel and forming arms D D, in which the axis B takes its bearing. The periphery of the wheel is grooved, so as to form an annular recess E around the wheel. In this recess a series of blades F F are arranged transversely across the groove or recess in the wheel. The axis of the wheel is arranged relatively to the axis of the barrel, so that the groove of the wheel is in line with the barrel and so that the blades will travel in a path to successively bring the blades forward of the bore of the barrel. The blades are each constructed with a notch or opening G, which corresponds to the bore of the barrel, these notches open at the upper edge of the blades and so as to leave a clear way from the barrel forward through the blades as they revolve, and so that the ball as it leaves the barrel may not come in contact with either of the said blades. The annular groove E of the wheel is considerably larger than the notch G of the blades, so as to expose the surface of the blades around the recess G within the groove. As the gases escape from the barrel they enter the groove of the wheel and strike the blade then exposed, the force of the gases thereby causing the wheel to revolve, each successive blade catching the force as it presents itself before the barrel. The axis or arbor B of the wheel C carries a pinion H, which works into a gear-wheel I, here represented as supported upon the same bracket as the wheel C, and so that the rotation of the wheel C will impart corresponding rotation to the gear I. The gear I serves to communicate the rotation of the wheel C to

the mechanism of the arm. As here represented, this is done by means of a crank-pin J on the wheel I, from which a connecting-rod K extends to the mechanism of the arm, and so that the revolution of the wheel I will impart corresponding reciprocating movement to the rod K, which will produce the opening and closing movement of the breech-piece and cocking and discharging of the hammer. The revolution of the wheel C will be very rapid, more rapid than would be naturally required to produce the operation of the mechanism, and it is not desirable to check this rapid revolution to any considerable extent, for the reason that it is purposed to employ this rapid revolution for cooling the barrel, as will be hereinafter described. For these reasons the pinion H is made much smaller that the gear I, so that the revolution of the gear I will be proportionately slower than the revolution of the wheel C; but it will be understood that the proportionate speed of the wheels may be varied, and is immaterial to the invention, and it will also be understood that the connection between the wheel C and the mechanism will be adapted to the particular mechanism which may be employed, the illustration of the connecting-rod and crank being sufficient for the clear understanding of the invention. The firing will be very rapid. Consequently the wheel C will maintain substantially a continuous revolution so long as cartridges are supplied to the barrel.

To utilize the blast for cooling the barrel, a tubular conductor L is arranged tangentially to the wheel C and upon the side of the wheel opposite the barrel, the tube opening toward the wheel, as seen in Fig. 3, and so that as the wheel C rotates the blades will force air into the tube L in like manner as air is thrown by revolving fans. Around the barrel a jacket M is arranged, so as to leave a space or chamber N between the jacket and the barrel. This jacket opens forward near the muzzle, may be as at O, Fig. 1, and into the chamber N at the rear the conductor L leads, as seen in Fig. 1, so that the blast of air produced by the revolving wheel C will be forced into the chamber N around the barrel, the air escaping forward, and thus will maintain a constant circulation of cool air around the barrel during the operation of the gun, which will tend to prevent the heating of the barrel from rapid firing.

To facilitate the drawing of air into the groove in the wheel C forward of the blades, the sides of the groove are constructed with openings P between successive blades. In case the blast or cooling is not required the groove on the periphery of the wheel may be omitted, the periphery of the wheel being provided only with the series of blades; but we prefer to employ the groove, as the groove itself serves to confine the gases and the action thereof more directly upon the blades than would be the case were the sides open between the blades for the free escape of gases.

We claim—

1. In combination with the barrel of a gun, a wheel arranged upon an axis at the forward end of the barrel, the said axis being at right angles to the axis of the barrel, the wheel constructed with a series of blades upon its periphery, said blades moving in a path central with the line of the barrel, and the blades constructed with an opening through them corresponding to the bore of the barrel, the said opening through the blades extending through the outer edge of the blades, with mechanism, substantially such as described, between said wheel and the mechanism of the gun, substantially as specified, and whereby the rotation of said wheel will impart operative movement to said mechanism.

2. In combination with the barrel of a gun, a wheel arranged upon an axis at the forward end of the barrel, the axis of the wheel being at right angles to the axis of the barrel, the wheel constructed with an annular groove on its periphery, the wheel having a series of blades arranged transversely across said groove and so that as the wheel revolves the said blades will be successively presented in line with the barrel, the blades constructed with an opening corresponding to the bore of the barrel, the said opening of the blades extending through the outer edge of the blades, with mechanism, substantially such as described, adapted to connect said wheel with the breech mechanism of the gun, substantially as described.

3. In combination with the barrel of a gun, a wheel arranged upon an axis at the forward end of the barrel, the axis of the wheel being at right angles to the axis of the barrel, the wheel constructed with a series of substantially radial blades on the periphery, the plane of the blades being transversely across the periphery and so that the said blades in revolving will be successively presented in line with the barrel, the blades constructed with an opening corresponding to the bore of the barrel, mechanism, substantially such as described, adapted to connect the said wheel with the breech mechanism of the gun and with a jacket around the barrel, forming an air-chamber between said jacket and barrel, with a conductor opening forward toward the blades of said wheel and leading therefrom into said jacket, substantially as described, and whereby the revolution of the said wheel produces blast through the said conductor and into said chamber around the barrel.

In testimony whereof we have signed this specification in the presence of two subscribing witnesses.

JOHN M. BROWNING.
MATTHEW S. BROWNING.

Witnesses:
C. J. BROWN,
JOHN E. RAMSDEN.