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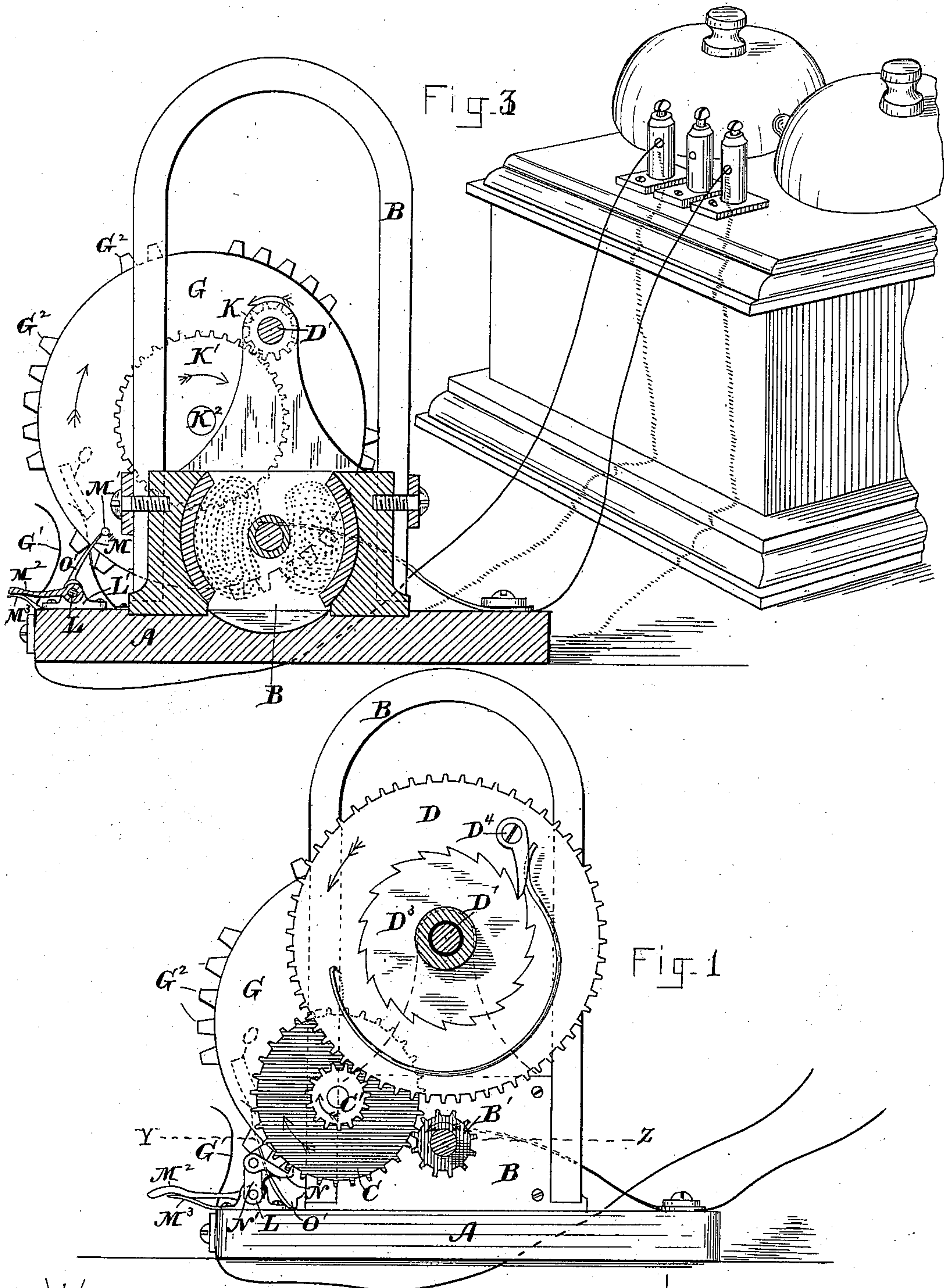
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W. J. KEENAN & E. M. WILSON.

FIRE ALARM SIGNAL.

No. 333,131.

Patented Dec. 29, 1885.



WITNESSES:
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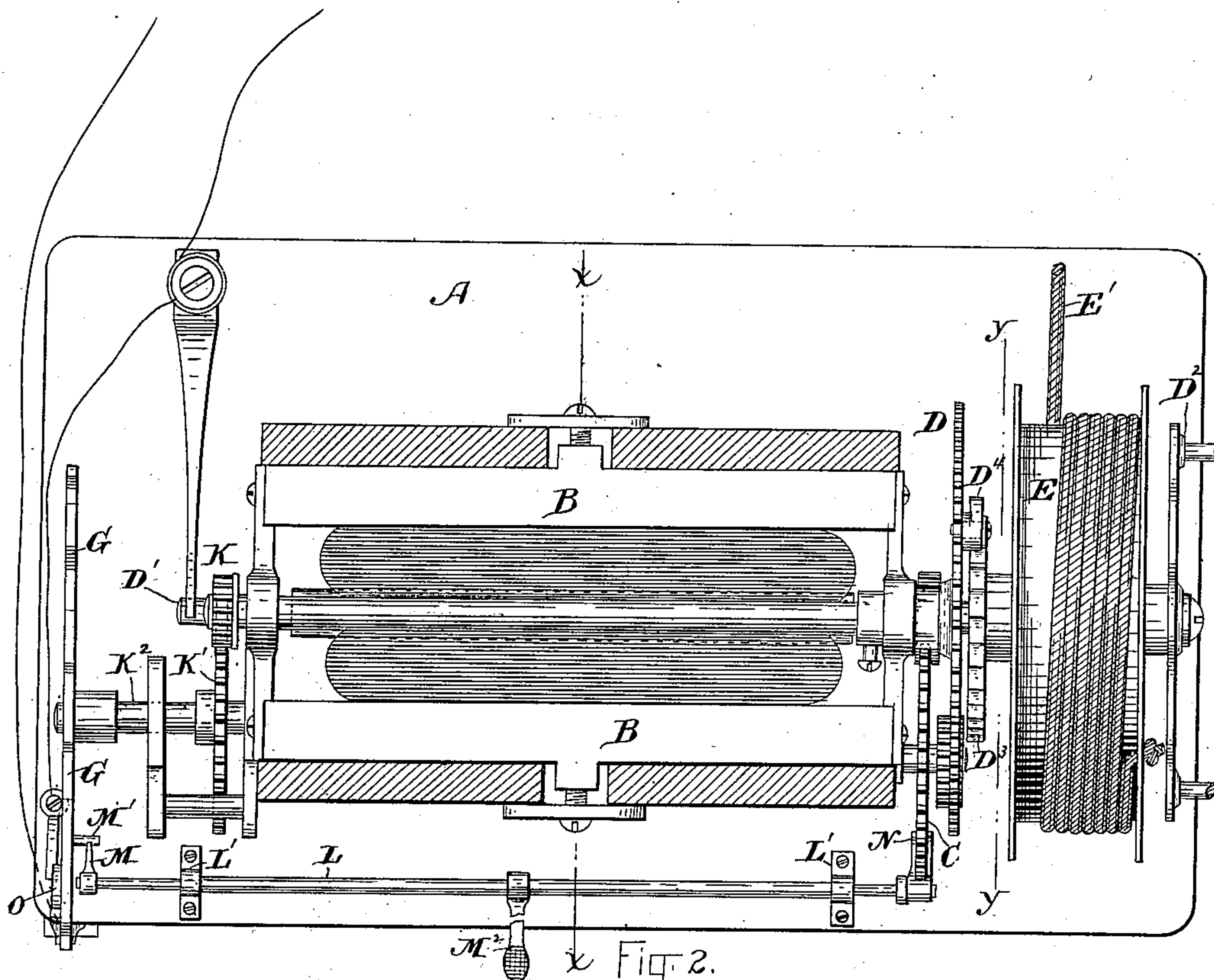


Fig. 2.

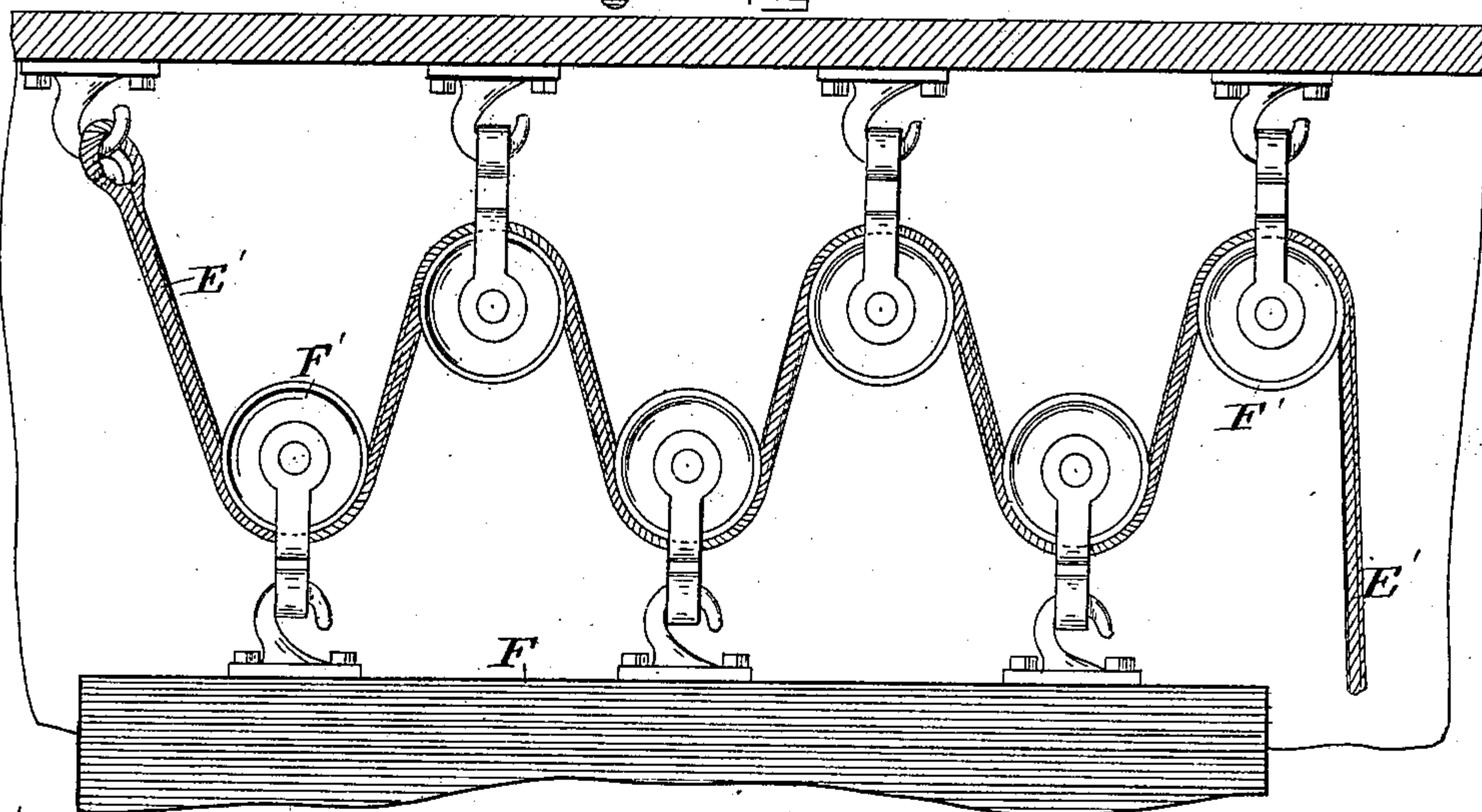


Fig. 5.

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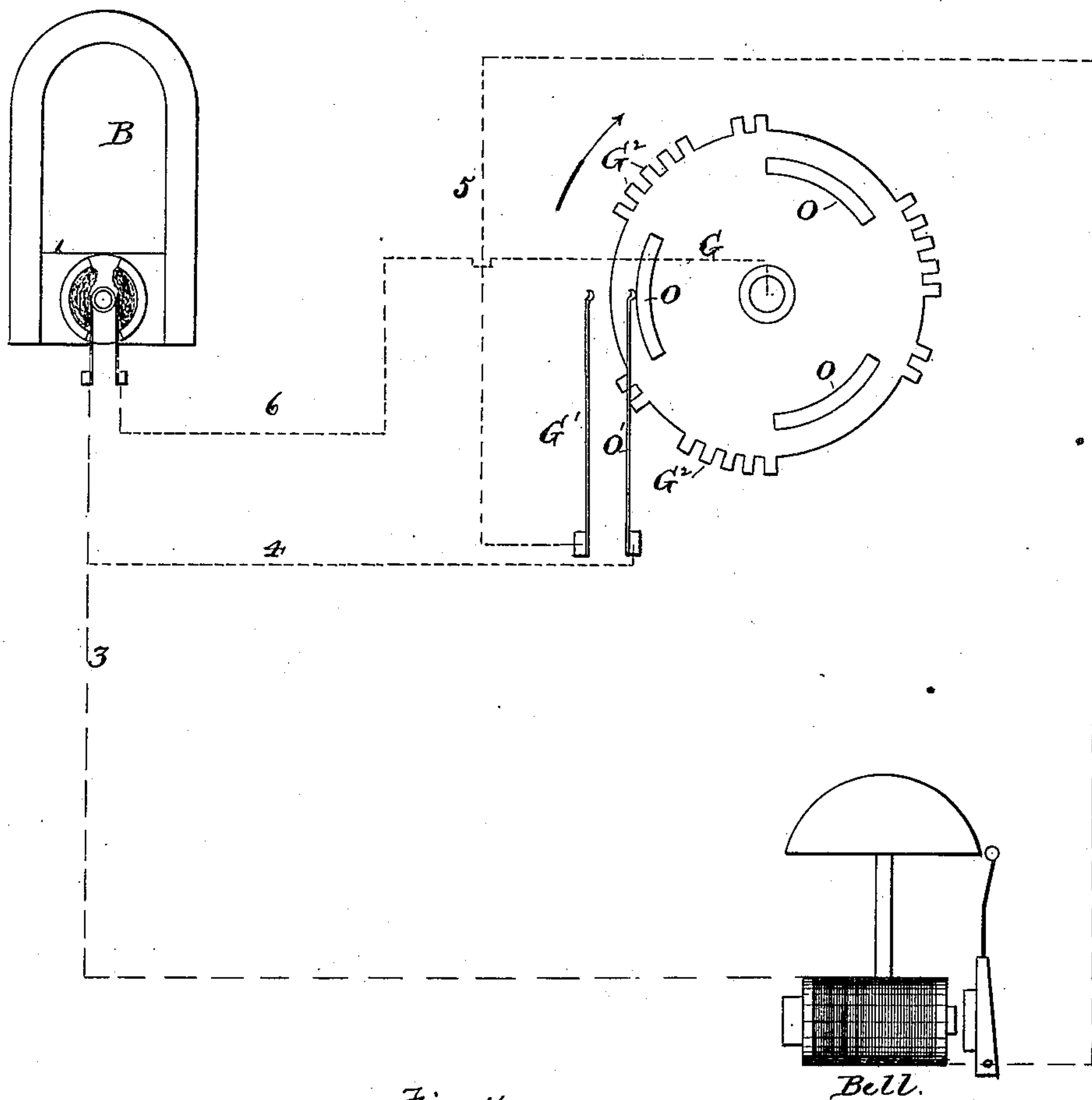


Fig. 4.

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UNITED STATES PATENT OFFICE.

WILLIAM J. KEENAN, OF BOSTON, AND EUGENE M. WILSON, OF WORCESTER,
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FIRE-ALARM SIGNAL.

SPECIFICATION forming part of Letters Patent No. 333,131, dated December 29, 1885.

Application filed May 17, 1884. Serial No. 131,829. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM J. KEENAN, of Boston, in the county of Suffolk, and EUGENE M. WILSON, of Worcester, in the county of Worcester, and State of Massachusetts, have invented certain Improvements in Fire-Alarm Signals, of which the following is a specification.

Our invention relates to that class of electric signaling apparatus known as "fire-alarm" telegraphs, and has for its object to dispense with the batteries working on a closed circuit, which are usually employed, and to substitute therefor a magneto-generator placed in each of the call-boxes, and provided with circuit making and breaking apparatus driven by a motor and formed to be operated automatically after being wound up by the operator. Thus we avoid the expense and uncertainty attending the use of batteries.

Our improvements relate wholly to the apparatus employed in the call-box, and in no way affect the central-office apparatus, which may be of any well-known form.

Our invention is fully set forth in the following specification and the accompanying drawings, which show the apparatus contained in a box of about the size commonly used for fire-alarm call-boxes.

Figure 1 is an end elevation of our apparatus without the protecting case. Fig. 2 is a horizontal section on line Y Z, Fig. 1. Fig. 3 is a section on line X X, Fig. 2. Fig. 4 is a diagram of connections. Fig. 5 is a detached view showing the arrangement of the weight-supporting cord.

The same letters of reference indicate same parts in all the figures.

In the drawings, A is a base, to which is secured the magneto-generator B, and to the shaft of said generator is secured a wheel, B', meshing into gear C, and a pinion, C', on the shaft of said gear is engaged by gear D, which latter is affixed to its shaft D'. The generator B is provided with a commutator or pole-changer of the usual form, and is adapted to give uniform currents of definite direction as long as operated, being thus the equivalent of a battery.

We have here shown the generator as having the well-known "Siemens" armature of

the H form, and thus having only one coil wound thereon. It may be found in practice that more than one coil will give better results, although in our experiments, which have been conducted with an armature of this form, we have found the current practically uniform, at least for all of the purposes of this invention.

A drum, E, fitted to turn loosely on shaft D', (like a loose pulley,) is arranged to wind a cord, E', upon itself when said drum is turned in the direction shown by the arrow by means of the crank D². A ratchet-wheel, D³, is secured to drum E, and allows the drum to be turned independently in the one direction to wind up the cord E', but locks it with wheel D as it is turned in the other direction, by means of a click, D⁴, on said wheel, which locks into the teeth of said ratchet, as shown. A weight, F, is attached to cord E', and a system of pulleys, F', over which said cord passes, as shown, reduces the distance of the fall of the weight in a well-known manner, and renders the apparatus more compact with a given amount of cord wound on the drum.

If, as in the normal position of the apparatus, the cord E' be unwound from the drum E, it will be seen that by turning handle D² in the direction of the arrow in Fig. 3 the cord will be wound onto the drum, while the ratchet D³ and click D⁴ will not allow the wheel D to participate in the motion of the drum, but on the release of said handle the ratchet F will tend to cause the drum E and shaft D' to move in the reverse direction, and at the same time click D⁴ will lock ratchet D³ and wheel D together and cause wheel D to revolve, carrying with it wheel C, and thus the armature of the magneto B will be revolved with a speed multiplied by the train through which the motion has been transmitted from drum E. One effect of this arrangement will be to give a very uniform speed to the armature of generator B. A pinion, K, Figs. 2 and 3, is also secured to shaft D', and meshes into a wheel, K', secured to a shaft, K². A circuit-wheel, G, is also secured to shaft K², and has a number of contact-points, G², on its circumference, (best shown in Fig. 4,) which are arranged to make contact with a spring, G'. These contact-points are arranged to transmit groups of im-

pulses in the usual manner in fire-alarms, here two impulses, a pause, and then five impulses, representing twenty-five, and this is repeated three times during a revolution, and the circuit from the generator is passed through said circuit-wheel, as shown in Fig. 4, in which current passes from one pole of the generator through spring Z to line, and is shunted by wire 4 to spring O'; thence, when said spring makes contact with one of the segments O on circuit-wheel G, the current passes through said wheel by wire 6 to the other pole, Z', of the generator, thus short-circuiting the instrument, the wheel G being connected through its shaft to the generator. The spring G' is connected by wire 5 through a signal-bell with the line and with the spring Z. When the spring G' makes contact with one of the projections G², the circuit is closed through the wire 5, the signal-bell, line, spring Z, generator, spring Z', line 6, and wheel G, and at the time that the circuit is completed in this way said generator is operative. Said bell will be sounded as often as a projection, G², makes contact with spring G'.

As circuit-wheel G must always start from a perfectly definite point, and after weight F has stopped descending, owing to the cord on drum E having been all unwound, the momentum of the parts will not allow the stoppage of the train and circuit-wheel to be instantaneous. I provide means for causing said wheel to always stop in the same position.

A rock-shaft, L, pivoted between blocks L', has secured to it an arm, M, which is engaged by a pin, M', on circuit-wheel G, and the motion of said wheel is thereby arrested at the starting-point. (See Fig. 3.) A lever, M², also secured to shaft L, is arranged to be depressed by the operator, and thereby arm M is moved out of engagement with pin M', and wheel G is free to move. A spring, M³, raises said lever, and thereby moves arm M into the path of pin M' whenever said lever is not depressed, as hereinbefore described.

Owing to the attraction of the field-magnets for the armature, it is better that the generator receive an initial impulse to insure its starting. To this end a catch, N, is secured at one end to arm N', which is secured to shaft L, and the other end of said catch is formed to engage the teeth of wheel C, so that the depression of lever M' will cause the said catch to lock into the teeth of wheel C, and turn it a short distance, but far enough to set the machine in motion, as when once set in motion there will be no further difficulty.

The operation of the apparatus is very simple. The apparatus is supposed to be located in any convenient locality, as are the ordinary boxes now in use, and the bell or receiving apparatus is in the central station or any other desired locality. In case of fire, the weight having been previously wound up, the person giving the alarm depresses the lever M², thus releasing wheel G, and giving wheel C the slight impulse, as above described. Weight F will then descend at

a uniform speed, operating the generator B, as hereinbefore stated, the generator by the action of circuit-wheel G sending a definite series of impulses to line, according to the number and arrangement of the contact-points G² on wheel G. This will ring the bell or operate the register in the receiving station precisely as is done in the systems now in use. After the alarm has been given the weight will be wound up by the rotation of the crank B² in the direction indicated by the arrow in Fig. 3.

It is well known that a magneto-generator requires much less power to drive it when the circuit through it is not closed than it does when the circuit is closed, and this tends to produce irregularity in the motion of our apparatus, as when the circuit is broken by wheel G the machine will increase its speed, and perhaps cause the impulses to be sent so rapidly as to become confused. To avoid this source of error, we secure to the side of wheel G a series of metallic segments, O, in a circle concentric with said wheel, said segments coinciding with the spaces between the different series of teeth G²—that is, between each series of teeth that gives a complete signal and the next series of teeth that repeats the signal. A spring, O', is arranged to make contact with said segments, as is best shown in Fig. 4, when wheel G rotates. The segments O are so arranged that when the contact between spring G' and the projections G² on wheel G is broken at the same time contact between segments O and spring O' is formed; and as spring O' is connected with wire 4, Fig. 4, this will close a local circuit through said wire 4, wheel, wire 6, and generator, as before explained. As the generator will thus be short-circuited upon itself, the load will be increased rather than decreased, and there will be no sudden increase of speed to decrease the time between signals, as might happen without this device.

Although we have referred to the use of a magneto-generator in connection with our apparatus, any of the well-known forms of dynamo-generators might be used as well and without departing from the working principle of our invention. It is obvious that by the use of a weight to drive the apparatus we avoid any of the sources of failure which might occur with apparatus driven directly by crank, as both a uniform speed is given to the circuit-wheel and the generator is driven at a uniform speed. This latter feature is of importance, as to operate the register commonly used in central fire-alarm stations to record the call, it is necessary to have a much more uniform current than would be necessary to merely ring a bell, as the power required is much more in the case with the register, and without some means of securing a perfectly steady current the register might fail to record the call with accuracy.

Although we have described our apparatus as a fire-alarm telegraph, we do not confine ourselves to this application, but may apply

it to other purposes, such as telephonic signals, &c.

We claim—

1. In an electric signaling apparatus, the combination, with a magneto-electric generator, a circuit-wheel arranged to transmit electrical impulses in a definite order, and a mechanically-impelled motor operating both the generator and circuit-wheel, of a shaft carrying both locking and starting levers for said motor, adapted to operate both levers simultaneously, substantially as described.

2. In an electric signaling apparatus, the combination, with a magneto-electric generator, a circuit-wheel, and a motor, of a shaft having an arm rigidly attached thereto, arranged to normally engage with and stop the motor, another arm also secured to the shaft, carrying a pawl arranged to engage with and to give an initial impulse to the motor, and a lever connected to said shaft, the arrangement being such that when the lever is operated the motor-train is released and an initial impulse given to the motor, substantially as described.

3. The combination, with a generator, a motor connected to and operating said generator by a train of gears, a circuit-breaking wheel also driven by the motor through the generator, a spring-actuated shaft carrying at one end an arm arranged to engage with the circuit-breaker wheel to stop the generator and motor, and a pawl at the other end of the shaft arranged to engage with the gear operating directly with the generator-shaft, whereby a slight movement of the shaft will simultaneously unlock the gear and give an initial motion to the generator sufficient to overcome its resistance, substantially as described.

4. The combination, with a motor consisting of a drum, a cord fixed at one end and passing over a series of fixed and movable pulleys and connected to the drum, and a weight connected to the movable pulleys, a generator, and a train of gears connecting the drum to the armature-shaft of the generator, a circuit-breaking wheel, and gears connecting the shaft

of the generator and wheel, and a shaft carrying both a stopping device and a starting device for the motor, adapted to be operated simultaneously, substantially as described.

5. The combination of a magneto-electric generator, a circuit-controlling wheel, a signal device, and a motor actuating said generator and wheel and two circuits through the controlling-wheel, substantially as described, whereby the circuit of the generator is closed, except when broken by the action of the wheel, as set forth.

6. The combination, in an electric signaling apparatus, of a wheel, G, having a pin, M', the wheel C, the shaft L, carrying arm M, arranged to lie in the path of the pin, and pawl N, arranged to engage the teeth of wheel C, whereby the mechanism may be released and a slight movement given thereto at one and the same time, substantially as described.

7. In an electric signaling apparatus, the combination, with a magneto-electric generator and a signaling-instrument, of an independent circuit-controlling wheel having contacts to send signals of a predetermined character by alternate breaks and makes, and contacts to short-circuit the machine when not transmitting the signals, substantially as described.

8. In an electric signaling apparatus, the combination of a magneto-electric generator, a toothed circuit-wheel, a motor actuating said generator and wheel, a series of metallic segments on said wheel coinciding with the spaces between the series of teeth, a contact-spring, and connections, as described, whereby the generator is short-circuited when the line-circuit is broken, as set forth.

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses, this 15th day of May, 1884.

WILLIAM J. KEENAN.
EUGENE M. WILSON.

Witnesses:

C. F. BROWN,
A. L. WHITE.