

No. 708,727.

Patented Sept. 9, 1902.

O. NÄTHER.
CURTAIN SHUTTER.

(Application filed Dec. 18, 1901.)

(No Model.)

2 Sheets—Sheet 1.

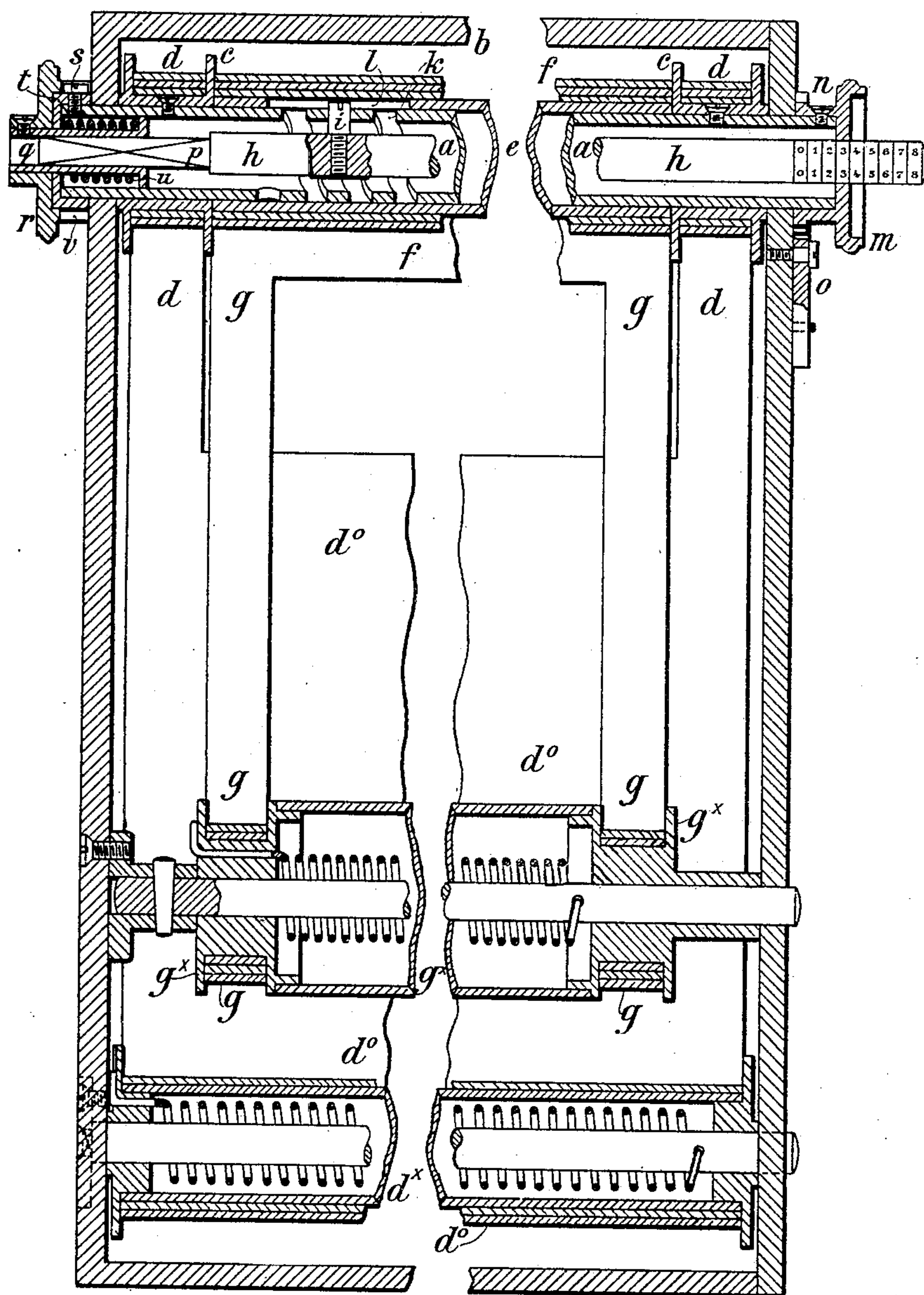


Fig. 1.

Witnesses

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CURTAIN SHUTTER.

(Application filed Dec. 13, 1901.)

(No Model.)

2 Sheets—Sheet 2.

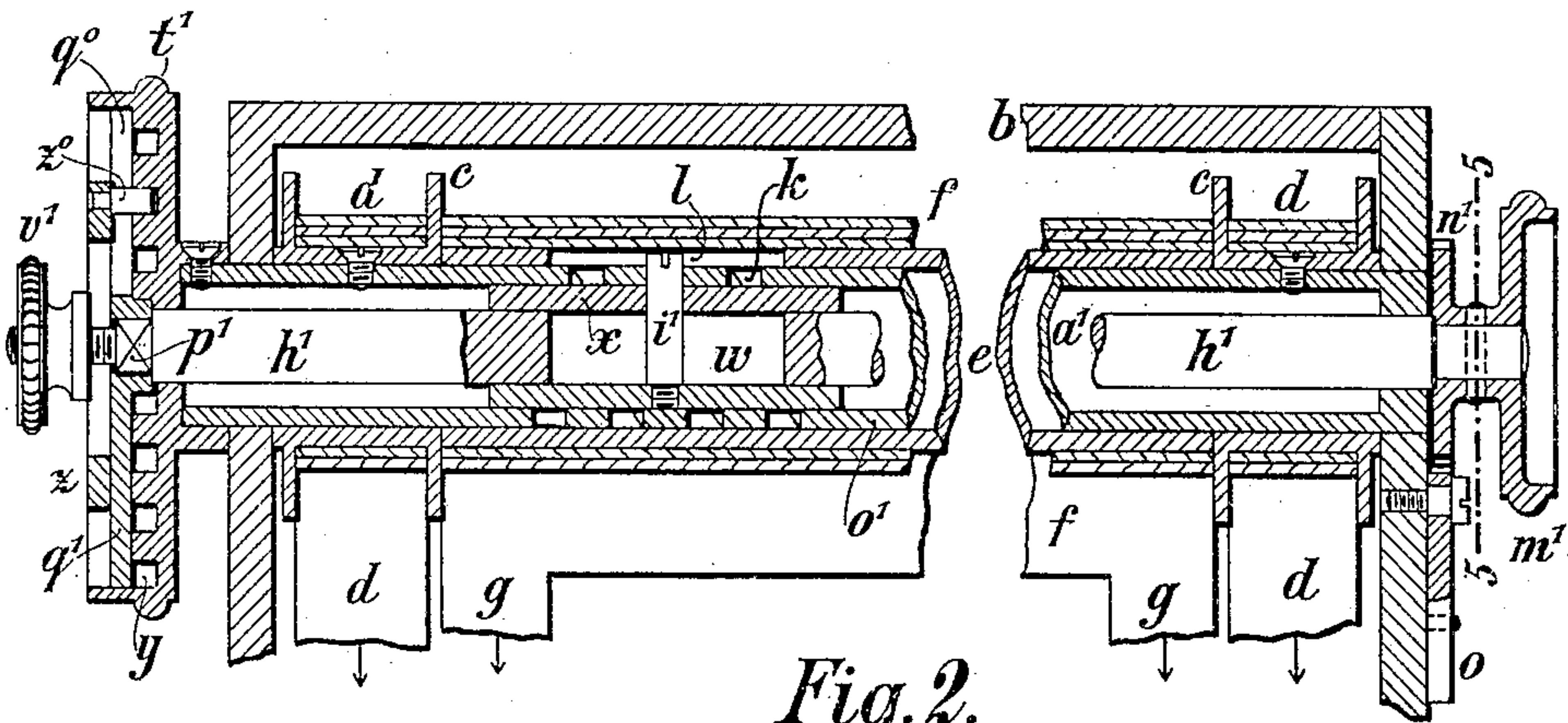


Fig. 2.

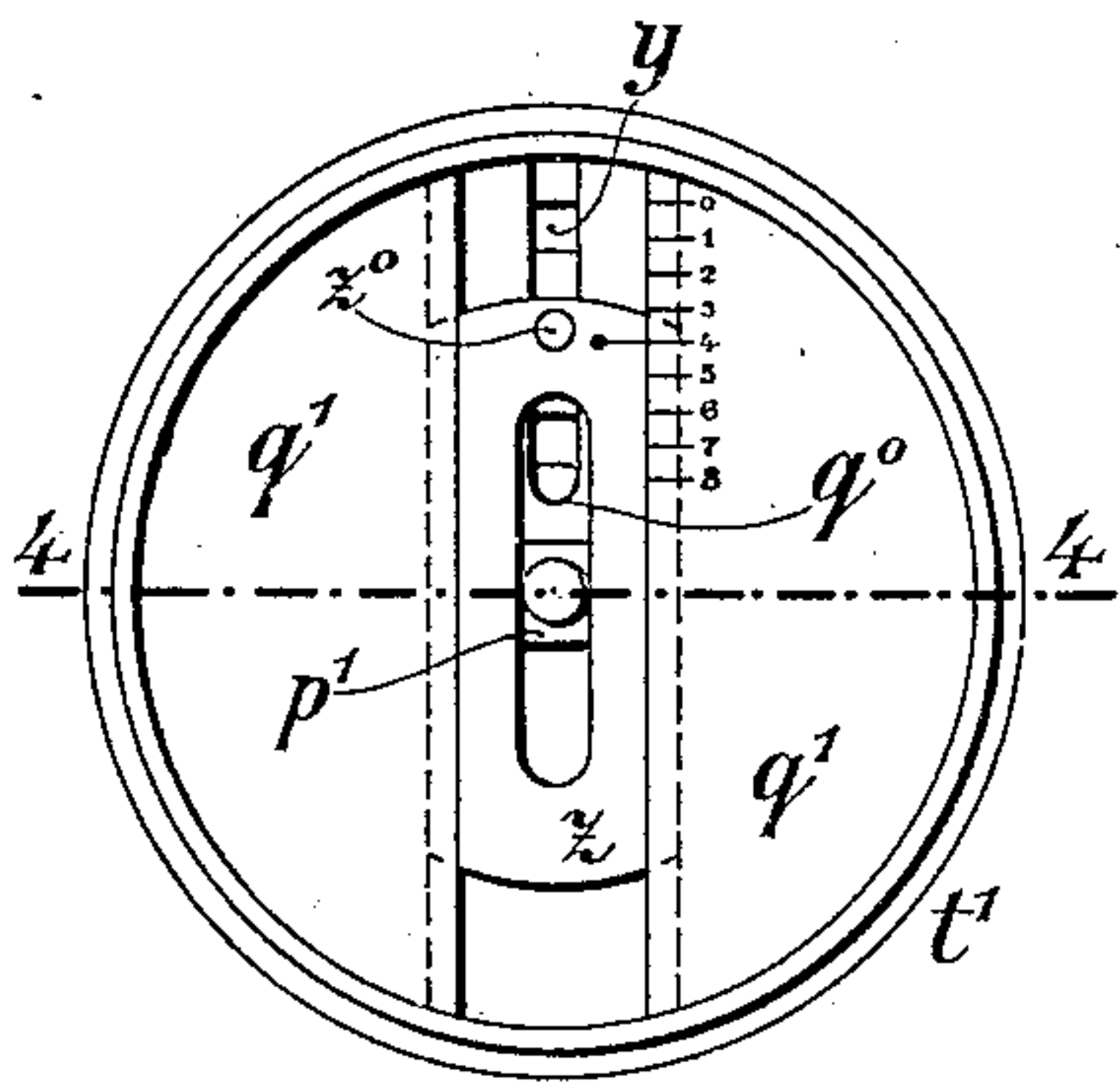


Fig. 3.

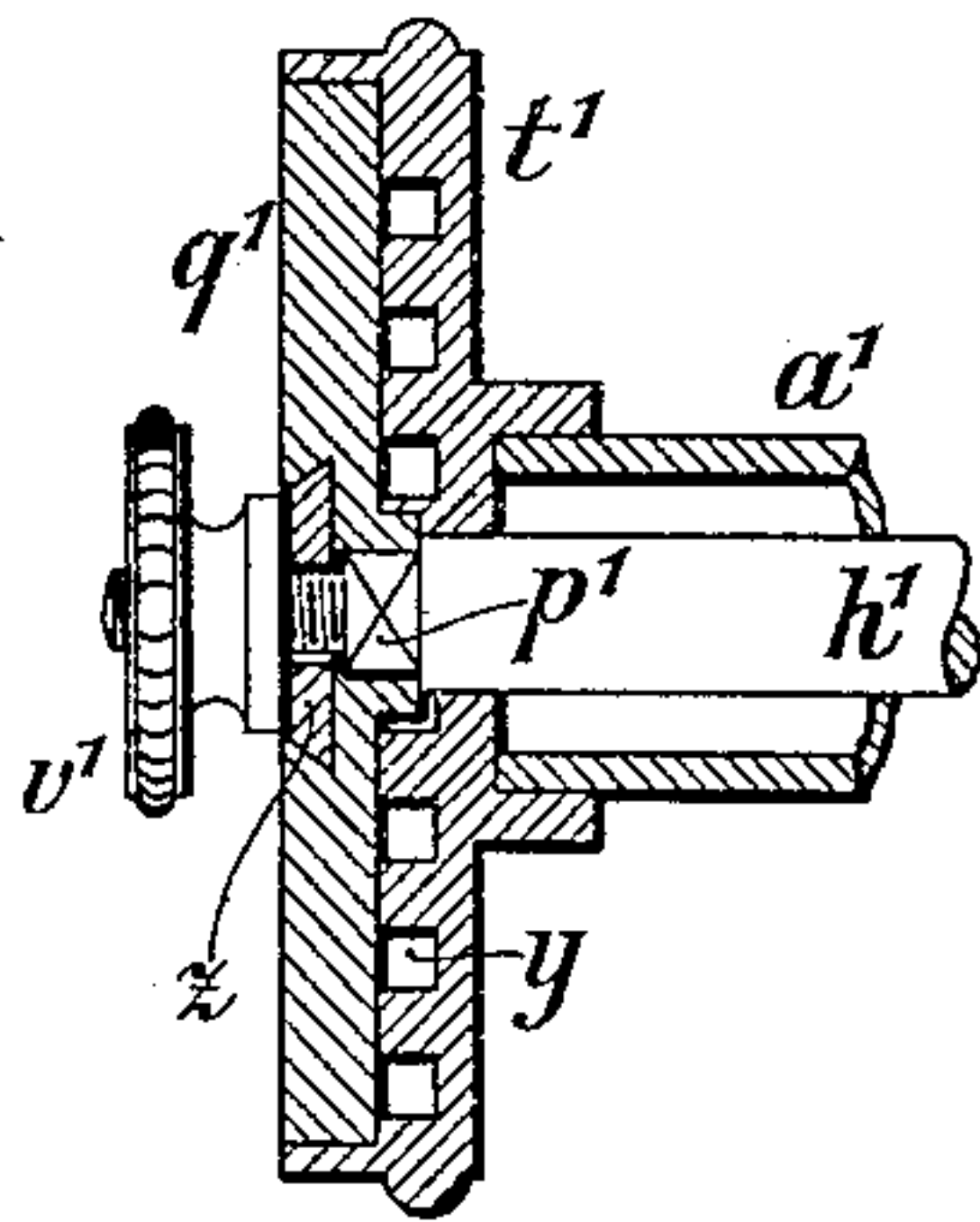


Fig. 4.

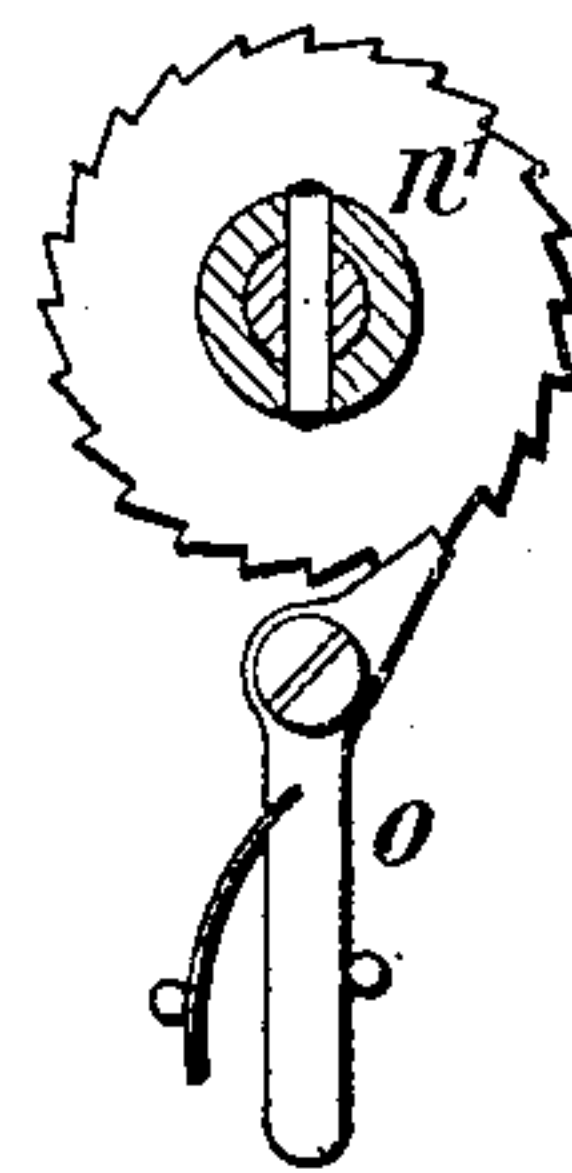


Fig. 5.

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UNITED STATES PATENT OFFICE.

OSWALD NÄTHER, OF JENA, GERMANY, ASSIGNOR, BY MESNE ASSIGNMENTS,
TO FIRM OF CARL ZEISS, OF JENA, GERMANY.

CURTAIN-SHUTTER.

SPECIFICATION forming part of Letters Patent No. 708,727, dated September 9, 1902.

Application filed December 13, 1901. Serial No. 85,760. (No model.)

To all whom it may concern:

Be it known that I, OSWALD NÄTHER, manager, a subject of the King of Saxony, residing at Spitzweidenweg 25, Jena, in the Grand Duchy of Saxe-Weimar, German Empire, have invented a new and useful Curtain-Shutter, of which the following is a specification.

In the construction of curtain-shutters having an adjustable aperture considerable economy of space has been effected by combining the spools which wind up, when the shutter is being set, the upper and lower halves of the curtain (above and below the aperture) into a multiplex spool working on a single axis. The lines or tapes from which the lower half of the blind is either indirectly or directly suspended are taken up by two outer spools, while the upper half of the curtain winds on a middle one. The outer spools are combined in such a manner that individual independent motion is impossible; but in relation to the middle spool, while being usually fixed so as to rotate with it, they are capable of being displaced, the latter for the purpose of adjusting the width of the aperture. Two combinations working on this plan, but widely differing from each other, have hitherto been in use. One of them only admits of adjustment of the aperture while the mechanism is in the run-down position. The other, though not subject to this limitation, takes up too much room, owing to the connection of the outer spools by means of a parallel shaft and two pairs of toothed wheels. Neither one nor the other drawback is present in the combination of the spools according to the invention here dealt with. In this combination the two outer spools are fixtures upon a hollow axle; but the middle spool is connected by engaging a tappet-pin with a central axle for the purpose of common rotary movement. As the margin of possible variations in the width of the aperture necessitates more than one complete revolution of the middle spool and the outer spools relatively to each other, the slot for the passage of the tappet-pin is cut helically in the hollow axle and is a longitudinal one in the middle spool. The tappet is either rigidly connected with the central axle, in which case the latter participates in the helical move-

ment, or it moves also within a longitudinal slit of the central axle, when the latter suffers no endwise displacement.

In the accompanying drawings, Figure 1 is a section through a curtain-shutter in the combined setting-spool of which the central axle has a helical movement. Fig. 2 is an axial section through a modified form of the combined setting-spool in which the central axle has only a rotary movement. Fig. 3 is a left-hand end view of the spool shown in Fig. 2. Fig. 4 is a section on line 4 4 in Fig. 3. Fig. 5 is a section on line 5 5 in Fig. 2.

In Fig. 1 the hollow axle *a* is journaled in the walls *b* of the camera-frame. The outer spools *c* are secured to the hollow axle and serve to wind the tapes *d*, which support the lower half *d'* of the curtain. This part of the curtain is fastened on a spring-controlled roller *d''*. The middle spool *e* is loosely mounted on the hollow axle *a*. It serves to wind the upper half *f* of the curtain, which is connected by means of tapes *g* with a spring-controlled roller *g''*. It will be seen that this arrangement allows to adjust the width of the aperture (the distance between the halves of the curtain) by merely rotating the middle spool relatively to the outer spools; but it should also be understood that the subject-matter of the invention, the combined setting-spool, is in no way touched by alterations of those parts by which the tapes *g* and *d* are tightened and their relative displacement is transformed into an adjustment of the width of aperture.

The central axle *h* carries the tappet-pin *i*, which passes through the helical slot *k* of the hollow axle *a* and engages into the longitudinal slot *l* of the middle spool *e*. One end of the central axle *h* is journaled in the small hand-wheel *m*, which is secured to the hollow axle *a*. This wheel serves to wind up the curtain, for which reason it is connected with a device similar to that shown in Fig. 5 and consisting of a ratchet-wheel *n*, integral with the wheel *m*, and a spring-pressed catch and release-lever *o*, pivoted on the frame. The opposite end of the central axle *h* has a square extremity *p*, which slides in a bush *q*. The latter is fitted at its inner end within the hollow axle *a* and carries on the outer extremity

a small hand-wheel r . A spring u is compressed between the flange of the bush q and a cap t , which is fastened by the screws s to the hollow axle a . The tubular outer portion of hand-wheel r is provided with a series of notches v , which under the action of spring u engage the heads of the screws s , so as to prevent wheel r from rotating in relation to the hollow axle a . This wheel being also non-rotatable in relation to the central axle h the two outer spools c are thus coupled with the middle spool e for common revolution in the winding up or running down of the curtain.

In order to adjust the width of the aperture of the curtain by rotating the middle spool e , at first the hand-wheel r is drawn outward (against the pressure of spring u) until the notches v are clear of the heads of screws s . Then wheel r is rotated to a position in which the spring u is enabled to cause other notches v to engage the heads of the screws s . Rotating the hand-wheel so as to unroll the upper half f of the curtain has the effect of narrowing, rotating it in the other sense of widening, the aperture. In rotating wheel r and therewith bush q the central axle h screws either inward or outward through the hand-wheel m , during which movement the existing width of aperture may be read by a scale on that extremity of the axle.

In the modification of the combined setting-spool illustrated by Figs. 2 to 5 the tappet-pin i' works in a longitudinal slot w cut into the central axle h' , because in this case the latter is not intended to suffer any endwise displacement, the proper position of the pin being insured by its being firmly fixed to an intermediate bush x . The winding-wheel m' , with the ratchet-wheel n' , is fitted to one end of the central axle h' , whose other end carries upon the square-cut extremity p' a plate q' , adjacent to a disk t' , which latter is attached to the hollow axle a' . The disk t' is provided with a spiral groove y . A slide z upon plate q' carries a pin z^o , which engages into the spiral groove y through a slit q^o in plate q' . The screw-nut v' (in Fig. 3 removed) at the extreme end of the central axle h' clamps when tightened the slide z immovably against plate q' . Thereby any relative movement of disk t' and plate q' is prevented, and thus the outer spools c are coupled to the middle spool e . The adjustment of the width of the aperture is effected by unwinding or winding up the tapes d , which control the movement of the lower half of the shutter. For this purpose the disk t' is rotated after loosening the screw-nut v' in either direction until by the action of the groove y upon the pin z^o the slide z has reached

a position in which its index marks the desired width of aperture on the scale engraved on plate q' , Fig. 3. While the hollow axle a' and the outer spools c , secured to it, are rotating with disk t' , the helical groove k in the said axle displaces the tappet-pin i' without further effect.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a curtain-shutter having an adjustable aperture and a triplex setting-spool the combination, with two side spools controlling one half of the curtain and a middle spool controlling the other half of the curtain, of a hollow axle on which both side spools are secured and the middle spool is rotatably mounted, a central axle, a tappet non-rotatably mounted on the central axle, penetrating a helical slot in the hollow axle and projecting into a longitudinal slot in the middle spool, means for non-rotatably connecting the central axle and the hollow axle at different angular positions relatively to each other, and a setting device connected with one of the axles, essentially as described.

2. In a curtain-shutter having an adjustable aperture and a triplex setting-spool the combination, with two side spools controlling the opposite half of the curtain and a middle spool controlling the adjacent half of the curtain, of a hollow axle carrying the side spools fixed and the middle spool rotatable thereon, a central axle, a tappet guided in a longitudinal slot of the central axle, in a helical slot of the hollow axle and in a longitudinal slot of the middle spool, a bush in which the central axle is longitudinally guided, means for non-rotatably connecting the bush and the hollow axle at different angular positions relatively to each other, and a setting device connected with the hollow axle, essentially as described.

3. In a curtain-shutter having two curtain-webs the combination with two side spools controlling one curtain-web and a middle spool controlling the other curtain-web, of a hollow axle on which both side spools are secured and the middle spool is rotatably mounted, a central axle, a tappet non-rotatably mounted on the central axle, penetrating a helical slot in the hollow axle and projecting into a longitudinal slot in the middle spool, and means for rotating both the central axle and the hollow axle independently of each other.

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

OSWALD NÄTHER.

Witnesses:

EMIL DÖNITZ,
PAUL KRÜGER.