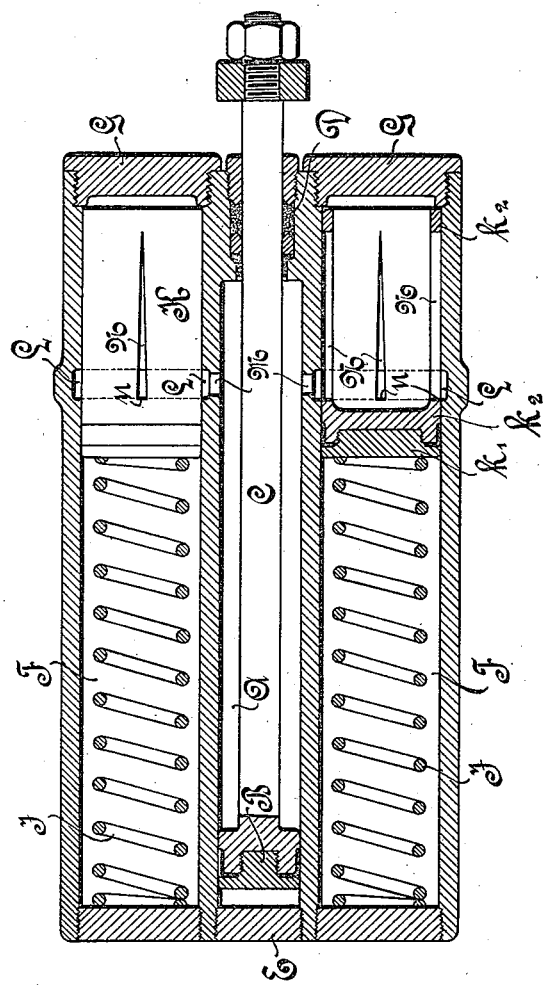
No. 650,180. Patented May 22, 1900.

J. KRONE.

FLUID BRAKE FOR GUNS.

(Application filed Feb. 28, 1900.)

(No Model.)



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UNITED STATES PATENT OFFICE.

JOHANNES KRONE, OF ESSEN, GERMANY, ASSIGNOR TO FRIED. KRUPP, OF SAME PLACE.

FLUID-BRAKE FOR GUNS.

SPECIFICATION forming part of Letters Patent No. 650,180, dated May 22, 1900.

Application filed February 28, 1900. Serial No. 6,790. (No model.)

To all whom it may concern:

Be it known that I, JOHANNES KRONE, engineer, a citizen of the German Empire, residing at 56 Bismarckstrasse, Essen-on-the-Ruhr, Germany, have invented certain new and useful Improvements in Fluid-Brakes for Guns, of which the following is a specification.

My invention has reference to improvements in that class of fluid-brakes for guns in which the liquid is forced through a throttled passage from the recoil-cylinder into another cylinder, the so-called "running-out cylinder" displacing its piston against the resistance of springs or air for the purpose of storing the energy required for running the gun back into battery.

The object of the present invention is to dispense with the means hitherto used, for the purpose of obtaining a constant resistance, for throttling the liquid (tapering throttling-rods, throttle-valves, &c.) and to produce a fluid-brake extremely simple and not sensitive in construction and having the advantage of having the smallest possible number of parts without being inferior to any of the known fluid-brakes. This result I accomplish by throttling the liquid by means of openings in the walls of the piston of the running-out cylinder, which is formed as a hollow cylinder with one end closed.

My invention will be best understood by reference to the annexed drawing, which shows an example of my invention in horizontal section, embodying a recoil and two running-out cylinders, in which the openings in the running-out pistons are made wedge-shaped.

A is the recoil-cylinder, placed between and parallel to the running-out cylinders F, which are by preference formed in one piece with the same. The piston B of the recoil-cylinder A is connected to some part of the gun sharing the recoil motion, such as the gun-barrel, by a piston-rod C, passing through the stuffing-box D, while the three cylinders are connected to the stationary parts. Of course this arrangement may also be reversed. The construction and arrangement of the two running-out cylinders are the same all through for both. Each one is provided with a running-out piston K, against which bears a spring J, which tends to push it against the head G. The piston K consists of a hollow cylinder k^2, provided with a number of tapering slits N, parallel to the axis, and with a packing-nut k'. The sides of the openings N may also be flat arcs of a circle or curve or of any suitable shape; nor is it necessary that the slits should be parallel to the axis. They may be spiral. In place of slits a series of small holes may be used arranged in the walls of the running-out piston in such a manner that the area at the different zones is different—namely, decreasing toward the open end of the piston. The connection between the recoil-cylinder A and the running-out cylinder F is made through openings M and annular channels L in the walls of the running-out cylinders. These channels L are so located that their edges facing the springs of the cylinders F are in the plane of the wide end edges n of the slits N. The space of the recoil-cylinder A between the piston B and the stuffing-box D, the passages M, the annular channels L, the slits N, and spaces between the closed end of the running-out piston K and the head G are filled with liquid, while the parts between the piston B and the head E, as well as the spaces containing the springs J, are by preference connected with the outer air In some cases the springs J in the running-out cylinders F may be replaced by compressed air.

Before firing the several parts of the fluid-brake are in the positions shown in the drawing. In firing the piston B approaches the stuffing-box D of the recoil-cylinder and the liquid is driven into the running-out cylinder through the openings M, the annular channels L, and the slits N and pushes the running-out piston K away from the head G, thereby compressing the spring J, the stroke of the piston K in proportion to that of the piston B being determined by the ratio of the areas of the recoil-cylinder and the running-out cylinder. As the piston K is moved away from the head G the current is more and more throttled, narrower parts of the slits N passing before the annular channels L, thus gradually contracting the passages. After the recoil is completed the springs J expand and, through the piston K and the liquid, return the recoil-piston B to its original position.

What I claim as new is—

In a fluid recoil-brake for guns the combination with the recoil-cylinder, of a running-out cylinder communicating therewith by a passage and annular space and provided with a hollow cylindrical piston closed at one end, said hollow piston having openings decreasing in cross-section from the closed end toward the open end, whereby the liquid is throttled in its passage between the recoil-cylinder and the running-out cylinder, as the openings in the running-out piston pass the passages of communication between the running-out cylinder and the recoil-cylinder, substantially as and for the purpose specified.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JOHANNES KRONE.

Witnesses:

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