

No. 696,318.

Patented Mar. 25, 1902.

O. C. CULLEN.  
FIREARM.

(Application filed Dec. 14, 1899.)

2 Sheets—Sheet 1.

(No Model.)

FIG. 1.

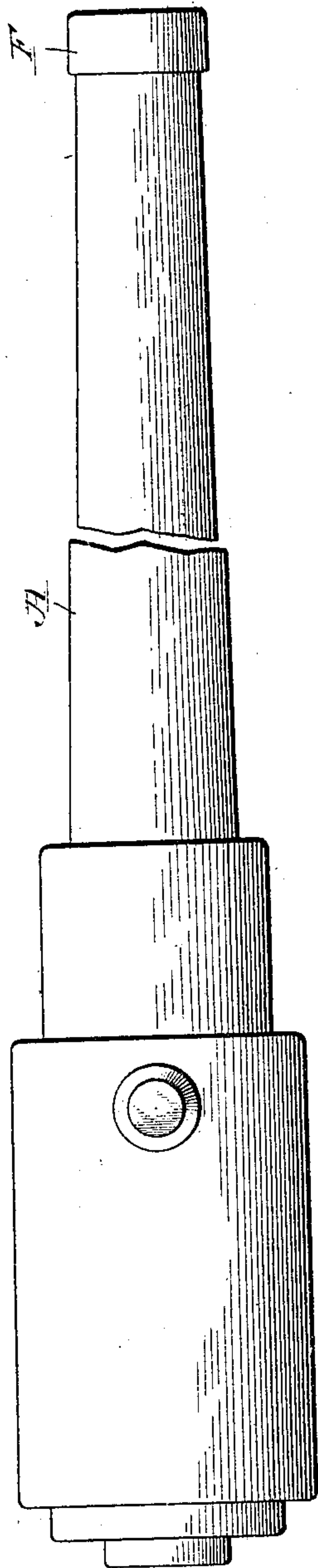
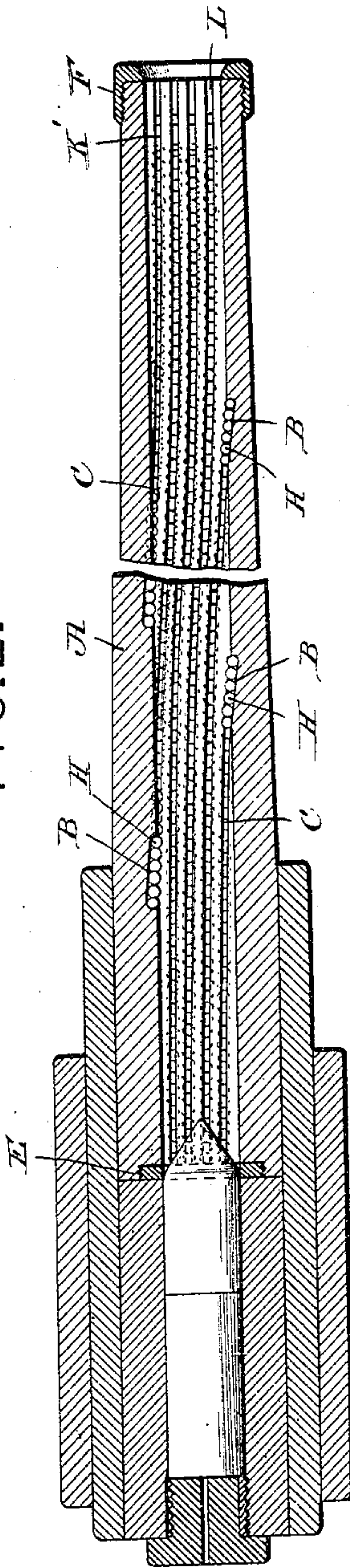


FIG. 2.



ATTEST-

*Harry L. Amer.*  
*G. W. Anderson*

INVENTOR.

*Orlan Clyde Cullen.*

*By E. W. Anderson -*  
*his Atty.*

No. 696,318.

Patented Mar. 25, 1902.

O. C. CULLEN.  
FIREARM.

(Application filed Dec. 14, 1899.)

2 Sheets—Sheet 2.

(No Model.)

FIG. 3.

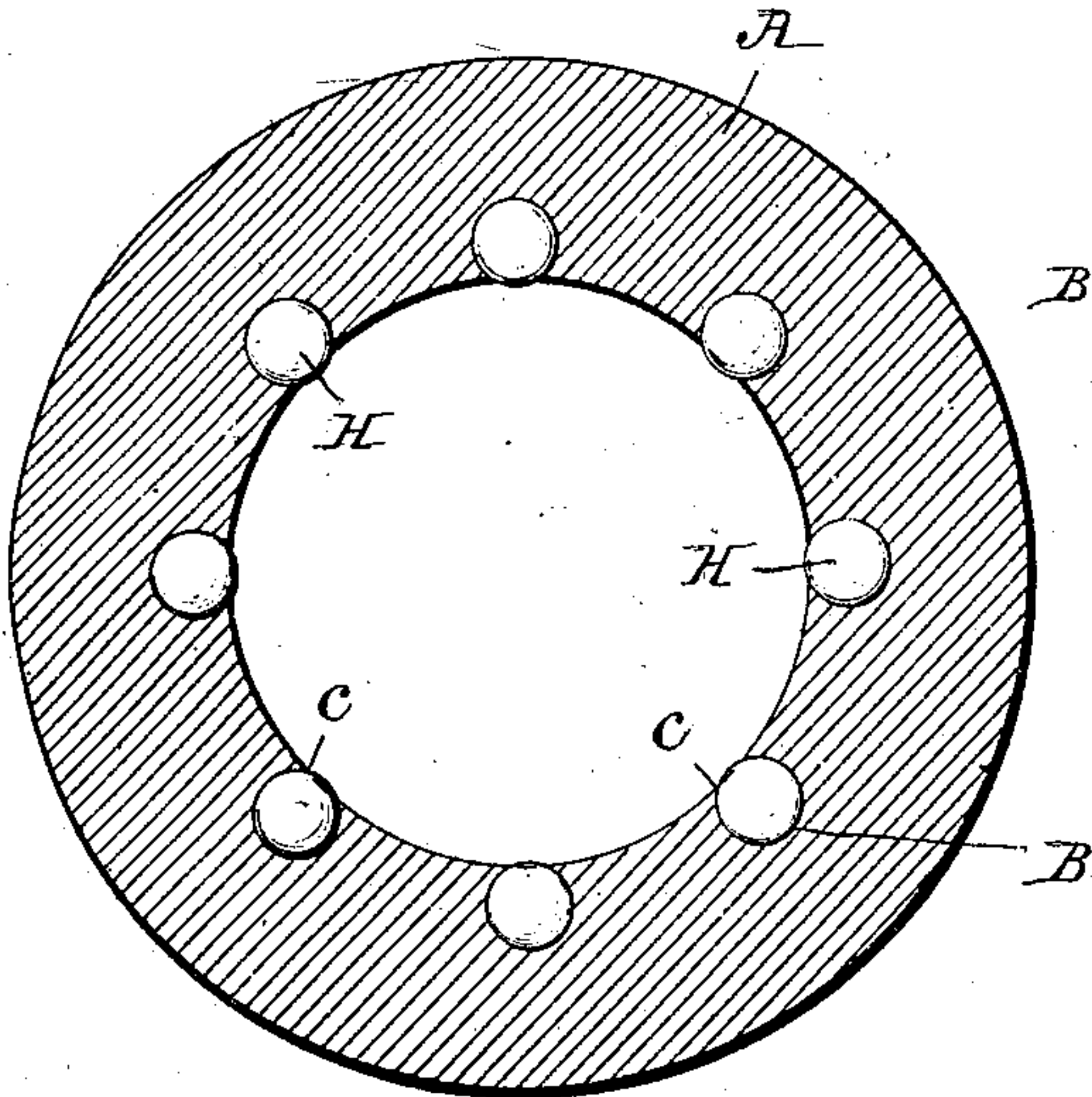


FIG. 4.

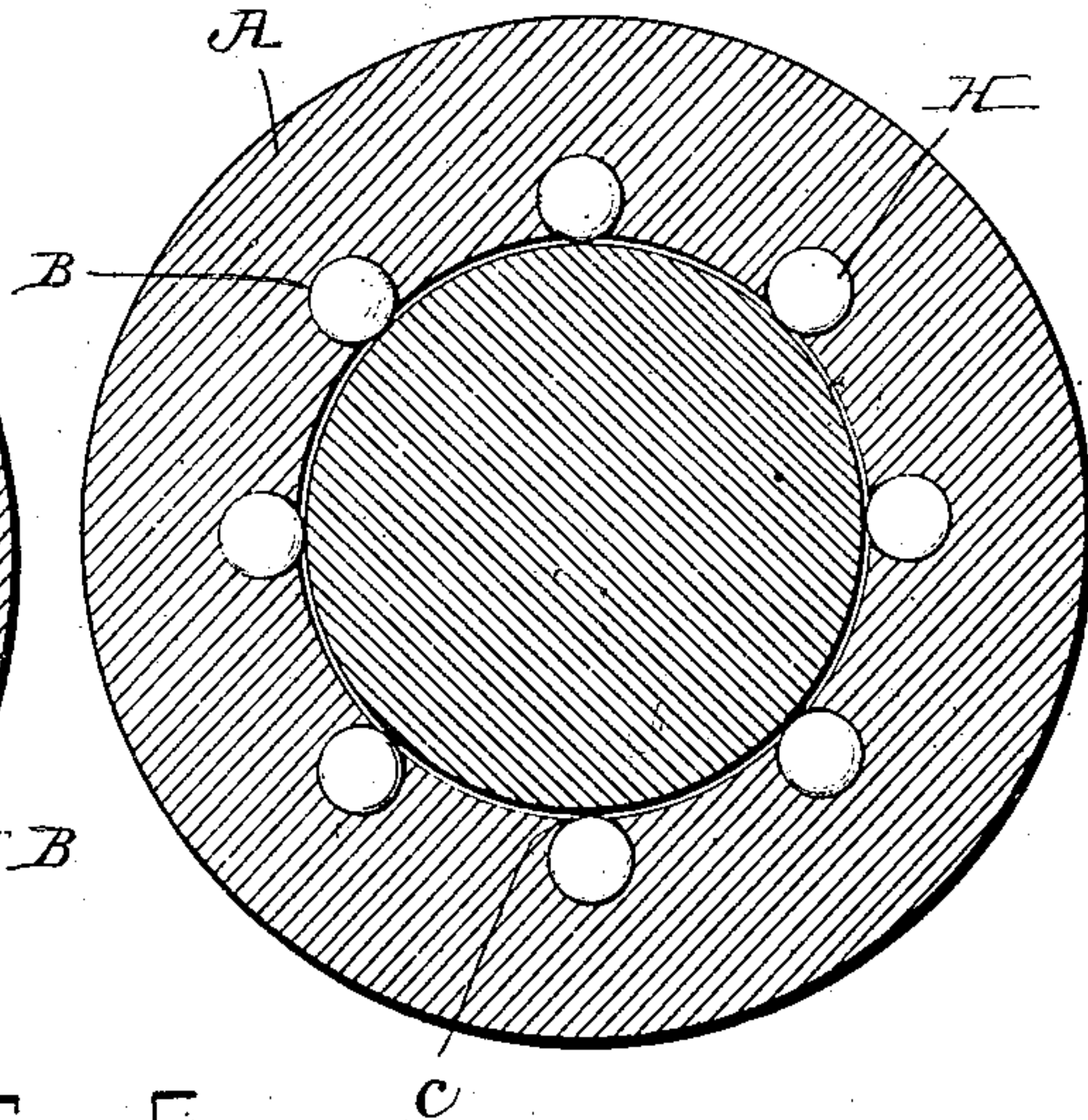


FIG. 5.

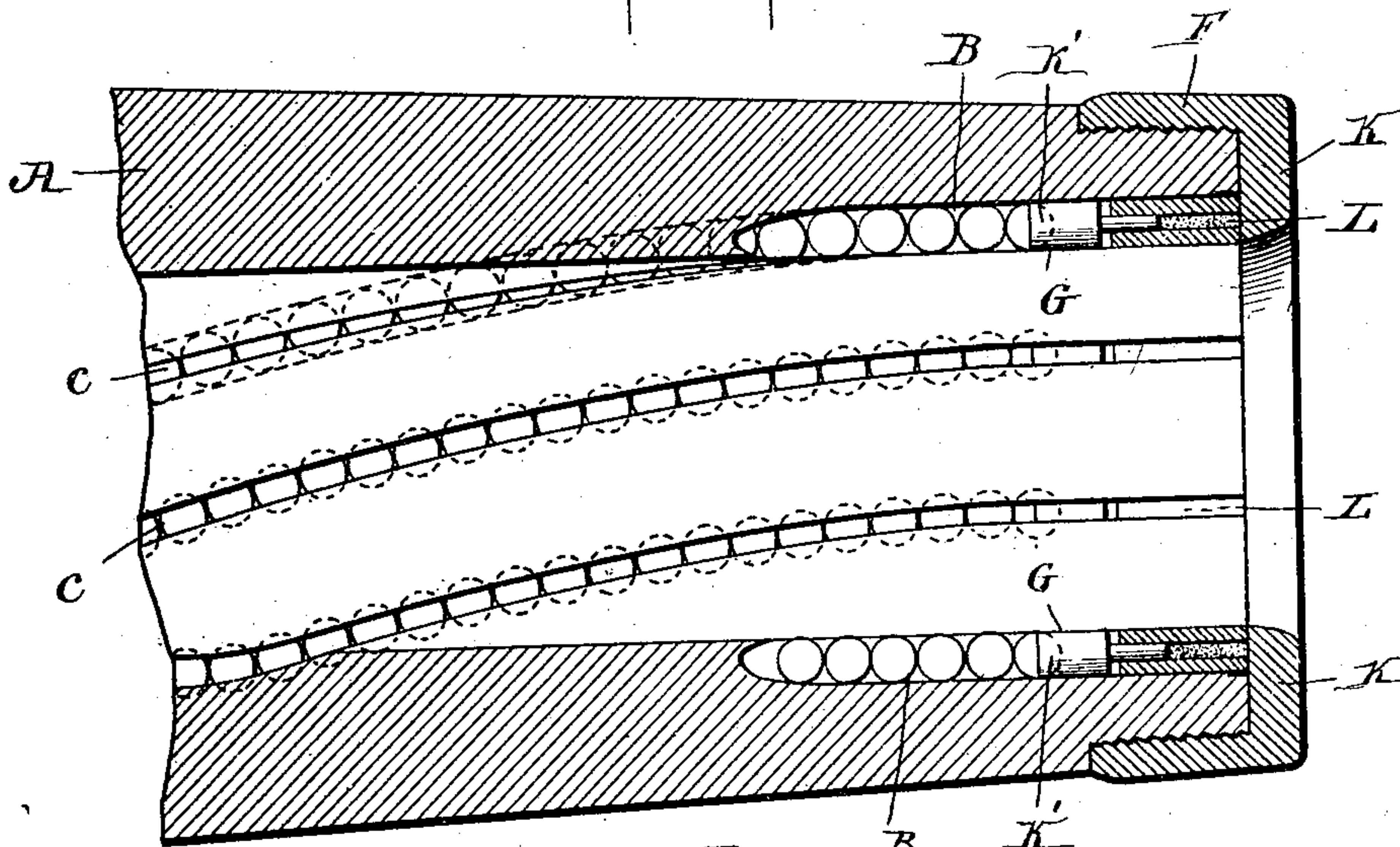
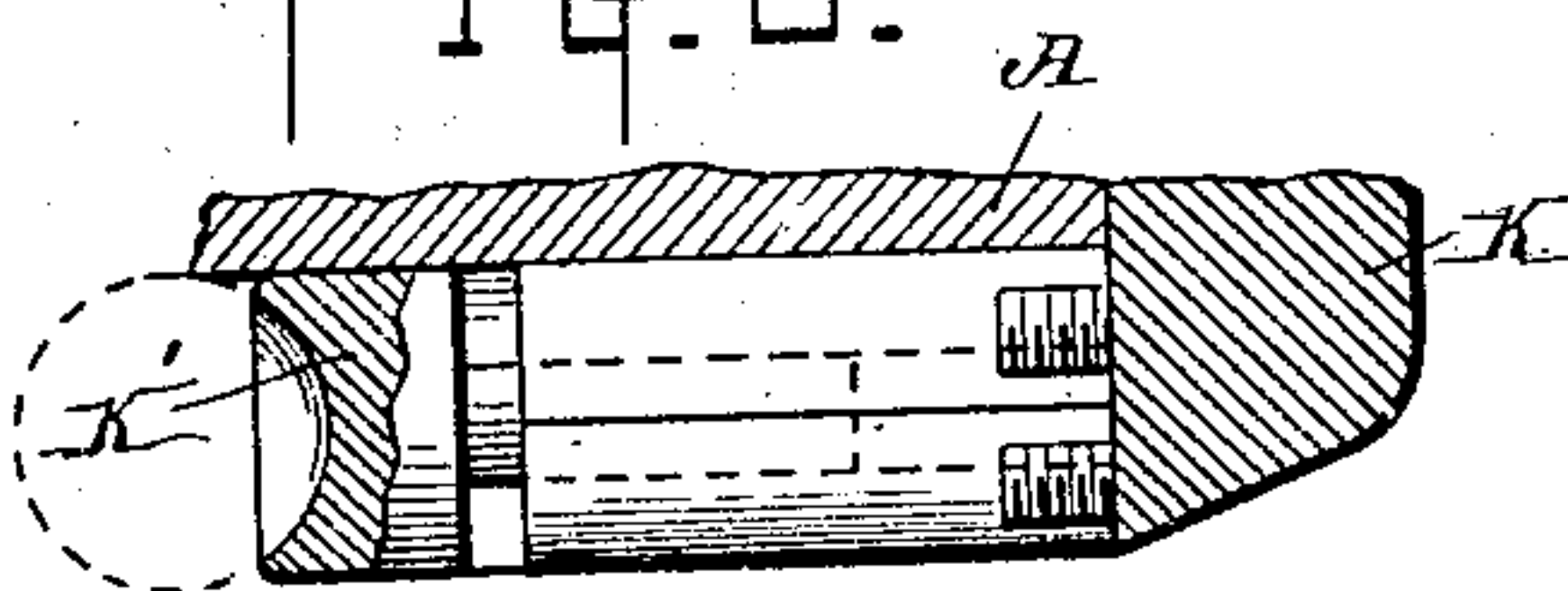


FIG. 6.



Witnesses  
Harry L. Amer.  
Geo. M. Anderson

Inventor  
Orlan Clyde Cullen.  
by E. W. Anderson  
his Attorney



# UNITED STATES PATENT OFFICE.

ORLAN CLYDE CULLEN, OF WATERLICK, VIRGINIA, ASSIGNOR TO ELIZABETH DOUGLAS CULLEN, OF WATERLICK, VIRGINIA, AND EDWARD WILLOUGHBY ANDERSON, OF WASHINGTON, DISTRICT OF COLUMBIA.

## FIREARM.

SPECIFICATION forming part of Letters Patent No. 696,318, dated March 25, 1902.

Application filed December 14, 1899. Serial No. 740,318. (No model.)

*To all whom it may concern:*

Be it known that I, ORLAN CLYDE CULLEN, a citizen of the United States, residing at Waterlick, in the county of Warren and State of Virginia, have invented certain new and useful Improvements in Firearms; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

In the drawings, Figure 1 is a side view of a gun. Fig. 2 is a central longitudinal section showing the invention. Figs. 3 and 4 are cross-sections. Fig. 5 is an enlarged section of the muzzle portion. Fig. 6 is a detail view.

The invention relates to firearms; and it consists chiefly in providing the cylinder of the bore with ball-bearings having a spiral arrangement in suitable seats of the cylinder.

The invention further consists in combining with the ball-bearings and their groove-seats a recoil-cushion; and, finally, the invention consists in the combinations of parts hereinafter set forth.

In the accompanying drawings the invention is shown in connection with a cannon of rifle character or designed to give rotary motion to the projectile.

The letter A designates the barrel or cylinder portion of the gun or part in front of the chambered breech, and B indicate spiral inclosing grooves, preferably of uniform twist in the wall of the cylinder. These grooves are equidistant and in number usually eight, although a greater or less number may be employed, if desired. Each groove is in cross-section bounded by the greater arc of a circle and communicates with the bore by a slot C, which is of comparatively small transverse extent or narrow with relation to the diameter of the cylindrical groove. Each spiral cylinder-groove is therefore formed in the wall of the bore and communicates with the latter by its narrow spiral slot, as indicated. In practice it is preferable to bore the cylinder-groove through from end to end of the barrel and to close the ends of the groove. This may be accomplished by providing the

end of the barrel with a screw-plug or stop, as indicated at E, or screw-plugs may engage the groove ends. In closing the grooves at the muzzle it is preferred to thread the end of the chase and to place thereon a screw-cap F, having a muzzle-flange K, forming the face of the piece and covering in the ends of the grooves. At the muzzle end each groove is bored for several inches in right cylinder form or parallel to the axis of the piece, the twist of the groove merging into this straight portion or cushion-seat G, in which is located a spring or glycerin recoil-cushion L, the latter being preferred.

K' is a cylinder slide or piston arranged in the seat G next the series of ball-bearings H and in rear of the glycerin-cushion. These ball-bearings are of hard steel of true spherical form and when in position in the grooves are designed to project from the same through the slots C by a small portion of the superficies, usually one-twentieth of the diameter. The balls fit the groove rather neatly, there being sufficient tolerance to allow rotation.

The projectile preferred for use in this gun is made with a cylindrical body, without projections or flanges, as it is designed to engage the projecting portion of the ball-bearings, this engagement being in the nature of elastic pressure, which is set up by the elasticity of the steel balls of the body of the cannon and of the projectile itself. In order to secure this elastic pressure, the diametric distance between the bottoms of opposite grooves is made equal to or rather slightly less than the diameter of two ball-bearings and the diameter of the projectile. When the projectile is provided as indicated, the best results are attained in range and accuracy, as well as in the duration of the piece. For the best results for accuracy the projectile should be made a tight fit for the ball-bearings, and as these ball-bearings have only a slight projection into the bore when the projectile is passing through the bore its surface approximates very closely contact therewith.

When the glycerin-cushion is used, the muzzle end of the groove is usually provided



with a cylinder or plates forming a cylinder of smaller diameter than the groove, and the glycerin is placed therein. The piston is usually shouldered and made concave at the rear end to receive the face of the end roller or ball.

Having described this invention, what I claim as my invention, and desire to secure by Letters Patent, is—

1. A gun having, in the wall of its bore spiral inclosing grooves carrying ball-bearings, substantially as specified.
2. A gun having, in the wall of its bore, spiral grooves, carrying ball-bearings, and provided with recoil-cushions at their forward ends, substantially as specified.
3. A gun having, in the wall of its bore spiral grooves of circular cross-section communicating with the bore by comparatively narrow spiral slots, substantially as specified.
4. A gun having, in the wall of its bore, spiral grooves of circular cross-section, terminating in cushion-seats at their forward ends, and communicating with the bore by com-

paratively narrow spiral slots, substantially as specified.

5. A gun having its cylinder-wall provided with spiral inclosing grooves, and their slots of communication, the recoil-cushions at the ends of said grooves, the ball-bearings, and the screw-cap or stop at the ends of the grooves, substantially as specified.

6. In a gun, the combination with inclosing grooves or seats in the cylinder, of ball bearings projecting slightly from said grooves or seats, substantially as specified.

7. A gun having the bore provided with grooves or seats, and in such grooves or seats, rotary bearings adapted to engage a smooth cylinder projectile in its passage through said bore, substantially as specified.

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

ORLAN CLYDE CULLEN.

Witnesses:

GEORGE M. ANDERSON,  
HARRY L. AMER.