

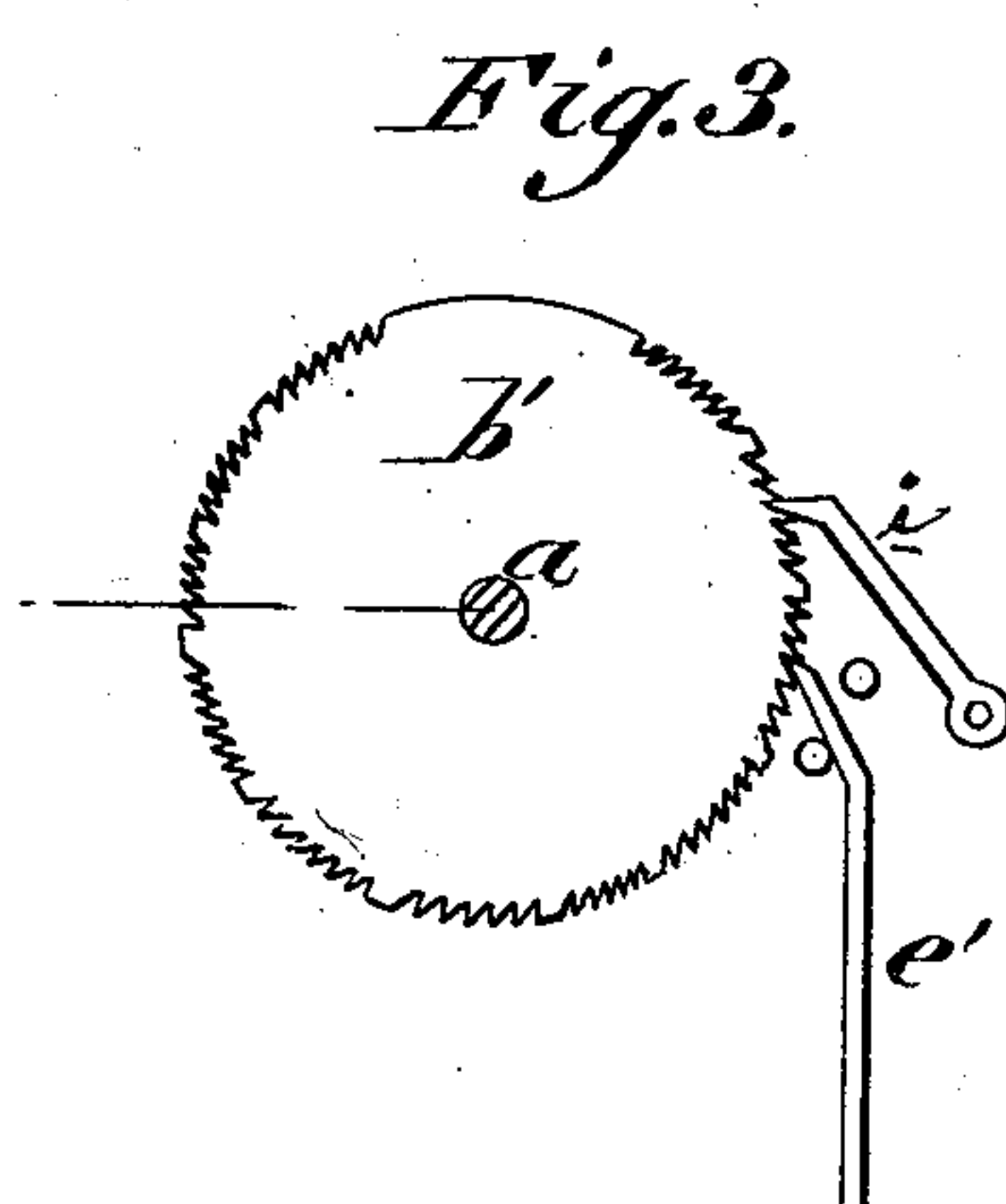
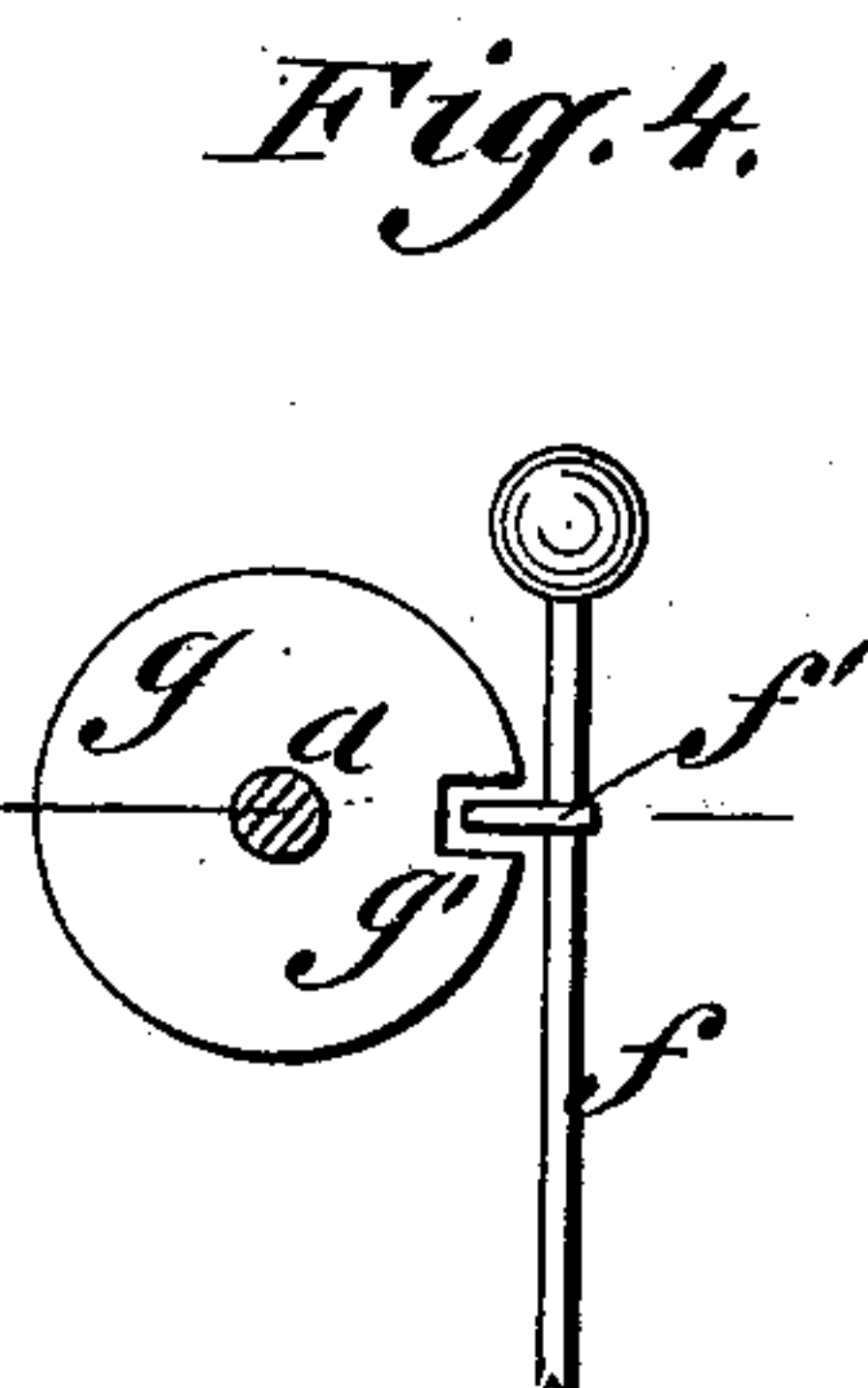
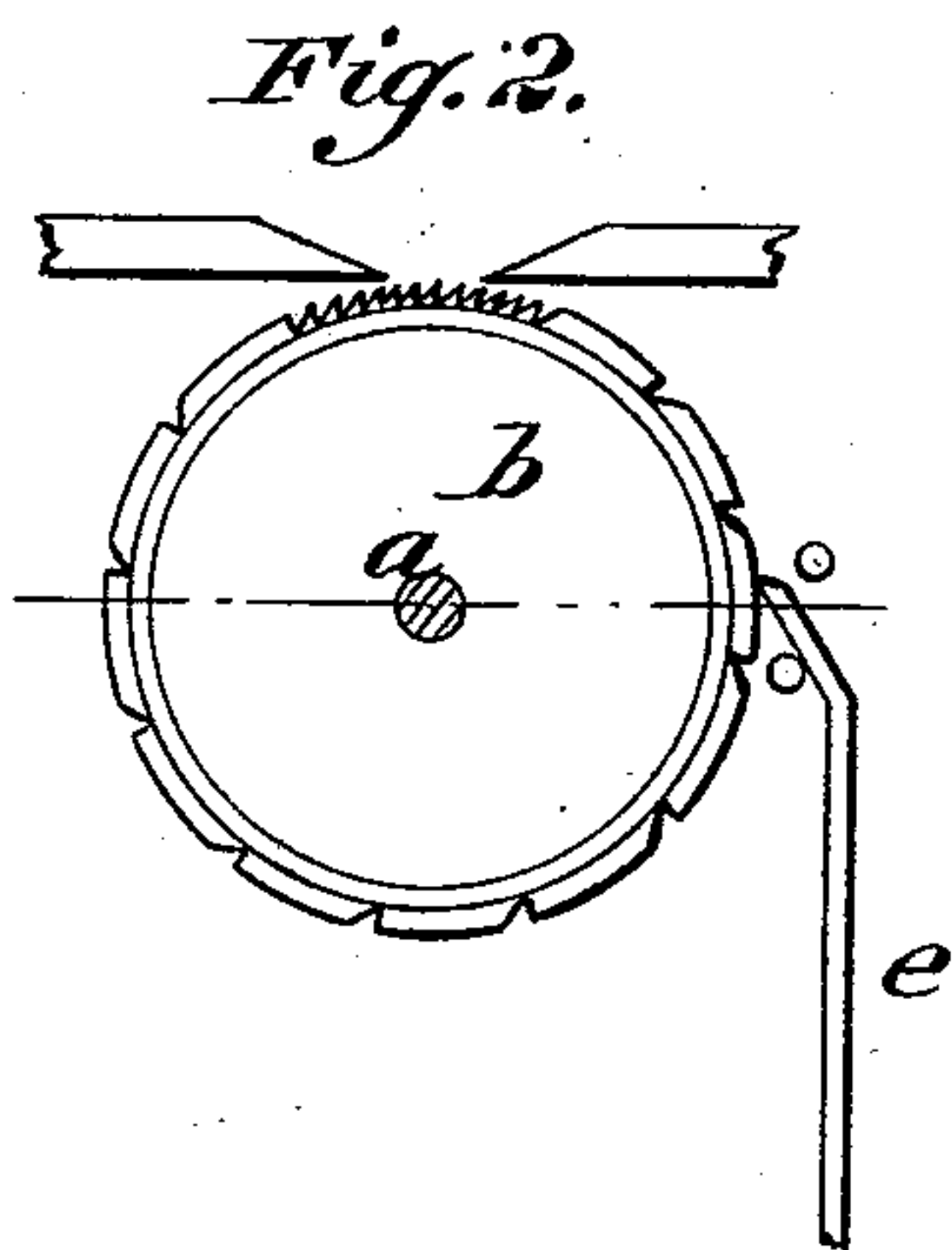
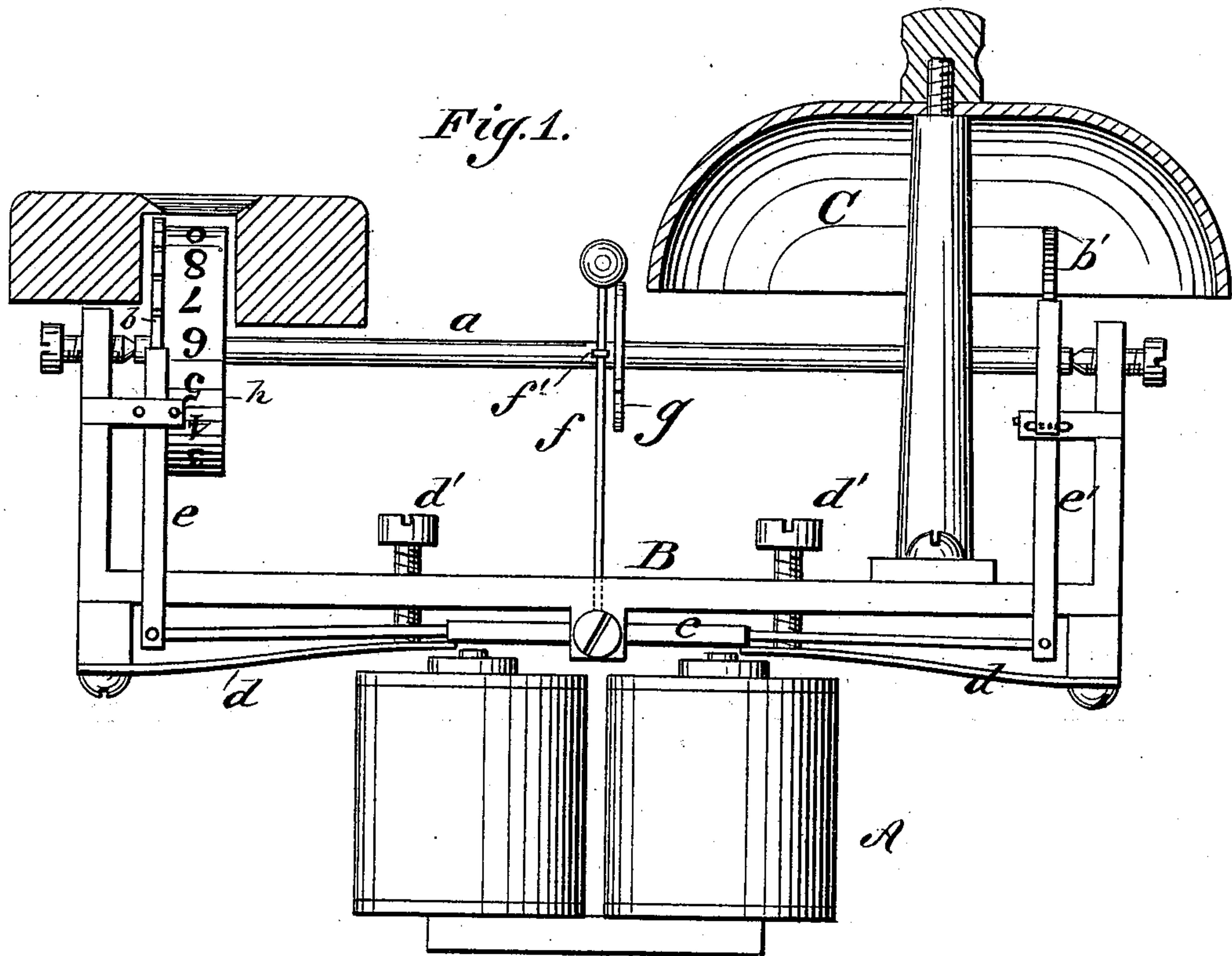
(Model.)

G. S. MOLER.

CALL INSTRUMENT FOR TELEGRAPH LINES.

No. 251,622.

Patented Dec. 27, 1881.



WITNESSES:

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GEORGE S. MOLER, OF ITHACA, NEW YORK.

CALL-INSTRUMENT FOR TELEGRAPH-LINES.

SPECIFICATION forming part of Letters Patent No. 251,622, dated December 27, 1881.

Application filed February 16, 1881. (Model.)

To all whom it may concern:

Be it known that I, GEORGE S. MOLER, of Ithaca, in the county of Tompkins and State of New York, have invented a new and Improved Call-Instrument for Telegraph-Lines, of which the following is a specification.

My improvements relate to call-bell mechanism for telegraph-lines, and have for their object to allow calling of any one station on the line, and at the same time indicate at all stations that the line is in use.

The invention consists in polarized armatures and ratchet mechanism combined with the call-bell for setting the instrument and selecting the bell to be rung, as hereinafter described and claimed.

In the accompanying drawings, Figure 1 is an elevation, partially sectional, of an instrument embodying my invention. Figs. 2 and 3 are side views of the ratchet-wheels separately, and Fig. 4 is a side view of the hammer-guard.

Similar letters of reference indicate corresponding parts.

A is an electro-magnet.

B is a stand carrying a bell, C, and sustaining a shaft, *a*, which carries ratchet-wheels *b* *b'* at its ends.

c is a polarized armature pivoted at its mid-length above the magnet A.

d d' are springs fixed on stand B and projecting beneath the end of armature *c*, so as to retain the same in a midway position.

d' d' are set-screws for adjusting the springs.

e e' are pallets fitted for engagement with the ratchet-wheels *b b'*, respectively, and connected to the opposite ends of armature *c*.

f is the hammer carried by armature *c*; and *g* is the hammer-guard consisting of a disk carried by shaft *a* contiguous to hammer *f*, and having a notch, *g'*, through which a projection, *f'*, on the hammer may project when the disk is in proper position, thereby permitting the hammer to strike the bell.

h is a numbered wheel carried by shaft *a*, which wheel will be inclosed in a box having an aperture that exposes but one number at once.

The teeth on the ratchet-wheel *b'* are not uniformly placed around the wheel, but are separated in groups by a plain portion or tooth on

which the pallet can move without turning the wheel. The number of groups will correspond with the number of stations in the line, and the ratchet-wheel *b* has as many teeth or notches as the wheel *b'* has groups. The teeth in wheel *b* are placed equidistant around the wheel and in such position that when the pallet *e'* of wheel *b'* rests on a blank tooth the pallet of wheel *b* is engaged with a notch of one of said groups, as shown in Figs. 2 and 3, respectively.

The pawls *e* and *e'* are also shown in the same figures as working between two pins, the lower one of which holds the pawl out of action at certain times, as and for the purpose hereinafter described.

The operation of the call-instrument is as follows: As previously stated, the instrument is intended for telephone-lines which can be worked by a rapidly-revolving magneto-electric generator and not conveniently by a battery. It is intended that the pulsations of the electricity shall be at the rate of about three hundred and fifty per minute to get the best effect, and in the actual use of the instrument that is the rate at which I cause the armature to vibrate. I use a reversing-key to cause the current to flow in one direction part of the time and then in the other direction, and by means of this reversal of the current I am enabled to rotate the shafts of all the instruments to the point I choose, and then to detain them all at that point while ringing the bell chosen. The method of doing this is explained as follows, referring to the drawings: The armature *c* is a polarized armature. The armature is held by the springs *d* and *d'* so that it is normally about the same distance from both poles of the electro-magnet A. When a current is sent one way over the line-wire the end C of the armature is drawn down, but when it is sent the other way the other end is drawn down, and at the rate of about three hundred and fifty times per minute as long as the pulsating-current is sent. It will be noticed that the armature will only go back to the middle point between the pulsations. When the left-hand end of the armature is drawn down the pawl *e'* will push the wheel *b'* along a tooth unless it should happen to be just over a blank tooth. When it does act it will keep pushing and rotating the wheel *b'* along till it does

come to a blank tooth, when the wheel stops. At the time the pawl *e'* comes to a blank tooth the pawl *e* comes opposite a notch in the wheel *b*, but every time the left-hand end of the armature is drawn down the pawl *e* slides upon the pin under it instead of acting on the wheel *b*. This action and the riding of the pawl *e'* on a blank tooth on *b'* cause the wheel to stop revolving. Now, if the current be reversed long enough to give one or more pulsations, the right-hand end of the armature will be drawn down and the pawl *e* thereby caused to take into a notch in *b* and thus rotate the wheels the distance of a notch. At the same time the pawl *e'* is drawn away from the wheel *b'* on account of sliding up the pin under it, so that after the wheels have moved the one notch they will stop again till the current is reversed to the way it was at first. I thus move the wheels along step by step quite rapidly, and watch for the number of the station I desire to call. When the right-hand end of the armature is drawn down the hammer *f* would strike the bell *C* but for the hammer-guard *g*, Figs. 1 and 4.

The method of causing a bell to ring is as follows: The notch *g'* in the hammer-guard *g* is so placed that when it is opposite the pin *f'* on the hammer the pawl *e'* is acting about half-way between two blank teeth, and the pawl *e* is also about half-way between two notches. If at this instant the current is reversed, the right-hand end of the armature will be drawn down, making the hammer *f* strike the bell, which may then be rung for any length of time without moving any of the wheels on the line, for the pawl *e'* will slide on the pin under it without acting on the teeth, and the pawl *e* will have no notch under it to act upon. After waiting a brief interval, if no reply is made, the bell can be rung again without disturbing the wheels. During the ringing and during the talking the number on wheel *h* remains exposed through the opening in the case; but when such ringing or talking has been finished the current is reversed, so as to cause pawl *e'* to act and drive the wheels till the blank tooth prevents further motion, when the numbers will all be hid from view. In that way I get my "line-in-use" signal.

In further explanation of the operation whereby only one hammer is released, so as to call but one station on the line at a time, I will add that the notches of the guards *g* of the instruments at the several stations on the line do not coincide in position relative to the numbers on their respective wheels *h*, and hence when the notch *g'* of one of said wheels coincides with the projection *f'* of the adjacent hammer, the corresponding notches and projections of the guard-wheels and hammers of all the other instruments are not coincident, so that but one instrument can operate at a time. In other words, when one hammer is free to strike all the others are locked out. When the operator in the central office wishes to call some office—say, for instance, the office

corresponding to number 6 on the index-wheel *h*—he looks at the index-wheel before him while he sends a pulsating-current over the line in such a direction as to draw down the left-hand end of each armature on the line at each pulsation, causing the pawls to act on the right-hand wheels, *b'*. Six or seven pulsations are necessary to bring a number in sight and carry it past and out of sight. Then the current is reversed during a pulsation or two, drawing down the right-hand end, *c*, of the armature. All the bells would be struck at this time if it were not for the hammer-guards, which prevent the hammer of every one from striking. The reversal carries the right-hand wheels, *b'*, past a blank tooth. Then by running the current in the same direction as before, another number will be carried past the opening through which the numbers are visible. So in like manner we pass the successive numbers till the number 6 begins to appear in the opening. Then by reversing the current before it goes out of sight all of the hammers will strike upon the hammer-guards *g* except the hammer of bell No. 6, which will find an opening for it to strike through; but if the shaft *a* had turned so that the number 6 had just disappeared, the notch in the hammer-guard would have moved too far along to allow the hammer to strike through it. While the line is used for talking the number is permitted to remain in sight at all the stations; but when they cease talking a current is made to carry the number out of sight, so that the index-wheels will stand between 6 and 7 till the next call is made.

The method of obtaining unison is as follows: To get past the single notches in the wheel *b* the key needs to be reversed each time only for an instant, but that will not take any of the wheels across the part of *b* which has teeth upon it, so they all wait there till the key is purposely held reversed long enough to allow the pawl *e* to drive the wheel *b* past that place. In that way they will soon get in unison and be constrained to remain in unison.

What I claim is—

1. The combination of the call-instrument for telegraph-lines, consisting of magnet *A*, polarized armature *C*, pallets *e e'*, connected to opposite ends of the armature, shaft *a*, wheels *b b'*, having alternate teeth or groups of teeth and blank spaces, as specified, the hammer-guard *g*, and hammer *f*, carried by armature *c*, substantially as shown and described.

2. In call-instruments for telegraph-lines, an armature hung at its mid-length, whereby it is capable of two independent movements, combined with ratchet mechanism at each end of said armature, fitted for operation by the two movements of the armature to give rotation to a number-wheel, substantially as shown and described.

GEORGE SYLVANUS MOLER.

Witnesses:

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FRANK T. WILSON.