H. BORCHARDT.

SMALL ARM.

APPLICATION FILED MAY 13, 1909.

1,025,733.

Patented May 7, 1912.

3 SHEETS—SHEET 1.

Fig. 1.

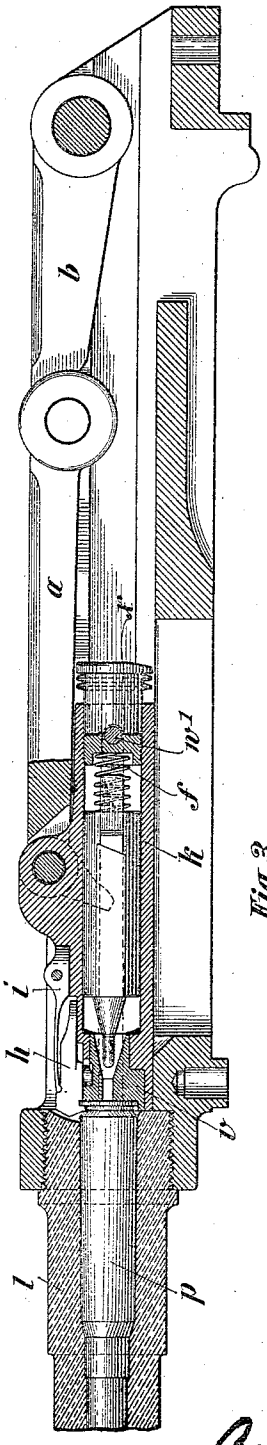
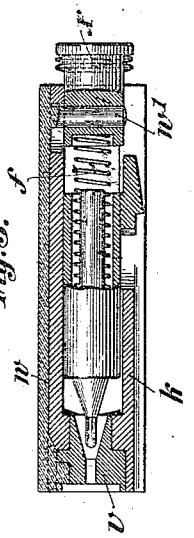


Fig. 3.



Witnesses:

W. Wallace

René Bruine

Inventor:

Hugo Borchardt

By Attorneys,

Arthur C. Fraser & Co.

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3 SHEETS—SHEET 2.

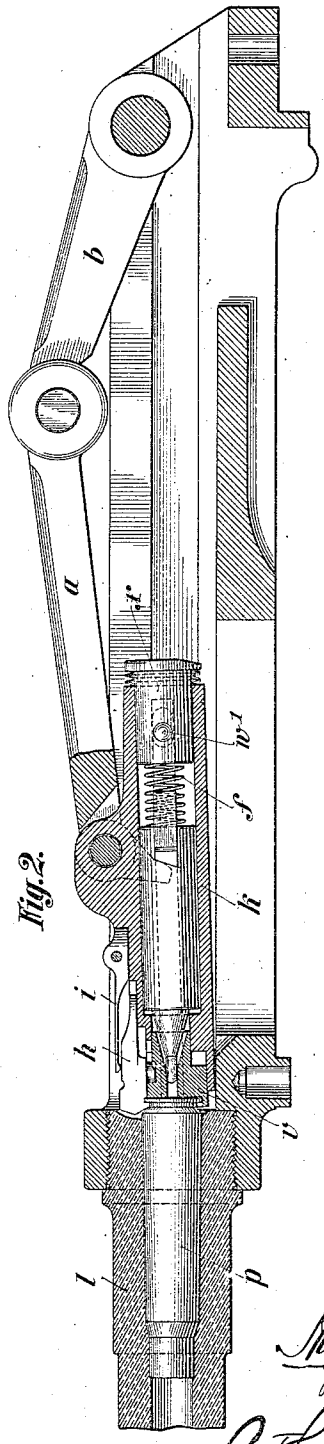

Fig. 2.

Witnesses:

J. J. Wallace

Rene' Bruine

Inventor:

Hugo Borchardt

By Attorneys,

Arthur C. Fraser & Sons

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3 SHEETS—SHEET 3.

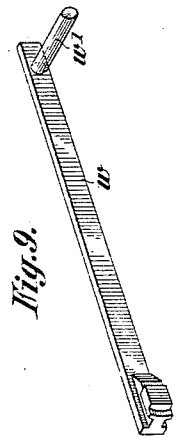

Fig. 9.

Fig. 11.

Fig. 12.

Fig. 10.

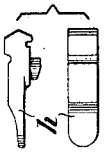

Fig. 14.

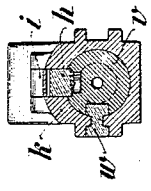

Fig. 5.

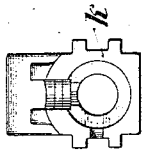

Fig. 7.

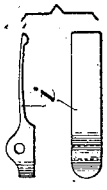

Fig. 13.

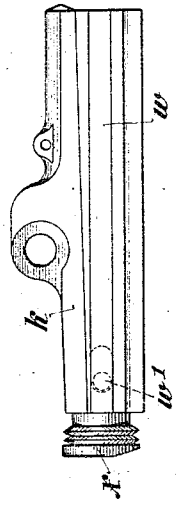

Fig. 4.

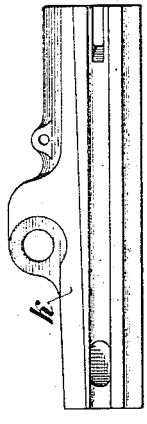

Fig. 6.

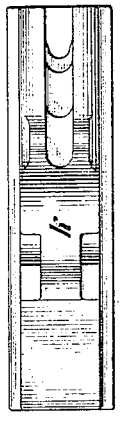

Fig. 8.

WITNESSES:

Rene' Pluine

William F. Martinez

INVENTOR:

Hugo Borchardt

By Attorneys,

Arthur C. Fraser & Sons

UNITED STATES PATENT OFFICE.

HUGO BORCHARDT, OF CHARLOTTENBURG, GERMANY.

SMALL-ARM.

1,025,733. Specification of Letters Patent. Patented May 7, 1912.

Application filed May 13, 1909. Serial No. 495,778.

To all whom it may concern:

Be it known that I, HUGO BORCHARDT, a citizen of the United States of America, residing at Kantstrasse 31, Charlottenburg, near Berlin, Germany, have invented certain new and useful Improvements in Small-Arms, of which the following is a specification.

This invention relates to fire-arms, and more especially to automatic fire-arms in which the breech-bolt is withdrawn or driven rearward by recoil following discharge of the piece, and in which the empty cartridge-case or shell is extracted by the breech-bolt in its rearward movement.

The particular object of the invention is to provide a fire-arm in which there is a delayed and preferably yielding or elastic action of the breech-bolt in its operation of extracting the cartridge-case. This is desirable inasmuch as the cylindrical walls of the cartridge case are pressed by the gases of explosion against the inner walls of the barrel so that the cartridge-case presents a substantial resistance against its extraction from the barrel, and if too sudden or strong a pull is exerted on the cartridge-case, the base thereof is liable to be broken away, or damage caused to the extractor, thereby disabling the gun.

The invention consists, generally, of a fire-arm having a breech block movable into and out of engagement with the breech thereof, and a cartridge-extractor, the extractor being mounted on a part of the breech-bolt capable of allowing the body or main portion of the breech-bolt a limited movement independent thereof in its movement away from the breech of the gun. Between this part or head and the body of the breech-bolt there is preferably arranged a spring for the purpose of providing an elastic or resilient engagement between the two parts. In the form of the invention illustrated the breech-bolt is shown as connected with a toggle lever which breaks joint on recoil of the gun to allow the breech-bolt to move away from the breech, but the breech-bolt may operate or be operated in any other suitable manner.

For a more detailed description of the invention reference will be had to the accompanying drawings (but these drawings are to be considered as illustratory only and not as defining the limits of the invention) wherein—

Figure 1 is a longitudinal section of a gun embodying my improvements, with the breech closed and before discharge. Fig. 2 is a similar view, after discharge of the gun, and showing the relative movement of the breech-bolt and head in the initial stage of the opening and extracting movement. Fig. 3 is a horizontal longitudinal section of the breech-bolt detached from the gun and showing the parts in the normal position. Figs. 4 and 5 are respectively an elevation and section of the breech-bolt. Figs. 6, 7 and 8 are detail views of the body of the breech-bolt; Fig. 9 is a detail view of one of the parts of the breech-bolt; Figs. 10, 11 and 12 are detail views of the bolt-head; and Figs. 13 and 14 are detail views of the extractor spring and extractor.

In the construction illustrated a well known form of breech mechanism is shown, wherein the breech-bolt is connected to the gun through a toggle device, said device comprising the links *a* and *b*, the breech-bolt *k*, which is movable toward and away from the breech of the gun to open and close same, being connected to link *a* of the toggle device. This breech-bolt *k* has a part or head *c* thereon capable of moving, or allowing it (the breech-bolt) a movement, independent thereof, and to this head *c* is fitted the extractor *h*, the longitudinal part *w* by means of its cross pin *w'* connecting said head *c* with the end *x* forming the abutment for the firing pin spring *f*, and, in order to allow the cross pin *w'* to project into the hollow interior of the bolt *k* and to give the necessary play between the body of the breech-bolt and the longitudinal part *w* in the movement of the parts from the position shown in Fig. 3 to that shown in Fig. 2, there is provided a longitudinal slot in one wall of the breech-bolt. The construction of these parts is illustrated in detail in Figs. 4–12 inclusive; Figs. 6, 7 and 8 illustrating the body of the breech-bolt *k*; Fig. 9 the connecting part *w*, and Figs. 10, 11 and 12 the head *c* of the breech-bolt. Figs. 4 and 5 are illustrations of these parts assembled. The extractor *h* with its claw is inserted in the breech-head, and is held in the engaging position by means of a plate spring *i*, acting on its upper surface, a spe-

cial notch being formed in the latter to receive the thickened end of the spring. The construction of this extractor is illustrated in detail in Fig. 14 and that of its spring in Fig. 13.

The operation of the gun is as follows:— The parts being in the position illustrated in Fig. 1, that is with the breech closed and before the gun is discharged, the claw of the extractor h engaging over the rim or the base of the cartridge, and the spring f holding the breech bolt k and the breech head v in close contact through the longitudinal part w, pin w^1 and end x, the gun is fired, after which the breech mechanism begins to open. The breech head v being held fast by its engagement with the cartridge through the intermediary of the extractor, offers a great resistance against backward movement, and the shock given to the breech head v by the explosion is immediately transmitted to the breech-bolt k, which moves rearward and opens the breech mechanism, while the backward movement of the breech head is retarded or delayed according to the amount of the resistance of the cartridge against extraction from the barrel. The difference between the rapidities of the backward movements of the breech bolt and the breech head causes the breech bolt k to withdraw from the breech head v and the spring f to be compressed, thereby augmenting the tractive force exerted by the breech bolt on the breech head. From the means described it follows that the extraction of the cartridge-shell is effected not suddenly but with a gradually increasing force. After the cartridge-shell has been started from its engagement in the barrel, the spring f is free to expand, thereby drawing the head v into engagement with the breech-bolt, which position is retained during the completion of the movement of the bolt.

What I claim is:—

1. In a breech-loading firearm, the combination with the breech thereof, of a breech-bolt movable to open and close said breech, cartridge-extracting means, means for transmitting the motion of said breech-bolt to said cartridge-extracting means upon withdrawal of said breech-bolt, and resilient means for modifying momentarily the action of said transmitting means after the beginning of the opening movement of said bolt.

2. In a breech-loading firearm, the combination with the breech thereof, of a breech-bolt for opening and closing said breech operated by recoil of the gun, cartridge-extracting means, means transmitting the motion of said breech-bolt to said cartridge-extracting means upon withdrawal of the breech-bolt, and resilient means for modifying momentarily the action of said transmitting means after the beginning of the opening movement of said bolt.

3. In a breech-loading firearm, the combination with the breech thereof, of a breech-bolt for opening and closing said breech, a part on said breech-bolt resiliently connected thereto and movable longitudinally thereon, and cartridge-extracting means carried by said movable part of the breech-bolt.

4. In a breech-loading firearm, the combination with the breech thereof, of a breech-bolt for opening and closing said breech, a part on said breech-bolt movable longitudinally thereon, a yielding or resilient connection between said movable part and breech-bolt, and cartridge-extracting means carried by said movable part of the breech-bolt.

5. In a breech-loading firearm, the combination with the breech thereof, of a breech-bolt for opening and closing said breech, a part on said breech-bolt movable longitudinally thereon, a connecting-piece attached at one end to said movable part of the breech-bolt and at its other end to the breech-bolt, resilient means between said breech-bolt and movable part thereof, and cartridge-extracting means carried by said movable part of the breech-bolt.

6. In a breech-loading firearm, the combination with the breech thereof, of a breech-bolt for opening and closing said breech, a part on said breech-bolt movable longitudinally thereon, a connecting-piece attached at one end to said movable part of the breech-bolt and a spring interposed between said breech-bolt and the other end of said connecting-piece, and cartridge-extracting means carried by said movable part of the breech-bolt.

7. In a breech-loading firearm, the combination with the breech thereof, of a breech-bolt for opening and closing said breech, a part on said breech-bolt movable longitudinally thereon, and a cartridge extractor connected to said movable part of the breech-bolt, said extractor being pressed upon by a spring attached to the breech-bolt and having a sliding bearing on said extractor.

8. In a breech-loading firearm, the combination with the breech thereof, of a breech-bolt for opening and closing said breech, a firing pin mounted thereon, a part on said breech-bolt movable longitudinally thereon, a connecting-piece attached at one end to said movable part of the breech-bolt and a spring interposed between the other end of the connecting-piece and the firing-pin, and cartridge-extracting means carried by said movable part of the breech-bolt.

9. In a breech-loading firearm, the combination with the breech thereof, of a breech-bolt for opening and closing said breech, a part on said breech-bolt movable longitudi-

nally thereon, a yielding or resilient connection between said movable part and the breech-bolt, cartridge-extracting means carried by said movable part of the breech-bolt, and a toggle device, one end of which is connected to the frame of the gun and the other end of which is connected to said breech-bolt, adapted to press said bolt forward to close the breech and to permit a rearward motion of the breech-bolt to open the breech-bolt upon the recoil of the fire-arm.

In witness whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

HUGO BORCHARDT.

Witnesses:
ROBERT MICHALSKI,
WOLDEMAR HAUPT.