

(No Model.)

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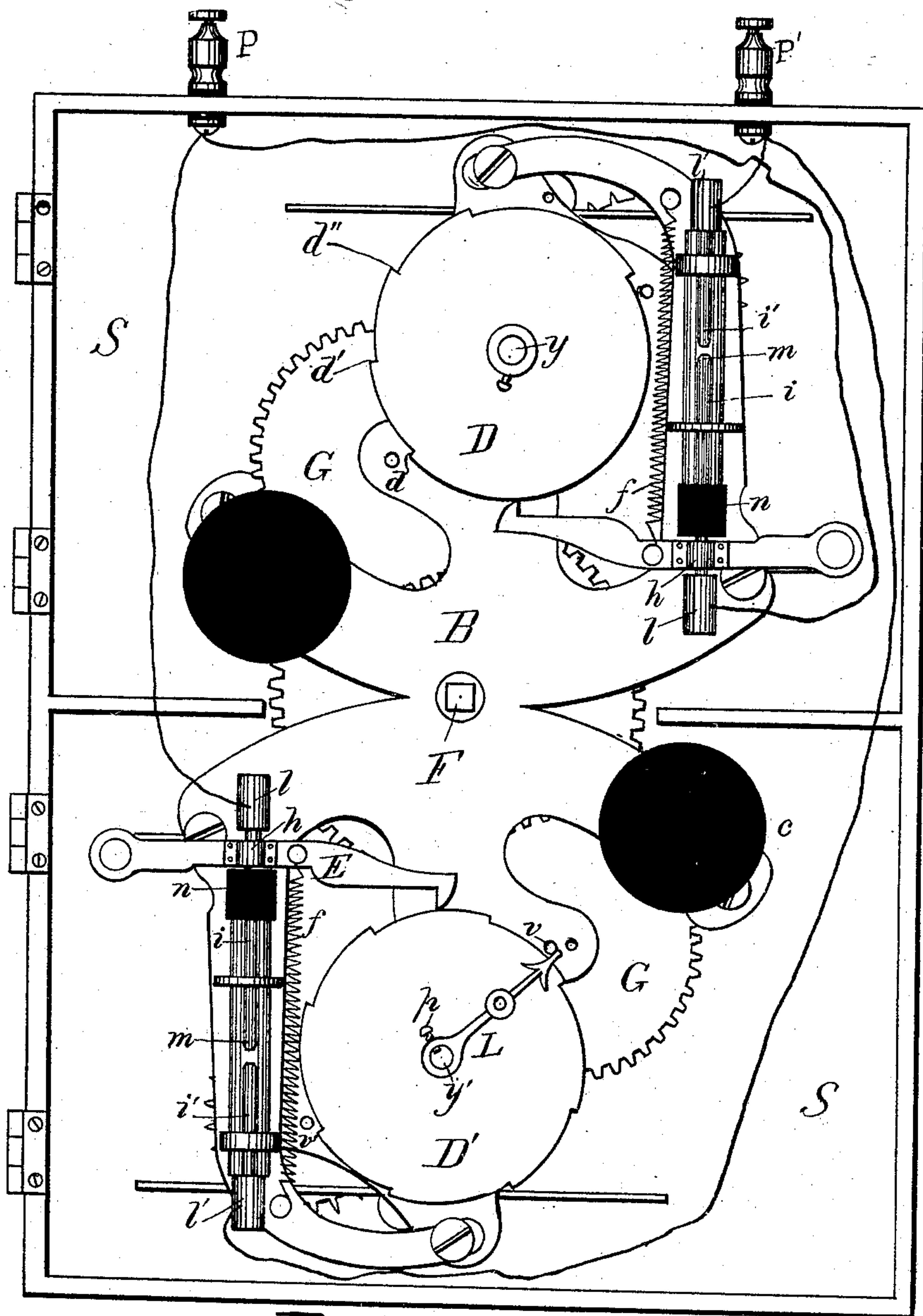
L. H. McCULLOUGH.

MULTIPLE SIGNAL BOX FOR FIRE AND POLICE TELEGRAPHS.

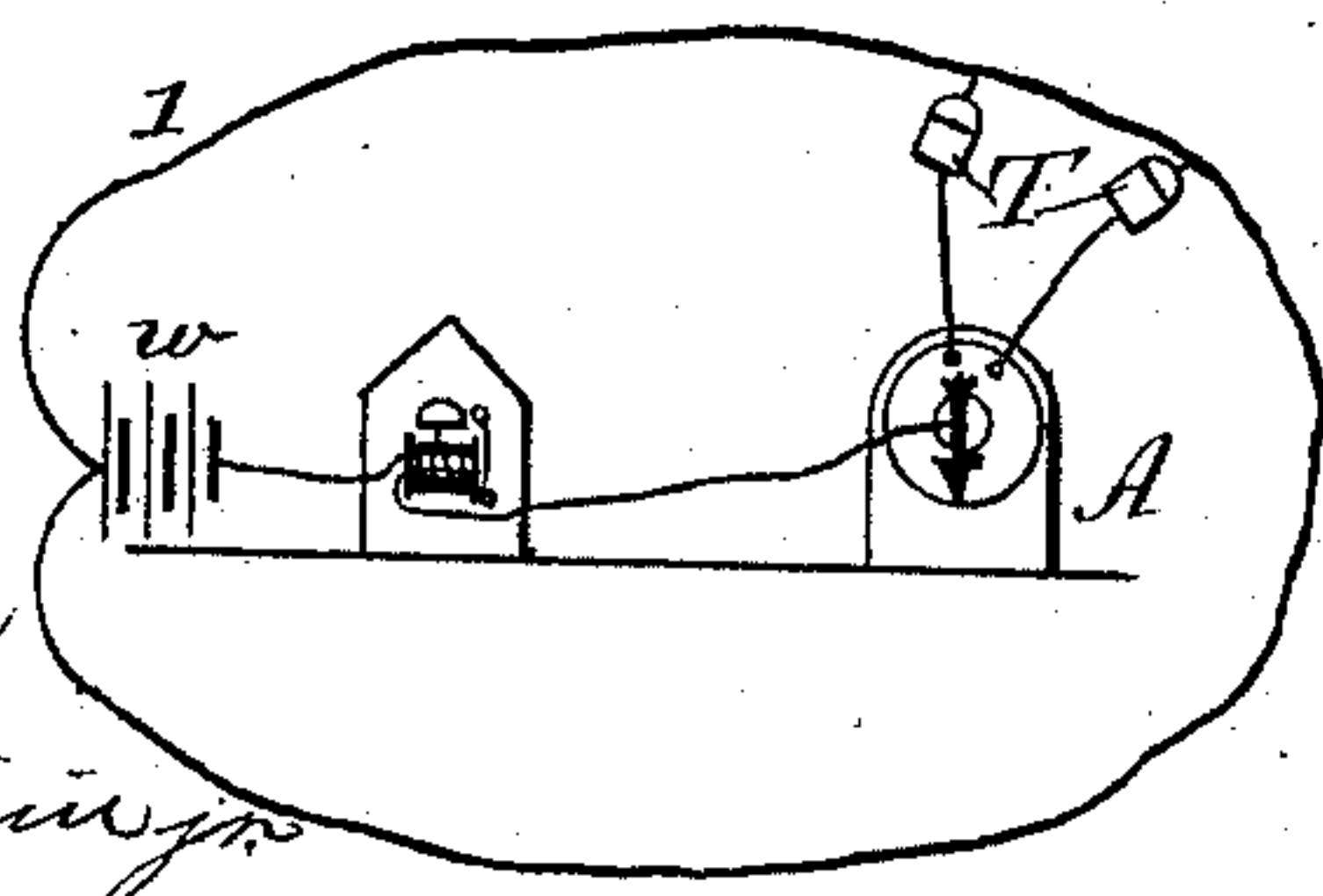
No. 316,477.

Patented Apr. 28, 1885.

*Fig. 1.*



*Fig. 9.*



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L. H. McCullough,  
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(No Model.)

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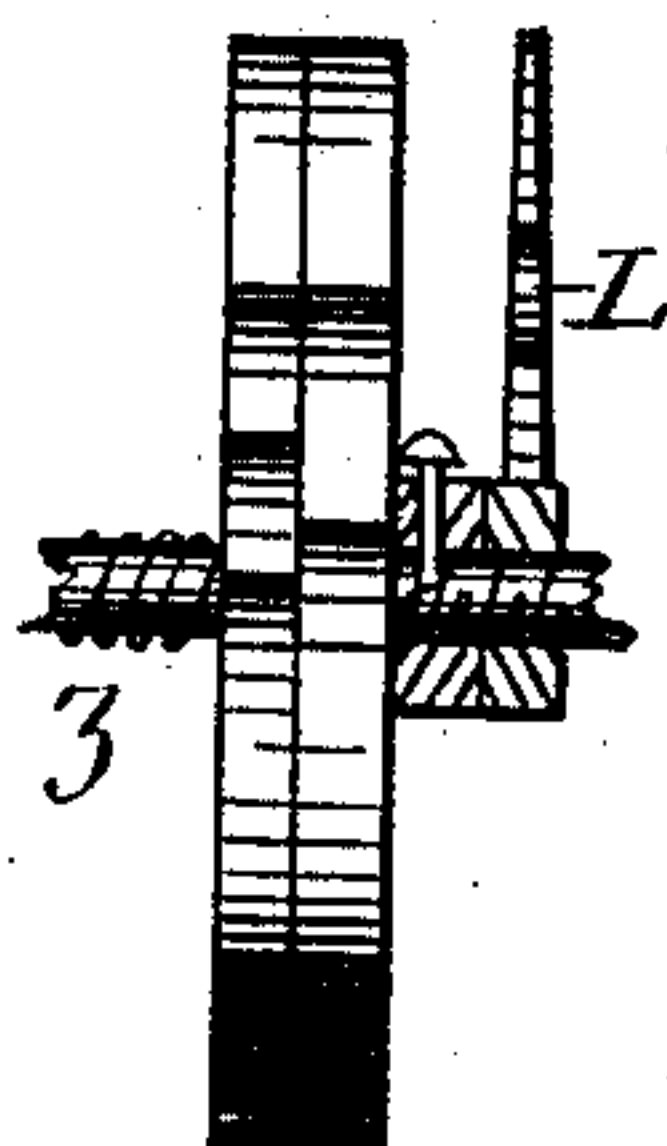
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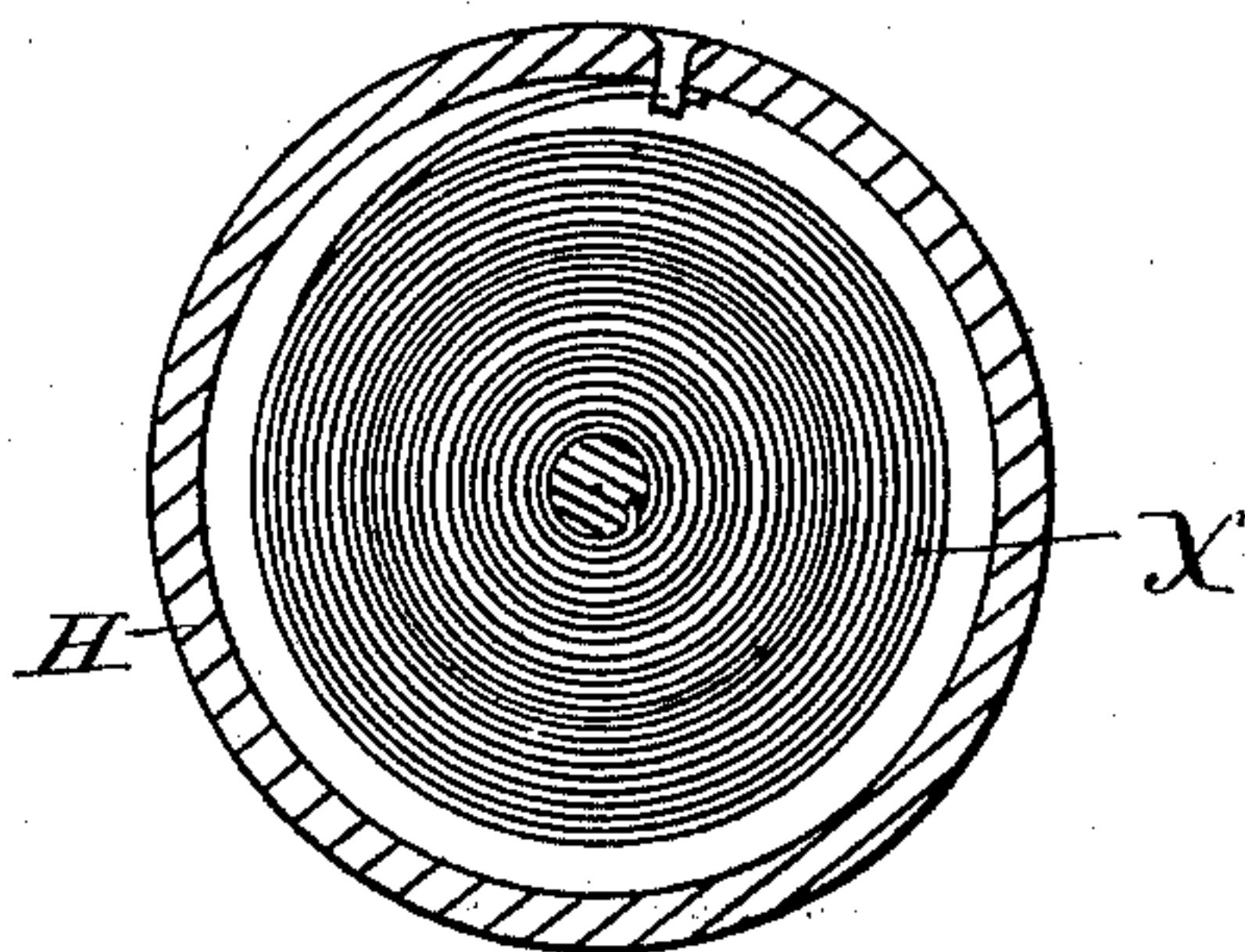
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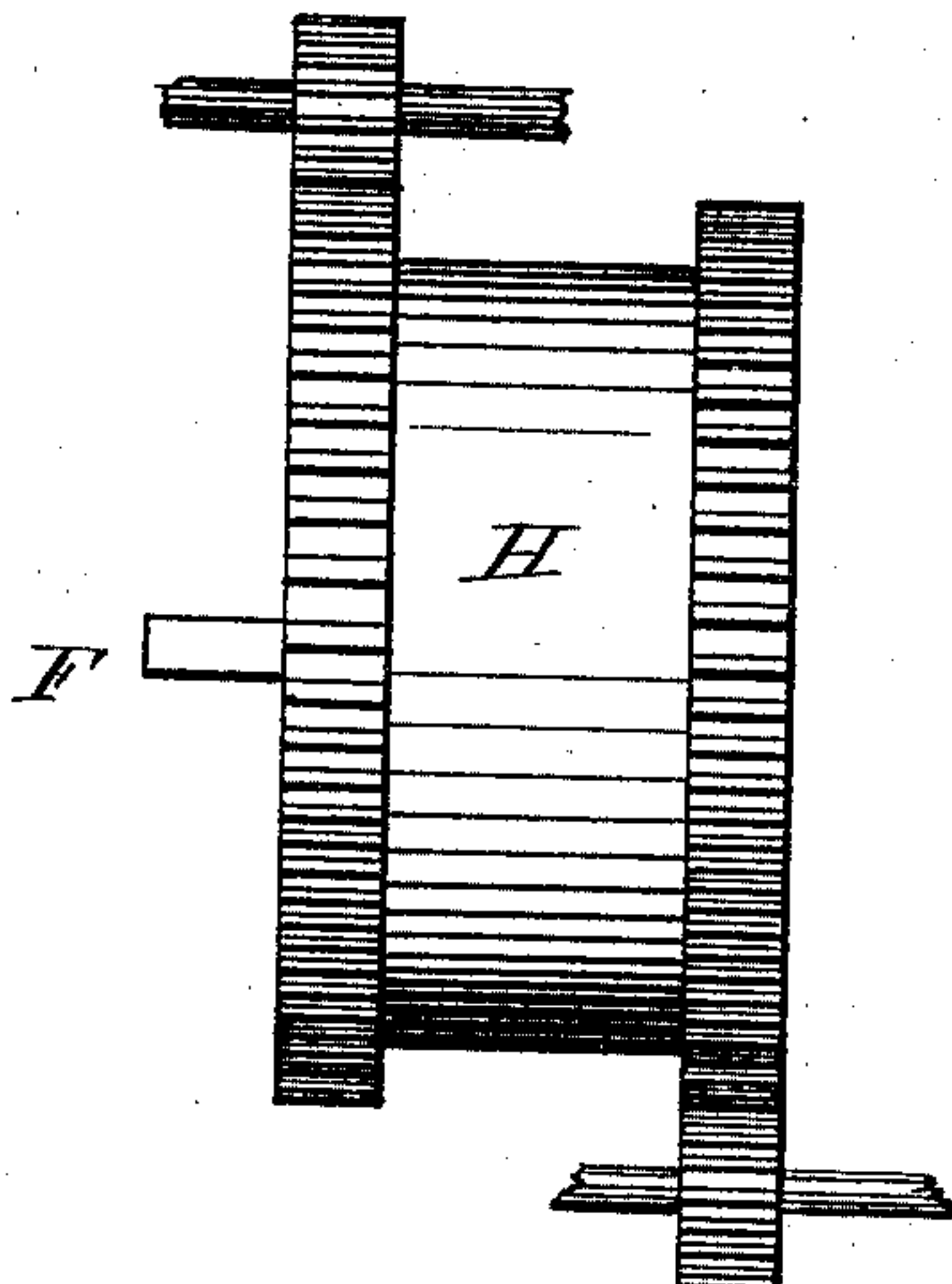
*Fig. 2*



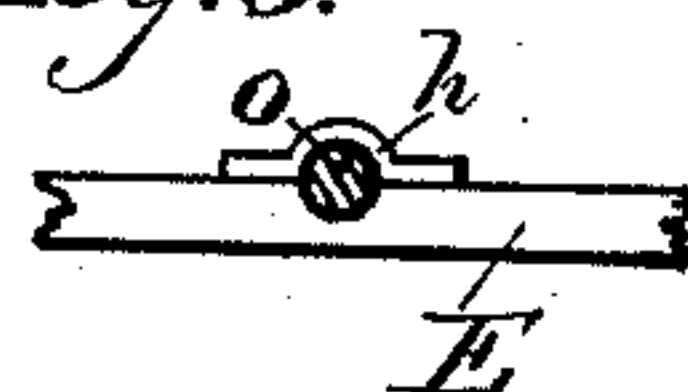
*Fig. 3.*



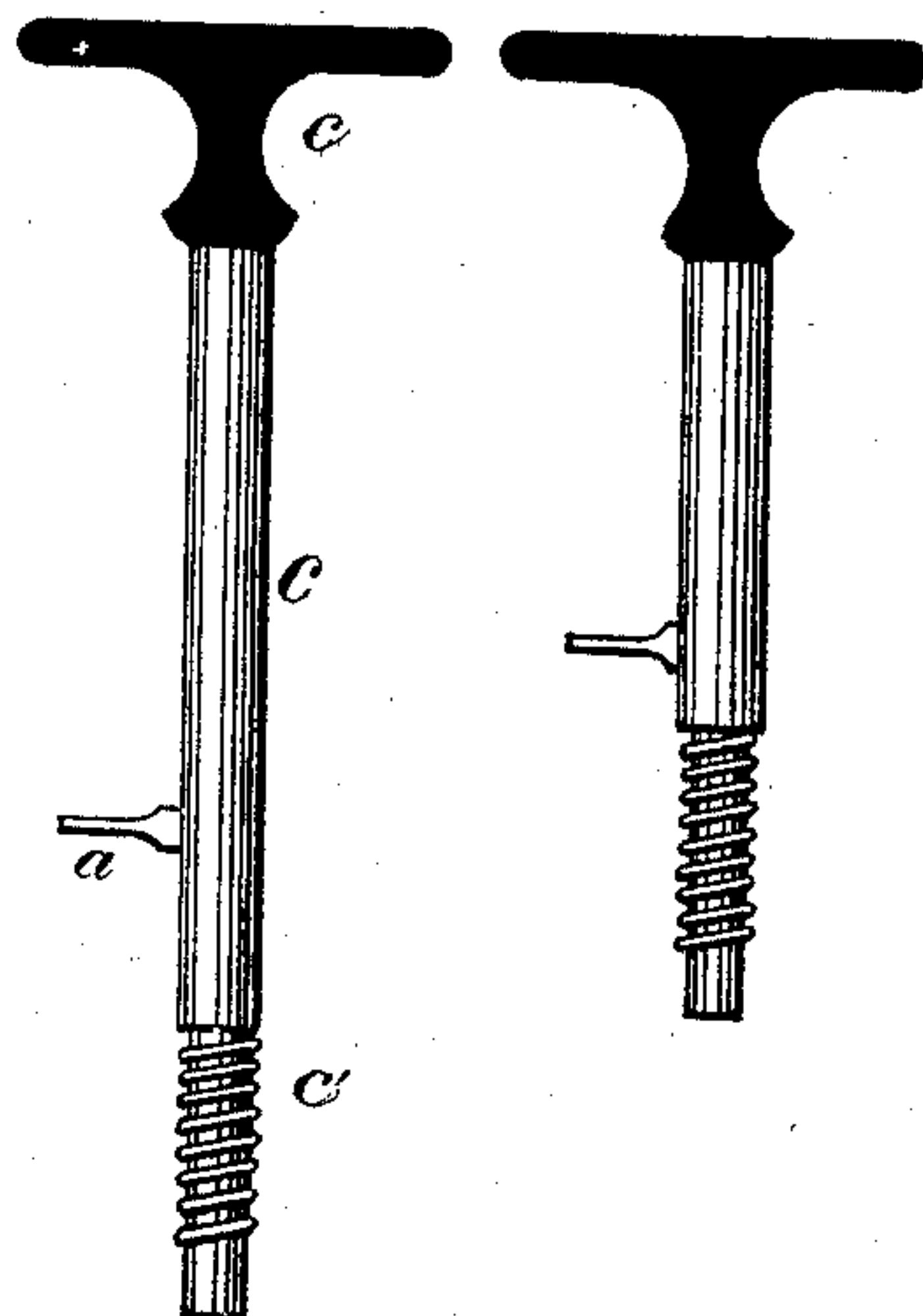
*Fig. 4.*



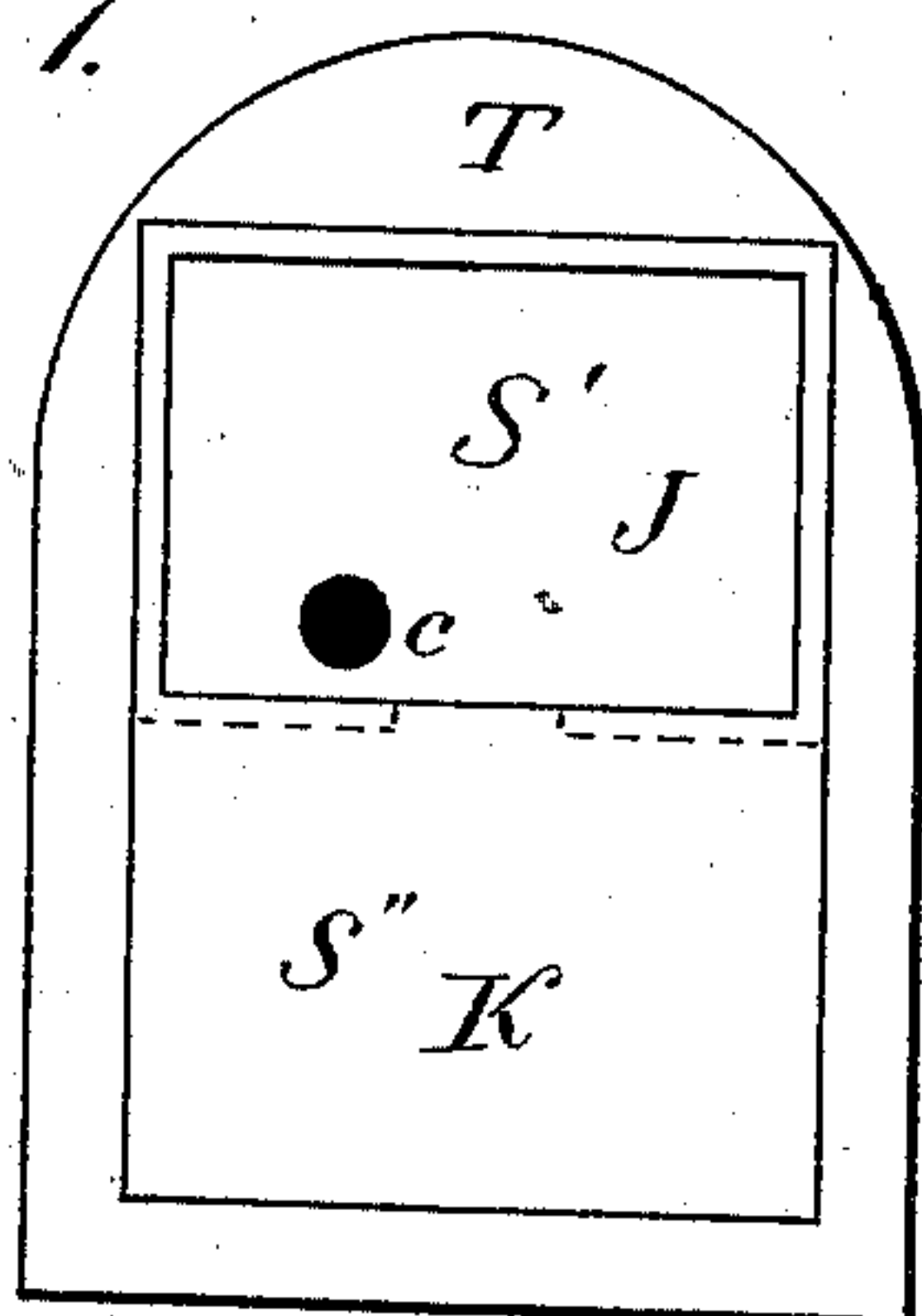
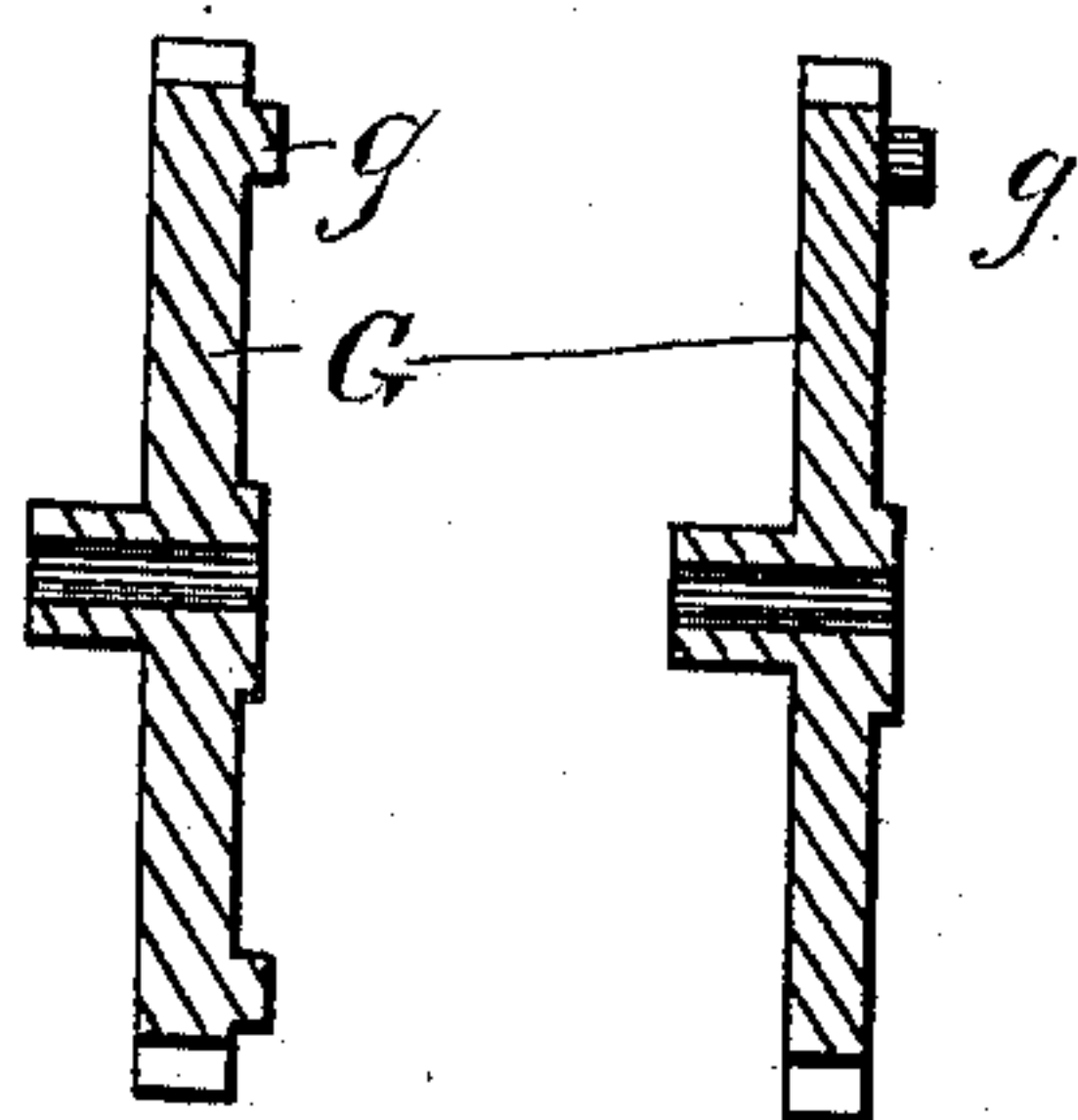
*Fig. 8.*



*Fig. 6.*



*Fig. 5. Fig. 7.*



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# UNITED STATES PATENT OFFICE.

LEWIS H. McCULLOUGH, OF RICHMOND, INDIANA, ASSIGNOR TO THE RICHMOND FIRE ALARM COMPANY, OF SAME PLACE.

MULTIPLE SIGNAL-BOX FOR FIRE AND POLICE TELEGRAPHS.

SPECIFICATION forming part of Letters Patent No. 316,477, dated April 28, 1885.

Application filed August 5, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, LEWIS H. McCULLOUGH, a citizen of the United States, residing at Richmond, in the county of Wayne and State of Indiana, have invented certain new and useful Improvements in Multiple Signal-Boxes for Fire and Police Telegraphs; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to multiple signal-boxes for fire and police telegraphs; and it consists in certain improvements whereby I am enabled to put my multiple signaling apparatus into compact form, and at the same time to keep the fire-alarm apparatus apart from that designed to be used in sending signals for police, police-patrols, &c., so that only those can send in the latter class of signals who are entrusted with special keys, in addition to those required to secure access to the apparatus for sending in alarms of fire.

My invention also consists of improvements in means for preventing minute particles of dust, fiber, or other substance from being deposited on the contact-points of my circuit-controlling apparatus, and so interfering with their proper operation.

My boxes are especially intended for use in connection with my non-interfering fire-telegraph system for which I have filed application for Letters Patent of an even date herewith, although they may be used with any system, it being easily possible to adapt them to open or closed circuit use.

It is now common in cities and large towns which maintain a force of police to have in easily accessible places, but at a distance from the fire-alarm signal-boxes, means for calling the police or police-patrols.

The object of having the two kinds of signaling apparatus separate and apart is that the power to call the police and police-patrols may be wholly in the hands of police agents. Now, other persons besides the police being often intrusted with the keys to fire-alarm signal-boxes, it has heretofore been thought necessary to keep the two apparatuses in separate

boxes at some distance apart. I combine them in one compact apparatus in which a single motor operates either class of signals, as may be desired.

In the drawings which accompany and form a part of this specification, Figure 1 is a front elevation of my multiple signal-box, the doors of its two compartments being removed. Fig. 2 shows, besides other details, an edge view of the two circuit-making wheels which I employ in sending in police and police-patrol signals. Fig. 3 is a cross section of the driving-spring and shaft and the spring-barrel. Fig. 4 is a side elevation of the same, showing gear-wheels attached to the shaft and barrel, respectively. Figs. 5, 6, 7, and 8 are detail views, and Fig. 9 shows my box applied to a system.

I inclose my multiple signal apparatus in an iron box, S, divided into two compartments, as shown, which box is inclosed in a larger iron box, T, (see Figs. 7 and 9,) similar to those now in common use in fire-telegraph systems. Keys to this larger box may be held by all persons authorized to send any kind of signals within the capacity of the apparatus.

In one compartment of the box S (here the upper) I place my fire-alarm-signaling apparatus and in the other compartment my apparatus for sending signals for police and police-patrols. The fire-alarm apparatus which I show in the upper compartment is substantially the same as that which I employ in separate fire-alarm signal-boxes designed to be used for sending fire-alarm signals only. The principal deviation from that form of apparatus lies in the arrangement of the spring-motor X, which in this case is attached to a shaft, F, for driving the fire-alarm-signaling apparatus, and to a barrel, H, for driving the police-alarm-signaling apparatus. The spring X operates suitable gearing to drive the circuit-making wheels D D' in a manner well understood.

It is obvious that the gearing for operating either signaling apparatus may be actuated indifferently from the barrel or the shaft.

Referring more especially to the upper part of Fig. 1, D represents a notched wheel, which operates the circuit-making apparatus through



lever E. The wheel D is so notched as to make and break an electric circuit through the lever E a definite number of times, and thereby to send to the different engine-houses a definite signal, the wheel D in each signal-box being differently notched to correspond to the number of the box. The lever E is pivoted at *e*, and is caused to press against the periphery of the wheel D by the spring *f*, which is attached to the lever E and to the frame B, which supports the apparatus within the box. When the wheel D is free to rotate under the influence of the spring X, the point *e'* of the lever E is brought by the spring *f* successively into the notches *d d' d''*, &c., and thereby operates the circuit-maker, as will be more fully set forth hereinafter. The spring X is normally prevented from acting to rotate the wheel D by a detent, *a*, attached to the rod C, Fig. 6. This detent stands normally in the path of a stop, *g*, on the gear-wheel G, Fig. 5. The rod C, however, which may be called the "push-rod" or "releasing-rod," can be moved longitudinally in its bearings; and when it is moved inward, by pressing on the button *c* on its outer end, the detent *a* is moved out of the path of the stop *g*. This releases the gearing, and the spring X is free to actuate the wheel D. A spring, *c'*, restores the rod C to its normal position after it has been pushed in to release the signaling mechanism. The wheels of the gearing are so proportioned that while the wheel G is making one revolution, before it is brought to rest by its stop *g* coming into contact with the detent *a*, the wheel D will make four complete revolutions, and cause the signal representing the number of any given station to be given four times in succession. The button *c* of the rod C can be reached as soon as the door of the inclosing-box is opened. The opposite end of the rod C is squared and passes into a square hole in the frame B, so as not to be turned when the stop *g* comes against the detent *a*.

Coming, now, to describe the means by which the lever E operates the circuit-making apparatus, it will be seen that a clip, *h*, is attached to the lever E, and that by the said clip the conducting-rod *i*, insulated where it passes under the clip by a hard-rubber covering, *o*, (see Fig. 8,) is fixed to the lever, so as to move with it. Attached to one end of this rod *i* is a binding-post, *l*. The rod *i* extends into a glass tube, *m*, which is hermetically sealed at one end by the sleeve *n*, of hard rubber, fitting over the tube and the rod *i*, and at its opposite extremity by being closed directly around the rod *i'*, a part of which lies within the tube. The ends of the rods *i i'* are normally out of contact with each other in the tube; but when the point *e'* of the lever E falls or is drawn into one of the notches *d d' d''*, &c., during the rotation of the wheel D, the lever E presses the rod *i* down into contact with *i'*, and thereby completes an electric circuit. I prefer to make the wheel D close the circuit intermediately through the lever

E and the rod *i*, it being easier with this construction to surround the contacts with a dust-proof chamber. It would not, however, be a departure from my invention to employ a contact-spring and a wheel with conducting and non-conducting portions with which the spring should make contact. The tube *m* may be made of any good insulating material; but I prefer glass, as it enables me to observe at all times the condition of the contact-surfaces.

The operation of the separate parts above described has already been indicated, and their joint operation may be briefly set forth as follows, it being understood that the keys to the inclosing-boxes T are given into the charge of policemen or other responsible persons whose duty it is to send in an alarm in case of fire. The outer box being open, the operator desiring to give an alarm of fire presses upon the button *c*, and thereby pushes in the rod C and its attached detent *a*, removing the latter from the path of the stop *g* on the gear-wheel G. By this operation the clock-work gearing is released and the wheel D begins to rotate. Meanwhile, as soon as the pressure is removed from the button *c*, the rod C is restored to its normal position by the spring *c'*, and the detent *a* is ready to engage the stop *g* when the wheel G shall have made a complete revolution. The wheel D continues to rotate until it has made four revolutions, when, the gear-wheel G having completed one revolution, the apparatus is brought to rest by the detent *a* engaging the stop *g*, as already indicated. During the rotations of the wheel D the point *e'* of the lever E is drawn by the spring *f* into the notches *d d' d''*, &c., and every time it is so drawn it pushes the end of the conducting-rod *i* against that of the conducting-rod *i'*, within the air-tight tube *m*, closing the line-circuit.

It is clear that for every time the button *c* is pressed a signal representing the number of the sending-station will be transmitted over the line four times. It is also clear that, since the contact is made within an air-tight chamber, there is no possibility of dust or other minute particles obstructing or deranging the operation of the electric circuit-making apparatus, for it is not possible that particles of dust should enter where the air is excluded.

I may make the chamber *m* simply dust-proof in substantially the manner described, or I may also provide means for preventing the injurious effects of sparking on the contact-surfaces by exhausting the air from the chamber and maintaining a vacuum therein. Even if the vacuum should not be perfect at first, a few sparks would burn out the oxygen and prevent any future wasting of the contacts.

I shall call the above-described circuit-controlling apparatus, "a key circuit-controller having its contact points or surfaces inclosed in a dust-proof chamber" to distinguish it from thermostatic circuit-controllers in which a sealed chamber incloses circuit-terminals one of which is an expansible conducting-liquid.

The apparatus in the lower compartment of



the box S is operated and operates in precisely the same manner as that already described, except in the following particulars:

The circuit-making apparatus is made up of two or more wheels, instead of one, mounted on the shaft  $y'$ , so as to be capable of longitudinal adjustment thereon. Their attachment to the said shaft is accomplished by means of a set-screw,  $p$ , running through their hub and into a longitudinal slot in the shaft  $y'$ . The outer end of the said shaft has a quick screw-thread, and a hand or pointer, L, having its hub correspondingly screw-threaded, is mounted thereon. The hub thus forms a nut on the end of the shaft  $y'$ . A spring, Z, bearing against the frame B and the wheel D' presses the hub of the latter normally out against that of the hand or pointer L. By turning the hand or pointer in one direction—say to the right—the wheels D will be forced inward against the power of the spring Z, and by turning it in the opposite direction the wheels will be moved outward by the force of the spring, and the successive turnings may be so graduated that one of them shall bring the outer of the two wheels D' under the end  $e'$  of the lever E, and the other shall bring the inner wheel under the same point. Stops  $v v'$  project from the frame to limit the motion of the hand at the proper point. The notches in the outer wheel D' are arranged in twos, and there are four pairs of notches around the periphery of the wheel. The notches of the inner wheel D' are arranged similarly, in threes, there being four sets of three about the wheel. The first notches in the two wheels coincide, as shown in Fig. 2. The wheels D' are notched alike in all the boxes.

The wheel G in the police-alarm apparatus has two stops  $g$  at diametrically-opposite points which lie in the path of the detent  $a$ . The apparatus is accordingly stopped after the wheel G has made a half-revolution—that is, after the wheels D' have made two complete revolutions. This will cause the signals representing calls for police or police-patrols to be sent in eight times each.

It is evident that I may vary the number and arrangement of the notches in the wheels D' without departing from the main features of my invention.

I have shown and described only two wheels D' upon the shaft  $y'$ , for the reason that I have especially designed my box to serve the purposes of fire and police telegraph.

If it should be desired to apply my signaling apparatus to district telegraphy in general, any desired number of wheels, each representing a distinct want, might be mounted on the shaft  $y'$  by lengthening the shaft somewhat and extending the screw-threaded portion so as to give more play to the hand or pointer L. The stops  $v v'$  should then be removed, and the proper directions given on a dial-face behind the pointer for moving the pointer so as to bring the proper wheel in line with the lever E.

Instead of wheels, I may use a drum having two or more series of contacts arranged around its outer surface. The upper compartment of the box S has a glass cover, J, through which the rod C projects. The rod C in the lower compartment is shorter than that in the upper, and with its button  $c$  is entirely concealed by the metal cover K of the lower compartment. Any person having a key to the outer box, which incloses the box S, can send in an alarm of fire by pressing on the button  $c$  of the upper rod, C, which button is exposed as soon as the door of the outer box is opened. Only those, however, who have special keys to the lower compartment can ring in a police-alarm. I thus secure the practical separation of the two classes of signaling apparatus, while at the same time I combine them into so compact a structure that they can be easily placed in boxes of the size now commonly employed as fire-alarm signal-boxes.

It will be observed that the two apparatuses are operated by a single motor. One of the battery-wires enters at binding-post P and passes to each of the binding-posts  $l$ , attached to the outer end of the rods  $i$ . The other battery-wire enters at binding-post P' and passes to each of the binding-posts  $l'$ , attached to the outer ends of the rods  $i'$ .

Having now described my invention, what I claim is—

1. In a signal-box for fire-alarm telegraphs, the combination of the wheel D, pivoted lever E, rods  $i$  and  $i'$ , one of which slides in air-tight bearings, and the exhausted tube  $m$ , whereby dust is prevented from collecting on the contact-surfaces and positive contact is made when the circuit-controller is operated, substantially as specified.

2. In combination with a signal-wheel adapted to open or close an electric circuit and suitable gearing therefor, a second signal-wheel, also adapted to open or close an electric circuit, and separate gearing therefor, and a motor for operating either set of gearing.

3. The signal-wheel D, and suitable gearing for operating the same, connected with the shaft F, the signal-wheels D', and suitable gearing for operating the same connected with the barrel H, and a motor connected with both shaft and barrel.

4. The circuit-wheels D', movable along the shaft  $y'$ , and the contact-lever E, in combination with the screw-threaded shaft  $y'$ , and the nut or hub L', and the spring Z, whereby the position of the wheels D on the shaft  $y'$  may be adjusted.

In testimony whereof I affix my signature in presence of two witnesses.

LEWIS H. McCULLOUGH.

Witnesses:

WM. M. STOCKBRIDGE.

WARREN C. STONE.