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RETARDING APPARATUS FOR GUNS HAVING DIFFERENTIAL RECOIL.

APPLICATION FILED FEB. 16, 1910.

955,797. Patented Apr. 19, 1910.

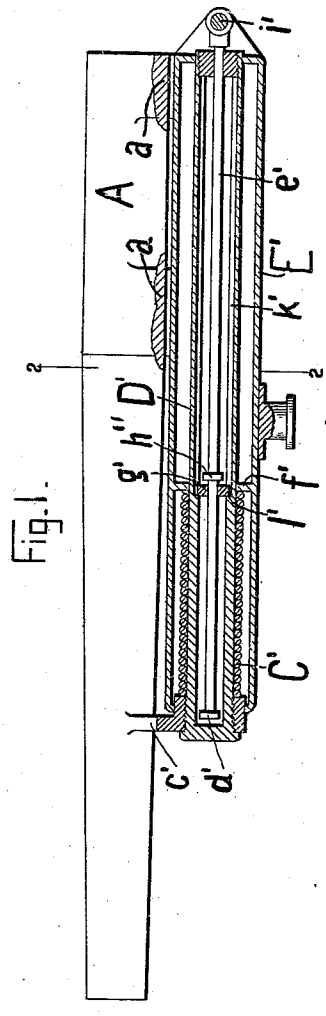


Fig. 1.

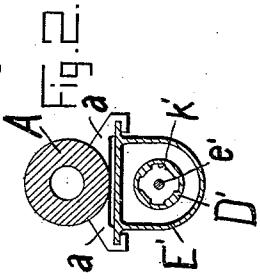


Fig. 2.

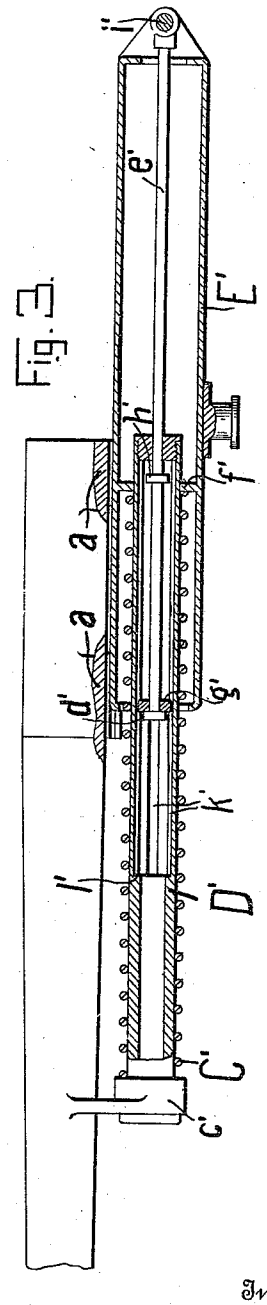


Fig. 3.

Witnesses

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# UNITED STATES PATENT OFFICE.

KONRAD HAUSSNER, OF EISENACH, GERMANY.

## RETARDING APPARATUS FOR GUNS HAVING DIFFERENTIAL RECOIL.

955,797. Specification of Letters Patent. Patented Apr. 19, 1910.

Original application filed June 17, 1909, Serial No. 502,848. Divided and this application filed February 16, 1910. Serial No. 544,146.

*To all whom it may concern:*

Be it known that I, KONRAD HAUSSNER, a subject of the Emperor of Germany, residing at Eisenach, Germany, have invented certain new and useful Improvements in Retarding Apparatus for Guns Having Differential Recoil, of which the following is a specification.

The present invention relates to guns of the differential recoil type which have, in addition to their recuperator, a means cooperating therewith whereby the gun barrel is restrained from running out of its carriage in case of delayed ignition, the firing of blank cartridges, and similar conditions of firing.

To this end, the invention herein disclosed embodies a means associated with the running-out gear and which was originally disclosed in my application for United States patent dated June 17, 1909, and bearing Serial No. 502,848, and of which application the present case forms a division.

Summarily stated, the present arrangement contemplates the use of a running-out gear comprising a spring supported from the gun barrel by a cylinder, which cylinder, with a piston fixed to the gun carriage, serves as a hydraulic brake or accumulator for arresting the running-out movement of the gun barrel when the same moves beyond the firing position.

The invention is shown, by way of illustration, in the accompanying drawings, wherein,

Figure 1 shows a barrel running-out gun applied with this improvement; Fig. 2 is a transverse section thereof on the plane 2—2, and Fig. 3 is a longitudinal section, the barrel being shown as it is brought to rest beyond the prescribed running-out movement.

Referring to the figures in further detail and wherein like characters of reference refer to the same parts, in the different views shown, A designates the gun barrel and $E^1$ the carriage therefor. Mounted within the carriage is a brake cylinder $D^1$ upon which latter is mounted the running out gear $C^1$ which comprises a spring. For supporting said cylinder $D^1$ the gun barrel is fitted with a horn $c^1$, to which the cylinder has screw-threaded connection at its forward end. Said horn $c^1$ serves at the same time as the front abutment of the running-out gear, while the rear abutment therefor is formed by the cross wall $f^1$ of the carriage $E^1$. The piston rod $e^1$ of the brake cylinder is rigidly connected to the upper carriage by the bolt $i^1$. As is shown by Figs. 1 and 2, the cylinder $D^1$ is provided at its rear part only with grooves $k^1$ while the front part is kept smooth. The piston $g^1$ rides loosely on the piston rod, and is held in the position shown in Fig. 1 by the edge of its front face bearing against the projection $l^1$ of the cylinder, and is prevented from greater axial movement by the collar $h^{11}$ of the brake piston rod.

The running-out of the barrel when the shot is fired, is so proportioned, that the collar $d^1$ is not reached by the piston $g^1$ as it moves forward with the brake cylinder before the barrel begins to return. For although the piston rides loosely upon the piston rod, nevertheless it moves forward with the cylinder, because the liquid behind the piston passes only to the other side of the piston through the small area of the grooves $k^1$ under great pressure. If the explosion of the charge fails to take place, the barrel continues to be driven forward by the running-out gear $C^1$, and the collar $d^1$ on the piston rod bears against the piston $g^1$, thereby compelling the liquid to force itself from the rear to the front side of the piston through the brake cylinder grooves $k^1$ until the barrel comes to rest.

Having thus described the invention, what is claimed as new therein and desired to be secured by Letters Patent is:—

1. The combination with a differential recoil gun comprising the gun barrel, its carriage, and running-out gear, of a fluid pressure brake comprising a cylinder carried by the gun barrel and a coöperating piston connected to the gun carriage, said brake constructed to permit of normal running-out movement of the gun barrel for firing and acting to retard the running-out movement when the gun barrel moves out beyond the firing position.

2. The combination with a differential recoil gun comprising the gun barrel, its carriage, and running-out gear, of a fluid pressure brake comprising a cylinder carried by the gun barrel, a piston connected to the gun carriage, and means coöperating therewith to throttle the fluid within the cylinder, whereby to arrest the outward movement of the gun barrel and bring the same to a stand-

still when it moves beyond the firing position.

3. The combination with a differential recoil gun comprising the gun barrel, its carriage, and running-out gear, of a fluid pressure brake comprising a cylinder adapted to contain a fluid and serving to mount the running-out gear, a piston within the cylinder and having connection with the carriage, and a means coöperating with the piston for throttling the fluid within the cylinder whereby to arrest the running-out movement of the gun barrel and bring the same to a standstill when the barrel moves out beyond the firing position.

4. The combination with a differential recoil gun comprising the gun barrel, its carriage, and running-out gear, of a fluid pressure brake comprising a cylinder fixed to and movable with the gun barrel, a piston rod within said cylinder and having a fixed connection with the carriage, and a piston having a limited movement on said rod and adapted to throttle the fluid within the cylinder whereby to arrest the running-out movement of the gun barrel and bring the same to a standstill when the barrel moves out beyond the firing position.

5. The combination with a differential recoil gun comprising the gun barrel, its carriage, and running-out gear; of a fluid pressure brake comprising a cylinder fixed to and movable with the gun barrel, said cylinder having a throttling section for a portion of its length, a piston rod within said cylinder and having a fixed connection with the carriage, and a piston on said rod having movement within the throttled section of the cylinder, and adapted to permit of normal running out movement of the gun barrel and bring the same to a standstill when it moves out beyond the firing position.

The foregoing specification signed at Erfurt, Germany, this 31st day of January, 1910.

KONRAD HAUSSNER.

In presence of—
PETER BLANSENBACH,
GUSTAV LAUTEN, Jr.