

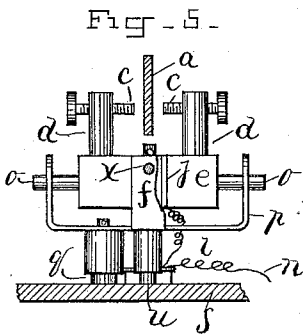
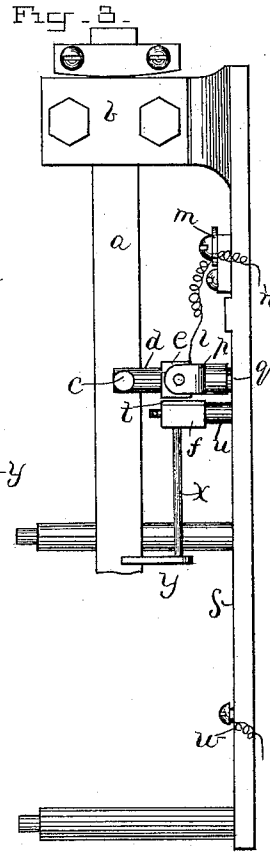
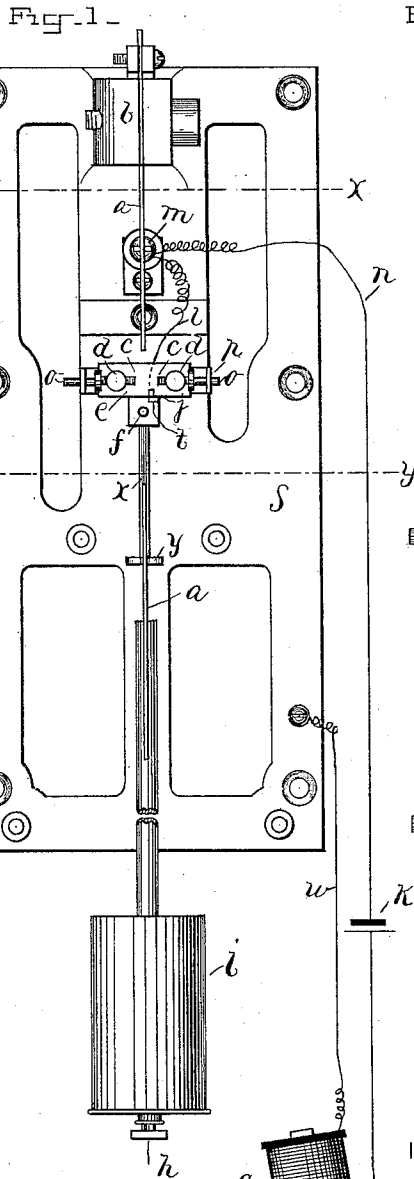
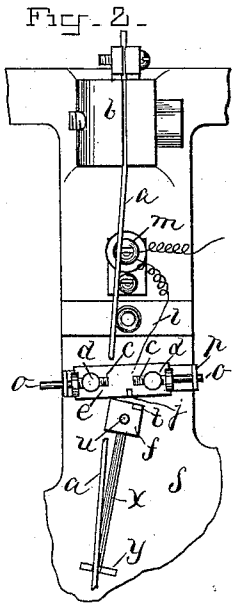
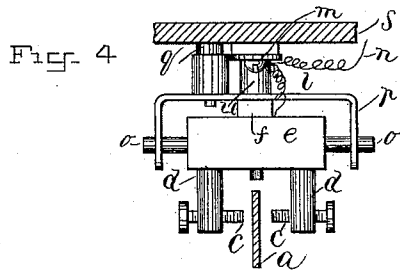
(No Model.)

2 Sheets—Sheet 1.

H. PHILLIPS.
ELECTRIC PENDULUM CLOCK.

No. 466,011.

Patented Dec. 29, 1891.



WITNESSES=

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INVENTOR=

Henry Phillips
By A. P. Thayer.
attor

(No Model.)

2 Sheets—Sheet 2.

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Fig. 6—

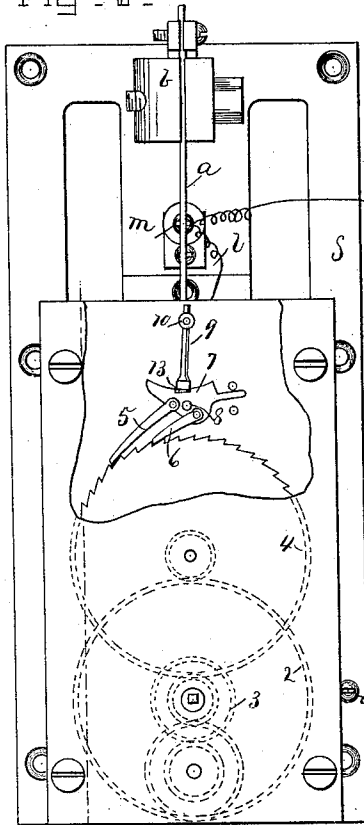


Fig. 7—

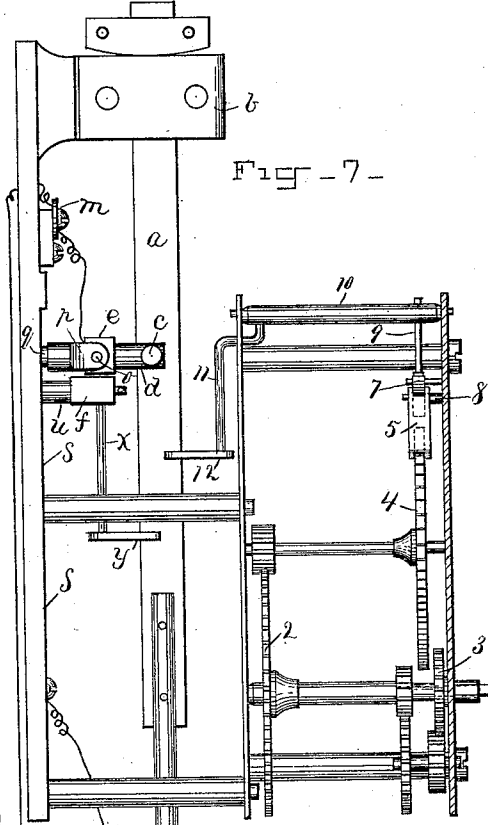
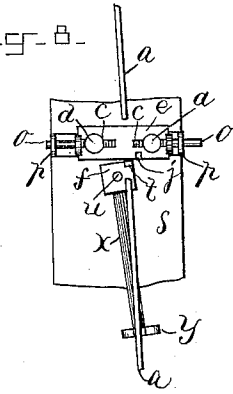


Fig. 8—



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UNITED STATES PATENT OFFICE.

HENRY PHILLIPS, OF NEW YORK, N. Y.

ELECTRIC PENDULUM CLOCK.

SPECIFICATION forming part of Letters Patent No. 466,011, dated December 29, 1891.

Application filed March 11, 1891. Serial No. 384,668. (No model.)

To all whom it may concern:

Be it known that I, HENRY PHILLIPS, a citizen of the United States, and a resident of New York city, in the county and State of New York, have invented new and useful Improvements in Electric Pendulum Clocks, of which the following is a specification.

My invention relates to electric pendulum clocks in which a switch to control the circuit is actuated by the pendulum and the pendulum is geared with the clock-train for actuating it; and it consists in the improved construction and arrangements of the switch devices hereinafter described and claimed, reference being made to the accompanying drawings, in which—

Figure 1 is a front elevation of the clock-supporting frame, switch mechanism, and part of the pendulum, illustrating my invention. Fig. 2 is a similar view of part of the apparatus of Fig. 1, with the pendulum and switch mechanism in different positions. Fig. 3 is a side elevation of the apparatus of Fig. 1. Fig. 4 is a detail, in horizontal section, of the pendulum and plan of the switch apparatus as seen from the line *x x*, Fig. 1, looking downward. Fig. 5 is a section of the pendulum and plan of the switch apparatus as seen from the line *y y*, Fig. 1, looking upward. Fig. 6 is a front elevation with a part broken out, illustrating the clock-train; and Fig. 7 is a side elevation, with parts in section, also showing the clock-train. Fig. 8 is a detail in front elevation showing the positions of the switch and brush when the pendulum is swung to the right.

The pendulum *a*, the upper portion of which consists of a flexible metal strip, is suspended at the upper end in the usual manner from the bracket *b*, and plays between the points of the adjusting-screws *c*, carried on the studs *d*, projecting from the horizontally-ranging sliding switch-block *e*, as in some other electric pendulum clocks; but in the contrivance of this switch-block in other respects, and of the brush-block *f*, I have provided novel and simple, and at the same time very efficient and reliable, means of closing and breaking the circuit for energizing an electro-magnet *g* to pull the pendulum in one direction only through the armature *h*, carried on the lower end of the bob *i*, the magnet being suitably

placed at one side of the vertical axis of the pendulum and slightly below the line in which the armature swings.

The switch-block carries a platinum contact-piece *j*, extending across its lower side about in the vertical plane of the axis of the pendulum, and being in electrical connection with one pole of the battery *k*, through the wire *l*, connected with the post *m*, which is insulated from the frame, and wire *n* connecting said post with the battery. Said switch-block is supported by pivots *o*, projecting from its ends so as to slide and also oscillate in bearings in the extremities of the yoke-bar *p*, which has pivotal support for vertical oscillation on the stud *q*, projecting from the back plate *s*, and located at a point some distance to one side of the vertical axis of the pendulum. The switch-block is therefore adapted to slide for making and breaking the contacts, also to oscillate on its longitudinal axis to insure contact along the entire length of the contact-pieces, and to swing in a vertical plane, the purpose of which is to cause its contact-piece to pass in one direction without contact with the brush.

Directly underneath the switch-block and in the vertical axis of the pendulum, or thereabout, is the pivoted oscillating brush-block *f*, so placed that the switch-block rests on its upper side, said brush-block having the platinum contact-piece *t* on the upper surface and being in this instance located laterally to the vertical plane of the pendulum on the opposite side of said plane to that of the pivot *q*, on which the switch-block swings; but it may be in said vertical plane. The brush-block is carried on the pivot-stud *u*, projecting from the back plate, and is in electrical connection with the magnet and the other pole of the battery through the wire *w*. A rod *x*, connected to the lower side of the brush-block, extends downward a suitable distance and connects with the pendulum by the fork *y* for vibrating said block. It will now be seen that when the pendulum is in the middle position or to the right of it the switch-block rests on the contact-piece *t* of the brush-block, so that electrical connection will be established when contact-piece *j* of the switch-block rests above or is passing over contact-piece *t*, and when the pendulum swings past

the center and vibrates the brush-block in the other direction the corner of the brush-block on that side of the pendulum swings the switch-block up on its pivot, as shown in Fig. 2, and separates the contact-points, so that they do not touch when the pendulum shifts the switch-block in that direction. The screw *c* on that side is so adjusted that the switch-block is shifted in that direction sufficiently to bring its contact-piece *j* over contact-piece *l* of the brush-block ready for contact when the pendulum arrives at the middle position on its return to the right, and the upper surface of the brush-block resumes the level position. At the same time the armature of the pendulum comes into the field of force of the magnet suitably placed on that side of the center position and is influenced thereby until contact of the pendulum with the adjusting-screw *c* on that side shifts the switch-block to the right and breaks the connection, the time of which is determined by the adjusting-screw *c* on that side, so as to give the pendulum the proper impulse for its required vibrations.

For driving the clock-train of which 2 represents the wheel turning the minute-hand and 3 the wheel of the hour-hand, the pendulum is made to drive the intermediate wheel 4, which is suitably geared with wheel 2 of the clock-train by the gravity pawls 5 and 6, which are suitably pivoted to the opposite extremities of the rocker 7, pivoted at 8, and forming part of an impulsion device of which the rest consists of the vibrating arm 9, suspended from the shaft 10, which is made to oscillate synchronously with the pendulum by the lever 11, suspended from said shaft and having the forked end 12 embracing the pendulum to be so actuated by it. The rocker 7 has a notch 13 in its upper edge, and directly over the pivot 8, in which the lower end of arm 9 engages and shifts said rocker and then escapes in both directions in the well-known operation of these devices to shift the train the predetermined distance for properly marking the time and allowing the pendulum to overrun the requisite movements of the train more or less as its beats require.

I claim—

1. In an electric pendulum clock, the combination, with the pendulum, of the sliding and vertically-swinging switch actuated thereby and having an electric contact-piece, and the vibrating brush also actuated by the pendulum, said switch having a pivot-support near one end and intermediate support on the vibrating brush, and thereby having electrical contact with the brush in the movements of the pendulum in one direction only and avoiding said contact in the movements in the reverse direction, substantially as described.

2. In an electric pendulum clock, the combination, with the pendulum, of the sliding vertically-swinging and transversely-rocking switch actuated thereby and having an electric contact-piece, and the vibrating brush also actuated by the pendulum, said switch having a pivot-support near one end, and intermediate support on the vibrating brush, and thereby having electric contact with the brush in the movements of the pendulum in one direction only and avoiding said contacts in the movements in the reverse direction, substantially as described.

3. In an electric pendulum clock, the combination, with the pendulum, of the switch-block having an electric contact in the lower side, and the stud-screws embracing the pendulum for being shifted thereby, the supporting-yoke in which the switch-block has support for sliding and oscillating, the pivot-support of the yoke placed laterally to the pendulum and near one end of the switch-block, and the pivoted brush located in the vertical plane of the pendulum, or thereabout, and having an arm connected with the pendulum for being vibrated, and having the switch-block resting on its upper flat side, substantially as described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 5th day of March, 1891.

HENRY PHILLIPS.

Witnesses:

W. J. MORGAN,
W. B. EARLL.