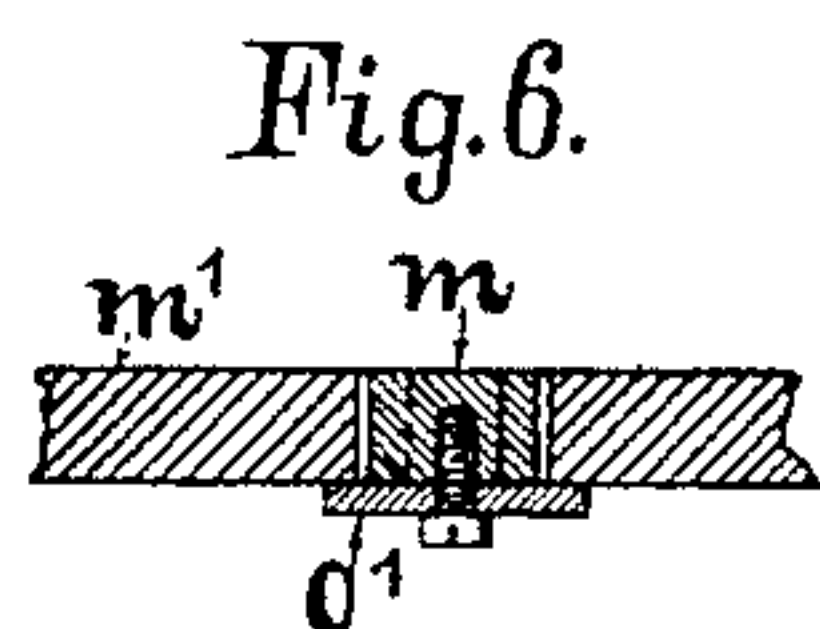
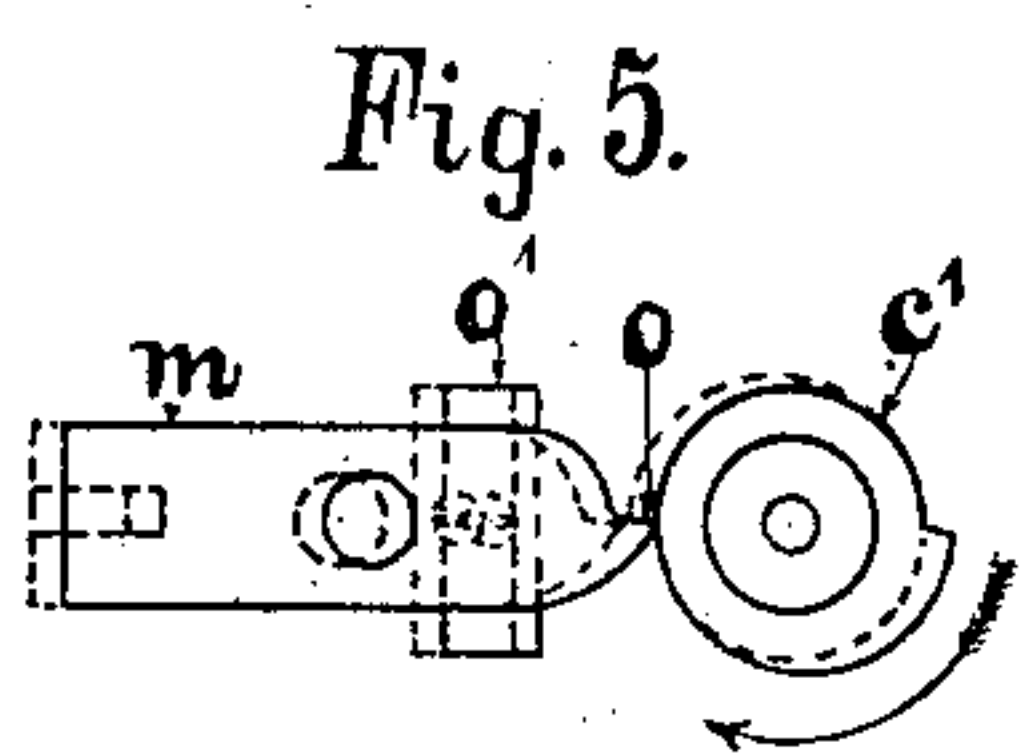
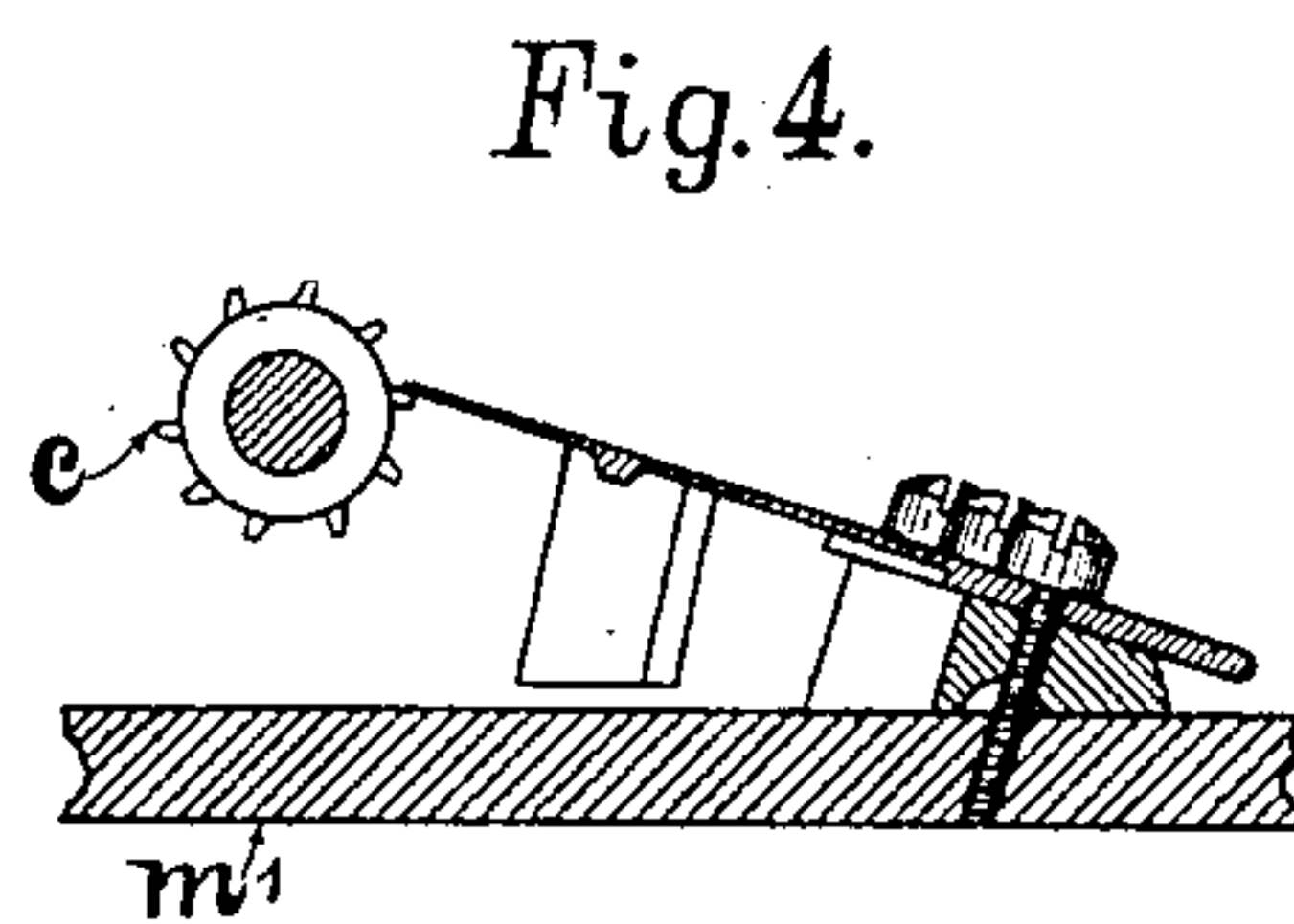
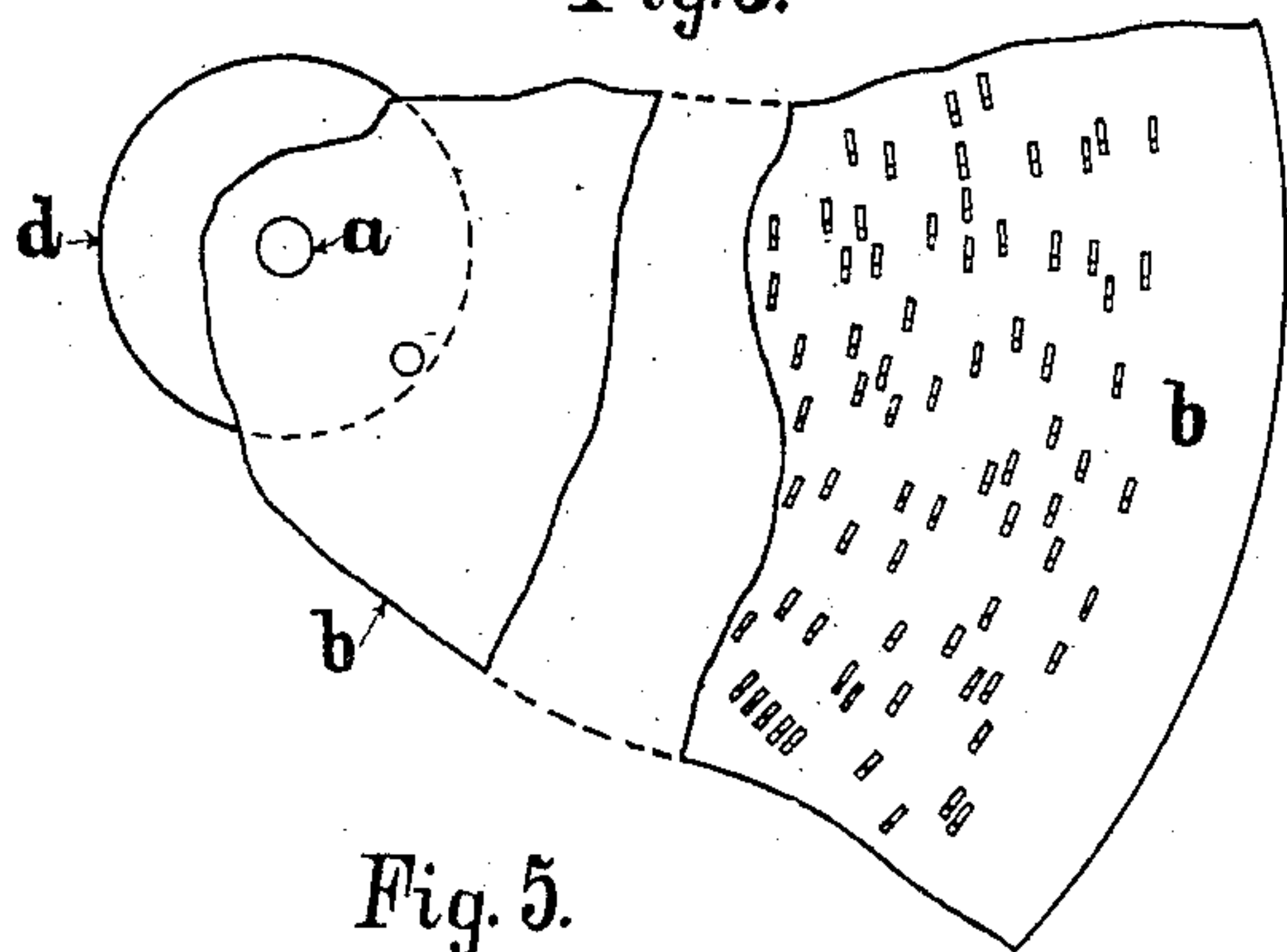
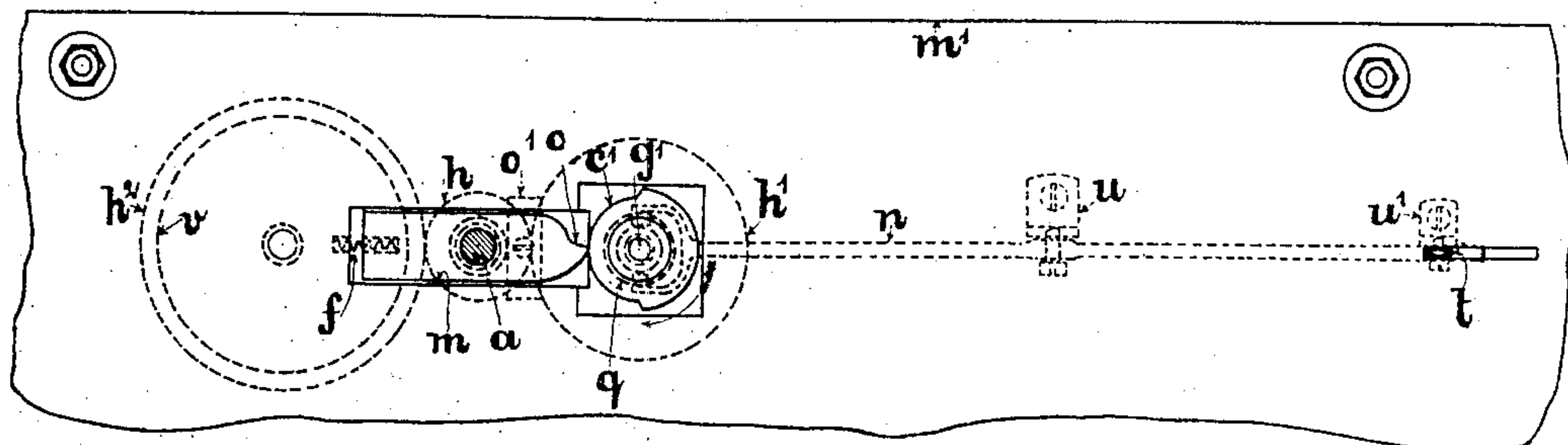
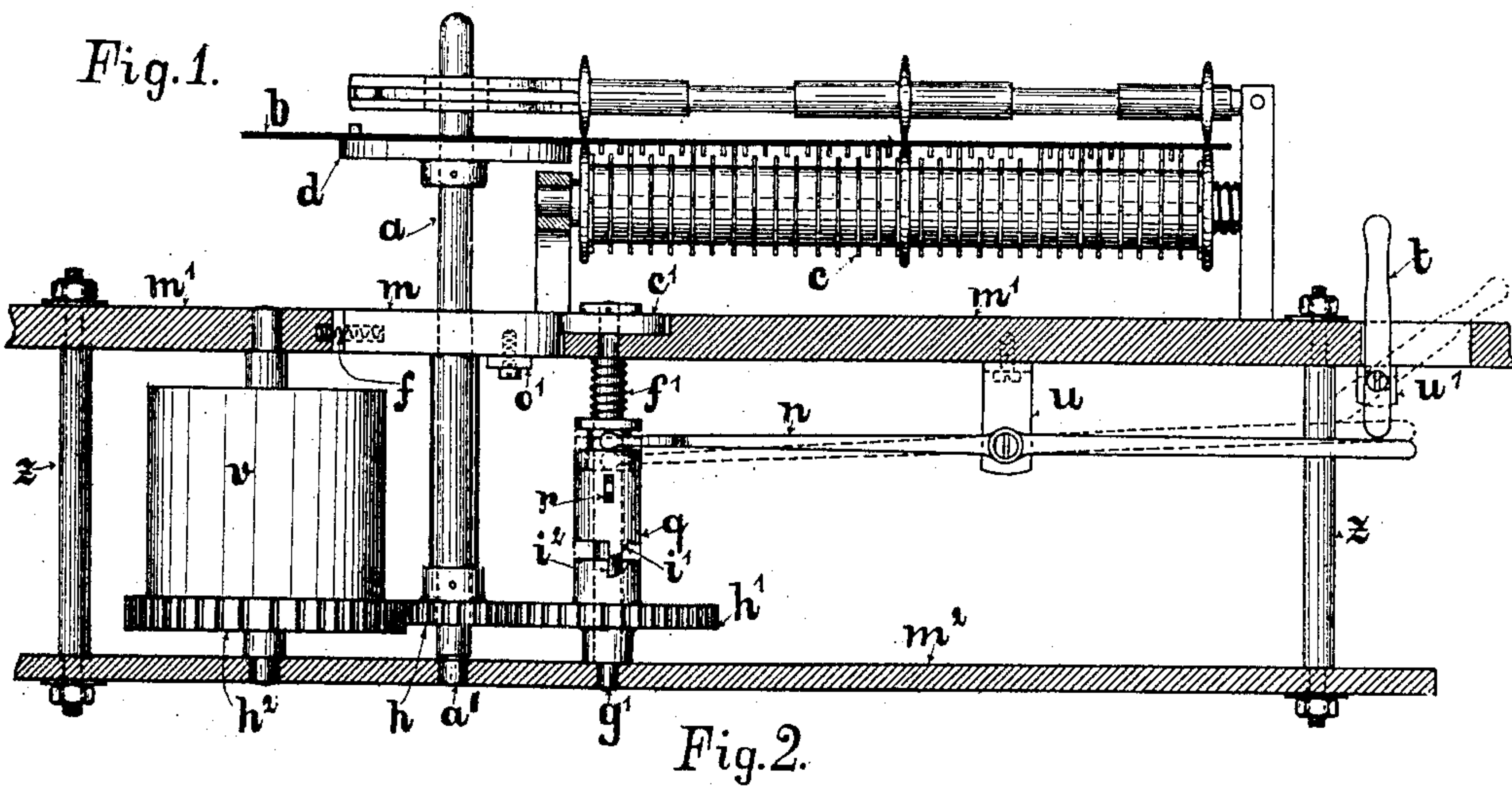


2 Sheets—Sheet 1.

No. 599,710.

Patented Mar. 1, 1898.



*Witnesses*

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MECHANICAL MUSICAL INSTRUMENT.

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Fig. 7.

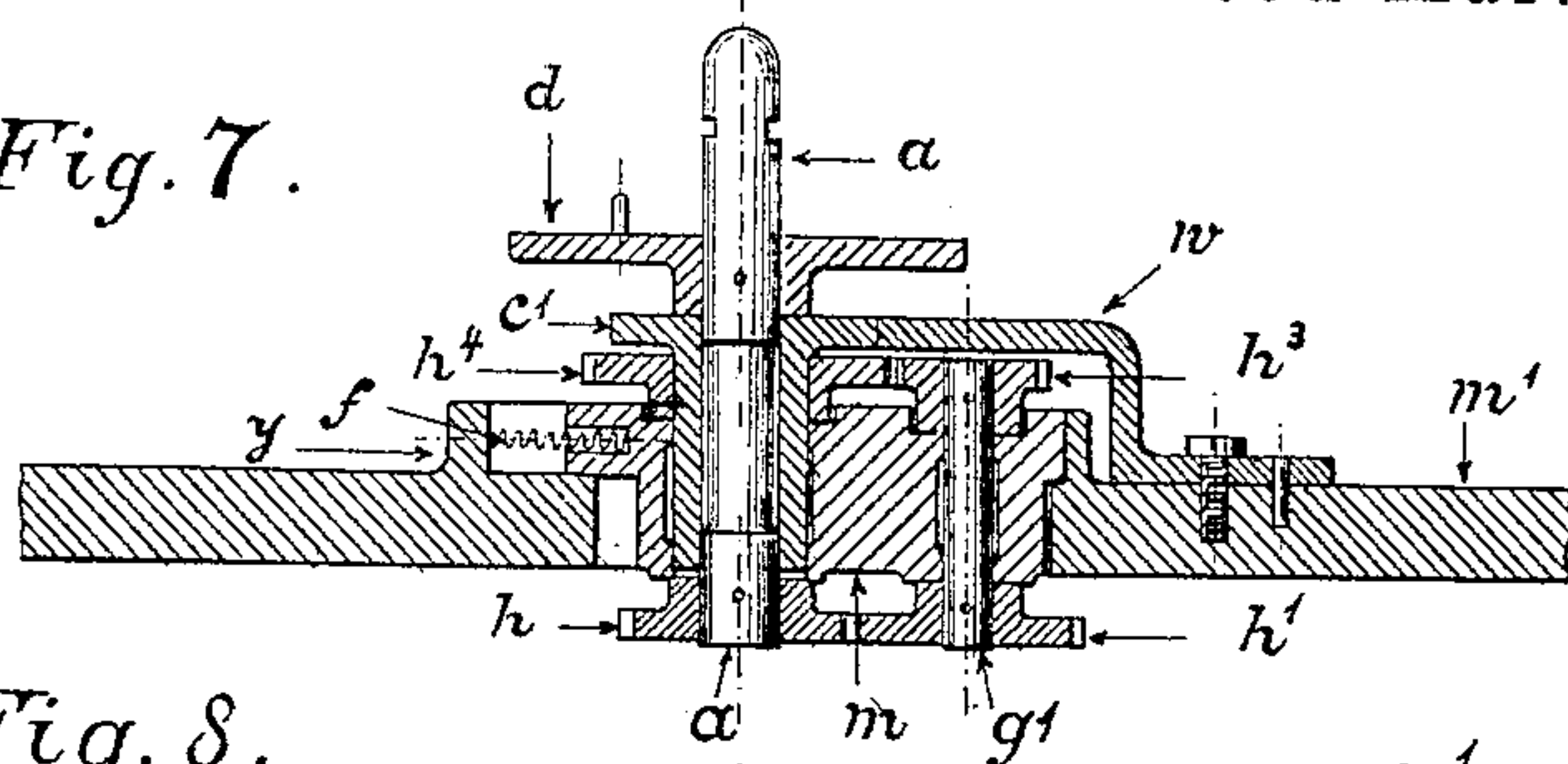


Fig. 8.

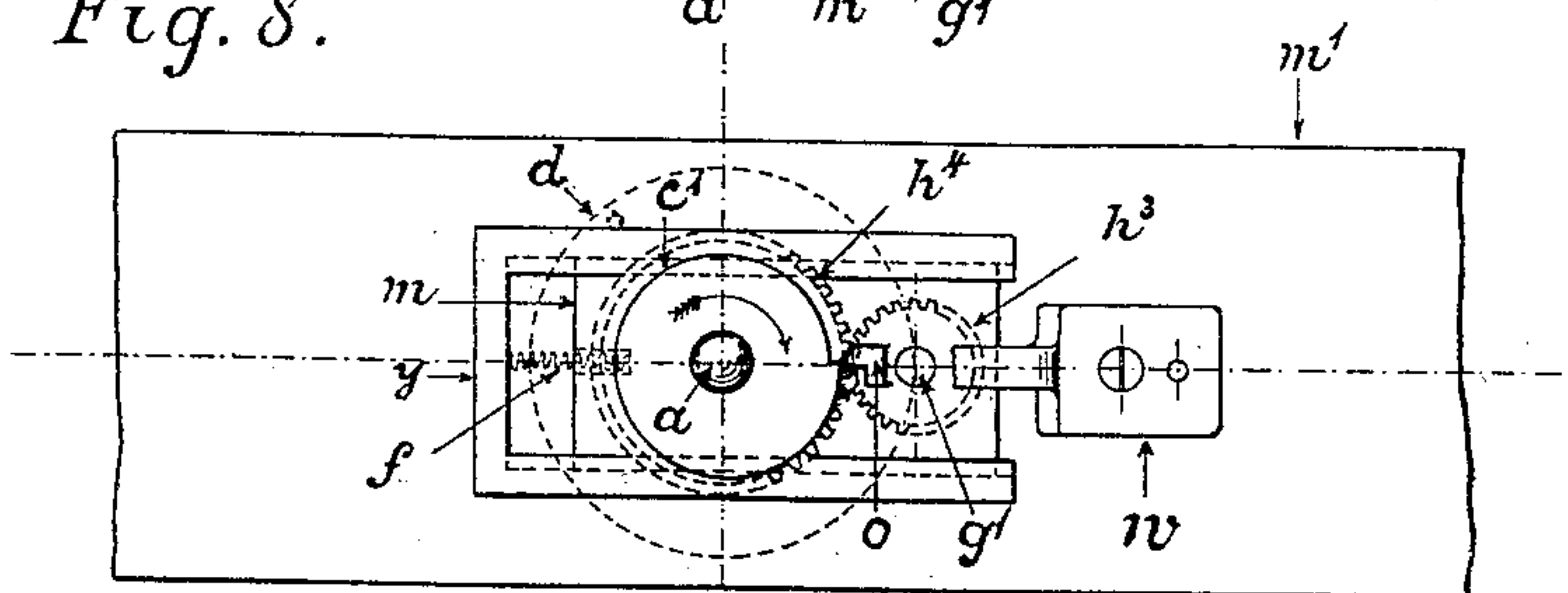


Fig. 9.

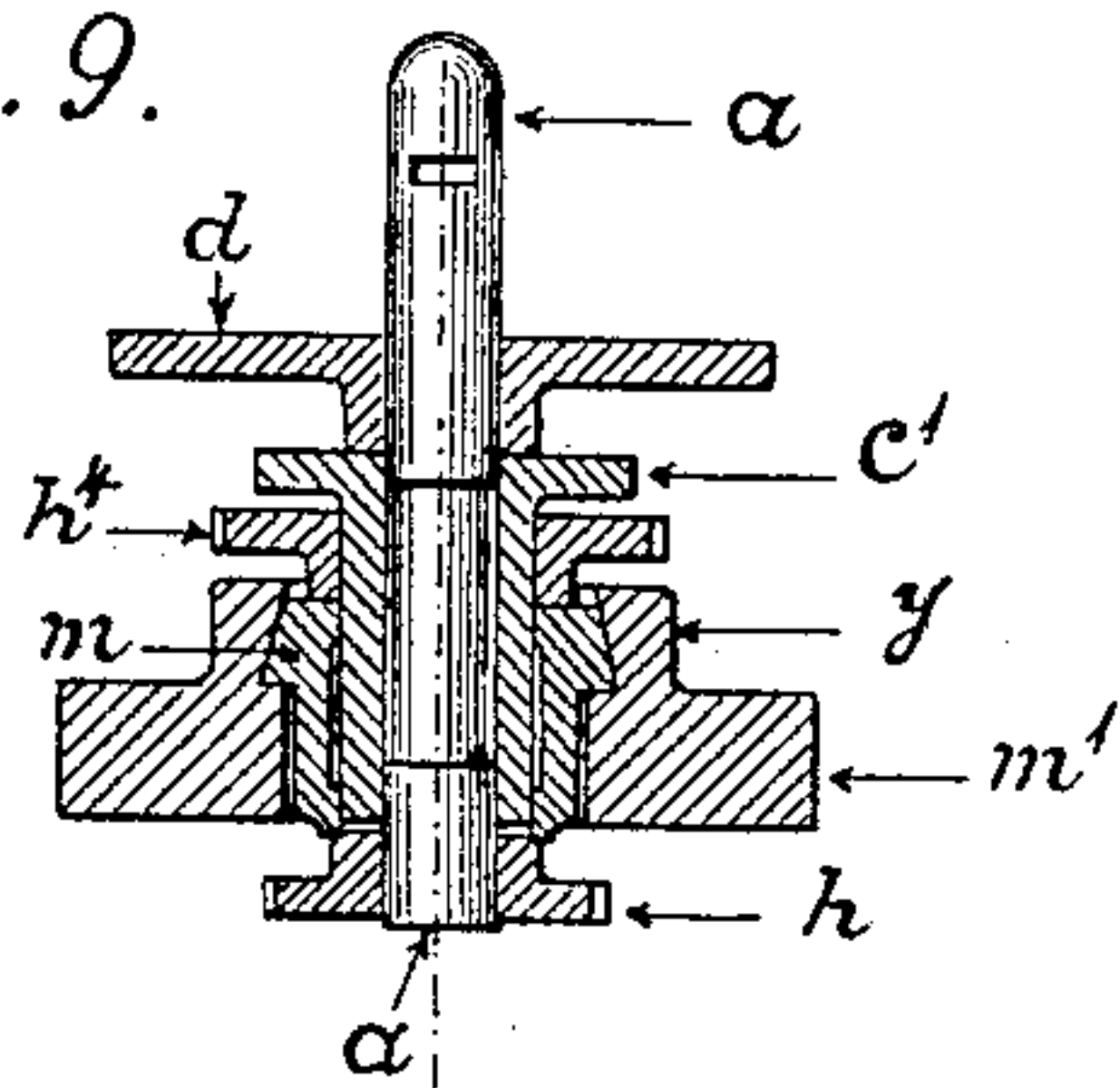


Fig. 10.

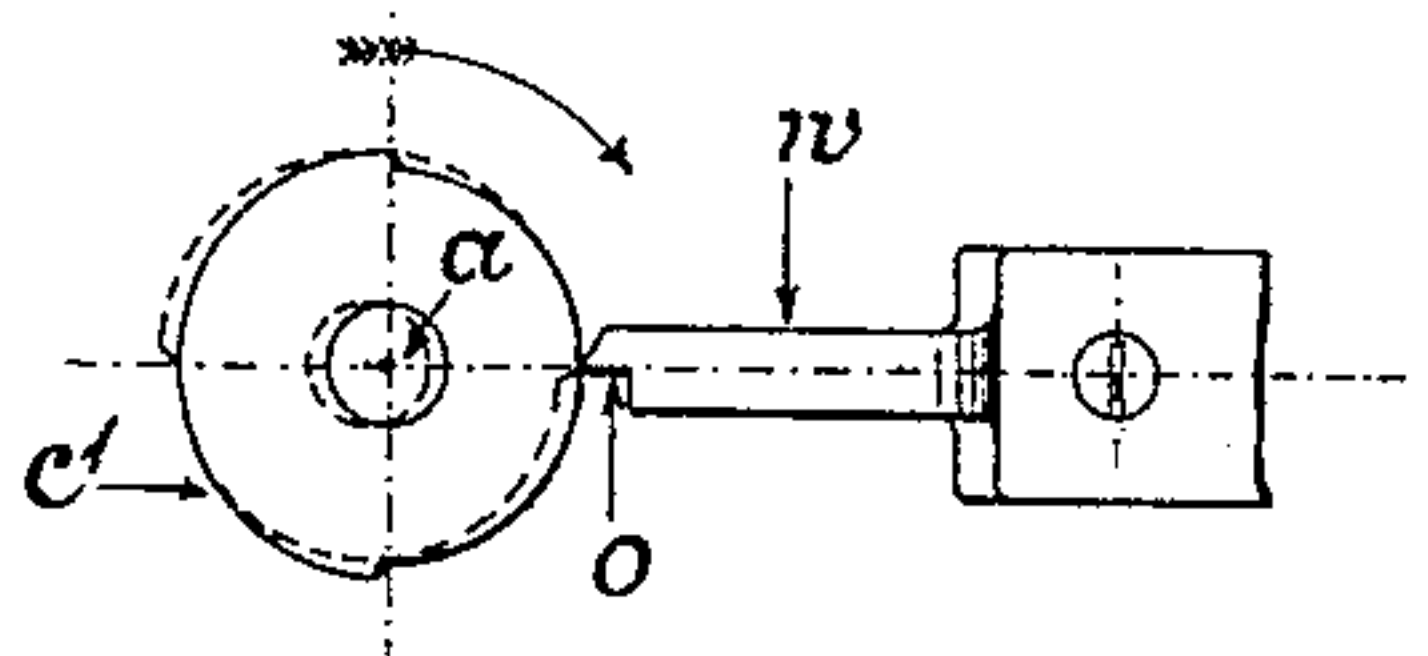


Fig. 11.

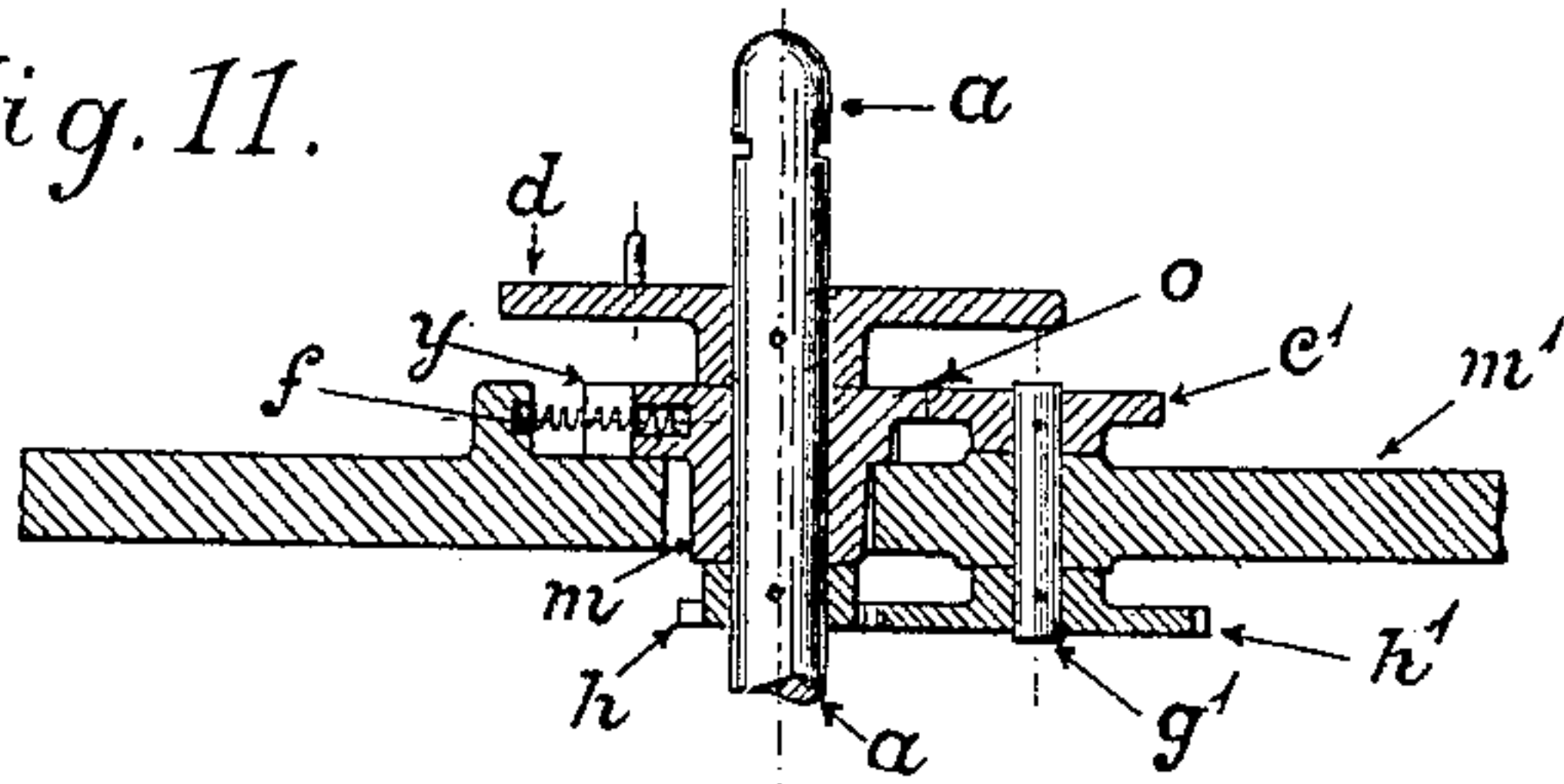
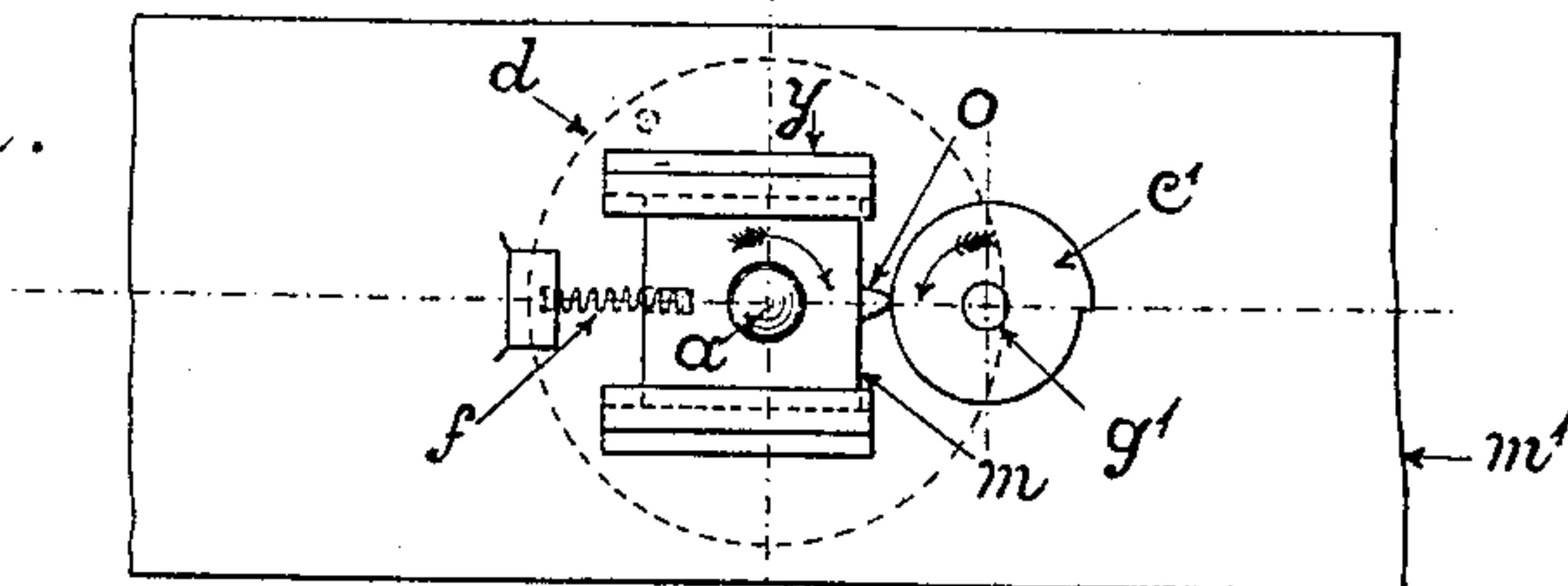


Fig. 12.



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Inventor  
A. Keller  
by his Attorney. *[Signature]*



# UNITED STATES PATENT OFFICE.

ALFRED KELLER, OF LEIPSIK, GERMANY.

## MECHANICAL MUSICAL INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 599,710, dated March 1, 1898.

Application filed April 27, 1896. Serial No. 589,246. (No model.)

*To all whom it may concern:*

Be it known that I, ALFRED KELLER, a subject of the Emperor of Germany, and a resident of Leipsic, in the Kingdom of Saxony, German Empire, have invented certain new and useful Improvements in Mechanical Musical Instruments, of which the following is a specification.

The object of this invention is shown in the annexed drawings in connection with a musical instrument with circular music-sheet and note-comb.

By this invention it is possible to play with one music-sheet musical pieces of double the length or longer than has been possible hitherto or to play more than one piece of music.

In the annexed drawings, Figure 1 shows a longitudinal section; Fig. 2, a plan. Fig. 3 shows part plan of the music-sheet *b* and the driving-disk *d*; Fig. 4, a section of the note-comb and the axle of the plucking-wheel. Figs. 5 and 6 are details of the mechanism. Figs. 7 to 12 represent modifications of the mechanism, Fig. 7 being a longitudinal section, Fig. 8 a plan view, Fig. 9 a cross-section, and Fig. 10 a detail view, of one modification, and Fig. 11 a longitudinal section, and Fig. 12 a plan view, of the other modification.

In the present musical instrument are used music-sheets upon which next to the note-signs over the plucking-wheels *c* are placed one or more note-rows to lie between each two plucking-wheels *c*. The note-sheets are fixed successively upon the axle *a*, carrying the music-sheets, and are arranged movable with this carrying-axle *a* to enable, after each revolution of the music-sheet *b*, other note-signs to be brought over the plucking-wheels *c*. In order to cause successive revolutions of the music-sheet *b* to repeat the same note-rows instead of bringing other rows into action, the arrangement for the moving of the carrying-axle *a* with the music-sheet *b* may be set out of action.

The driving-work, as well as the device for the moving of the carrying-axle *a*, is fixed on the plates *m'* *m*<sup>2</sup>, united together by bolts or rods *z*. The carrying-axle *a* revolves in the slide *m* and in the fixed plate *m*<sup>2</sup>. The slide *m* is guided, as shown in Fig. 6, in a slot in the plate *m'* and fastened therein by the plate *o'*, screwed on the slide *m* and projecting under the plate *m'*. The spring *f* keeps the slide

*m*, with its nose *o*, upon the periphery of the cam-disk *c'*, fixed upon the axle *a*. The axle *a* is therefore adapted to revolve and to swing within certain limits in the plates *m'* and *m*<sup>2</sup>. The cam-disk *c'* operates the moving of the carrying-axle *a*, the slide *m* being pressed back in the slot against the spring *f* on the revolution of the disk *c'*, when the larger radius of the disk *c'* meets the nose *o* of the slide *m*. The carrying-axle *a* is kept during the moving of the slide *m* by its ball-like bearing in the plate *m*<sup>2</sup> in order that it may be allowed to become inclined and only the upper part of the carrying-axle *a* be displaced. The disk *c'* is so constructed that its periphery after each revolution of the music-sheet *b* moves the slide *m*, with the upper part of the carrying-axle *a*, so far that the note-rows lying between the already-played note-rows of the music-sheet *b* are brought over the plucking-wheels *c*.

The carrying-axle *a* and the axle *g'* are operated from the spring-barrel *v* by means of the toothed wheels *h*<sup>2</sup>, *h*, and *h'*. The wheels *h*, *h'*, and *h*<sup>2</sup> are arranged in one plane as near as possible to the plate *m*<sup>2</sup>, and therefore the wheel *h* upon the carrying-axle *a* is close to its ball-like bearing *a'* in order that on moving of the axle *a* the wheel *h* moves only a little, and therefore remains in gear with the wheels *h'* and *h*<sup>2</sup>. The carrying-axle *a*, with the music-sheet *b*, makes two revolutions, while the axle *g'*, with disk *c'*, makes one revolution.

The note-rows upon the music-sheet *b* can be arranged centrically or spirally. In note-rows arranged centrically upon the music-sheet *b* the tooth *o* of the slide *m* slides, after each revolution of the music-sheet *b*, upon a step in the periphery of the cam-disk *c'* from an arc of one radius to an arc of a different radius, so that the music-sheet *b*, by means of slide *m* and carrying-axle *a*, is then moved, and in one revolution of the music-sheet *b* the one group of note-rows and in the next revolution another group of note-rows is played, the latter lying between the first. Thus after having played one music-piece by a further revolution of the same music-sheet another piece may be played or the same piece repeated, as hereinafter described.

In note-rows arranged spirally upon the music-sheet *b* the tooth *o* of the slide *m* slides



upon a spiral periphery of the cam-disk  $c'$ , Fig. 5, and thus, also, for the same purpose during two successive revolutions of the music-sheet  $b$  it is moved evenly in one direction to bring into action two note-rows. Arrived at the end of the second revolution the music-sheet is moved, by means of the spring  $f$ , again in its previous condition.

By giving to the axle  $g'$  correspondingly fewer revolutions and to the disk  $c'$  a corresponding form instead of one there can be played successively, also, more note-rows arranged between the plucking-wheels  $c$ . The driving may also be effected by the periphery of the music-sheet  $b$  instead of the carrying-axle  $a$ , as shown here.

To set out of action the device for the lateral movement of the carrying-axle  $a$ , the wheel  $h'$ , serving for the operating of the axle  $g'$ , is placed loosely upon the latter. Also upon the axle  $g'$  is a movable sleeve  $q$ , fixed by a feather  $r$ , projecting into a slot thereof. The socket  $q$  is provided with a tooth  $i'$  and adapted to the size of this tooth and corresponding with the same the nave of the wheel  $h'$  has a recess  $i^2$ . Into the latter the tooth  $i'$  is pressed by the spring  $f'$ , surrounding the axle  $g'$  between sleeve  $q$  and plate  $m'$ . The sleeve  $q$  is provided with a groove in which engages the end of the lever  $n$ , fulcrumed in the post  $u$ . Over the other end of the lever  $n$  is a second lever  $t$ , fulcrumed upon the angle-bracket  $u'$  and projecting through a slit in the plate  $m'$ . The angle-brackets  $u$  and  $u'$  are fastened by screws upon the plate  $m'$ . The lever  $t$  is arranged in such a manner that if it is turned in the position shown in Fig. 1 the free end of the lever  $n$  is pressed downward, the sleeve  $q$  is lifted by the forked end of the lever  $n$ , and the tooth  $i'$  is taken from the recess  $i^2$ . When the lever  $t$  is turned into the position shown in Fig. 1 in dotted lines, the lever  $n$  is free and the spring  $f'$  presses the sleeve  $q$  downward and the tooth  $i'$  passes into the recess  $i^2$ . As soon as the tooth  $i'$  enters the recess  $i^2$  the wheel  $h'$  turns in the same direction the sleeve  $q$ , axle  $g'$ , and cam-disk  $c'$ , and the latter operates the moving of the carrying-axle  $a$  with music-sheet  $b$ . When the tooth  $i'$  is out of the recess  $i^2$ , the wheel  $h'$  rotates loosely upon axle  $g'$  and the latter, with sleeve  $q$  and cam-disk  $c'$ , are put out of operation. In this case the lateral movement of the carrying-axle  $a$ , with music-sheet  $b$ , ceases and the same note-rows are repeated.

In the device represented in Figs. 7 to 10 the carrying-axle  $a$  is journaled in the nave of the cam-disk  $c'$  and does not rock in a bearing at its lower end, but when displaced is moved equally, and therefore maintains its parallelism with the remainder of the apparatus. The cam-disk  $c'$  turns in the slide  $m$ . The axle  $g'$  is also journaled in the slide  $m$ . Upon the carrying-axle  $a$  is fixed the music-sheet-carrying disk  $d$ , and the gear-wheel  $h$  upon the axle  $g'$ , the gear-wheel  $h'$ , and the gear-wheel  $h^3$ , while the wheel  $h^4$  is fixed upon

the nave of the cam-disk  $c'$ . The slide  $m$  is arranged to move in the prismatic guides  $y$  of the plate  $m'$  with the carrying-axle  $a$ , cam-disk  $c'$ , and axle  $g'$ . The periphery of the cam-disk  $c'$ , according to the arrangement of the note-rows upon the note-sheet, is either of spiral form, as in Fig. 8, or concentric form, as in Fig. 10. The cam-disk  $c'$  is operated by means of the wheels  $h$   $h'$   $h^3$   $h^4$  and the axle  $g'$  from the carrying-axle  $a$  and is kept by the spring  $f$  with its periphery against the nose  $o$  of the bracket  $w$ , screwed upon the plate  $m'$ . The carrying-axle  $a$  completes a whole revolution while the cam-disk  $c'$  makes half a revolution, and the displacement of the carrying-axle  $a$  is effected by moving the slide  $m$  at the division of the note-rows during or at the end of each half-revolution of the cam-disk  $c'$  by the nose  $o$  of the bracket  $w$ .

In the apparatus shown in Figs. 11 and 12 the nose  $o$  is on the slide  $m$ , the wheel  $h$  upon the carrying-axle  $a$ , turning in the slide  $m$ , and the wheel  $h'$  and the cam-disk  $c'$  upon the axle  $g'$ , journaled in the plate  $m'$ . The spring  $f$  presses the nose  $o$  constantly on the periphery of the cam-disk  $c'$ . The displacement of the carrying-axle  $a$  is effected hereby in the same manner as in the above-described apparatus from the cam-disk  $c'$ , which is operated by the carrying-axle  $a$  by means of the wheels  $h$  and  $h'$  and axle  $g'$ . As during the movement of the slide  $m$  with carrying-axle  $a$  the wheel  $h$  also moves, but the wheel  $h'$  remains in its position, the teeth thereof are made correspondingly long in order that the wheels  $h$  and  $h'$  may remain in gear.

I claim as my invention—

1. In a mechanical musical instrument the combination with a rotary music-disk of a shaft adapted to receive the center of said disk and revolve the same, a slide-bearing for said shaft, a cam-disk and abutment therefor adapted to displace said slide-bearing, means for connecting the shaft to revolve the cam-disk and a clutch interposed between the shaft and cam-disk for connection and disconnection of the latter for the purpose set forth.

2. In a mechanical musical instrument the combination with a rotary music-disk of a rotary shaft adapted to receive the center of said disk and to engage the same, a stationary bearing for said shaft remote from the music-disk, a movable collar bearing therefor nearer the music-disk, a prime mover, gear connecting said prime mover to the shaft near the stationary bearing thereof and means for rocking said shaft adapted to operate near the movable bearing for the purpose set forth.

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

ALFRED KELLER.

Witnesses:

OTTO DOEDERLEIN,  
ERWIN RAABE.