

(No Model.)

W. HEBLER.
BARREL FOR FIRE ARMS.

No. 296,958.

Patented Apr. 15, 1884.

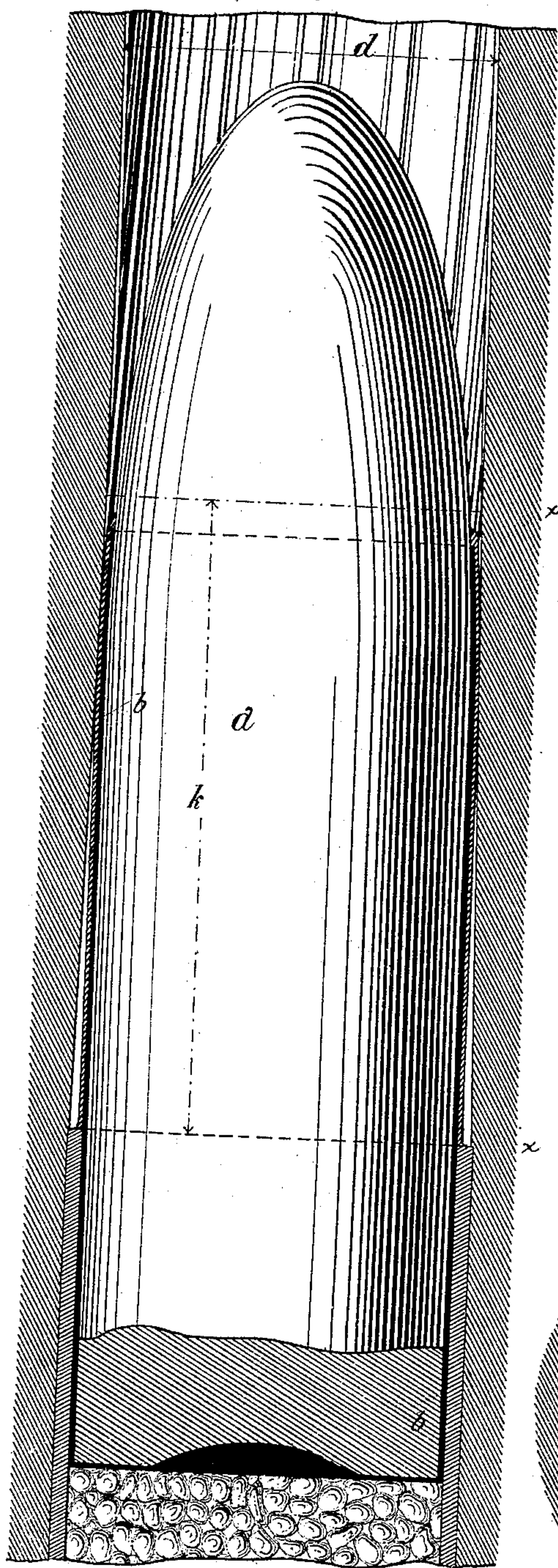


Fig. I

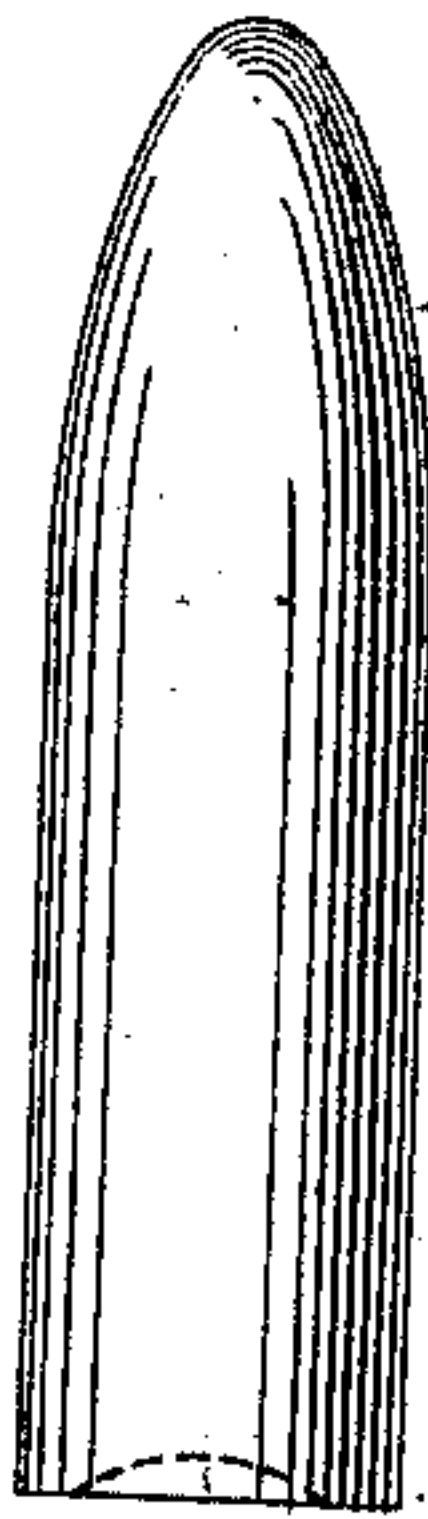


Fig. VI

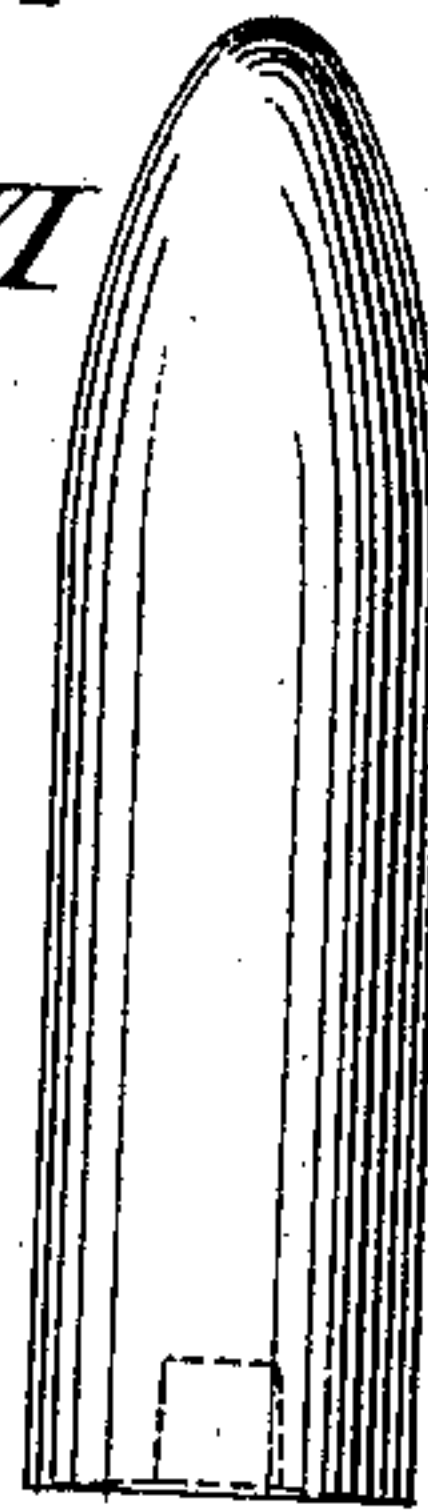


Fig. VII

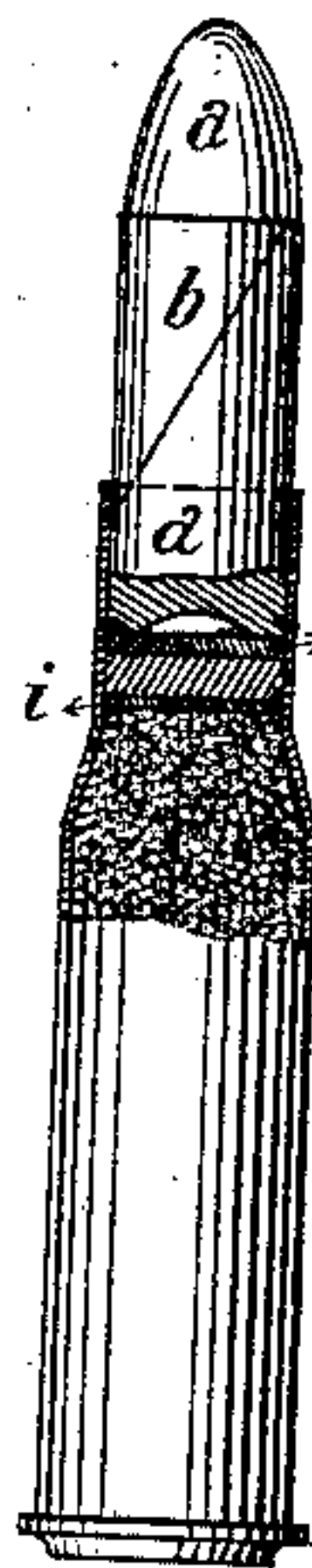


Fig. V



Fig. IV



Fig. III

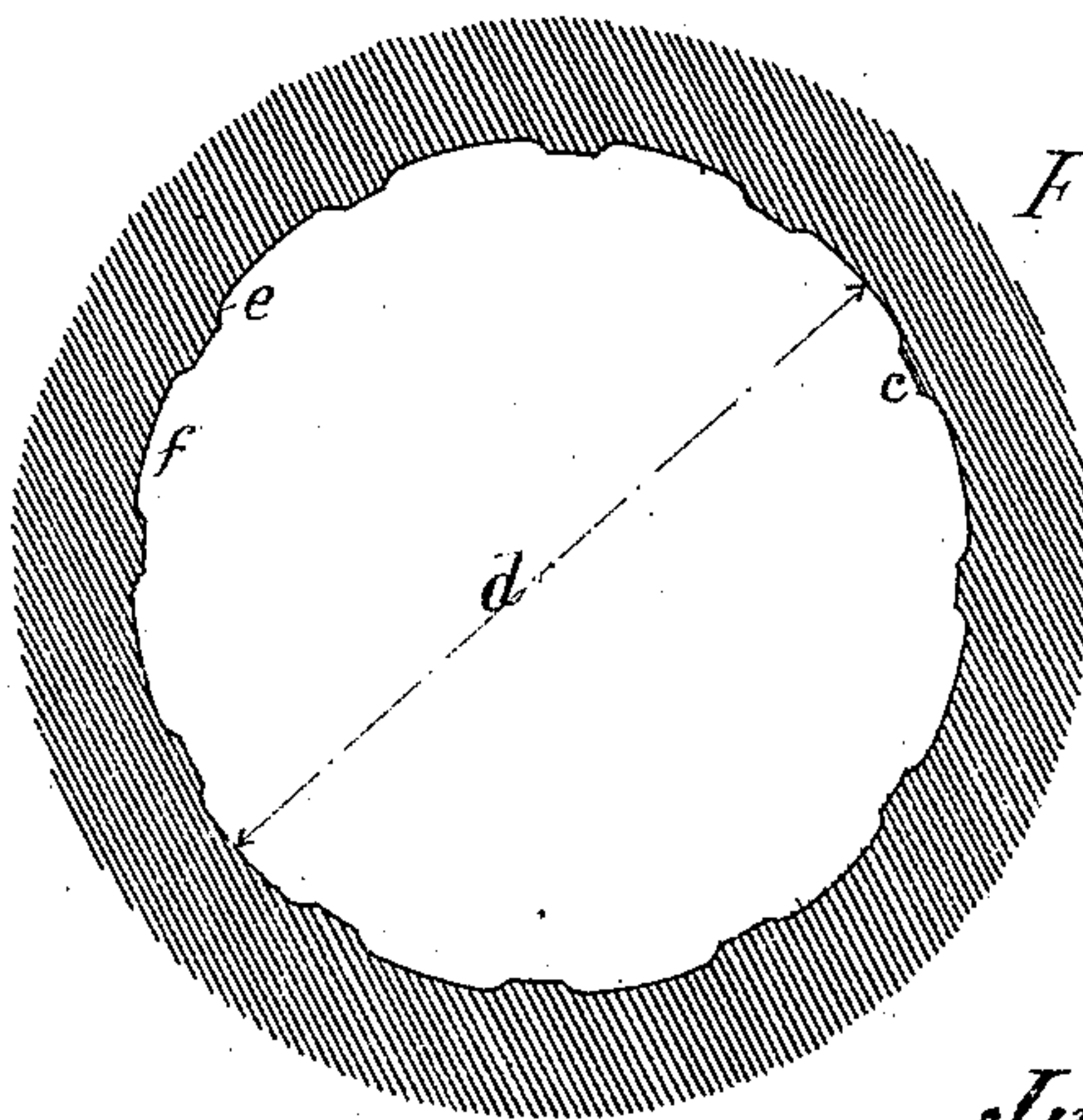


Fig. II

Witnesses:

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UNITED STATES PATENT OFFICE.

WILLIAM HEBLER, OF ZURICH, SWITZERLAND.

BARREL FOR FIRE-ARMS.

SPECIFICATION forming part of Letters Patent No. 296,958, dated April 15, 1884.

Application filed January 11, 1883. (No model.) Patented in Italy December 27, 1882, No. 14,898; in Belgium December 30, 1882, No. 59,888; in Sweden March 13, 1883; in France March 30, 1883, No. 152,669; in Spain May 6, 1883, No. 3,747, and in England July 3, 1883, No. 338.

To all whom it may concern:

Be it known that I, WILLIAM HEBLER, a citizen of the Republic of Switzerland, residing at Zurich, Switzerland, have invented a new and useful Small-Arm, of which the following is a specification.

My invention is based upon the employment of a small caliber (six to ten millimeters, or about one-fourth to four-tenths of an inch) by which, in connection with several characteristic improvements in the rifling of the barrel, extreme accuracy is attained.

Figure I represents the projectile in its seat in the barrel, about seven times enlarged. Fig. II, a section of the bore, also seven times enlarged. Fig. III is a side elevation of a cartridge for a large number of grooves. Fig. IV is a side elevation of a cartridge for a less number of grooves. Fig. V is a side elevation of a cartridge for a small number of grooves; and Figs. VI and VII are side elevations of projectiles on a larger scale, showing in dotted lines the depression for the twisted-up end of the paper that incloses it.

In the fire-arms that have been in use previous to my invention the diameter of the projectile, with its surrounding paper, is less than that of the bore in the grooves, and the projectile is caused to fill the grooves by the upsetting or slugging when acted upon by the gases which are developed by the exploding powder.

In my present invention, the diameter of the projectile *a*, with its inclosing-paper *b*, should be equal to one-tenth of a millimeter larger than the diameter *d* of the bore in the grooves, and in firing the "land" or ungrooved projecting portions or ridges *c* of the barrel are pressed into the projectile, rather than the projectile being upset into the grooves, as heretofore. The twisted-up end of the surrounding paper *b* is confined in a slight hollow or chamber at the bottom of the projectile. A slight conoidal portion—say between the points *x x*, Fig. 1—connects the rifled part of the barrel with the bullet-seat. In order the better to confine the gas produced in firing the cartridge, I make the grooves very shallow and comparatively wide and the lands narrow. The faces of the grooves and

lands are arcs of concentric circles, and the meeting edges of said grooves and lands are curved or rounded. By this construction it will be seen that where there is employed a projectile or cartridge the bullet of which fits tight in the bore, or is of substantially greater diameter than the circle of the grooves, the gun is rendered practically gas-tight in its bore in firing, and the entire force of the explosive secured. The sloping and rounded edges of the grooves enable the bore to be kept clean more easily than the sharp right-angular edges. The barrel, the bore of which is represented in section seven times enlarged in Fig. II, has more grooves than usual, and the latter have such a form, as described, that when there are, for example, eight or more grooves, the bullet will be so perfectly guided that there will be no need of any wads or expansion-chambers to insure a gas-tight fit. This is illustrated in Fig. III. With the larger number of grooves, *f*, their depth will be lessened, so that with twelve grooves their depth will be but from .09 to .15 millimeters, and the bullet will be less disfigured and the bore will be kept cleaner. While departing somewhat from the principle of employing a large number of grooves, I can yet insure the proper guidance of the bullet by the improvements shown in Figs. IV and V.

Fig. IV shows a cartridge for a bore with six to eight grooves. Behind the bullet I place a wad of paper-board, *g*, soaked with melted wax or other fatty substance, separated from the powder by a thin paper disk.

Fig. V shows a cartridge for less than six grooves in the bore, in which I place directly behind the bullet a rubber wad, *h*, then a fattened wad of paper board, and a disk of thin paper board between the latter and the powder. With the large number of very shallow grooves, I give to my small bore a very rapid pitch. For example, instead of a pitch of one turn in from fifty to seventy centimeters, I give it one turn in from fifteen to forty centimeters. The length of the bullet in comparison to its diameter, as well as its actual length, is greater than that of those heretofore used. Referring to Figs. VI and VII, where the bullet is enlarged to twice the size of those shown in Figs.

III, IV, and V, this increase in length is illustrated, and it may be tabulated thus: Length of old-style bullet, from two and one-fourth to two and three-fourth times its diameter; length of my bullet, from three to six times its diameter. For a bullet of, say, ten millimeters diameter, the length will be three diameters, and for one of six millimeters diameter the length will be six diameters.

10 The metal employed for making the bullets is an alloy composed of lead and tin, or lead and antimony, and it is a great deal harder and tougher than the material previously used. I take, for instance, ninety-two per cent. lead and eight per cent. tin, or ninety-six per cent. lead and four per cent. antimony; but the proportion of the different metals may be varied within rather wide limits. By the hardness of the material, the upsetting or slugging of the bullet is reduced to a minimum, and there will be a great deal less friction in the bore, so that the barrel will be less heated, because the bullet of harder material will be less upset and less pressed against the sides of the bore. The hardness of the bullet increases also the penetration, because the bullet in striking a body will be less upset and battered than a bullet of softer material would be.

20 The herein-described reduction of caliber, made capable of practical operation by the before-mentioned factors, affords over the large-bored arms heretofore in use a much flatter trajectory, and consequently more extended space for operative action, as well as a longer effective range; and the ammunition is lighter and the recoil less.

35 By the increased pitch, in combination with the other above-cited improvements, it is possible to give to a long slender projectile so high

a speed of rotation that its axis becomes perfectly stable, and remains so to the end of its flight.

In order to transform fire-arms already in use into small-bored rifles, in accordance with this invention, it is only necessary to replace the old barrel with one made as herein described.

The ammunition employed with the small-bore rifle is equally well adapted for single shot and for repeating-arms.

I claim—

1. The rifle-barrel having broad shallow grooves and narrow lands, the surfaces of which lands and the bottoms of which grooves are in arcs of concentric circles, the said lands and grooves being connected by curved or rounded portions, and having a pitch of one turn in from fifteen to forty centimeters, and also having a slightly conoidal portion connecting the rifled portion of the barrel with the bullet-seat, as set forth.

2. A rifled gun-barrel provided with a bullet-seat of slightly conoidal form, adapted to receive a projectile or bullet, the diameter of which bullet, including its envelope or wrapper, is greater than the diameter of the bore of the barrel taken in the grooves, whereby, as the cartridge is fired, the bullet is engaged by the lands, and the space in the barrel behind the bullet is rendered gas-tight, as set forth.

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

WILLIAM HEBLER.

Witnesses:

F. N. HAEFELI,
E. BLUM.