(No Model.)

H. WETZER.

SIGNALING APPARATUS.

No. 496,076. Patented Apr. 25, 1893.

Fig. 1.

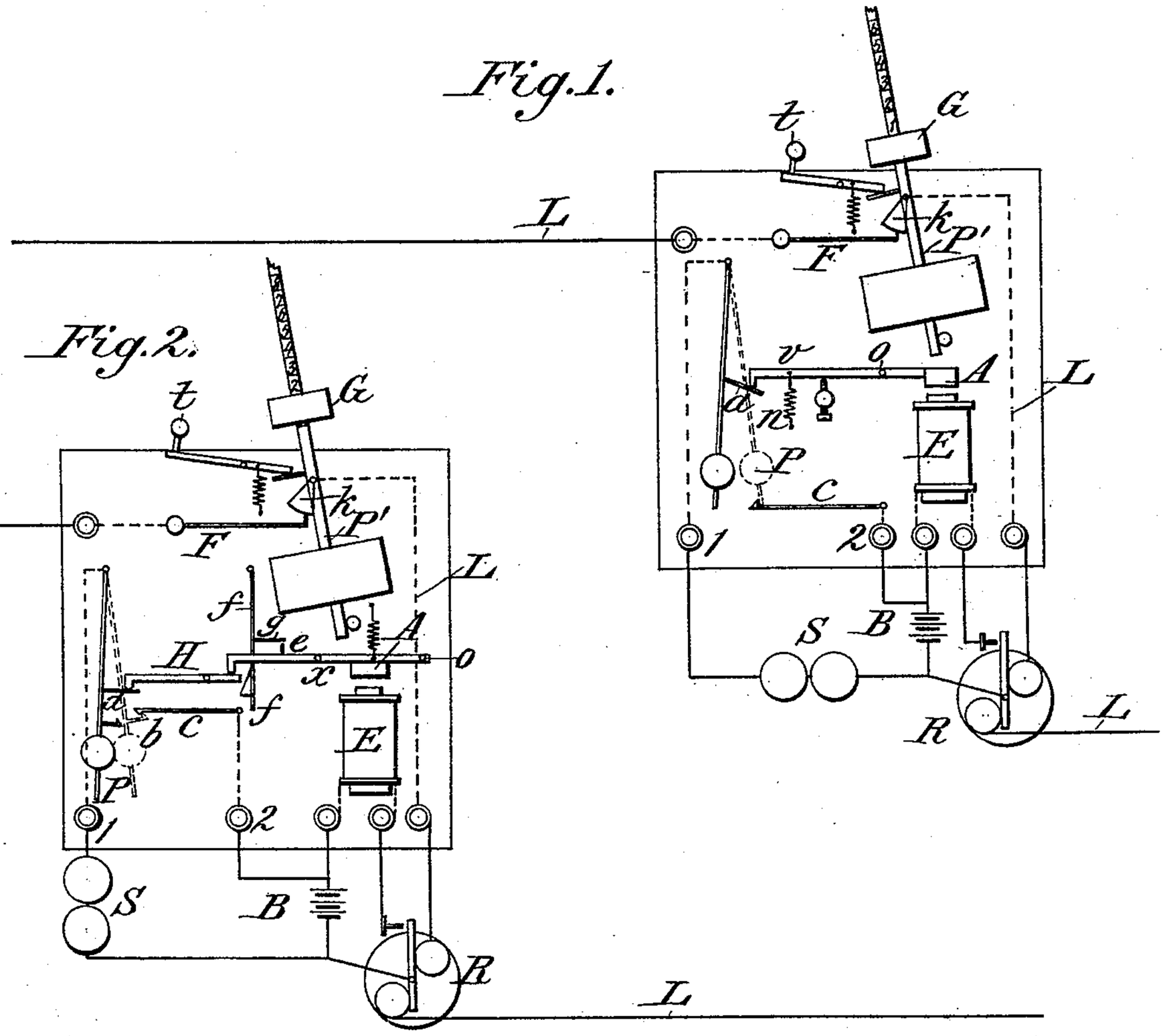


Fig. 2.

Fig. 3.

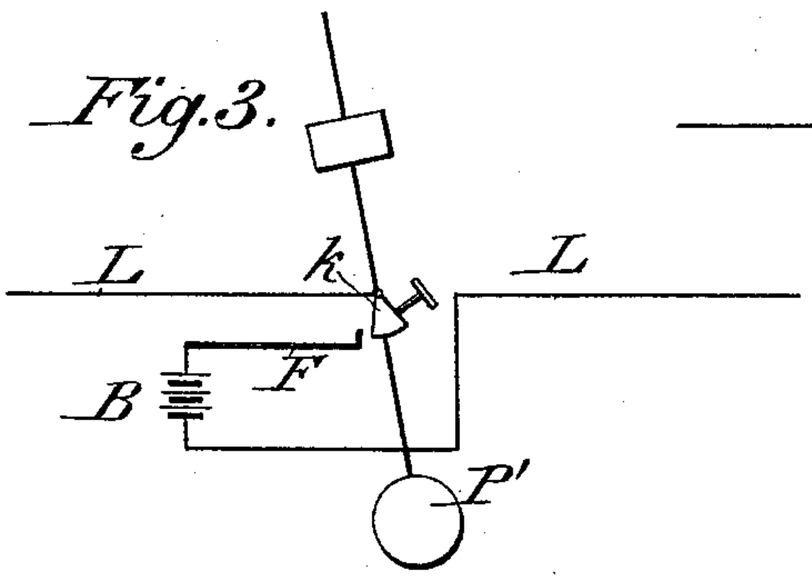


Fig. 4.

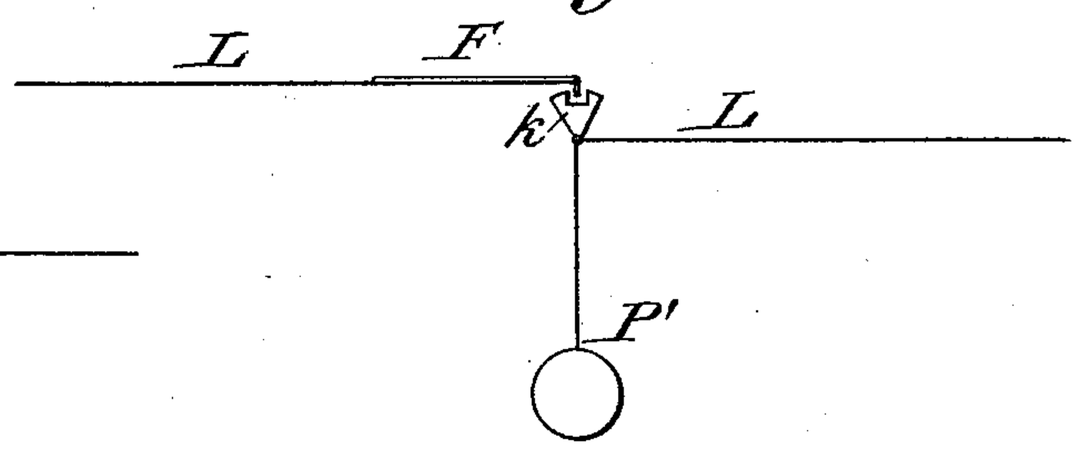
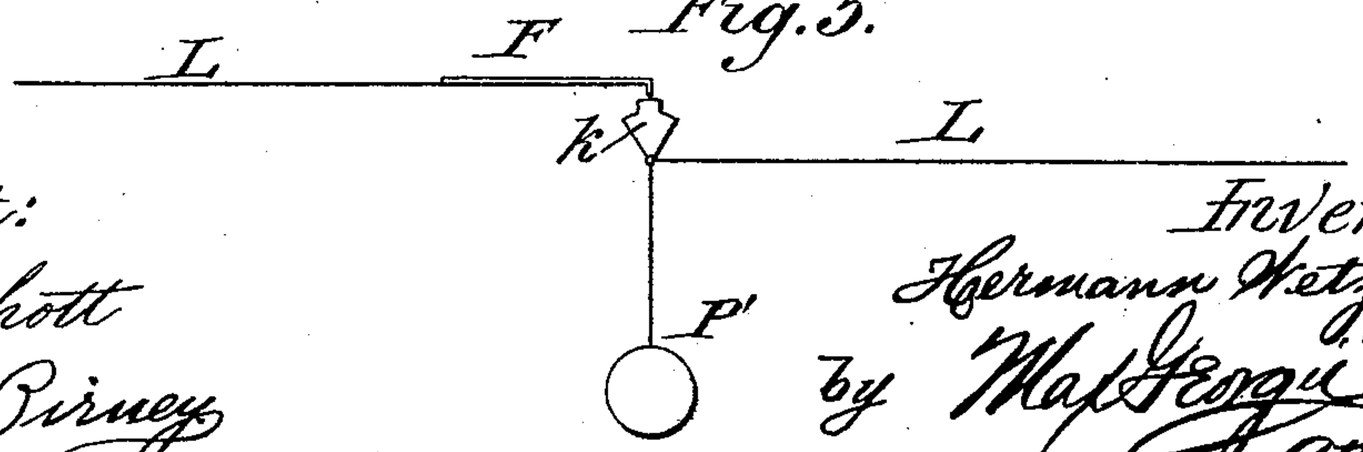


Fig. 5.



Attest:

F. H. Schott

A. J. Birney

Inventor:

Hermann Wetzer

by Mast Foster & Co.

Attorneys.

UNITED STATES PATENT OFFICE.

HERMANN WETZER, OF PFRONTEN, GERMANY.

SIGNALING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 496,076, dated April 25, 1893.

Application filed August 8, 1892. Serial No. 442,527. (No model.)

To all whom it may concern:

Be it known that I, HERMANN WETZER, a subject of the King of Bavaria, Empire of Germany, residing at Pfronten, Bavaria, Germany, have invented certain new and useful Improvements in Signaling Apparatus for Telegraph or Telephone Systems, of which the following is a specification.

This invention, as its title indicates, relates to devices whereby the operator at one station of a telephone or telegraph or similar system may signal to or call up any station on the line in which his station is located.

The invention more particularly relates to systems employing pendulums of varying length (one for each station) for actuating the signaling devices.

The purpose of my invention, is to provide means whereby the pendulums in the system are positively actuated by a constant force exerted, *e. g.*, by a hammer in response to the operator at the calling-up station and are rapidly and positively stopped when the signaling ceases and positively held or arrested in their condition of rest.

It is also the purpose of my invention, to enable the operator to close an alarm circuit at the called-up station and thereby to cause a continual alarm to be given, which will not cease until the operator at the called-up station breaks the said alarm circuit.

For these purposes, my invention consists in the devices, features and combinations of parts to be hereinafter described and pointed out in the claims.

In the accompanying drawings,—Figure 1 represents, in diagram, a signaling apparatus embodying my invention; Fig. 2, a similar view of a somewhat modified apparatus; Figs. 3, 4 and 5, detail views of certain parts of the apparatus, somewhat modified.

Each station to be called up is provided with a pendulum, P, each pendulum being of a different length and hence having different times of oscillation. Each pendulum, P, is provided with a pendulum-stop preferably in a lateral arm, *a*, Figs. 1 and 2, upon which, when the line is at rest, rests the arm or hammer, *v*, of the armature-lever A, pivoted at *o* (Fig. 1) or the hammer H (Fig. 2), so that the pendulums are urged a little out of their lowermost position. This pendulum-stop results in a rapid cessation of the oscillations of the pendulums, caused by a previous telegraphing or signaling.

Each signaling station is provided with a circuit making and breaking device, *e. g.* a pendulum, P′, whose oscillations may be varied by adjusting thereon a sliding weight, G. When no signaling occurs, all the pendulums P and P′ are at rest, the pendulums, P′, being crowded out of their condition of equilibrium by the key *t*. The said pendulum, P′, is provided with a contact, *k*, which, when the pendulum, P′, oscillates, alternately touches and leaves the spring F. (Figs. 1 and 2.) In constant current circuits employing relays, the parts *k* and F are connected with the circuits L, as represented in Figs. 1 and 2. When a station is to be called up, the signaling station adjusts the weight G of its pendulum P′, so that its time of oscillation is about the same as that of the pendulum, P, of the station to be called up, where upon it is caused to oscillate by pressing upon the key, *t*. When pendulum, P′, has almost attained its lowermost position, the contact, *k*, leaves the spring, F, and the circuit is broken. The relays, R, of all the stations hence close the circuit of their local batteries, B, and all armatures-levers, A, are attracted by the electro-magnets, E. The pendulum-stops are hence released and the pendulums, P, are thereby liberated from the lever-arms, *v*, resting upon their lateral arms, *a* (Fig. 1) and swing slightly in the direction toward, A, pendulum, P′, completing its first oscillation. On the second or return-oscillation, the pendulum, P′, as soon as it has passed its lowest position, again closes the circuit by the parts *k* and F. This causes the armature-levers, A, to drop and the arms, or hammers, *v*, thereof to strike the lateral arms, *a*, of all the pendulums P. This stroke upon the lateral arms gives an impulse to the pendulums, P. Pendulum, P′, now completes its second oscillation. When it has again attained its lowermost position in its third oscillation, the contact, *k*, again leaves the spring F, the circuit is again broken, all the armatures are again attracted by their electro-magnets, and the arms *v* rise, that is to say, the pendulum-stops

are released. When pendulum, P′, in its fourth oscillation again attains its lowest position, the springs, F, again close the circuits with *k* and the lever-arms, *v*, are again drawn downward by the springs, *n*. While the stroke of the armature-lever for those pendulums, P, which oscillate considerably faster than P′ occurs too late to impinge against the lateral arms, *a*, of the pendulums P the said stroke for the pendulums oscillating considerably more slowly occurs either too soon to impinge against the lateral arms, *a*, or they are struck, while the pendulums are still swinging in the direction of A, whereby these pendulums are stopped. Only that pendulum, P, which oscillates about as fast as the pendulum, P′, receives an impulse from the stroke of *v*. The return of this pendulum, P, is made free by the fifth oscillation of P′, while the sixth oscillation of, P′, imparts another impulse thereto, &c. The pendulum, P, thus soon acquires a sufficient amplitude of oscillation to cause a part thereof to strike a contact piece or pin, *c*, lying in the path of such part, thereby closing the circuit of a continuous electric bell or alarm. This bell will continue to ring, until the employé called up, stops the alarm. The arrangement may also be such that the pendulum rod, when it has acquired a sufficient oscillation, or a pin or hook, *b*, will be caught or arrested by the contact part, *c*, which, in this case, is in the form of a spring-hook or catch. The pendulum, P, will then be arrested in the position indicated in dotted lines in Figs. 1 and 2. When the pendulum is in this position, the current of an electric bell or other alarm, S, is closed and the current now passes from the local battery, B, through the alarm, S, through the binding-post 1, pendulum, P, spring-catch, *c*, returning to the battery, B, by way of binding-post 2. The alarm will sound or operate, until the employé called up, releases the pendulum, P, from the spring, *c*. The contact for the bell or alarm might, moreover, be produced, by causing the pendulum, P, to force a lever or spring beneath a latch, when it has attained a sufficient amplitude of oscillation, whereby an alarm-circuit is closed until the lever or spring is released by the employé called up. The pendulum may also receive its impulse in the following manner, that is to say, the pendulum, P′, Fig. 2, breaks and closes the circuit, L, in the manner described thereby closing and breaking the local-circuits at all the stations, by virtue of the relays, R. At each station the armature-lever A, (Fig. 2) whose fulcrum is at *o*, when attracted, presses one arm of hammer, H, beneath the toe of the spring-latch, *f*. On the return of the armature-lever, a stud, *e*, attached thereto, strikes against the arm, *g*, of the latch, whereby the hammer, H, is released therefrom and acts upon the lateral arm, *a*, in the same manner as the hammer *v* in Fig. 1.

In a constant current circuit omitting the relays, the contacting arrangement may remain the same. The striking device is that indicated in Fig. 2, only the fulcrum of the armature is at *x* instead of at *o* and the armature, A, is attracted by the direct action of the line-current.

In circuits employing relays, the current-source, B, is closed and broken by means of the contacts F and *k*, when the pendulum, P, oscillates, as shown in Fig. 3. The signal is then given as already explained. The same effect is produced in circuits without relays, only that the armature, A, is then attracted by the direct action of the line current. The signal may be produced moreover, by pendulums, P′, whose time of oscillation is twice as great as that of the pendulum, P, of the station to be called up. In this case the make and break of the contact are produced by the means indicated in Figs. 4 and 5.

From the above it will be noted that the term "hammer," is used to designate the part *v*, in Fig. 1, or the part, H, in Fig. 2. Moreover, inasmuch as either of these parts also perform the function of stopping the pendulum, they and the parts immediately acting upon them are comprised under the generic designation "pendulum-stops."

I claim—

1. In a signaling device, a series of pendulums of varying times of oscillation, arranged one at each station to be called up and an adjustable circuit making and breaking device arranged in the circuit connecting the different stations, in combination with a hammer for striking against the pendulum to impart a positive impulse thereto, an armature for actuating said hammer and an electro-magnet, the circuit of the electro-magnet being opened and closed by the adjustable circuit making and breaking device, substantially as set forth.

2. In a signaling device, a series of pendulums of varying times of oscillation arranged one at each station, and a pendulum, arranged in the circuit connecting the stations, whose times of oscillation are adjustable, in combination with a hammer, in each station adapted to strike against the pendulum, an armature for actuating said hammer, an electro-magnet for each armature, a spring, as F, and a contact attached to the adjustable pendulum, whereby the circuit of the electro-magnets are closed and broken and the hammers are caused to strike against the pendulums at regular intervals, substantially as set forth.

3. In a signaling-device, a pendulum, adapted to receive its oscillating impulses from the calling-up station in combination with a stop and means for releasing the stop from the calling-up station to arrest the pendulum, when no signal is given, substantially as set forth.

4. In a signaling-device, a pendulum, adapted to receive its oscillating impulses from the calling-up station and provided with a lateral arm, as *a*, in combination with a hammer,

adapted to rest upon the lateral arm and means for actuating said hammer, substantially as set forth.

5. In a signaling-device, a pendulum, adapted to receive its oscillating impulses from the calling-up station in combination with a contact-piece, lying in the path of a part attached to said pendulum and an alarm-circuit permanently connected with the pendulum and the contact-piece, whereby the pendulum, when attaining a sufficient amplitude of oscillation, causes the alarm to operate, substantially as set forth.

6. In a signaling-device, a pendulum, adapted to receive its oscillating impulses from the calling-up station in combination with a contact-piece, *c*, provided with a hook arranged in the path of a part attached to said pendulum and adapted to arrest the pendulum, when it attains a sufficient amplitude of oscillation, and an alarm-circuit permanently connected with the pendulum and the contact-piece, *c*, substantially as set forth.

7. In a signaling-device, a pendulum, adapted to receive its oscillating impulses from the calling-up station and provided with a hook, *b*, in combination with a contact-piece, *c*, provided with a hook, adapted to engage the hook, *b*, and an alarm-circuit connected with the hook, *b*, and the contact-piece, *c*, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

HERMANN WETZER.

Witnesses:

ALBERT WEICKMANN,

KARL MAŸER.