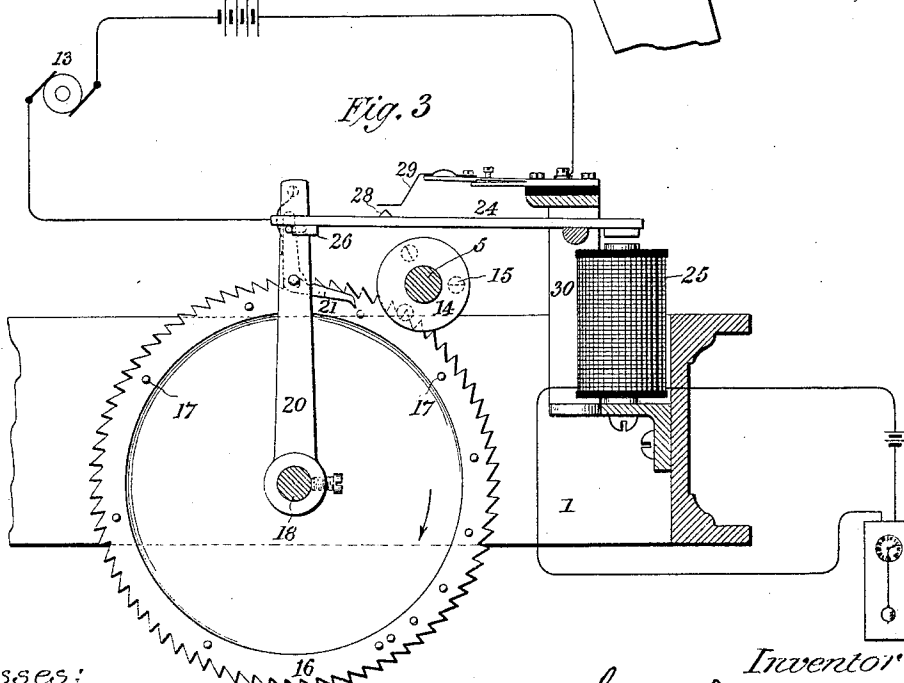
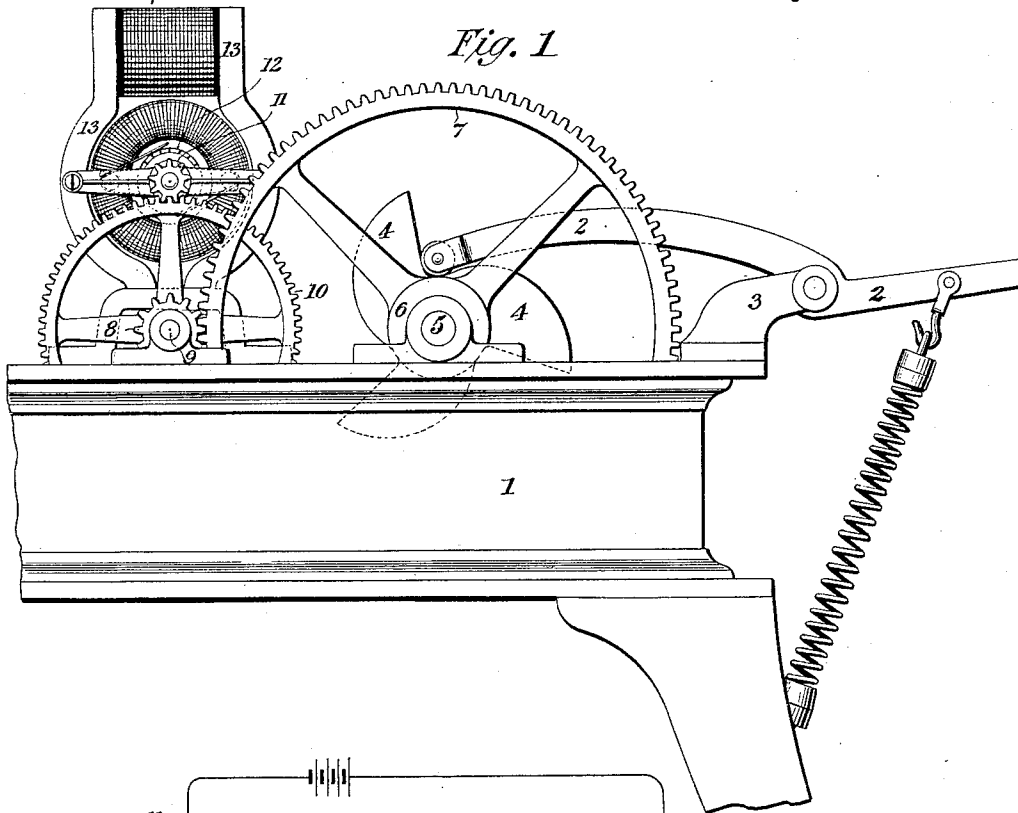


C. D. WARNER.
ELECTRIC CLOCK STRIKING MECHANISM.

No. 520,585.

Patented May 29, 1894.



Witnesses:
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R. F. Gaylord

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Fig. 2

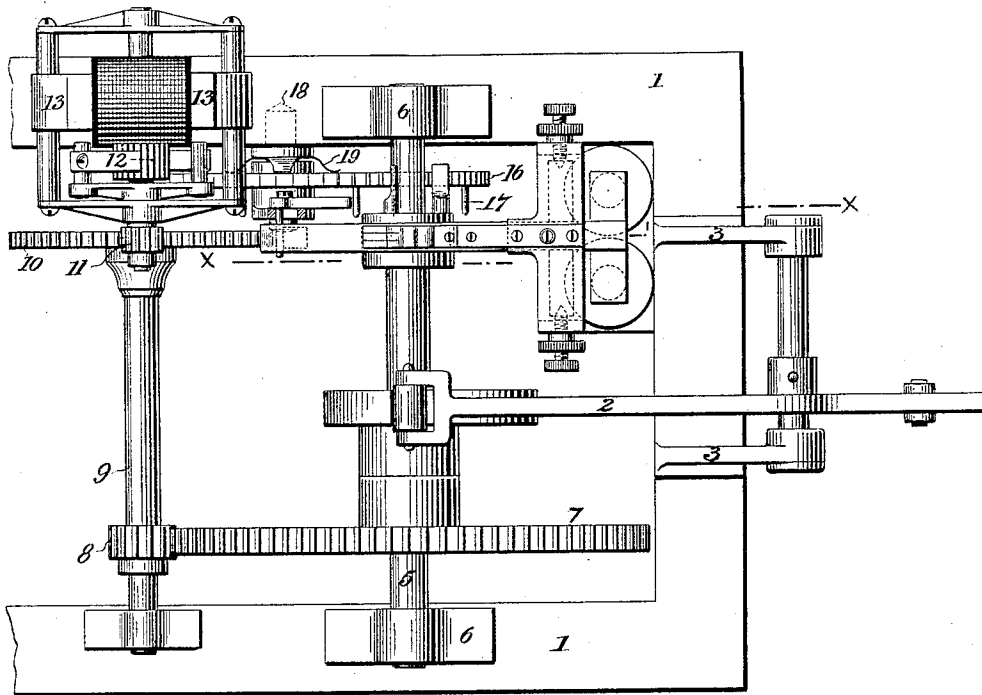
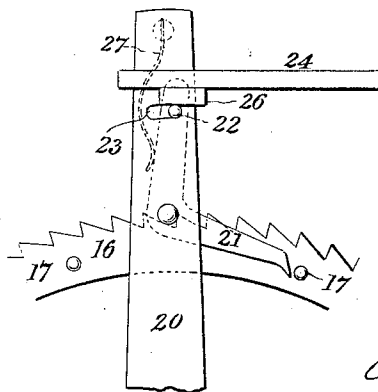


Fig. 4



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UNITED STATES PATENT OFFICE.

CHARLES D. WARNER, OF ANSONIA, CONNECTICUT.

ELECTRIC CLOCK STRIKING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 520,585, dated May 29, 1894.

Application filed April 6, 1893. Serial No. 469,261. (No model.)

To all whom it may concern:

Be it known that I, CHARLES D. WARNER, a citizen of the United States, residing at Ansonia, county of New Haven, and State of Connecticut, have invented a certain new and useful Improvement in Striking Mechanism for Clocks, of which the following is a specification, reference being had to the drawings accompanying and forming a part of the same.

10 This invention relates to electric apparatus for operating the striking-mechanism of a clock of large dimensions, such as a town-clock, or of an alarm mechanism, or of any similar mechanism embodying heavy and relatively slow-moving bell-hammers.

I show and shall describe my invention as applied to the striking-mechanism of a tower clock; but it is to be understood that the same is otherwise applicable,—as to fire-alarm or other signal-mechanism.

The common striking-mechanism of a tower clock, consists in essential respects of heavy weights occupying a considerable space of the tower or building as to run-way, and of hand-winding device whereby the weights are wound up. Such mechanism is both cumbersome and expensive, and the attention it requires in the matter of being frequently wound up is an important part of the cost of maintenance. It is the object of this invention to provide electric apparatus for operating such striking-mechanism, which apparatus is to be put into operation at proper intervals by a regulator electrically connected therewith.

I am aware that various electric devices have been proposed for operating the striking-mechanism of common house clocks, but in any such, where an electric current was the source of power for directly operating the striking hammer, the hammer was light and of little inertia, and such apparatus would not effectively or economically serve for use with a large hammer of great inertia such as this invention is applied to.

The invention consists of a tower, church, or similar clock, or signal striking-mechanism, and an electric motor directly geared or operatively connected therewith and for operating the same.

The invention also consists of electric circuit making and breaking devices, whereby

the motor of a striking-mechanism automatically breaks its own circuit upon completion of its work at any given time.

Figure 1 of the drawings represents a striking-mechanism of a tower or similar clock, the same being provided with an electric driving apparatus according to my invention. Fig. 2 is a plan view of the same. Fig. 3 is a section on the plane *xx* of Fig. 2. Fig. 4 is a detail view of parts of Fig. 3 when the same are in action.

1 represents the base or frame-work of the striking-mechanism.

2 is a lever that is pivotally hung on arms 3 and is to be properly connected to a bell hammer in such manner that the rise and fall of the inner end of the lever will lift the hammer head and let it fall upon the bell.

4 is a triplicate cam-wheel mounted on shaft 5 hung in journals 6 on the frame. This shaft also carries gear-wheel 7 which meshes with pinion 8 on shaft 9, which shaft carries also gear-wheel 10, and this wheel meshes with the pinion 11 on the armature 12 or other rotating part of the electric motor 13. This system of gearing is of the reduction kind, whereby the armature of the motor will need to rotate many times in order to rotate the gear one-third. The resistance to the motor, therefore, at any time, and against its rotation, is slight, and it is insured that the motor will at any time promptly start off upon receiving the proper actuating current. It will be plain, that as the motor rotates, the cam-wheel 4 will be slowly turned, and that the inner end of the lever will be gradually raised and eventually dropped behind one of the cams, thus effecting one blow of the bell hammer. Also, it will be seen, that after a given series of blows, or when the parts are at rest, as shown, the inner end of the lever rests between two of the cams, and so offers the least resistance to the starting of the motor, which therefore gets into full action before it does any lifting of the lever.

On shaft 5 is borne the escapement wheel 14, carrying escapement pins 15, which successively engage the teeth of and drive the hour wheel 16, which wheel is provided with the pins 17 spaced to correspond and determine the number of blows that the hammer shall strike at any given time. The hour

wheel is pivotally hung on axis 18 fixed in the frame-work, and a frictional retaining spring 19 serves to hold this wheel to any position when it may come to rest, or against unintentional rotation. Fixed upon axis 18 and rising vertically therefrom is the arm 20, which carries the pivotally supported and spring-actuated pawl 21, the lower end or toe of which is just above one of the hour pins 17 when the parts are at rest—Fig. 3. The vertical arm of this pawl carries the pin 22, which projects through a slot 23 in arm 20 and to under the armature arm 24 of the starting electro-magnet 25, which arm bears the lug 26 against which the pawl pin bears under stress of its spring 27. The armature arm or lever 24 carries the electric contact point 28, and just above this point is located the contact spring 29, which is supported on, but insulated from, the armature support 30.

Assuming the motor to be in circuit with a proper source of electricity and that such circuit includes the armature lever and the spring contact, and also that the starting magnet 25 is in circuit with proper mechanism controlled by some time mechanism, the operation is as follows:—Energizing the starting magnet, will cause the longer end of the lever of the same to be raised, thus closing the motor circuit and starting the motor. At the same time, and by the upward movement of the lever, the toe of the pawl will be lowered into the path of the hour pins on the hour wheel—Fig. 4, and the pawl pin will be carried forward under the lever lug to hold the lever in raised position after the cessation of the starting current. The motor by continuous rotation causes the hammer lever to rise and fall the requisite number of times, which is determined by the advance of another hour pin against the toe of the pawl, thus raising the same and withdrawing the pawl pin from under the lever lug and permitting the lever to fall and by breaking the motor circuit stop the motor. By these means I am enabled to operate bell hammers of large size by an electric motor of relatively small size, and thereby to dispense with the cumbersome and expensive weight mechanism and the fittings therefor heretofore employed.

The maintenance of such an electric mechanism, is also a matter of far less cost and trouble than that incident to the cost of a weight mechanism that must be frequently wound up.

The mechanism here shown may be variously modified, as will appear to those familiar with this art, and so I do not strictly confine myself to the construction illustrated.

What is claimed as new is—

1. In a tower-clock striking mechanism, the combination of a bell-hammer actuating device, an electric motor and its circuit for operating said device, a time circuit armature acting to close the motor circuit, and a locking device acting to hold the said armature in closed circuit position during the time of striking.

2. In a tower-clock striking mechanism, the combination of hammer actuating device, an electric-motor and its circuit for operating said device, a time circuit armature for closing the motor circuit, a locking device acting to hold the armature in closed circuit position during the time of striking, and mechanism operated by the motor and acting to open the motor circuit.

3. In combination, the bell hammer operating train and the driving motor thereof, the hour wheel 16 driven by the train and having the pins 17, the time circuit magnet and its armature, the motor circuit and means substantially as described whereby the depression of the time circuit armature will close the motor circuit and hold the same closed and whereby by the operation of the hour wheel said circuit will be opened.

4. In combination with the striking train of a tower clock including an electric motor for operating the same, a time circuit armature operating by one movement to close a circuit through the motor and by its opposite movement to open said circuit, and means substantially as described for holding the motor circuit closed during the requisite time of striking.

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