

No. 621,085.

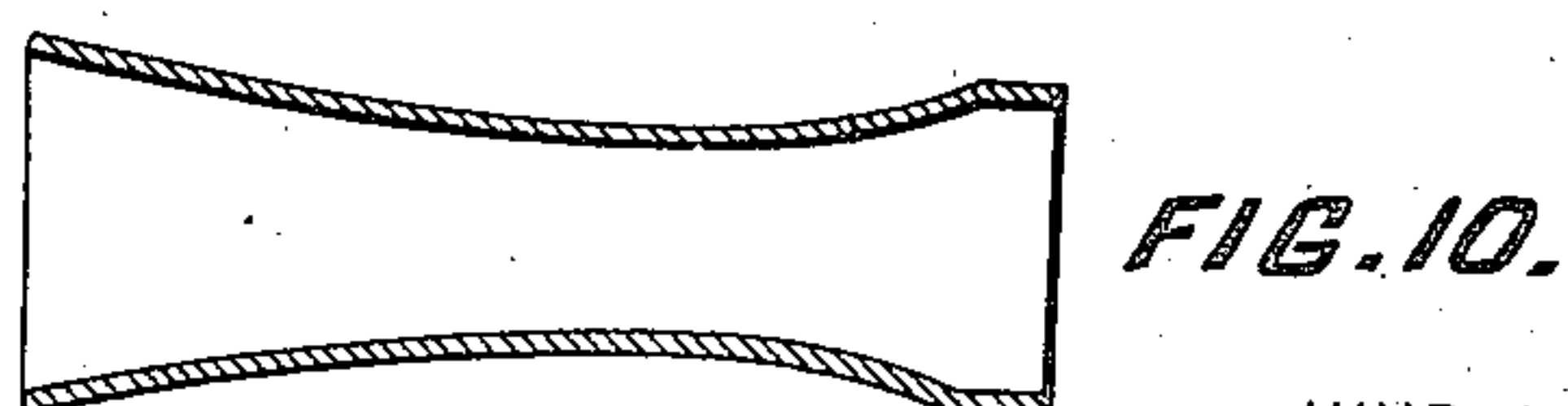
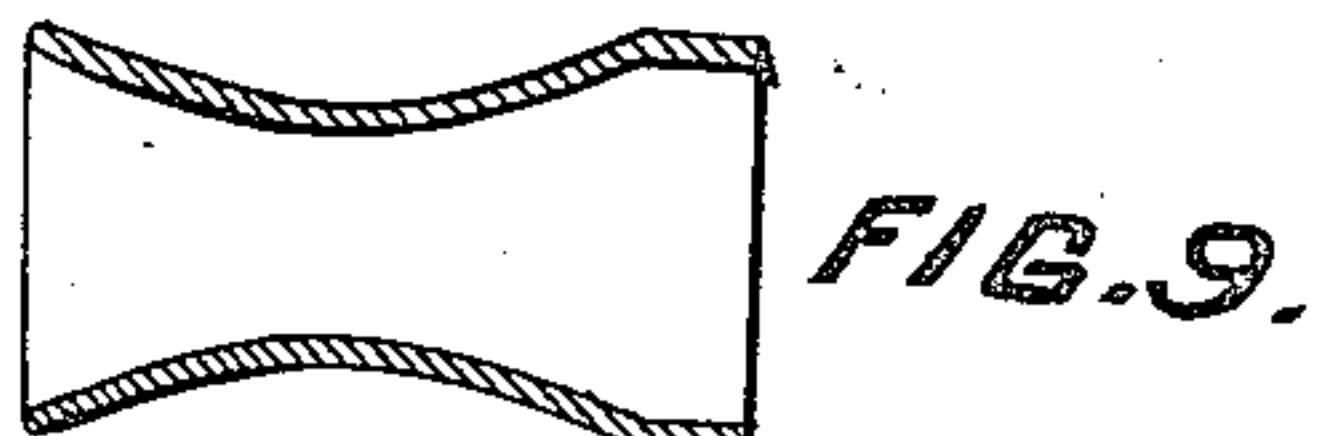
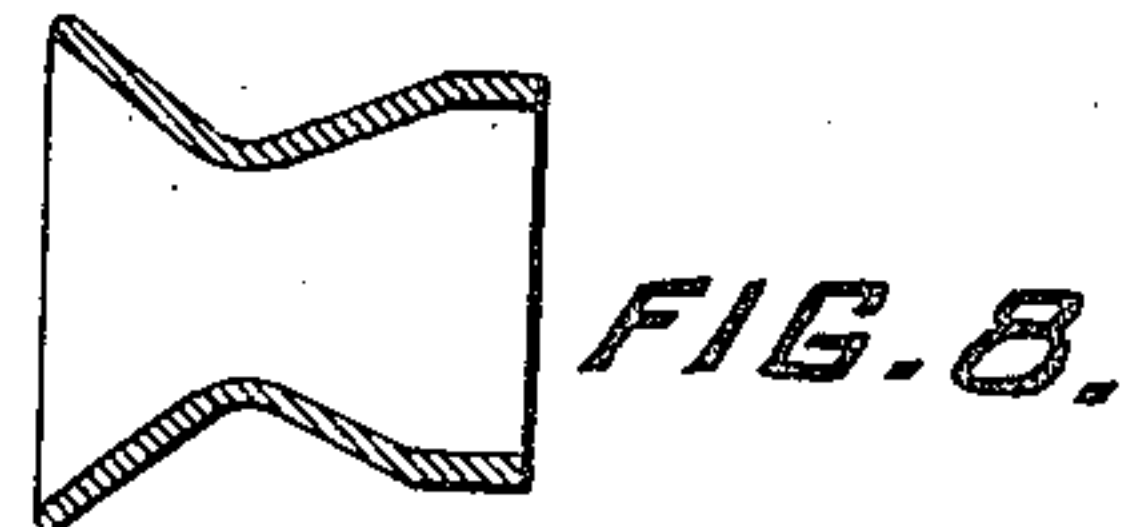
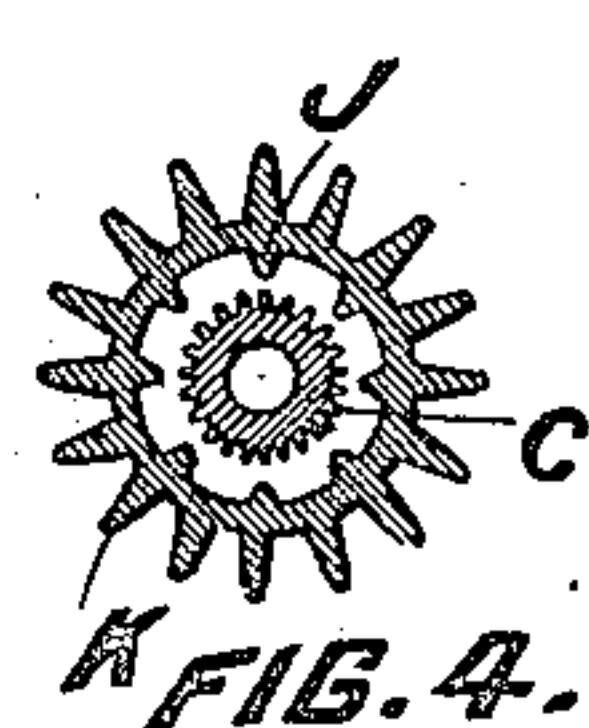
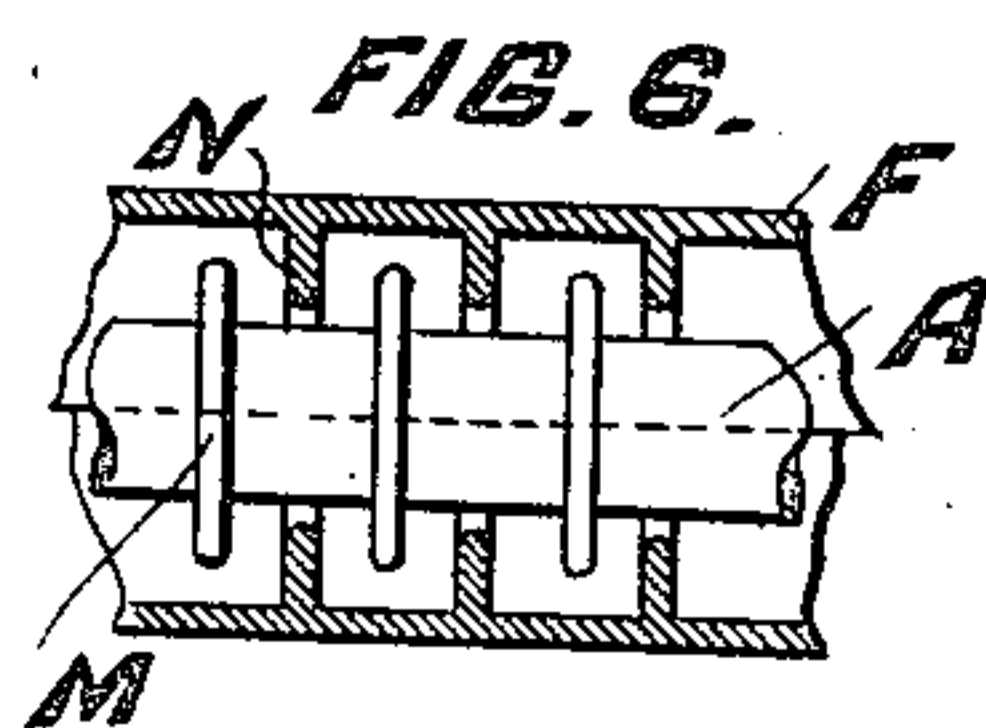
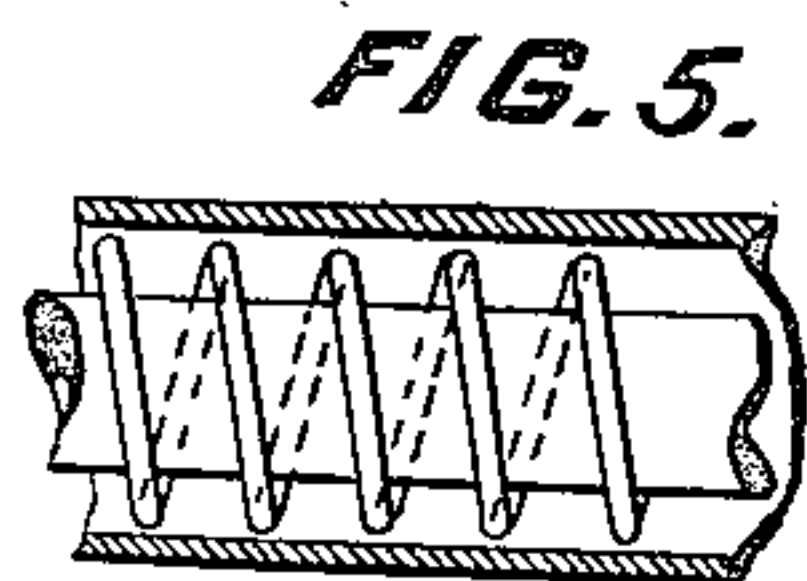
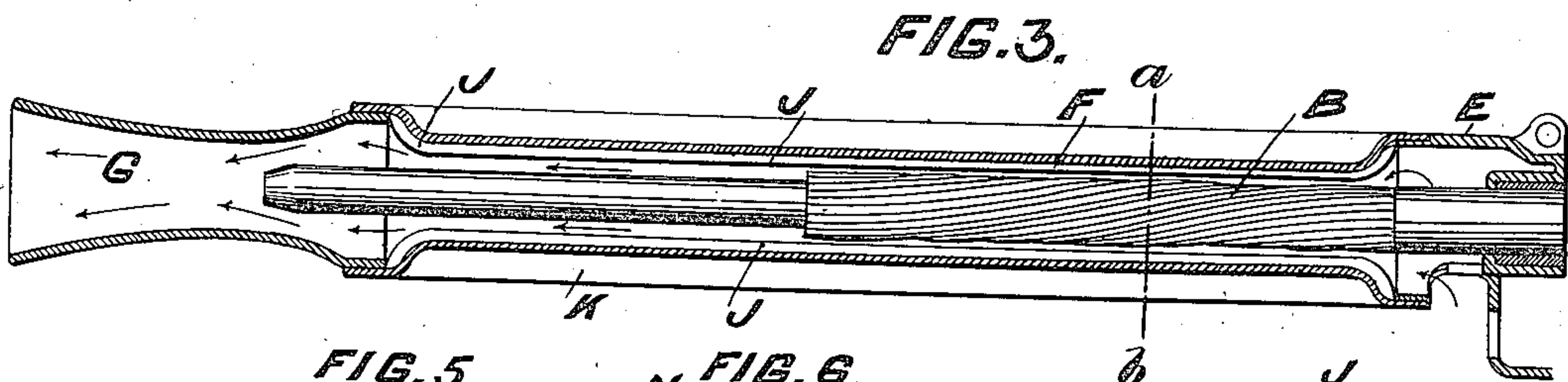
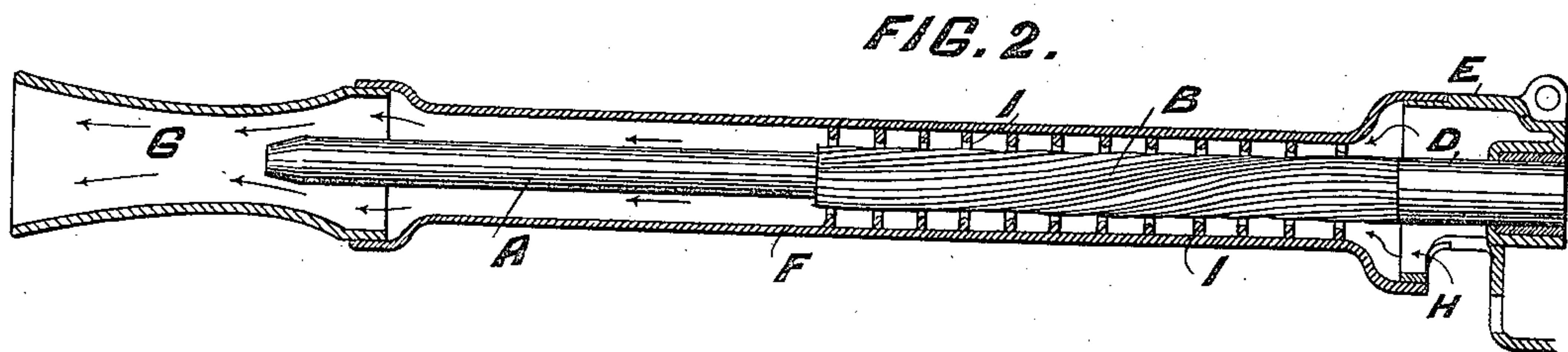
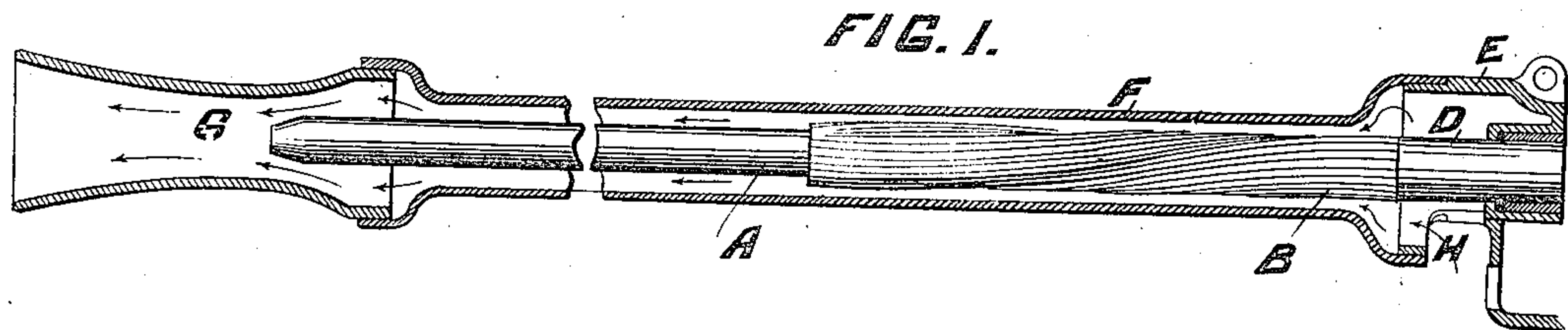
Patented Mar. 14, 1899.

G. HOOKHAM.
AUTOMATIC GUN.

(Application filed Jan. 7, 1899.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES:

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Richardson

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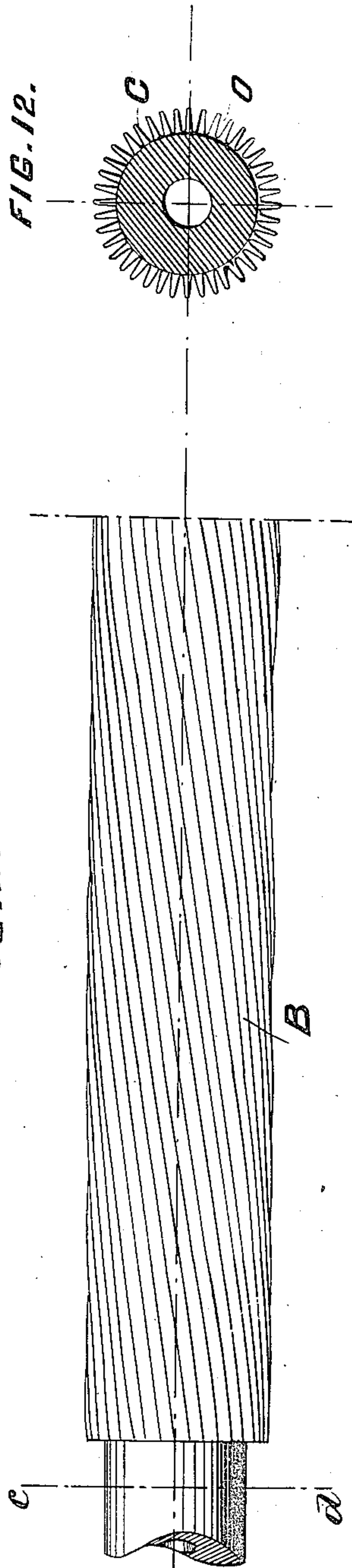
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2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

GEORGE HOOKHAM, OF BIRMINGHAM, ENGLAND.

AUTOMATIC GUN.

SPECIFICATION forming part of Letters Patent No. 621,085, dated March 14, 1899.

Application filed January 7, 1899. Serial No. 701,492. (No model.)

To all whom it may concern:

Be it known that I, GEORGE HOOKHAM, engineer, a subject of the Queen of Great Britain and Ireland, and a resident of New Bartholomew street, in the city of Birmingham, England, have invented certain new and useful Improvements in Automatic Guns, (for which I have made application for Letters Patent in Great Britain, No. 5,184, bearing date March 2, 1898,) of which the following is a specification.

This invention relates to automatic guns; and its object is to more effectively cool the barrel of such guns without the use of water.

The invention consists generally in a combination of heat-radiating ribs or surfaces attached to the barrel and a mechanical air-draft induced by each discharge of the gun and in any means employed to produce such mechanical air-draft where the impulse of the gases as they leave the muzzle at each discharge acts as a pump or ejector.

The accompanying sheets of drawings illustrate various methods of carrying the invention into effect.

Figure 1 is a longitudinal section through the front end of an automatic or magazine gun, illustrating the mechanism employed to produce the induced draft. Fig. 2 is a similar longitudinal section with certain variations in the position and shape of the cooling-ribs. Fig. 3 is also a longitudinal section similar to Fig. 1 with a third variation in the shape of the cooling-ribs. Fig. 4 is a transverse section on the line *a b*, Fig. 3. Figs. 5 and 6 are part longitudinal sections through the improved device, illustrating further modifications in the arrangement of the cooling-ribs. Figs. 7, 8, 9, and 10 are longitudinal sections of alternative forms of ejector-nozzles which may be employed. Fig. 11 is a part side elevation of one arrangement of the cooling-ribs applied to a .303 automatic or magazine gun. Fig. 12 is a transverse section on the line *c d*, Fig. 11.

In carrying the invention into effect, as illustrated in Fig. 1 of the drawings, the construction and operation are as follows: The barrel *A* of an automatic magazine-gun toward the rear end *B* is increased in diameter, as

shown, and this rear end is spirally fluted or grooved in such a manner that a large number of radiating-ribs *C* are formed. These radiating ribs *C* are clearly shown in the transverse sections, Figs. 4 and 12. The extreme rear of the barrel *D* is not fluted, but passes or slides through a bush carried with the ordinary mechanism of the magazine-gun, so that upon discharge the travel of the barrel due to the recoil is allowed for. Attached to any suitable portion of the ordinary gun mechanism distinct from the barrel is a chambered piece, such as *E*, and this chambered piece has screwed, riveted, or otherwise fixed to it a long sleeve or casing *F*, inclosing both the fluted and plain portions of the gun-barrel and terminating at the outer end in a removable nozzle, such as *G*. The chamber *E* leads by suitable port or passages *H* to atmosphere. When the machine-gun is in use, it is evident that as each discharge takes place within the nozzle *G* and that ports or openings *H* lead to the containing-casing *F* an ejector or pumping action will be set up by the sudden rush of the expanding gases into atmosphere, so that strong air-currents will be induced to flow over the ribs of the barrel in the direction clearly shown by arrows. It is further evident that the velocity and volume of this air-current will depend upon the shape and size of the containing-nozzle within which the gun discharges and the shape and size of the passages and radiating ribs of the casing *F* and gun-barrel *B*, and it is always preferred to so arrange the conical nozzles or other terminations within which the gases produced by the explosion act to form an air-ejector of such an area that great volumes of air are dragged over the cooling-surfaces.

Fig. 2 of the drawings illustrates a cooling arrangement of a somewhat similar nature to that shown in Fig. 1, the parts which are not modified having like letters to that figure. The modification consists in providing the exterior containing-casing *F* with a series of transverse radiating rings *I*, preferably formed integral with the said casing and approaching to within a short distance of the fluted portion *B* of the gun-barrel *A*. By this arrangement the major portion of the in-

duced air-current is forced to travel between the flutings of the ribs C. The direction of flow is also indicated here by arrows.

Figs. 3 and 4 of the drawings illustrate a cooling arrangement also of a somewhat similar nature to that shown in Fig. 1, the parts which are not modified having like letters to that figure. The modification illustrated in these figures consists in arranging the containing-casing F with a number of longitudinal radiating ribs both on the interior and exterior of the casing. The exterior ribs are lettered K and the interior J, and their shape and arrangement are clearly shown in both the figures in question. The operation of this modification is precisely similar to those hereinbefore described and therefore requires no further description. Arrows again indicate the flow of the induced air-current.

Figs. 5 and 6 are partial views which illustrate further modifications of the radiating ribs. In Fig. 5 a spiral rib L is formed around the gun-barrel A, and the interior surface of the casing F almost touches the said spiral, so that the air-current induced by the nozzle would be forced to take a helical course around the barrel. Fig. 6, on the other hand, shows rings M and N attached alternately to the barrel A and the casing F, so that the induced air-current would take a tortuous path alternately toward the casing and toward the barrel.

The different forms of nozzles illustrated in Figs. 7, 8, 9, and 10 may be employed as substitutes for the nozzle G when required. Fig. 7 is a nozzle of ordinary construction, where the diameter is gradually decreased toward the exit. In Fig. 8 the diameter of the nozzle quickly decreases to about the center of its length and then rapidly expands again, straight line surfaces being employed. In Fig. 9 the nozzle is at its smallest diameter about the center of its length; but the increases in size are less rapid, and the lines are curved. In Fig. 10 the smallest diameter is nearly coincident with the mouth of the gun-

barrel about a first third of the nozzle's length, and a gradual increase toward the orifice then takes place.

Figs. 11 and 12 show full-sized drawings of a portion of the rear end B of a .303 magazine-gun, illustrating the special form of radiating rib and spiral grooves which it is preferred to employ in all the modifications. The grooves O practically amount to a great number of screw-threads or helices of very large pitch cut upon the increased diameter B of the gun-barrel A.

It is to be clearly understood that any form of ejector-nozzle may be applied to the casing and also that any form of radiating rib may be attached to either the casing or the gun-barrel.

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

1. In combination in a gun with the barrel, the casing inclosing the barrel open at the rear to the atmosphere and terminating at its front end in a nozzle extending beyond the barrel, the space between the barrel and the casing being partially filled or obstructed by projections, substantially as described.

2. In combination, the gun-barrel having a portion of increased diameter comprising spiral flutings on its exterior and a casing surrounding the barrel having a nozzle at its front end and air-inlet openings at its rear end, substantially as described.

3. In combination with the gun-barrel having the spiral flutings on the outside thereof, the casing having the exterior and interior ribs and surrounding the barrel, said casing having a nozzle at its front end and air-inlets at its rear end, substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

GEORGE HOOKHAM.

Witnesses:

A. CHAMPENDAL,
H. KARCHER.