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PATENTED FEB. 20, 1906.

M. MÜNDEL.

AUTOMATIC CUT-OFF FOR EXPLOSIVE ENGINES.

APPLICATION FILED JAN. 6, 1905.

2 SHEETS—SHEET 1.

Fig. 1.

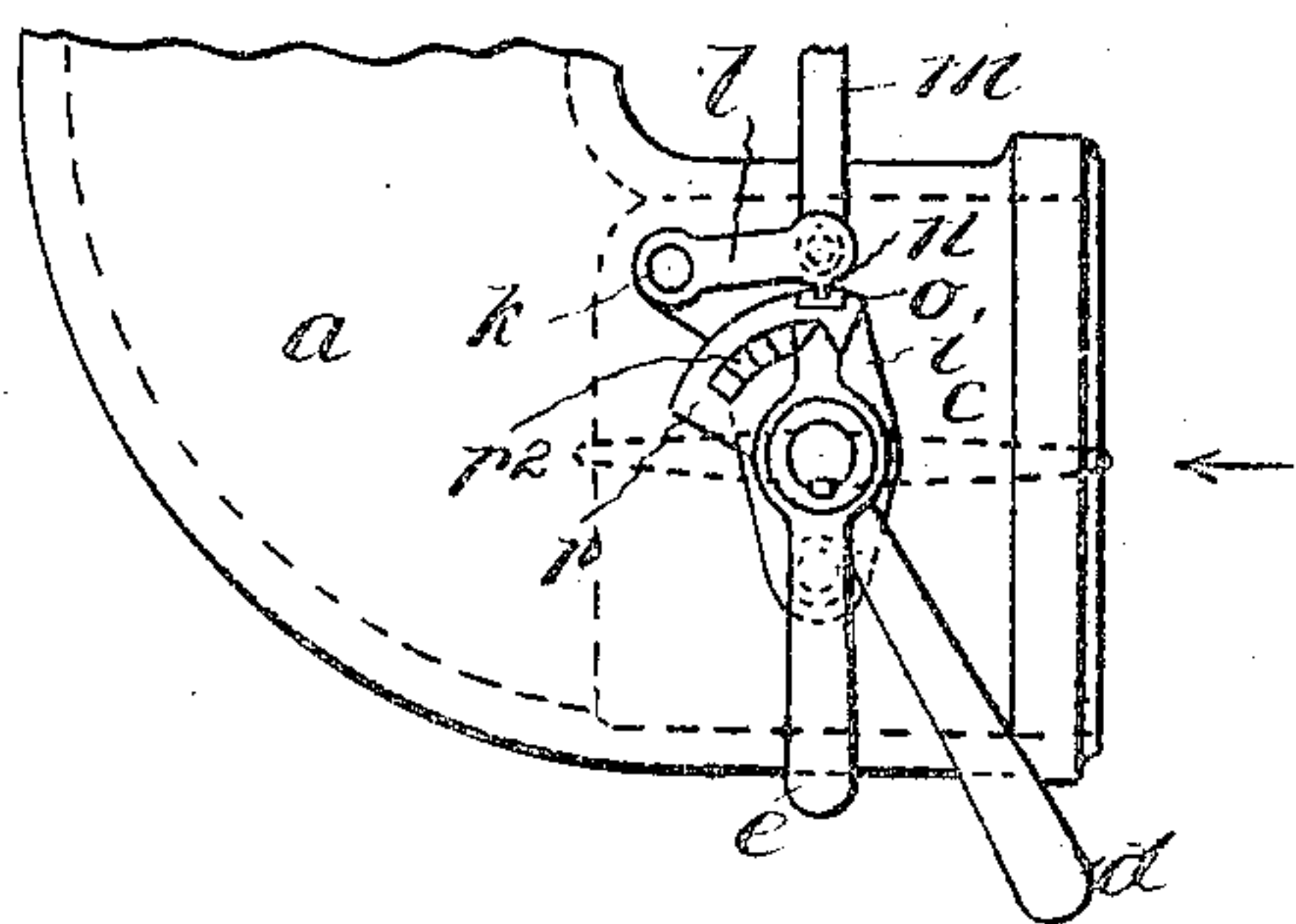


Fig. 2.

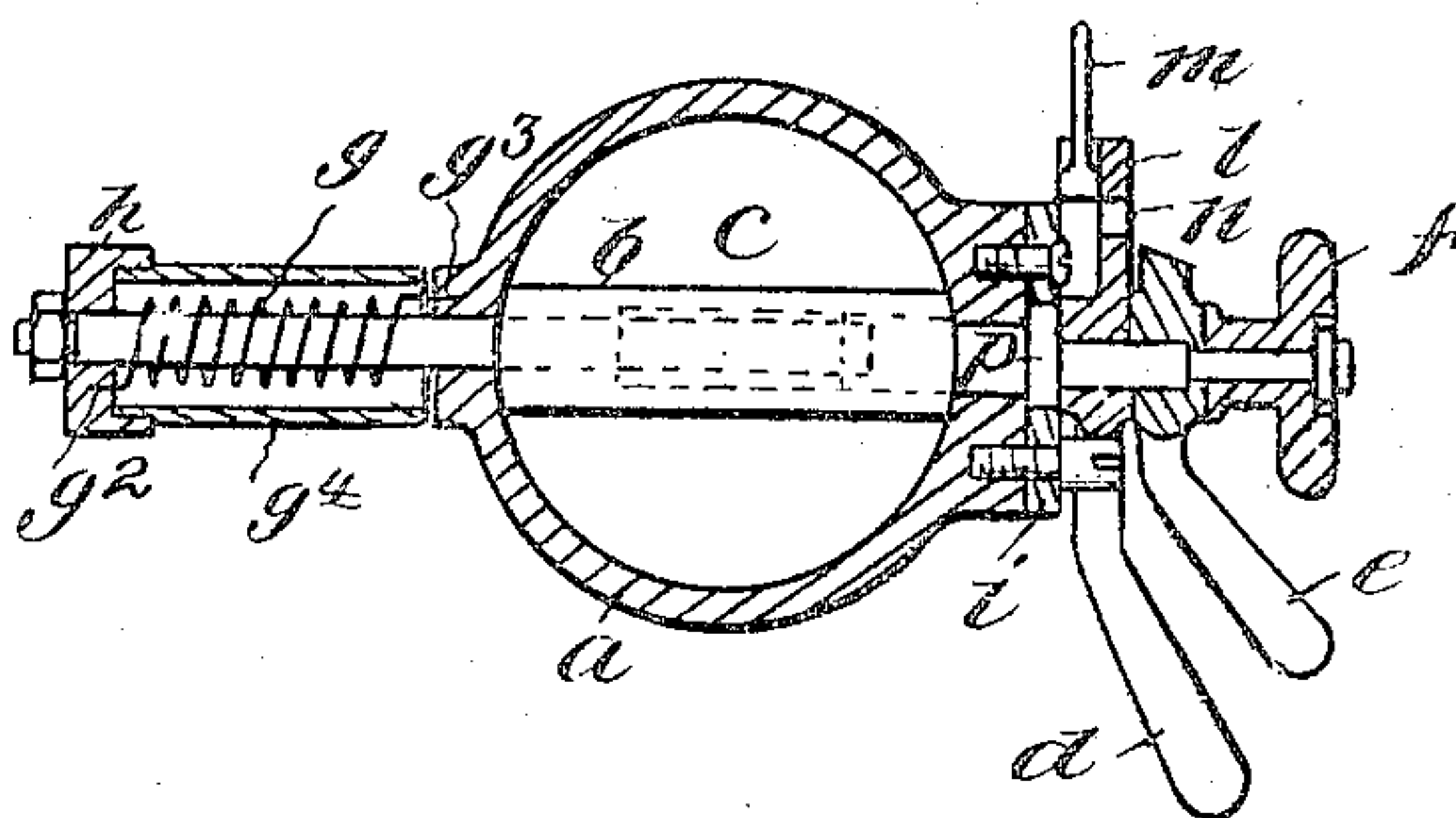


Fig. 3.

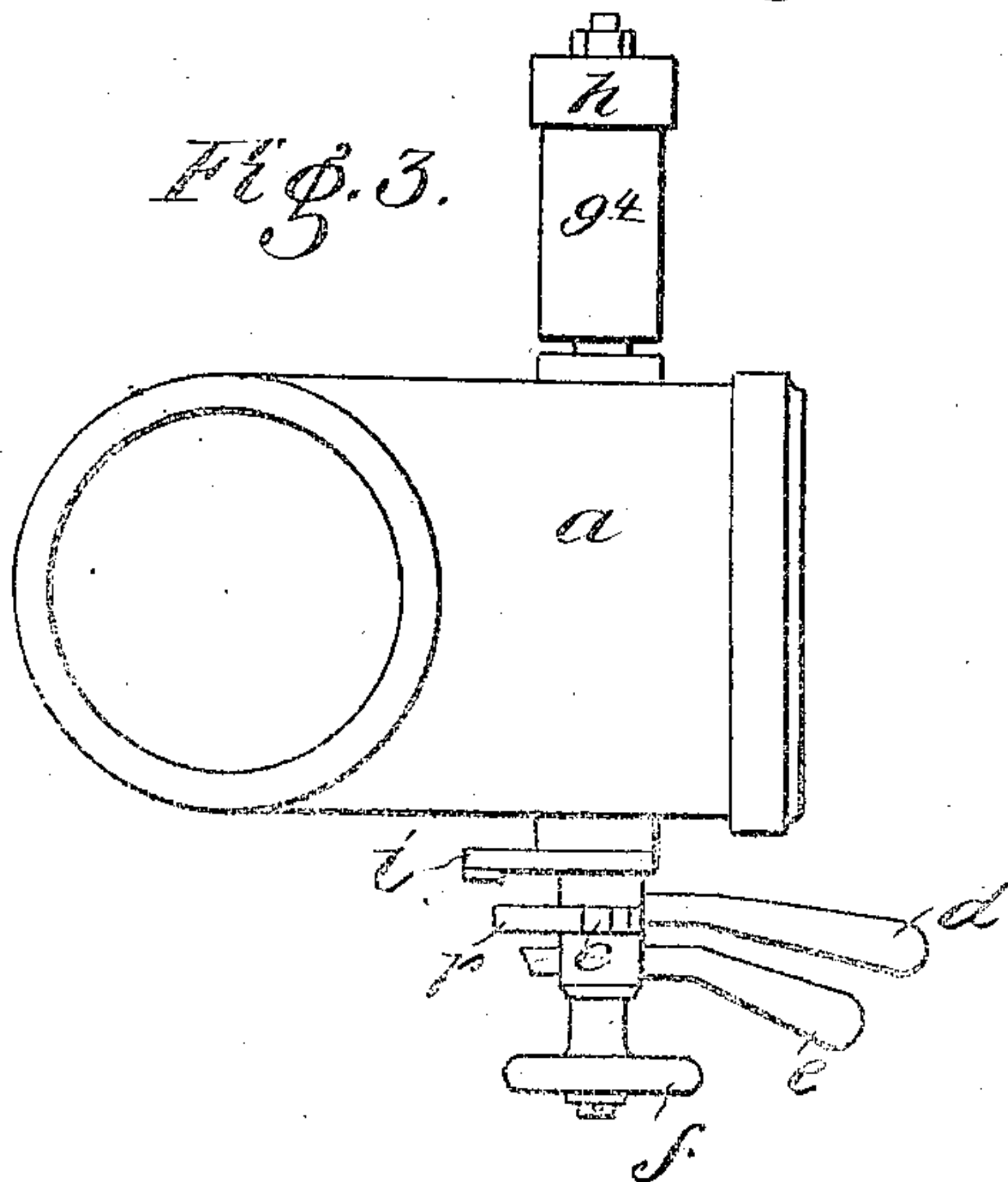
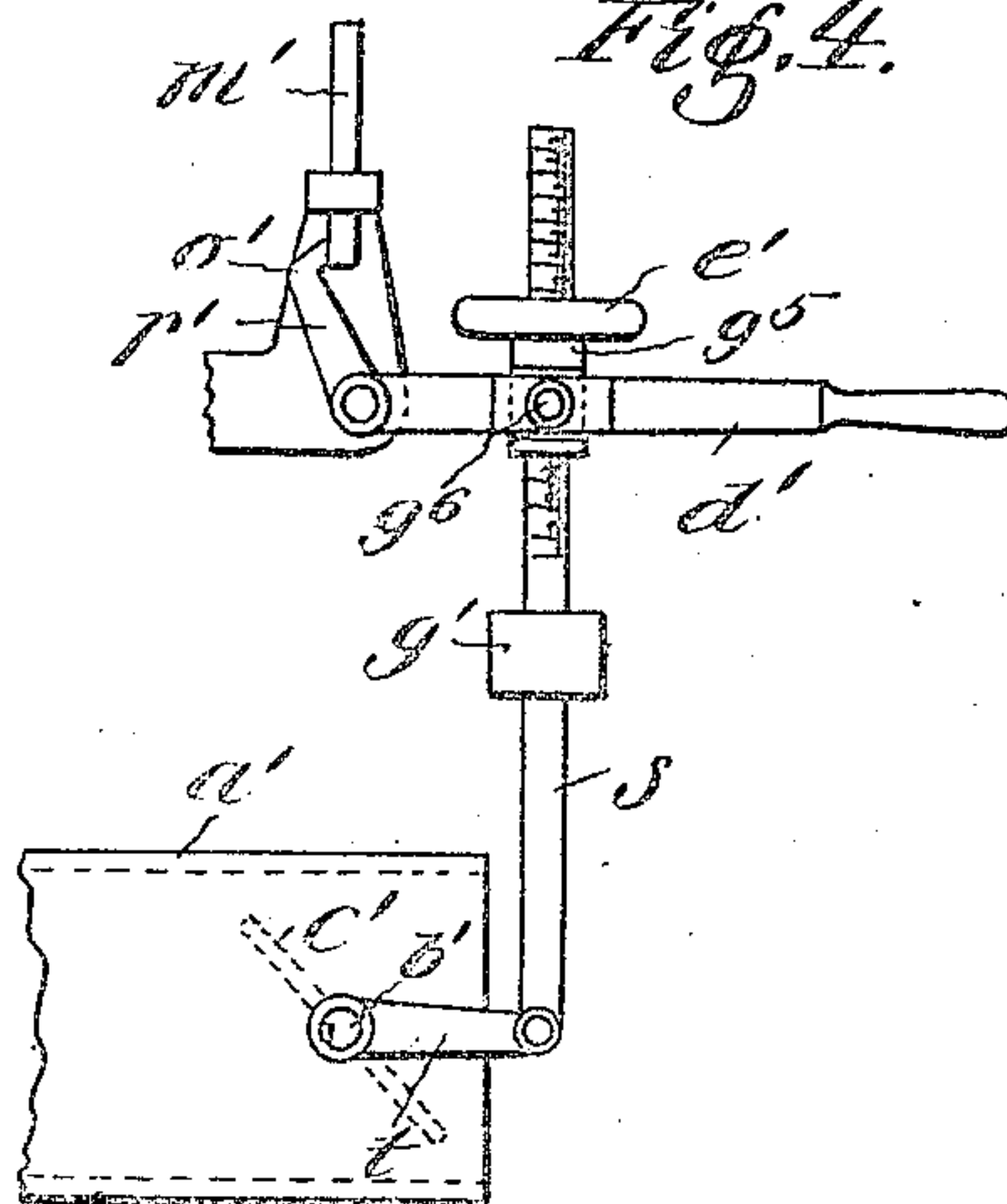


Fig. 4.



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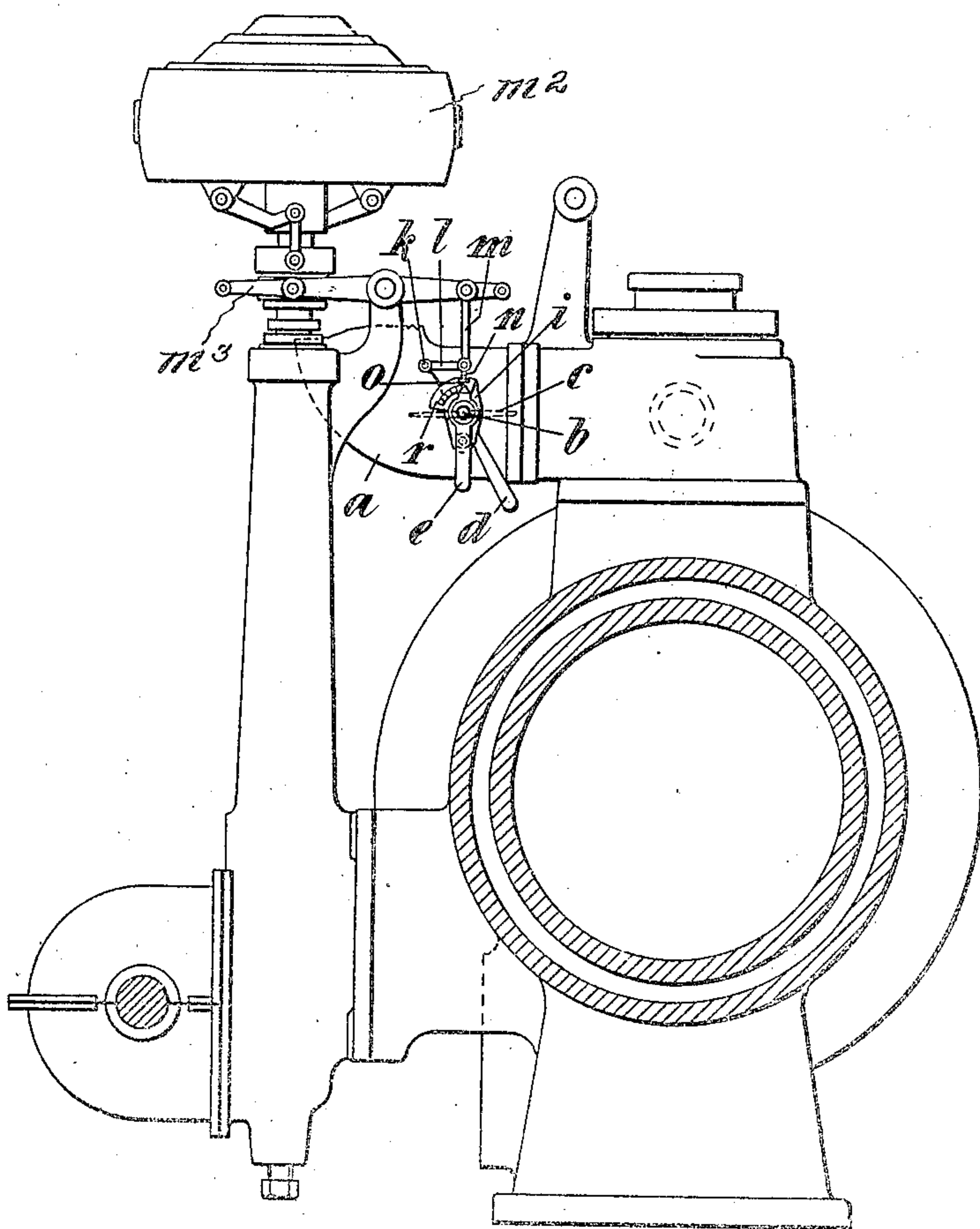
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AUTOMATIC CUT-OFF FOR EXPLOSIVE ENGINES.

APPLICATION FILED JAN. 6, 1905.

2 SHEETS—SHEET 2.

Fig. 5.



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UNITED STATES PATENT OFFICE.

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AUTOMATIC CUT-OFF FOR EXPLOSIVE-ENGINES.

No. 813,316.

Specification of Letters Patent.

Patented Feb. 20, 1903.

Application filed January 6, 1905. Serial No. 239,918.

To all whom it may concern:

Be it known that I, MAX MÜNZEL, engineer, a subject of the German Emperor, residing at Brunswick, Duchy of Brunswick, Empire of Germany, have invented certain new and useful Improvements in Automatic Cut-Offs for Explosive-Engines, of which the following is a specification.

This invention relates to automatic cut-offs, particularly for use in connection with explosive-motors or for other purposes wherein it is found applicable.

Primarily, the invention resides in providing an automatic cut-off in a manner as hereinafter referred to which is particularly adapted for closing the suction-pipe of an explosive-engine when the latter discontinues its operation, thereby preventing the escape of gas.

The invention further aims to provide an automatic cut-off which shall be simple in its construction, strong, durable, efficient in its use, and comparatively inexpensive to set up.

To this end the invention consists of the novel construction, combination, and arrangement of parts hereinafter more specifically described, illustrated in the accompanying drawings, which form a part of this specification, and particularly pointed out in the claims hereunto appended.

In the drawings, wherein like reference characters denote corresponding parts throughout the several views, Figure 1 is a side elevation of a portion of an air-suction pipe, showing the adaptation of a cut-off in accordance with this invention. Fig. 2 is a sectional plan. Fig. 3 is a plan. Fig. 4 is a side elevation of a modification; and Fig. 5 is a sectional elevation of an explosive-motor, showing a cut-off in accordance with this invention arranged in operative relation with respect to the motor.

Referring to the drawings by reference characters, *a* denotes an air-conduit or suction-pipe through which air is supplied to form the explosive charge or the gas mixture, and the said conduit *a* is closed when occasion requires by the automatic cut-off now to be described. The automatic cut-off consists of a valve *c*, arranged within said conduit *a* and carried by a stem *b*, which is journaled for rotation in and projects laterally from each side of said conduit *a*. Upon one of the projecting ends of the stem *b* is mounted a coiled tension-spring *g*, which has one of its ends, as at *g*², fixed to a disk *h*, se-

cured to the outer end of the stem *b*, and has its other end, as at *g*³, fixed to the conduit *a*. The function of the spring *g* is to automatically close the valve *c* when the same is released in a manner as hereinafter referred to. The spring *g* is inclosed in a sleeve *g*⁴, which is carried by the disk *h* and disconnected from the conduit *a*.

Upon the other projecting end of the stem *b* is loosely mounted a lever *d*, having its upper end enlarged and formed in a segment-shaped manner, as at *r*, with the top edge *n* thereof formed with a recess *o* for a purpose to be hereinafter referred to. A second lever *e* is connected with the stem *b* in such a manner that the said lever *e* can move longitudinally upon the stem *b* as well as rotate said stem *b* when necessary. The lever *e* is arranged in front of the lever *d*, and the said levers are clamped together upon the stem *b* so as to turn in unison when necessary by means of a wheel *f*, which is longitudinally shiftable upon the stem *b*, so as to press the said levers together and clamp them against an abutment *p* upon the stem *b*. Fixed to the conduit *a* is a support *i* and to the top of which, as at *k*, is pivoted one end of a swinging lever *l*. The other end of said lever *l* is attached to a holding-arm *m*, which is adapted to engage in the recess *o* for preventing the lever *d* from being shifted by the action of the spring *g*. The arm *m* is moved into and out of the recess through the action of the governor *m*² upon a lever-arm *m*³, attached at one end to the arm *m*, Fig. 5.

The manner in which the cut-off operates in connection with an explosive-motor is as follows: The valve *c* is adjusted to working position by the lever *d* and is then retained in such position by hand or by an optional stopping device (not shown) until the motor has operated to such an extent that the governor *m*² causes the arm *m* to move downwardly into the recess *o*, and thereby retain the lever *e* from movement. The wheel *f* is then released, the valve *c* then adjusted through the medium of the lever *e*, according to the requirements. The wheel *f* is then adjusted so as to clamp the levers *d* *e* to the stem *b*, the arm *m* in the meanwhile retaining the lever *d* in the position to which it had been moved when adjusting the valve *c* to working position, said arm *m* after the two levers have been clamped to the stem *b* continuing to retain the lever *d* in the position to which it had been adjusted, and at the same

time; owing to the fact that the two levers are clamped together upon the stem *b*, the latter is also prevented from movement until the arm *m* is moved out of the recess *o*. The movement of the arm *m* out of the recess *o* is had when the motor is stopped, the stopping of the motor causing the governor *m*² to rock the lever-arm *m*³, so that that end of the lever *m*³ which is connected with the arm *m* will be elevated, consequently shifting the arm *m* out of the recess *o* and permitting the action of the spring *g* to turn the stem carrying the two levers *d e* therewith and moving the valve *c* to closing position. A scale *r*² is arranged on the segment-shaped portion *r*, so that the position to which the valve *c* is to be or has been adjusted can be ascertained.

A modified form of cut-off is shown in Fig. 4, and in which *a'* denotes the conduit, *c'* the valve, and *b'* the stem. *s* denotes a vertically-movable rod connected at its lower end through the medium of the link *t* to the stem *b'*. The rod *s* carries a weight *g'* and also a sliding block *g*⁵, to which is pivotally connected, as at *g*⁶, a lever *d'*. The block *g*⁵ is adjusted through the medium of the screw-wheel *e'*, mounted upon the upper end of the rod *s*. The lever *g'* carries a trip-arm having a nose *o'*, which is adapted to abut against the lower end of the holding-arm *m'* when the said arm *m'* is moved to a position in the path of the nose *o'* through the action of the governor of the motor. The arm *m'* is connected with the governor in the same manner as the arm *m*. The function of the weight *g'* is to lower the rod *s* when the nose of the trip-arm *r'* is released, owing to the action of the governor upon the arm *m'*. The weight *g'* is used instead of the spring *g* heretofore referred to. The adjustment of the valve *c'* is caused through the operation of the wheel *e'*.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. An automatic cut-off for explosive-motors comprising the combination with a suction-pipe, of a valve mounted therein, means for shifting the valve to open position, means for retaining the valve in an open position,

means for automatically returning the valve to closure position when released, and means for adjusting the valve after the same has been shifted to open position.

2. An automatic cut-off for explosive-motors, comprising a valve, means for shifting the valve to open position, means for retaining the valve in an open position during the operation of the motor, means for automatically returning the valve to closure position when released, and means for adjusting the valve after the same has been adjusted to open position.

3. An automatic cut-off for explosive-motors comprising the combination with a suction-pipe, of a valve mounted therein, means for opening the valve, means for retaining the valve in an open position during the operation of the motor, means operated by the governor of the motor for moving said retaining means to and from operative position during the operation of the motor, and for moving said retaining means to and holding it in inoperative position when the motor discontinues its operation, means for automatically returning the valve to closure position when said retaining means is moved to inoperative position, and means for adjusting the valve after the same has been moved to open position.

4. An automatic cut-off for explosive-engines comprising a valve, means for opening the valve, means for retaining the valve in an open position during the operation of the motor, means operated by the governor of the motor for moving said retaining means to and from operative position when the motor is started and for moving said retaining means to and holding it in inoperative position when the motor is stopped, and means for automatically returning the valve to closure position when released.

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

MAX MÜNZEL.

Witnesses:

JULIUS SECKEL,
WILHELM ZEHRKE.