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Patented Nov. 21, 1899.

F. W. PROKOV.

ELECTRIC SIGNALING APPARATUS FOR RAIL OR TRAM WAYS.

(Application filed Dec. 30, 1897.)

(No Model.)

4 Sheets—Sheet 1.

Fig. 1.

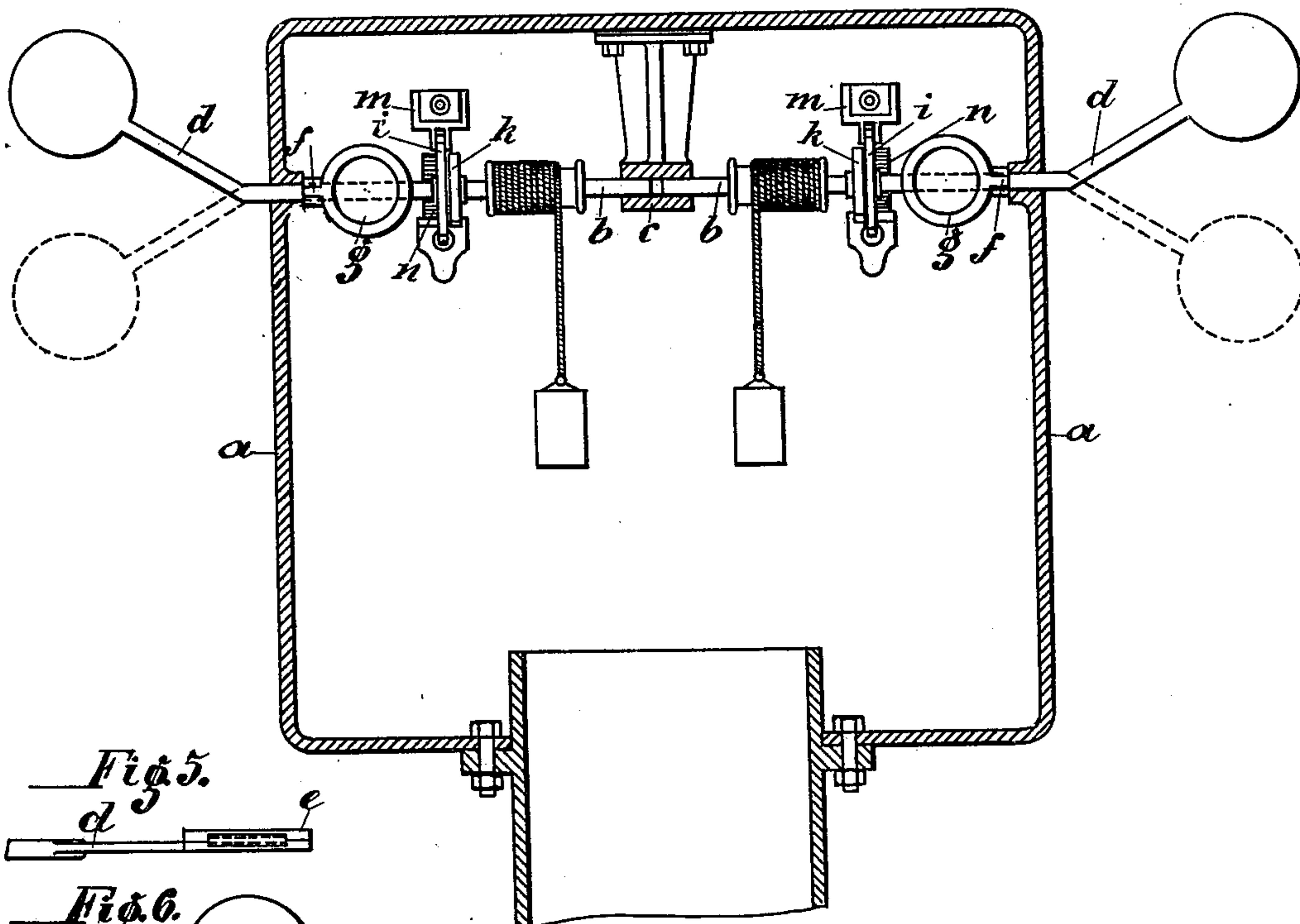
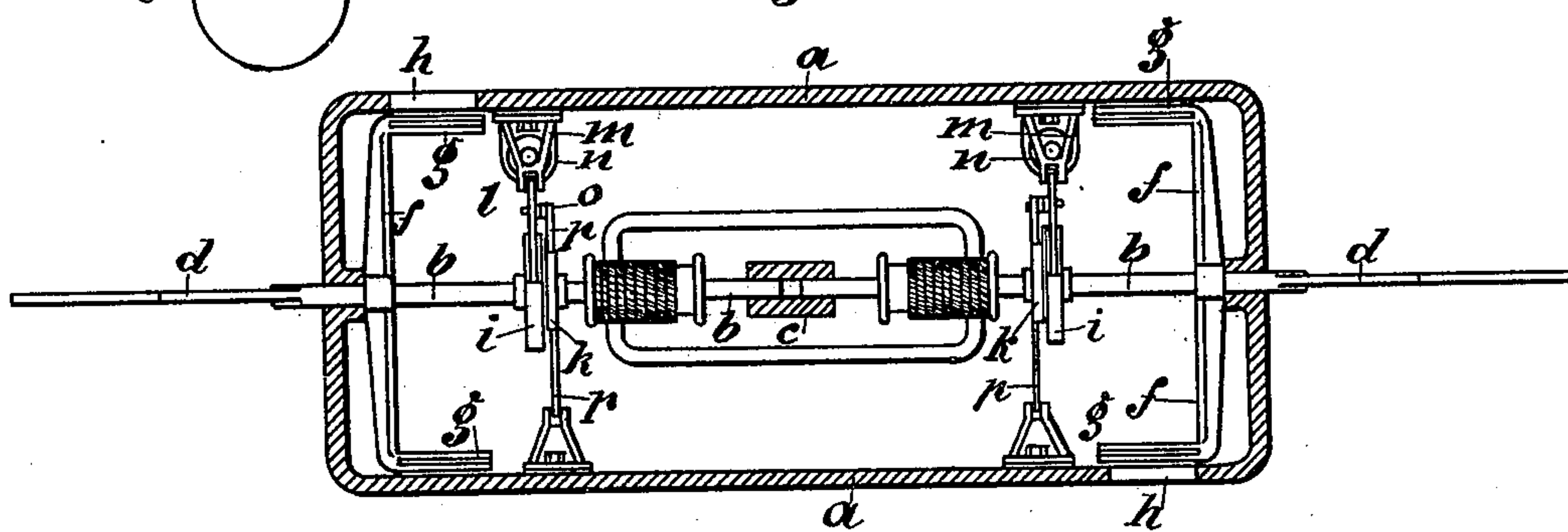


Fig. 2.



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Fig. 3.

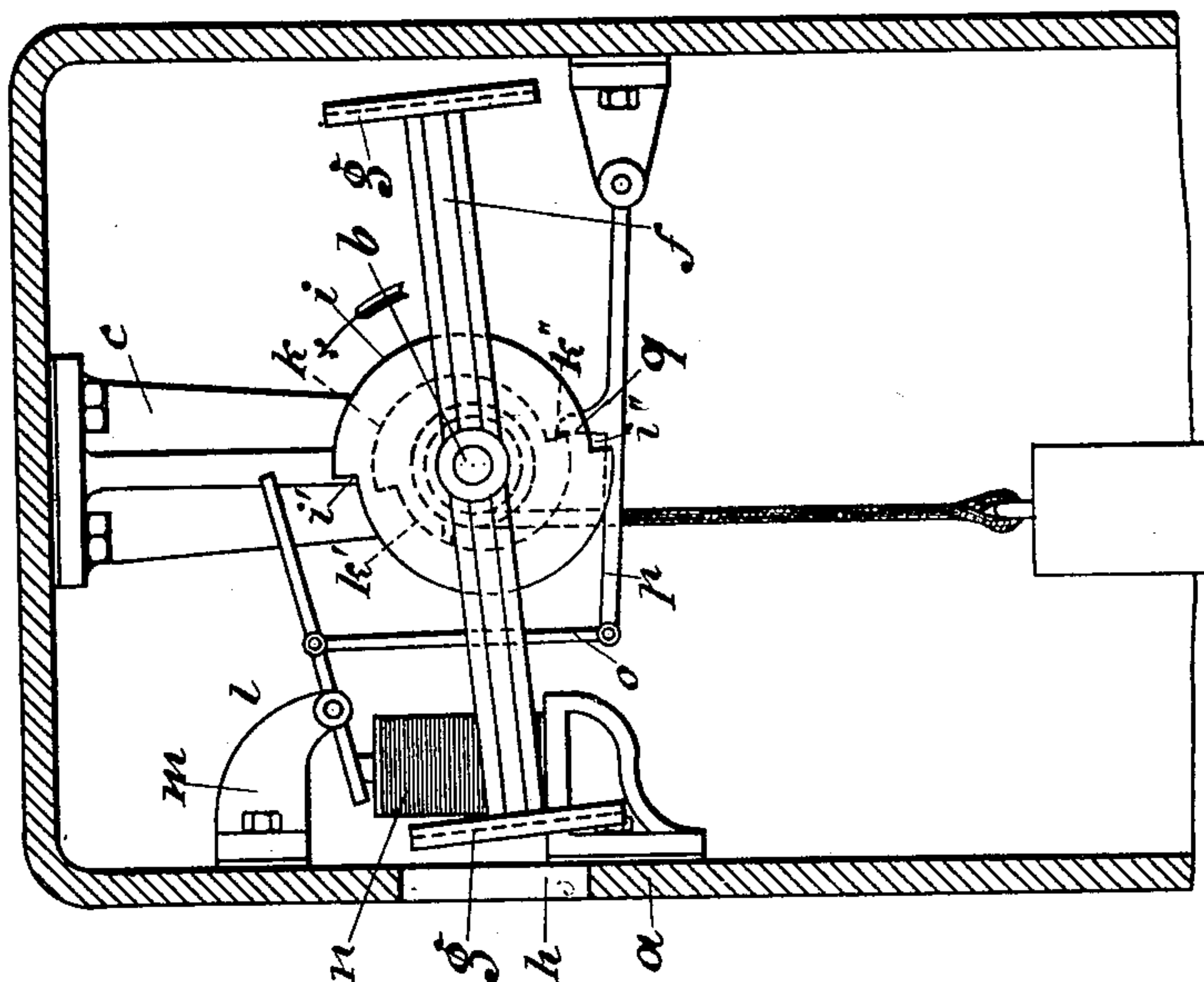
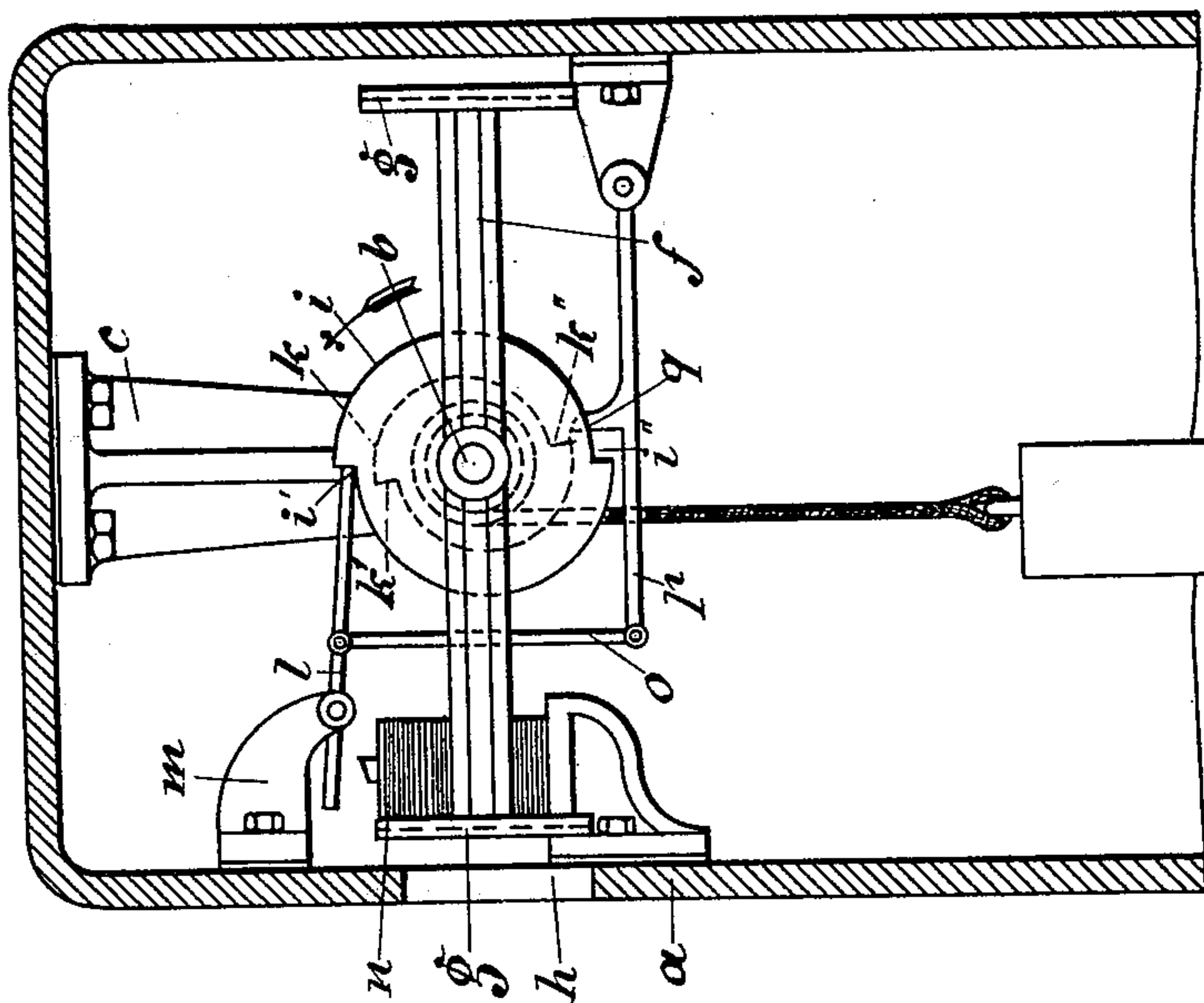


Fig. 3.



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Fig. 4. b

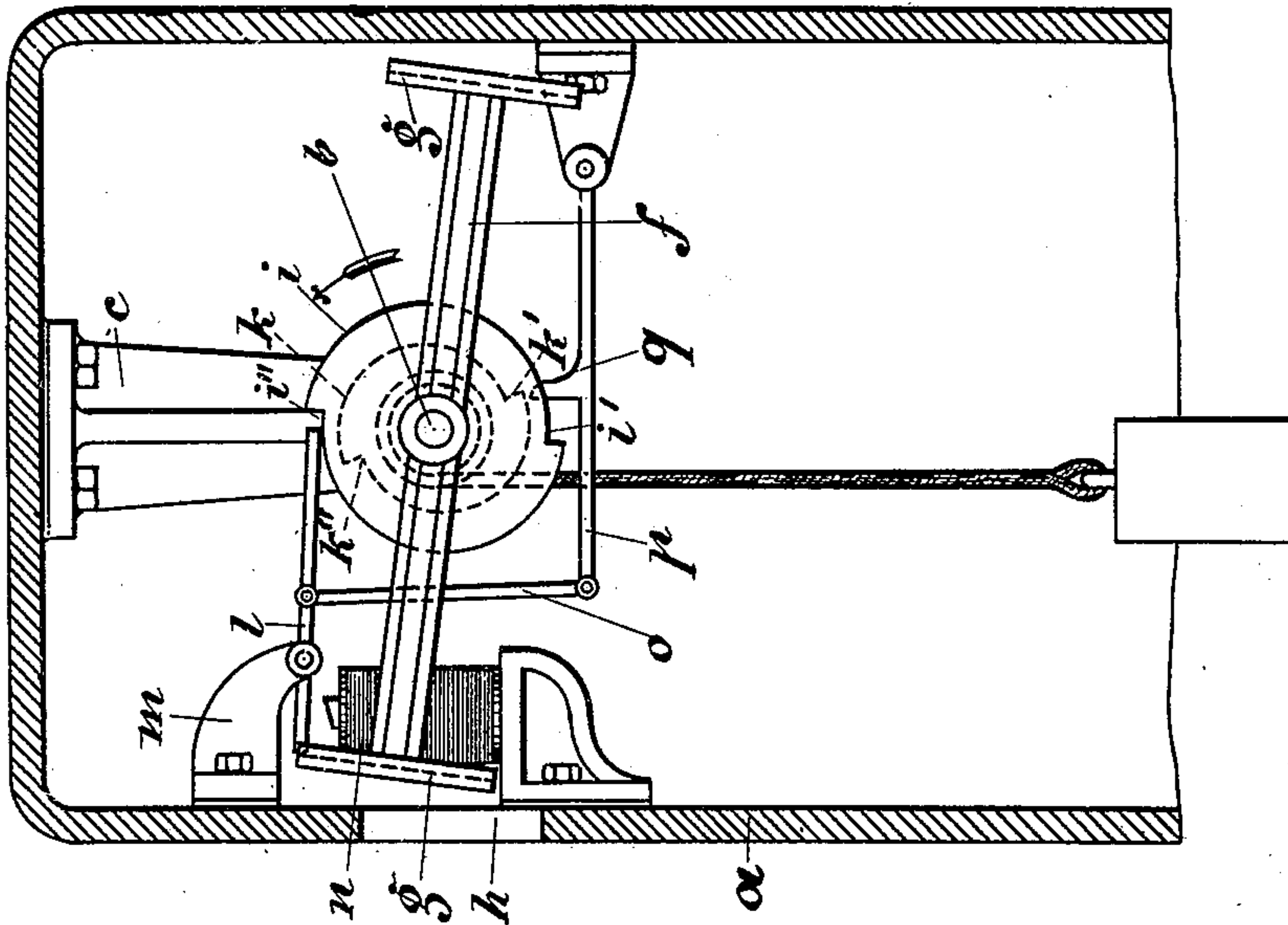
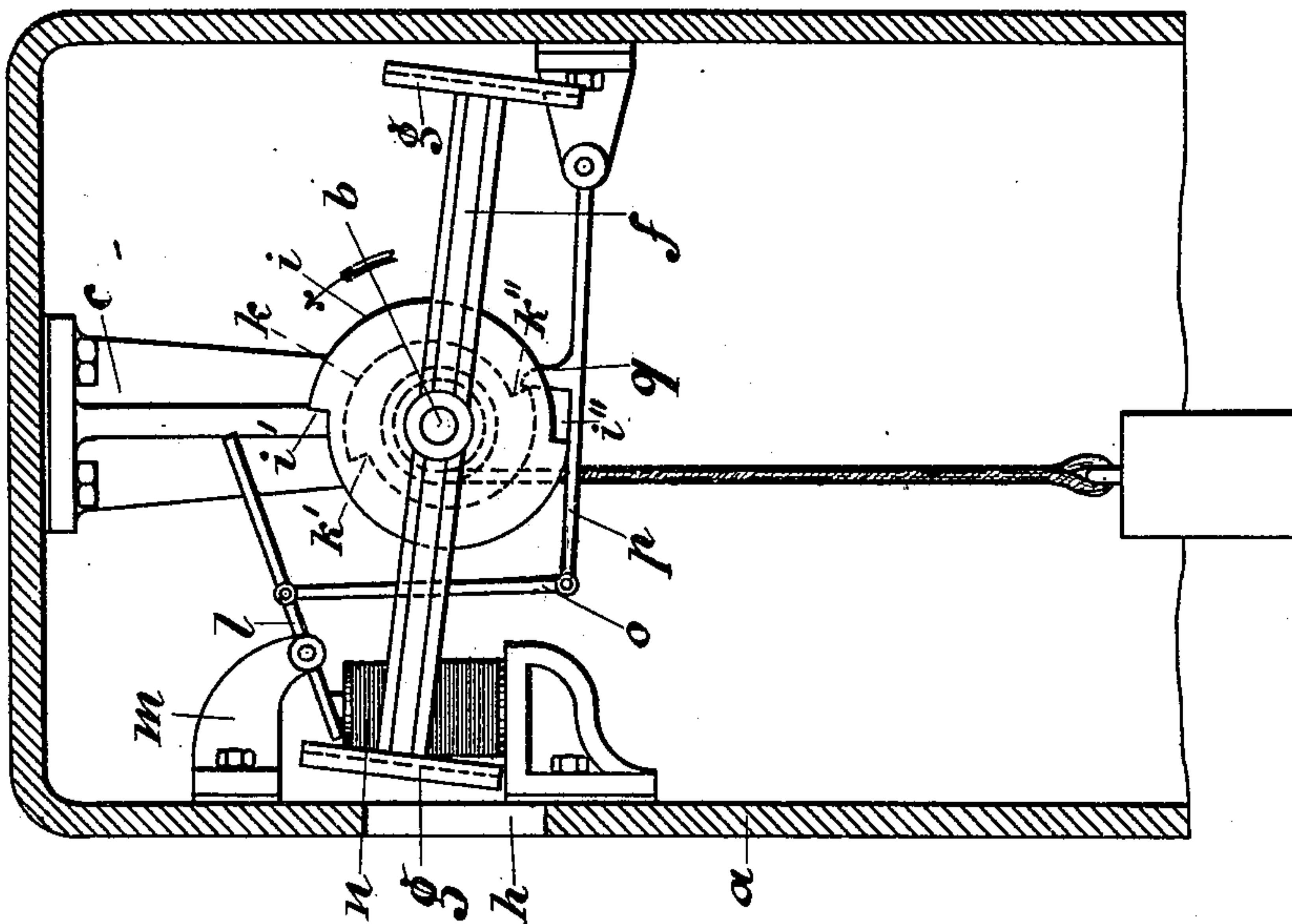


Fig. 4. a



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UNITED STATES PATENT OFFICE.

FRIEDRICH WILHELM PROKOV, OF BERLIN, GERMANY.

ELECTRIC SIGNALING APPARATUS FOR RAIL OR TRAM WAYS.

SPECIFICATION forming part of Letters Patent No. 637,414, dated November 21, 1899.

Application filed December 30, 1897. Serial No. 664,731. (No model.)

To all whom it may concern:

Be it known that I, FRIEDRICH WILHELM PROKOV, a subject of the King of Saxony, residing in Berlin, Germany, have invented certain new and useful Improvements in Electric Signaling Apparatus for Rail or Tram Ways, of which the following is a specification.

This invention relates to a signaling apparatus for rail and tram ways which may be actuated from the station as well as with the aid of track-current closers by a running train, a locomotive-engine, or a car. Such an apparatus contains a driving mechanism, being released when the keeper of an electromagnet is attracted and then operating on the signaling means.

The invention consists in an apparatus of this kind in which a single catch-lever forming one piece with the keeper of the electromagnet and a stop-lever connected with the catch-lever by means of a rod operate on a notched disk of the driving mechanism in such a manner that when the catch-lever is released, according to the arrangement of the notches of the said disk, the said mechanism is arrested either soon after or after a longer time, whereby the reversal of the signals takes place in the first case by further rotation of the said mechanism after the interruption of the circuit and in the second case immediately.

The invention is illustrated in the accompanying drawings, forming part of this specification, and in which—

Figure 1 is a front view of a double apparatus embodying the invention, the casing being shown in section. Fig. 2 is a plane of the apparatus, showing the casing also in section. Figs. 3, 3^a, and 3^b are side views showing the apparatus in several working positions. Figs. 4, 4^a, and 4^b are similar side views showing a modification of the apparatus in several working positions. Figs. 5 and 6 show a detail hereinafter referred to in two different positions.

Referring now to Figs. 1 to 3, *a* is the casing, which contains the apparatus and which has the form of a rectangular box fixed to a hollow standard. Near the top of the said box two horizontal shafts *b* are mounted, the axis or center line of the one forming the continuation of the axis of the other shaft. Both

shafts are supported independently rotatable at one end in a bearing *c*, depending from the top of the box, and at the other end in bosses formed at the smaller sides of the box *a*. On each shaft *b*, near its inner end, a drum is fixed, the rope of which carries at its free end a weight tending to rotate the shaft *B* in the direction of the arrow shown in Fig. 3. To the outer end of each shaft *b*, projecting from the box, an arm *d*, terminating in a signal-disk, is fixed. The said arm may either be inclined to the shaft *b*, as shown in Fig. 1, or form a straight continuation of the same, as shown in Figs. 5 and 6. In the latter case to the disk of the arm *d* a second disk *e* of equal diameter is hinged, which flaps down automatically when by a corresponding rotation of the shaft *b* both the disks are brought from the horizontal position in Fig. 5 into the vertical one in Fig. 6, the said second disk being applied again to the first disk as soon as the shaft returns both the disks into the horizontal position. This signal-arm is designed for the day service. For the night service each shaft *b* carries within the box two diametrically opposite arms *f f*, each of which terminates in a frame into which a disk *g* of glass is inserted, one of these glass disks being white or green and the other red. In the position of rest the arms *f f* are horizontal and the glass disks *g g* vertical. One of these disks *g g* is visible for up trains and the other for down trains through corresponding apertures *h* in the box *a*, when between both the glass disks a flame burns and when only one shaft *b* is provided.

A small distance from the arms *f f* of the disks *g g* each shaft *b* carries two notched disks *i k*, next to one another, the diameters of which may be equal or, as shown, different and which may be formed from one piece. Each of these disks *i k* is provided in its circumference with two diametrically opposite notches *i' i''* and *k' k''*, as shown in Fig. 3.

When the apparatus is in its position of rest, Fig. 3, then the long arm of a double-armed lever *l*, having its fulcrum in a bracket *m*, fixed to the box *a*, engages one of the notches of the disk *i*. The short arm of the lever *l* is the keeper of an electromagnet *n*, also fixed to the box *a*. When a current is sent through the windings of this electromag-

net either from a station or by means of a track-current closer, then the short arm of the lever *l* is attracted and the long arm is removed out of the notch *i'* of the disk *i*, as shown in Fig. 3^a. The long lever-arm is connected by a rod *o* with a stop-lever *p*, being arranged below the disk *k* and having its fulcrum on the opposite wall of the box *a*. Hence when the long lever-arm is raised the stop-lever *p* is raised too, and its stop *q* is brought against the circumference of the disk *k*, Fig. 3^a, and before the notch *k''*. Now the shaft is rotated a little in the direction of the arrow by the influence of the weight acting upon it till the stop *q* of the lever *p* thrusts against the notch *k''* of the disk *k*, so arresting the disk, while the free end of the long arm of lever *l* reaches behind notch *i'*. Hence when arm *d* is in the raised or safety position, as represented by Fig. 1, and it is now intended to lower this arm, as indicated by broken lines in Fig. 1, which will be the danger position, one has only to interrupt the circuit of the electromagnet again, whereupon lever *l* falls down on the circumference of disk *i*, but behind notch *i'*, while stop *q* leaves notch *k''*, so that the weights may act upon shaft *b* and rotate it until the free end of the long arm of lever *l* will engage notch *i''*, as shown in Fig. 3^b, shaft *b* having now made half a rotation, and in consequence of this arm *d* is in the low or danger position.

The modification shown in Figs. 4 to 4^b differs from that one just described and shown in Figs. 1 to 3^b only by the arrangement of notches *i'* *i''* and *k'* *k''* with regard to levers *l* and *p*. When this modification is in the position shown by Fig. 4, which corresponds with the position of Fig. 3 of the construction first described, then stop *q* is situated behind notch *k''* of disk *k*, for that stop *q* of the lever *p* comes behind the notch *k''* as soon as the long arm of the lever is withdrawn out of the notch *i'*, Fig. 4^a, so that the shaft *b* can accomplish nearly half a revolution immediately, the moment the circuit is closed. The said shaft revolves till the stop *q* engages the notch *k'* and the raised arm of the lever *l* is a short distance from the notch *i''*, Fig. 4^b. As soon as the circuit is now interrupted the shaft *b* still rotates a little, till the arm of the lever *l*, having moved toward the disk *i*, engages the notch *i''*. Then the shaft *b* has fully accomplished half a revolution. With the arrangement shown in Figs. 3 to 3^b this half-revolution is effected, as already pointed out, when the previously-closed circuit is opened again either in the station or when the train has passed in the corresponding direction that section of the

track where the corresponding track-current closer is placed, whereas with the modified arrangement shown in Figs. 4 to 4^b the said reversal is effected when the circuit is closed either again in the station or as soon as the train passes in the corresponding direction that section of the track where the corresponding track-current closer is placed.

It may be mentioned that the notches, the signal-glasses, and the signal-arms can be arranged in such a manner that the reversal of the signals is effected by each quarter of revolution of the shaft *b*.

I claim as new and desire to secure by Letters Patent—

1. In an electric signaling apparatus, the combination of a suitable casing, a rotatable shaft *b* therein, means tending to rotate said shaft, notched disks on the shaft each having notches as described, a signal adapted to be moved from one indicating position to another by movement of said shaft, a pivoted catch-lever in position to engage and to be disengaged from the notches of one of said disks, a separate pivoted stop-lever *p* engaging a notch of its disk alternately with the engagement of the catch-lever with notches in its disk, and a link connecting said levers so that as one lever is moved toward or from its disk the other lever moves oppositely, and a magnet to operate the catch-lever.

2. In an electric signaling apparatus the combination of a casing with opening *h* therein, a shaft *b*, arms *f*, disks *g* carried thereby and movable alternately behind opening *h*, a signal-arm *d* and signal also turned by said shaft, means tending to turn the shaft, disks on the shaft having diametrically-arranged notches, a catch-lever *l* adapted to engage the notches of one disk alternately, a stop-lever moved by the catch-lever and adapted to engage the notches of the other disk alternately with engagement with the catch-lever with the notches of its disk, and a magnet for operating the catch-lever.

3. The combination of shaft *b*, a weight tending to turn the shaft, notched disks on the shaft, a catch-lever *l* adapted to engage the notches of one of the disks, a stop-lever connected to the catch-lever and adapted to engage the notches of the other disk, glasses *g* for night signals, a signal-arm *d* terminating in a disk, and a second disk hinged thereto.

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

FRIEDRICH WILHELM PROKOV.

Witnesses:

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WLADIMIR ZIOLECKI.