

No. 715,672.

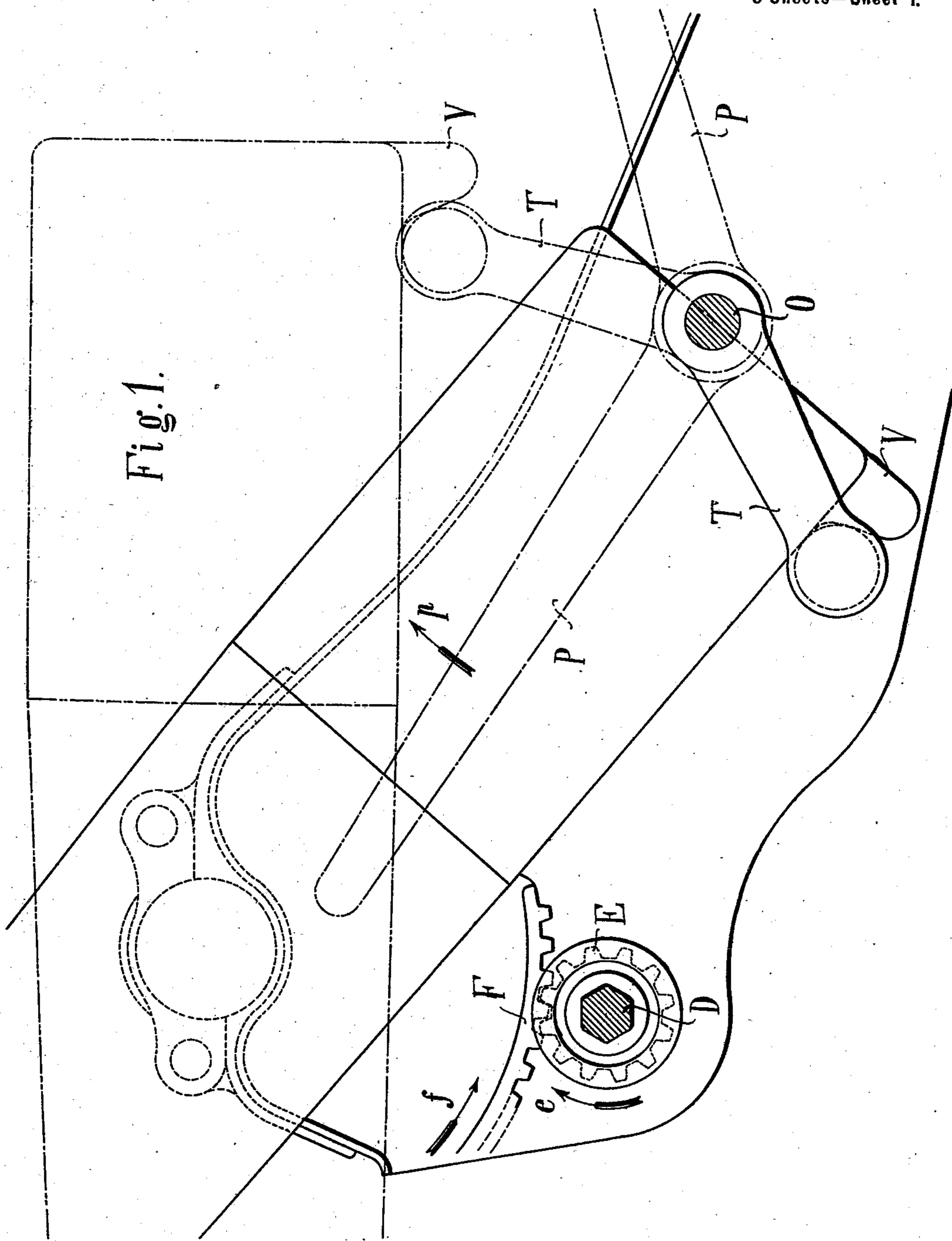
Patented Dec. 9, 1902.

**J. KURIG.
ORDNANCE.**

(Application filed July 28, 1902.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses:
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Inventor:
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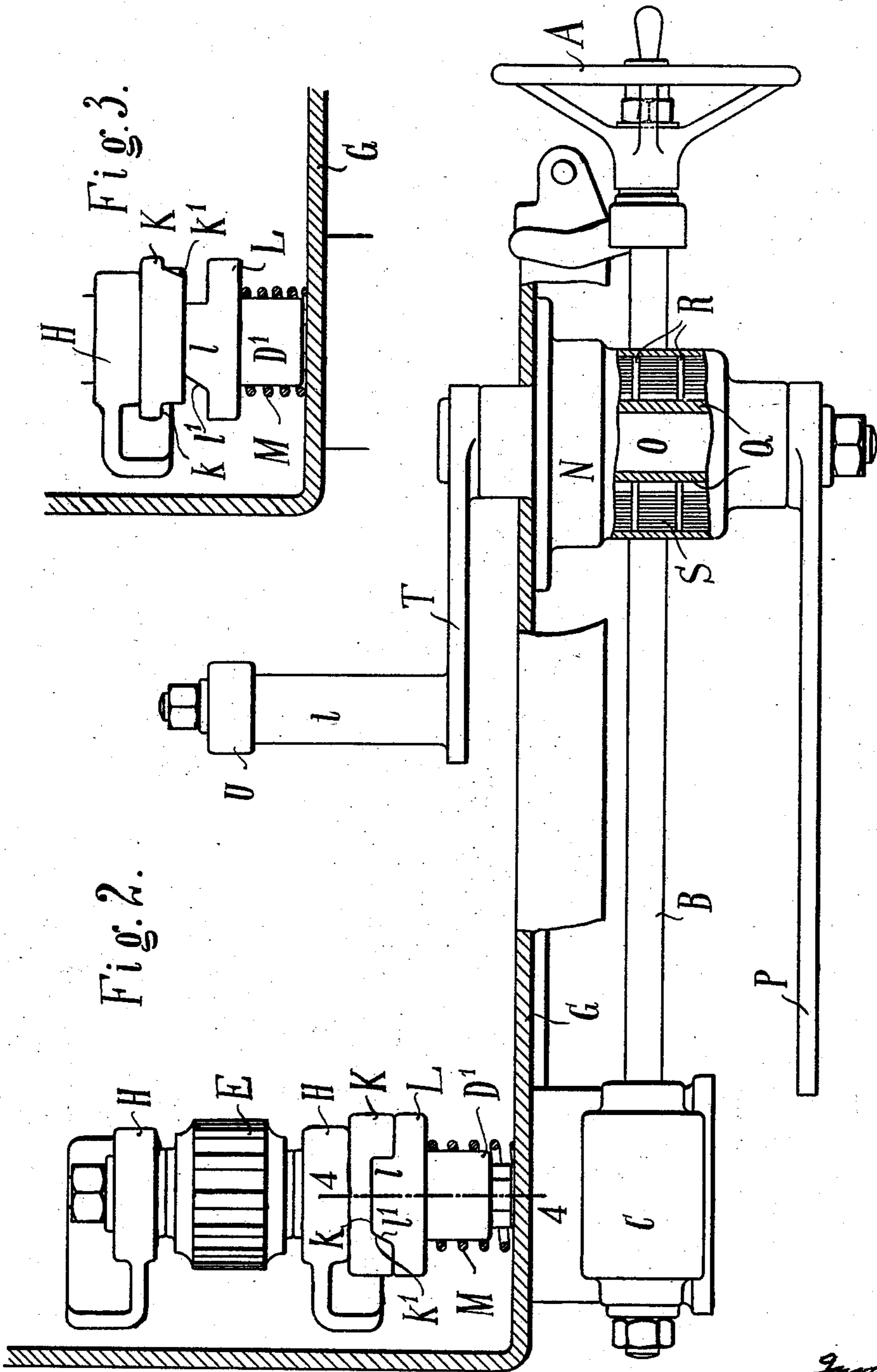
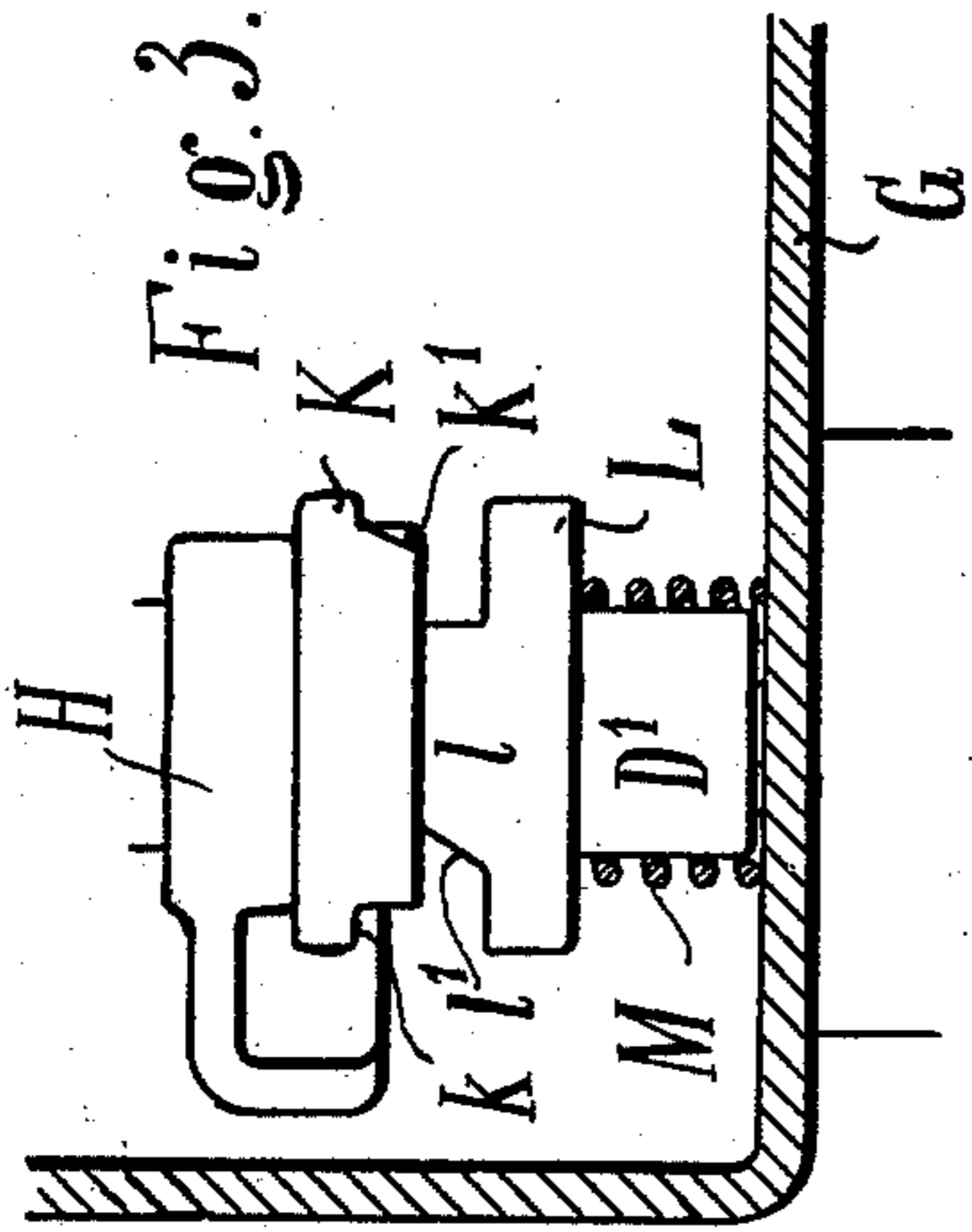
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3 Sheets—Sheet 2.



Witnesses:
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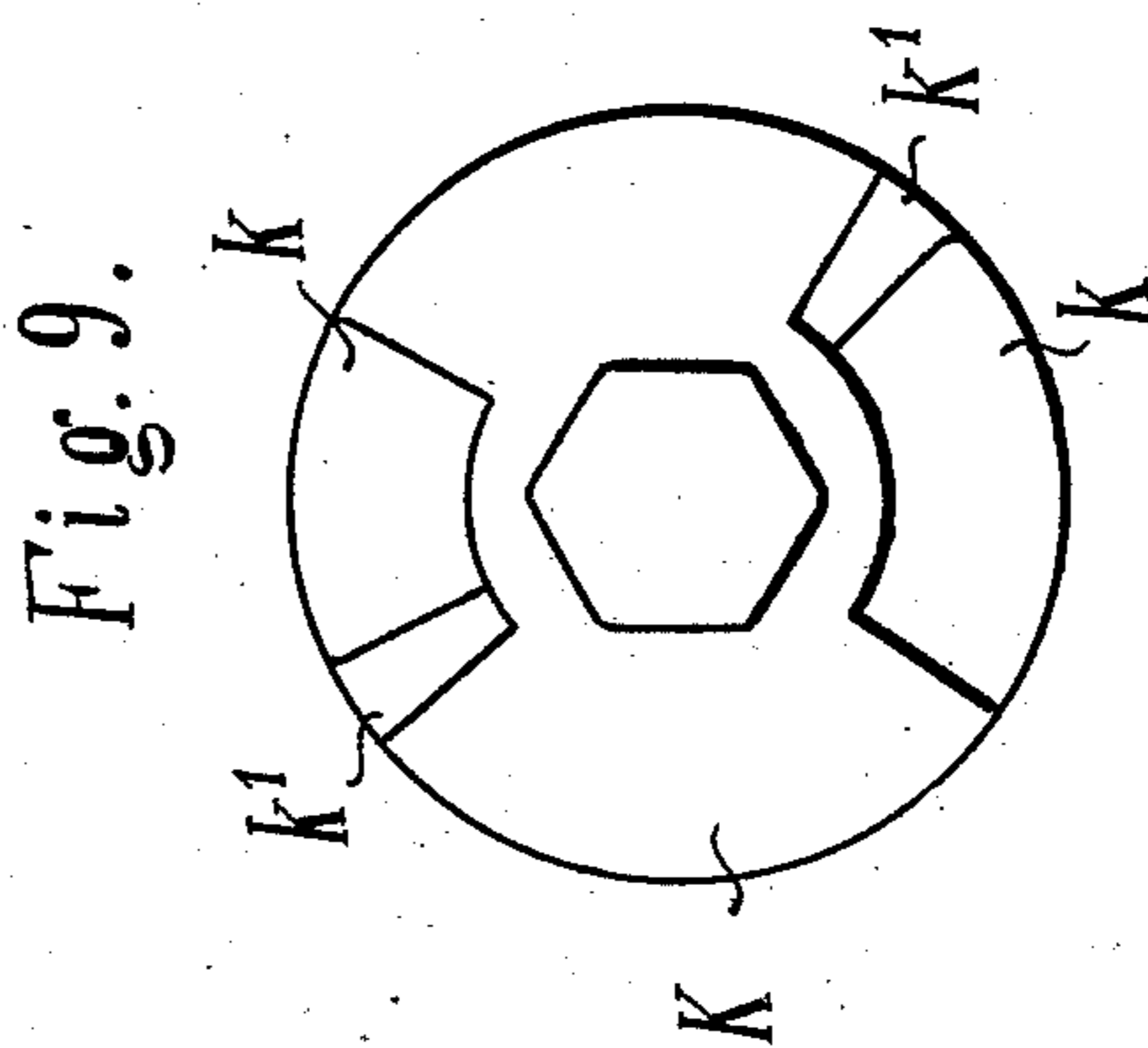
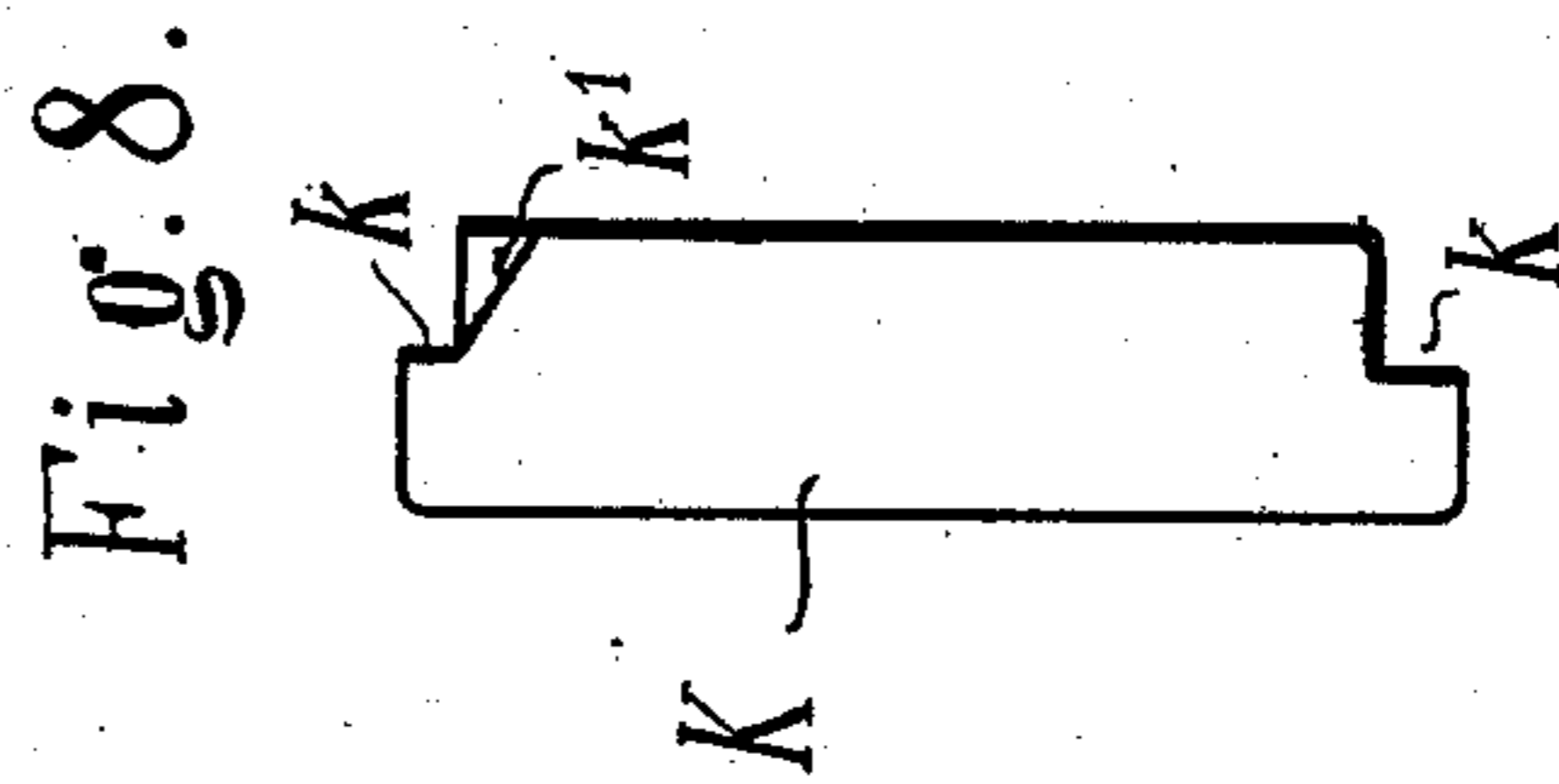
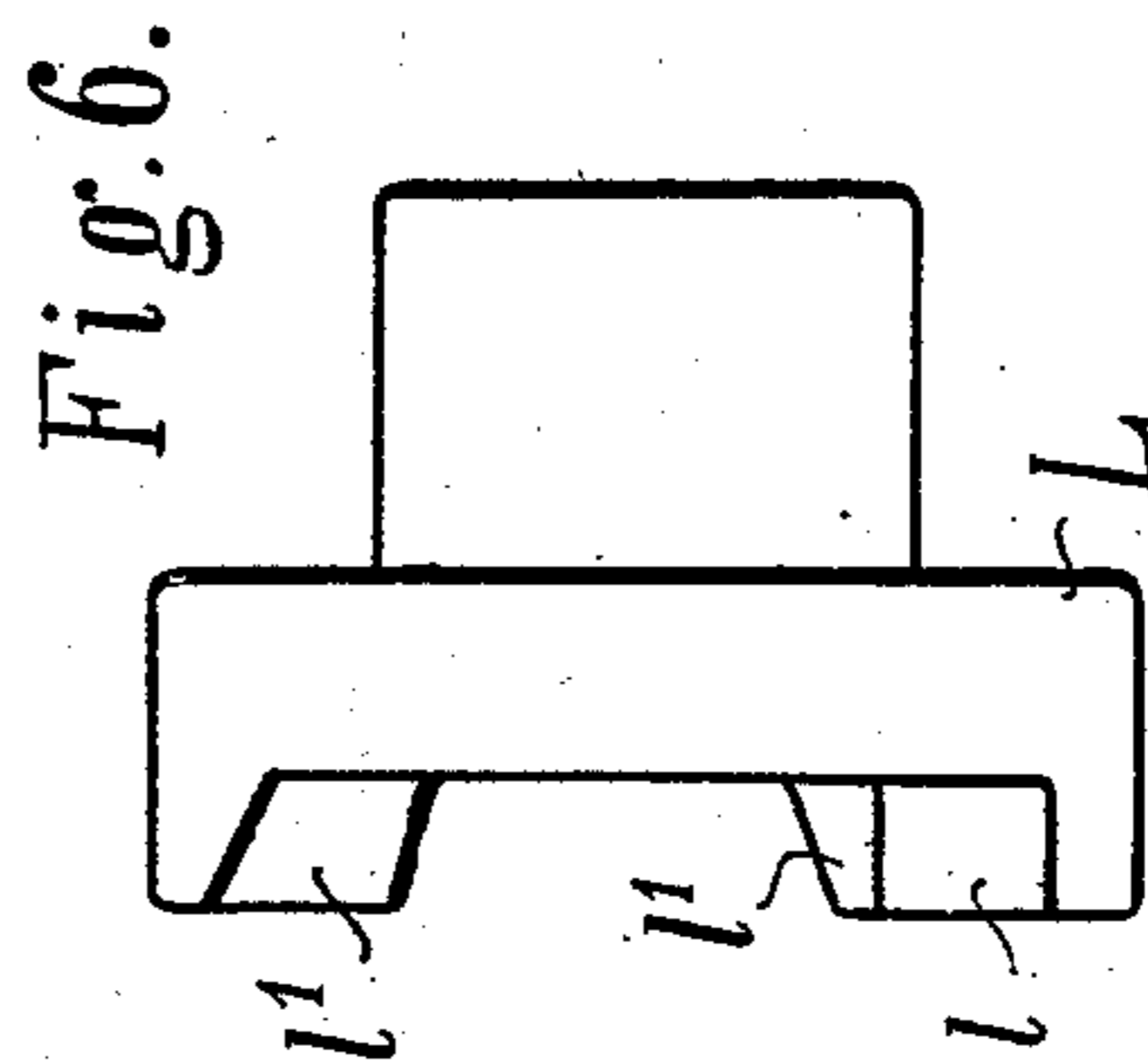
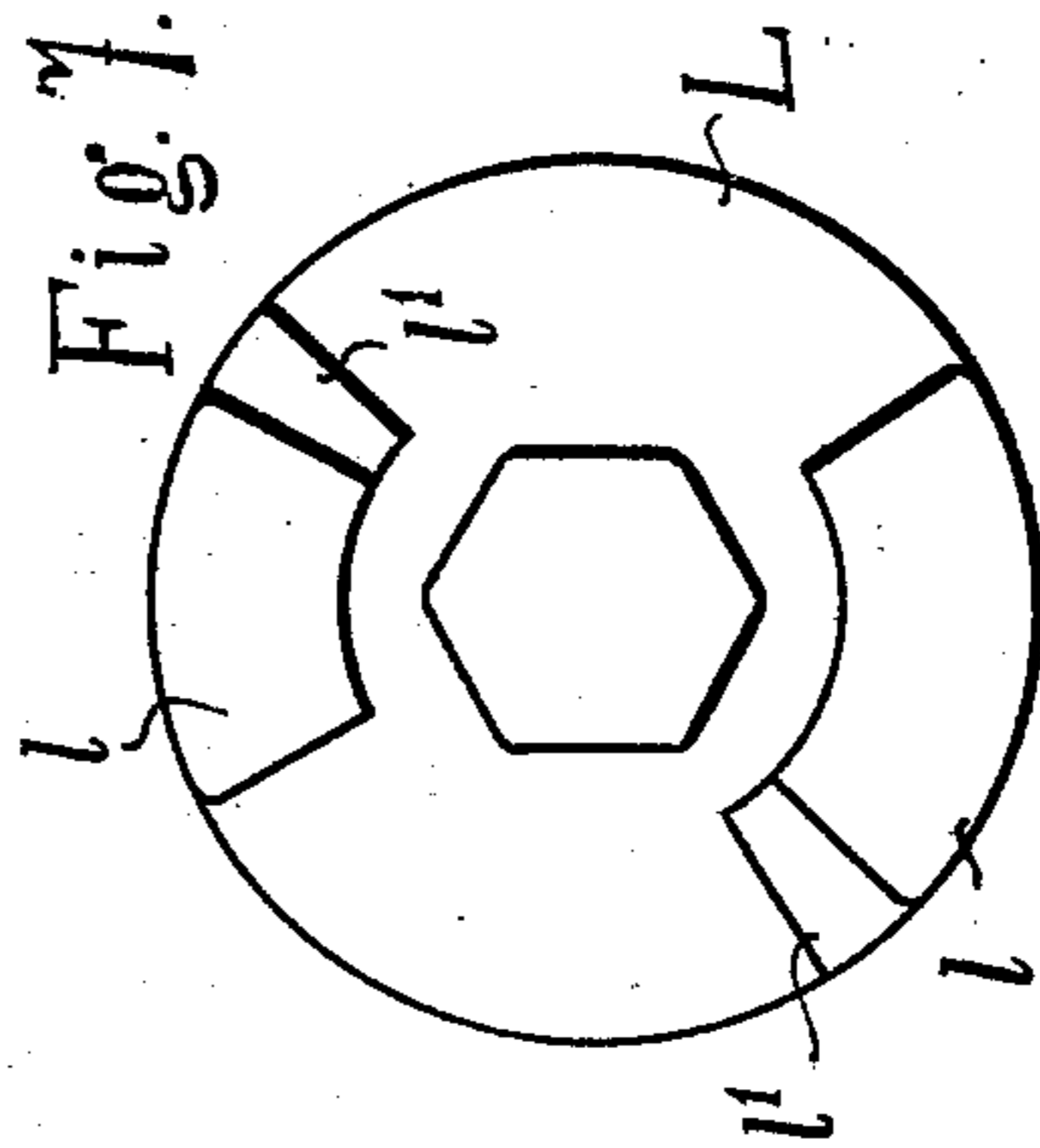
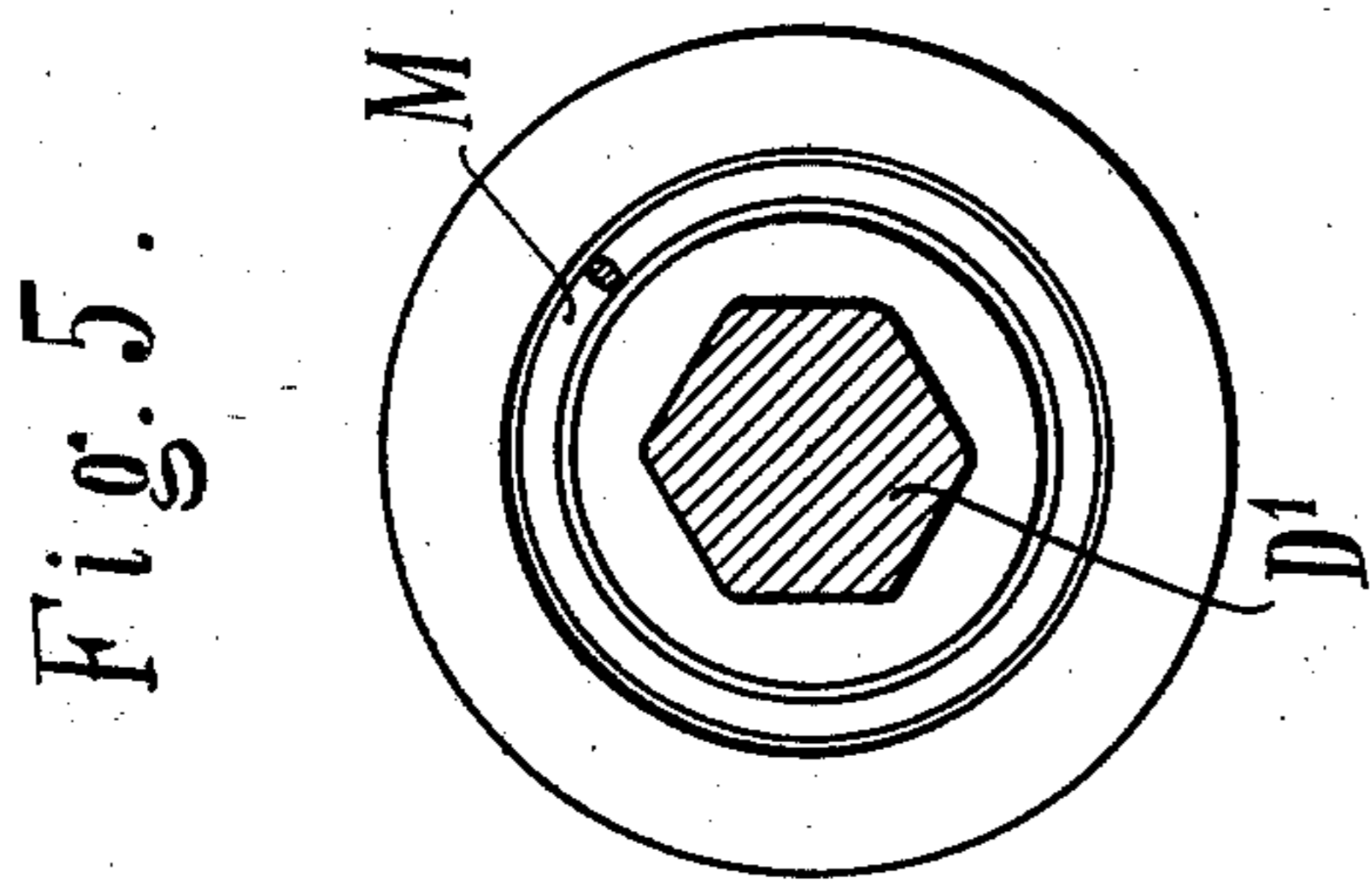
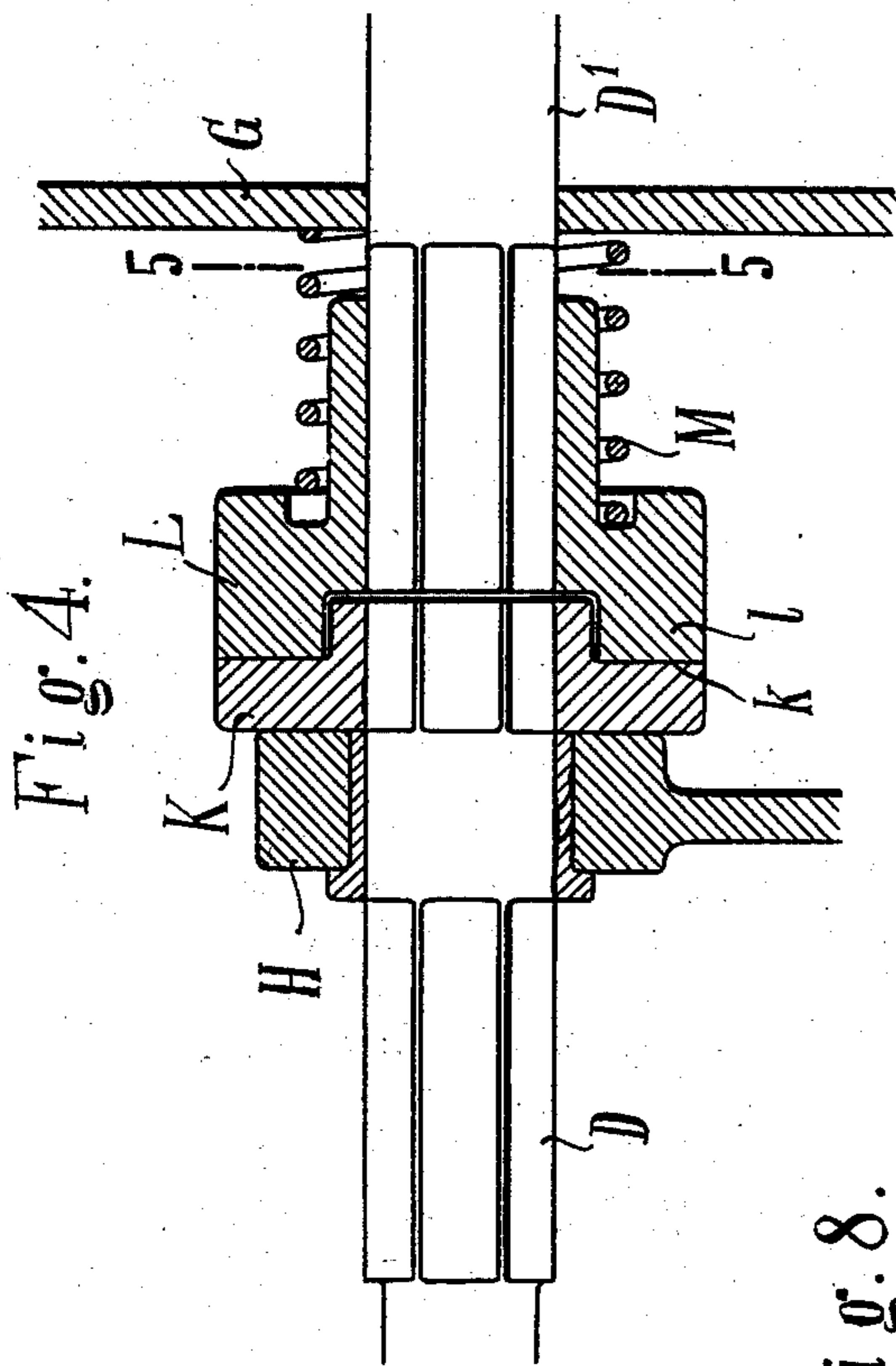
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(No Model.)

3 Sheets—Sheet 3.



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UNITED STATES PATENT OFFICE.

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ORDNANCE.

SPECIFICATION forming part of Letters Patent No. 715,672, dated December 9, 1902.

Application filed July 28, 1902. Serial No. 117,344. (No model.)

To all whom it may concern:

Be it known that I, JOSEF KURIG, a subject of the Emperor of Germany, and a resident of 16 Holzstrasse, Essen-on-the-Ruhr, Germany, have invented certain new and useful Improvements in Ordnance, of which the following is a specification.

This invention relates in general to those guns in which the gun-barrel must be returned to a specific loading position after each discharge and specifically to guns having an attachment for rapidly shifting the gun-barrel from the firing to the loading position and returning it to the firing position. It has heretofore been proposed to accomplish this result by introducing into the driving connections for the toothed arc and pinion mechanism a clutch, a sleeve engaging one of the clutch members through the medium of a screw-formed face and capable of throwing the clutch out of gear, and a lever for suddenly raising and lowering the gun having connections with the sleeve, through which it can throw the clutch out of gear as said lever is moved.

By the present invention the sleeve and its connection with the raising and lowering lever are done away with and the clutch is thrown out of gear through the medium of the gun-barrel. This result is accomplished, according to the present invention, by having the engaging bosses on the clutch members provided with spiral faces.

One embodiment of the invention is shown, by way of illustration, in the accompanying drawings, in which—

Figure 1 is a side elevation of the parts of the gun which come into consideration in connection with the present invention, the forward wall of the carriage being cut away and the gun-barrel being shown by full lines in its position of greatest elevation and by dot-and-dash lines in its loading position. Fig. 2 shows a plan view of the elevating mechanism in combination with the attachment forming the subject of the present invention, several parts being shown in section. Fig. 3 shows the coupling of the elevating mechanism in its disengaged position. Fig. 4 is a section on the line 4 4, Fig. 2, looking from left to right. Fig. 5 is a section on the line

5 5, Fig. 4, looking from right to left. Figs. 6 to 9 are detail views.

The particular construction of the elevating mechanism forms no part of the present invention, and therefore needs only to be briefly described. It consists, essentially, of a hand-wheel A, a shaft B, carrying a worm inclosed in a housing C, a worm-wheel in engagement with said worm mounted on a shaft D D', and a pinion E on the same shaft, which meshes with a toothed arc F, rigidly connected with the gun-barrel. The driving parts of the elevating mechanism—to wit, the hand-wheel A, shaft B, and worm-gear—are on the outside of the wall G of the carriage, while the remaining parts of the elevating mechanism, together with the bearings H for shaft D D', are arranged between the carriage-walls.

The shaft that carries the pinion E and worm-wheel of the elevating mechanism consists of two parts D and D', Fig. 4. Rigidly connected with the part D of this shaft, which with the exception of its journals is hexagonal and carries the pinion E, is one member K of a clutch. This clutch member has two diametrically opposite recesses *k*, Figs. 8 and 9, of different length and formed with pitched faces *k'*. When the clutch interlocks, these recesses are engaged with a slight degree of play by correspondingly-formed lugs with pitched faces on the other clutch member. (See also Figs. 6 and 7.) The clutch member L is axially movable but non-rotatable on the part D' of the shaft. The two clutch members are held in interlocked relation by a spring M, bearing at one end against the carriage-wall G and at the other end against the clutch member L and guided by a neck on the latter.

In a housing N, mounted on the outer wall G of the carriage, is journaled a shaft O, which carries a hand-lever P on its outer end. That portion of shaft O within the housing N is angular and carries a sleeve Q, with which are fixedly connected the inner ends of several spiral springs S, which are separated by washers R and have their outer ends fixed to the housing. These springs are so wound that they tend to rotate the shaft O, and through it the hand-lever P of the shaft O, in the direction of the arrow *p*, Fig. 1. Within

the carriage-wall on the shaft O is a lever T, which carries a lateral arm *t*, engaging beneath the breech of the gun-barrel or against a horn thereon through the medium of a roller U.

In the following explanation of the manipulation and mode of operation of the invention it will be assumed that the several parts are to be shifted from the position shown in Fig. 2 and by full lines in Fig. 1, which corresponds to the position of extreme elevation of the gun. While the parts are in this position the clutch is in engagement and is held in such engagement by the spring M. The shaft part D' is prevented from turning by the self-locking nature of the worm-gear of the elevating mechanism, so that the shaft part D, toothed wheel E, and the gun-barrel cannot of their own motion change their positions. The roller U of lever T is held by the action of spring S against the horn V of the gun-breech. If the gunner now desires to transfer the gun-barrel to the loading position without operating the elevating mechanism, he must apply force to the lever P, which tends to move the same in the direction of the arrow *p*, Fig. 1. This causes the lateral arm *t* of the lever T to exert a lifting pressure on the breech of the gun-barrel through the medium of the roller U and to swing the toothed arc F of the elevating mechanism, which is rigidly connected to the gun-barrel in the direction of the arrow *f*, Fig. 1. In consequence of this a rotary force in the direction of the arrow *e*, Fig. 1, is exerted by the toothed arc F upon the pinion E, with which said toothed arc is in engagement; but since, as has been above explained, the shaft portion D' is fixed against turning by the worm-gear of the elevating mechanism the clutch K L will be thrown out of gear through the medium of the inclined faces *k' l'* by the rotary force imparted to the pinion E of shaft portion D, the spring M being at the same time compressed. The lever P, responding to the force applied to it by the gunner, can now turn upon its axis and the gun-barrel be raised to the loading position independently of the operation of the elevating mechanism. In these movements springs S unwind and assist in raising the gun-barrel. As the gun-barrel is overbalanced it sinks as soon as the lever T has passed its dead-center. This movement continues the turning of the lever T until the roller U on the arm *t* impinges the horn V on the breech of the gun. The gun-barrel and the lever have then assumed the position shown by broken lines in Fig. 1, at which time movement of the lever P in the direction of the arrow *p* may be arrested by a suitable stop on the gun-carriage. (Not shown in the drawings.) To bring the gun-barrel, after loading, back to the same firing position which it had previously occupied, the hand-lever P is thrown toward the muzzle of the gun in opposition to the springs S, putting the latter under tension. The lever T takes

part in this movement and raises the gun until the lever passes its dead-center, whereupon the gun-barrel sinks under the increase of weight, due to the load that has been introduced, and swings the lever P to the position which it had at the beginning. When the gun-barrel has reached the precise firing position which it had formerly, the clutch K L is thrown into gear automatically by the operation of the spring M. In order to prevent a premature engagement of the clutch K L, the lugs and recesses of the clutch-faces are of different lengths, and the relation of the pinion E to the toothed arc F is so determined that the pinion E makes less than one revolution during the raising or lowering of the gun-barrel.

The arrangement constituting the subject-matter of this invention will always be used for transferring the gun-barrel from the firing to the loading position, and vice versa. Any corrections or adjustment in the firing or elevated position, however, will always be accomplished through the medium of the elevating mechanism by turning the hand-wheel A. In order to forestall unintentional disengagement of the clutch members K L, we have, on the one hand, the pressure of the spring M, which holds the parts of the clutch in engagement, and, on the other hand, the pitch of the inclined faces *k' l'* of the clutch lugs and recesses, all of which are sufficiently great to prevent the force transmitted through the clutch from releasing the latter when elevating the gun.

Having thus described the invention, the following is what is claimed as new therein:

1. In an attachment for elevating mechanism for guns, for rapidly transferring the gun-barrel from firing to loading position and return; the combination of means for raising and lowering the breech of the gun-barrel independently of the elevating mechanism, a clutch interposed in the elevating mechanism, and inclined faces on the engaging portions of said clutch, which force the clutch members apart when the driven portion of the elevating mechanism is moved independently of the driving portion.

2. In combination with the elevating mechanism of a gun, comprising driving and driven parts, a clutch interposed between said driving and driven parts, and having inclined faces forcing the clutch members apart when the driven part is moved independently of the driving part of the elevating mechanism, and means for raising and lowering the breech of the gun independently of the elevating mechanism.

3. In combination with the elevating mechanism of a gun, comprising driving and driven parts; a clutch interposed between said driving and driven parts, having inclined faces which force the clutch members apart when the driven part is moved independently of the driving part of the elevating mechanism, a spring holding the members of the clutch to-

gether, and means for raising and lowering the breech of the gun independently of the elevating mechanism; the strength of the spring and the pitch of the inclined faces of the clutch members being selected to prevent disengagement of the clutch members when the elevating mechanism is being operated through its driving part.

4. The herein-described means for controlling guns, consisting of elevating mechanism comprising a driving part having means through which it is rotated, and the driven part having means through which it raises and lowers the gun as it is rotated, a clutch interposed between the driving and driven parts of the elevating mechanism, having inclined faces between its engaging members, whereby rotation of the driven member of the clutch independently of the driving member forces the clutch members apart, and means for raising and lowering the breech of the gun independently of the driving part of

the elevating mechanism, whereby when the breech is moved by said raising and lowering mechanism, the clutch is disengaged. 25

5. In an elevating mechanism for guns, the combination of driving means including a worm-gear, and driven means including a toothed arc and pinion, through which the firing position of the gun is established, a clutch interposed between the driving and driven means, having inclined faces by which the clutch members are forced apart when the driven means is rotated independently of the driving means, and a lever raising and lowering the breech of the gun independently of the means for establishing the firing position. 30 35

The foregoing specification signed at Düsseldorf this 16th day of July, 1902.

JOSEF KURIG.

In presence of—

WILLIAM ESSENWEIN,
RUDY LIEBER