

No. 726,531.

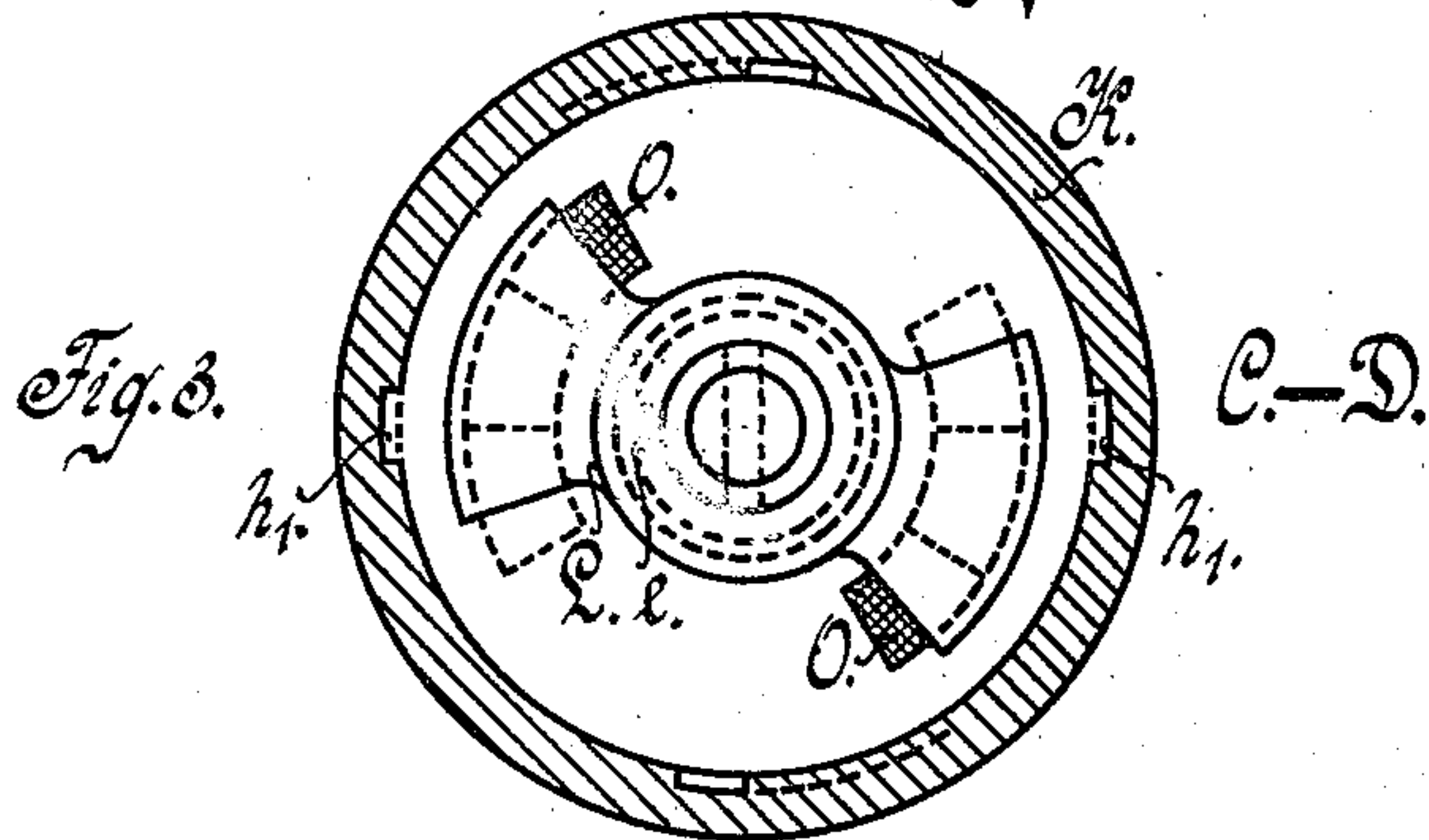
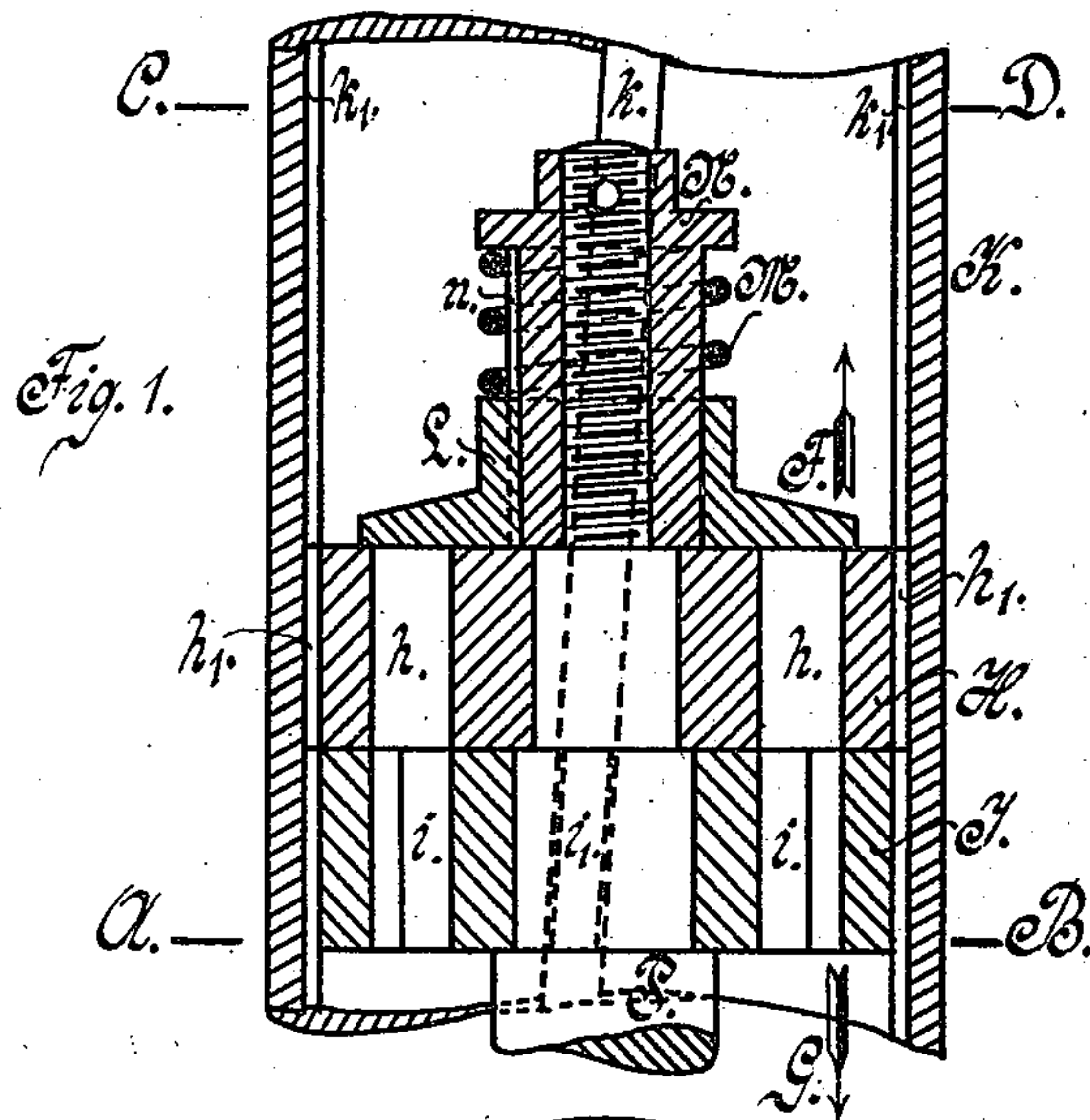
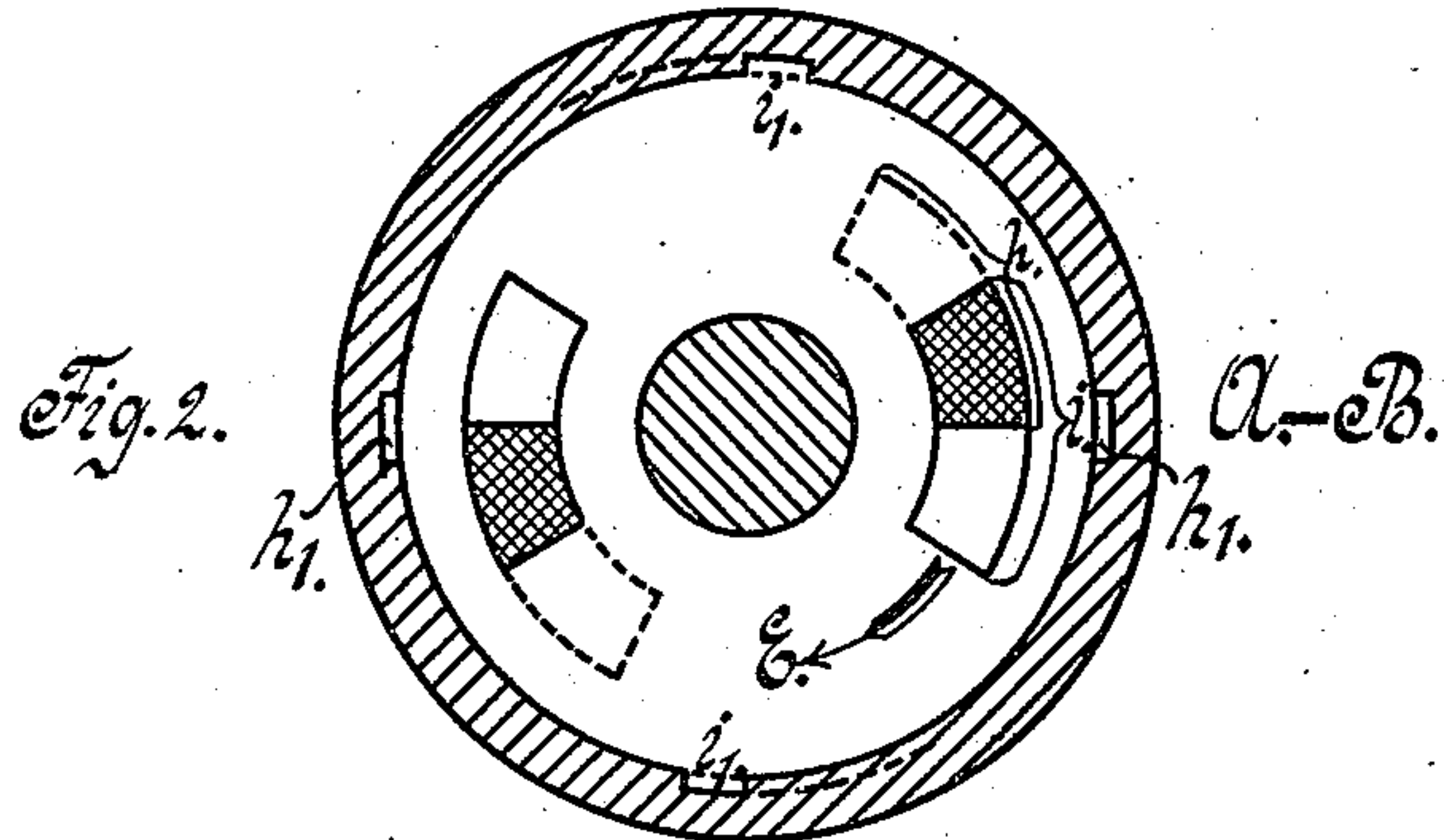
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K. HAUSSNER.

DEVICE FOR REGULATING THE RECOIL AND COUNTER RECOIL OF GUNS.

APPLICATION FILED NOV. 15, 1901.

NO MODEL.



Witnesses
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UNITED STATES PATENT OFFICE.

KONRAD HAUSSNER, OF EISENACH, GERMANY.

DEVICE FOR REGULATING THE RECOIL AND COUNTER-RECOIL OF GUNS.

SPECIFICATION forming part of Letters Patent No. 726,531, dated April 28, 1903.

Application filed November 15, 1901. Serial No. 82,353. (No model.)

To all whom it may concern:

Be it known that I, KONRAD HAUSSNER, of No. 7 Alexanderstrasse, in the city of Eisenach, in the Province of Thuringia and Empire of Germany, have invented certain new and useful Improvements in Devices for Regulating the Recoil and Counter-Recoil of Guns, of which the following is a specification.

This invention relates to improvements in devices for regulating and controlling the forward movement of liquid brakes for ordnance, and has for its object to render possible upon the forward movement of the gun a regulation of the section of the liquid-passage from outside without further packing than that of the single piston-rod being required.

The improved device is illustrated in the accompanying drawings, in which—

Figure 1 shows a vertical section through the brake-cylinder. Fig. 2 is a transverse section on the line A B of Fig. 1, while Fig. 3 is a transverse section on the line C D of Fig. 1.

As shown in Fig. 1, the brake-piston consists of two disks I and H, which are mounted upon the piston-rod P, so as to be capable of a rotating but not of a sliding or longitudinal movement upon the said rod. The disk H is provided with projections *h*, arranged to slide in straight grooves *k'* in the cylinder K, while the disk I, with its projections *i'*, is arranged to travel in spiral grooves *k* of the said cylinder in the direction of the arrow E. As soon as the recoil takes place, the piston-rod, with the two piston-disks, will be actuated in the direction of the arrow G. Accordingly, as hereinbefore indicated, the projections *h'* of the disk H will cause the latter to travel in a straightline. The disk I, however, in accordance with the spiral grooves *k* will carry out a spiral movement in the direction of the arrow G. The channel *i*, forming the passage for the brake fluid through the disk I, in conjunction with the hole *h* of the disk H, forming the passage for the brake fluid through the disk H will thus, as is apparent in consequence of the before-said spiral movement, constantly present a changing section to the flow of the glycerin during the said recoil. Upon the opposite side of the piston-rod a valve L is arranged provided with a projection *l*, adapted to slide in a groove *n* upon the

guide-piece N, whereby a to-and-fro movement of the valve is attained. The guide-piece N, however, being rigidly connected to the piston-rod by screw-thread and a cotter-pin, it is clear that the said valve L cannot turn relatively to the piston-rod.

The spring M, Fig. 1, serves to lightly press the valve L against the disk H.

During the recoil of the gun in the direction of the arrow G the liquid flowing from the front to the rear side of the piston will only lift the valve L to such extent as is necessary to permit the flow through the same.

When the gun, however, in consequence of the action of an accumulator, moves forward on counter-recoil and the piston-rod and piston-disk connected thereto reverse their direction of movement, so that they now move in the direction of the arrow F, then in consequence of the pressure of the spring M or in the absence of this by the action solely of the pressure of the liquid, the valve L will then be caused to bear upon the rear piston-disk H.

In its position at this moment it will be apparent that the said valve L will only leave for the entire path of the forward movement of the gun a very small and definite section of passage O open for the flow of the liquid. (See Fig. 3.) This section of passage O, as also readily apparent, can, however, be increased or diminished to an optional degree by turning the piston-rod from the outside, as upon the turning of the latter the guide-piece N, rigidly connected to same, as hereinbefore described, will move with the piston-rod, and as a consequence also the valve L, owing to the engagement of the nose or projection *l* with the groove *n*. On the outside the piston-rod itself can be securely held in any position against movement relatively to the brake-cylinder by means of a safety device of optional form. This simple regulation or adjustment without any further packing is, however, of the greatest value, as it is a well-known fact that a liquid such as glycerin contracts when subjected to cold, and thus in consequence of the high specific gravity produces a greater resistance in the flow of the liquid. For this reason it is desirable to employ for the forward movement of the gun a greater section of passage for the flow of the liquid in order that the accu-

mulator may be capable of bringing the gun into the position for firing. Furthermore, for greater elevations, cases can occur for which it is preferable to use larger sections for the passage of the liquid through the piston-disks than the sections chosen for small elevations. As a last point it may be remarked that the accumulator may in time decrease too large a degree in expansive force, in which instance it is also desirable and of important service to have the means at disposal to increase the said section in the manner hereinbefore described.

What I claim, and desire to protect by Letters Patent of the United States, is—

1. In a device of the character described, the combination with a piston-cylinder, a piston-rod and a piston rotatably mounted thereon, said piston comprising two disks provided with openings, of a longitudinally-movable valve controlling the passage of fluid through the openings in one of the disks, and means for effecting the turning of the disks on the piston-rod upon the recoil of the gun and simultaneously the turning of one of the disks relatively to the other for the purpose specified.

2. In a device of the character described, the combination with a piston-cylinder, of a piston-rod and a piston rotatably mounted

thereon, said piston comprising two disks provided with openings, projections on one of the disks engaging a spiral groove in the cylinder, projections on the other disk engaging longitudinal grooves in the cylinder and a longitudinally-movable valve arranged to control the passage of fluid through the openings in one of the disks, substantially as specified.

3. In a device of the character described, the combination with a cylinder, of a piston-rod, a piston rotatably mounted on the rod and comprising two disks provided with openings, means for effecting the turning of the disks on the piston-rod upon the recoil of the gun, and simultaneously turning one of the disks relatively to the other, a guide secured upon the piston-rod and provided with a groove, a valve mounted for longitudinal movement in the guide and provided with a projection engaging the groove in said guide and a spring arranged to bear upon the valve, all as specified.

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

KONRAD HAUSSNER.

Witnesses:

ADALBERT LAZAR,
MAX ZARNSWITZ.