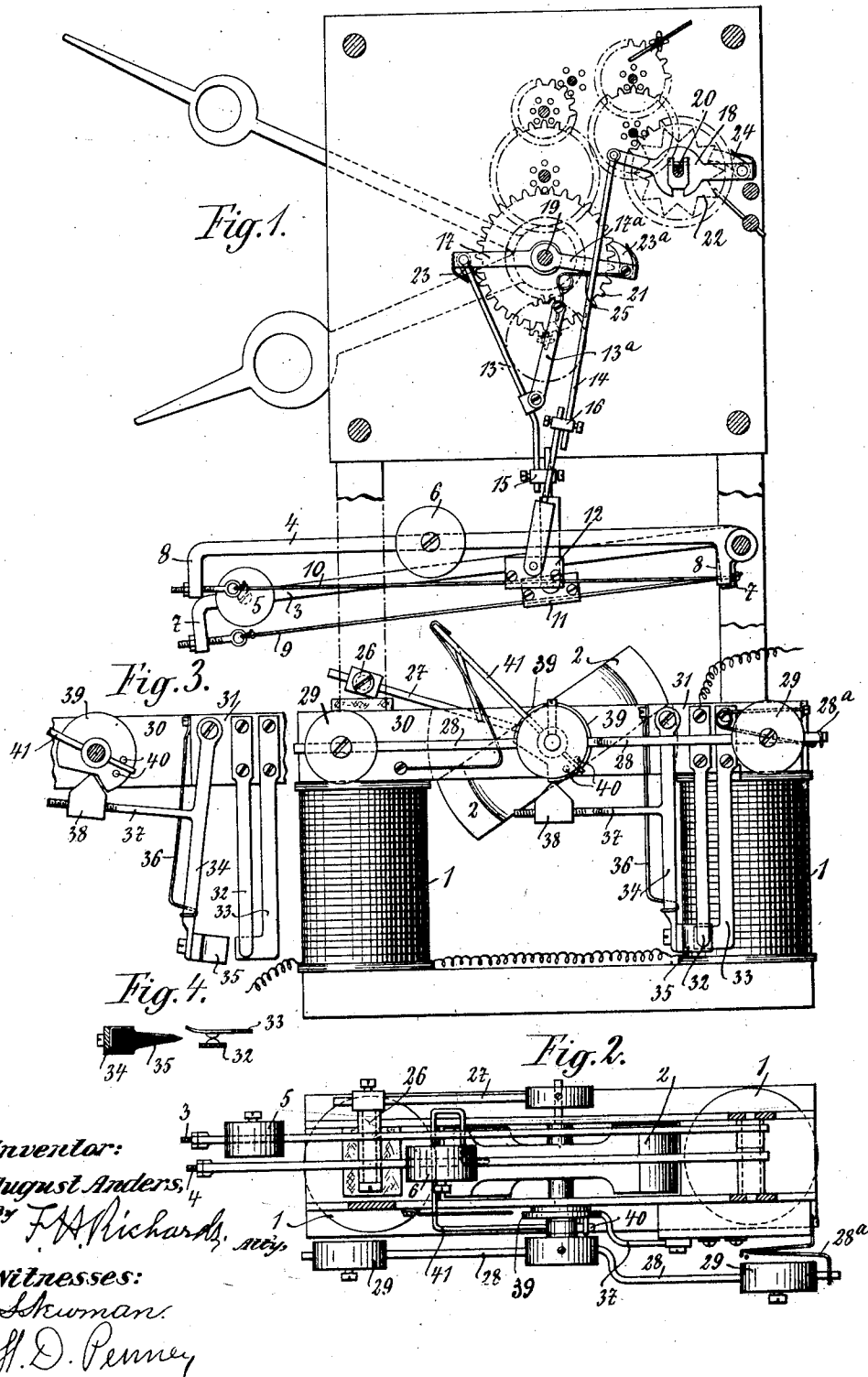


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 DEVICE FOR CONVERTING ORDINARY CLOCKS INTO CLOCKS WITH ELECTRIC DRIVING MEANS.
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UNITED STATES PATENT OFFICE.

AUGUST ANDERS, OF CHARLOTTENBURG, GERMANY.

DEVICE FOR CONVERTING ORDINARY CLOCKS INTO CLOCKS WITH ELECTRIC DRIVING MEANS.

No. 929,531.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, AUGUST ANDERS, a subject of the Empire of Germany, and residing at Charlottenburg, Germany, have invented new and useful Improvements in a Device for Converting Ordinary Clocks into Clocks with Electric Driving Means, of which the following is a specification.

Clocks with electric driving means for the moving and striking trains are already well known, their movement being specially constructed for the purpose of driving in this manner, or else they require complicated adaption. No device is, however, known which can be attached directly to any ordinary clock driven by a spring or a weight.

This invention enables any ordinary clock to be provided with an electric driving means.

A construction of the device applied to a clock, is illustrated by way of example in the accompanying drawing in which—

Figure 1 is a back view with the back plate removed, Fig. 2 a plan, with the push rods and pawl holders controlled by them, removed. Fig. 3 showing separately in side elevation the circuit breaker. Fig. 4 is finally a diagrammatic view of the insulating part in front of the contact springs, on an enlarged scale.

The well known electromagnets are marked 1 and the armature controlled by the same, 2. Above the latter are mounted in a rotatable manner two driving levers 3 and 4 provided with adjustable weights 5 and 6 which can be fixed in any position. One of the said levers is used for driving the moving train, while the other operates the striking train of the clock.

In clocks without a striking train, only one driving lever, that for the moving train, is required. Each of the two driving levers 3 and 4 carries two preferably downwardly directed arms 7 and 8, the two arms of one and the same lever being connected by a thread-like elastic element 9 or 10. The said elements can be constituted by a gut line, silk, fine string or wire, and its tension can be regulated as required by a tension device of usual construction. These thread-like elements carry clamping plates 11 and 12 to which are pivoted bifurcated push rods 13 and 14. At 15 and 16 the said rods are made longitudinally adjustable, so that their length can be easily modified to suit any desired

clock. The upper ends of the said push rods are pivoted to pawl holders 17 and 18 which are mounted loose on the spindles 19 or 20 of the wheels 21 and 22 suitable for driving the moving and striking trains of a clock, and carry spring controlled pawls 23 and 24. When the weighted levers 3 and 4 descend, the pawls engage with the intervals between the teeth of the corresponding clock work wheels 21 and 22 and cause the latter to rotate as the weight descends.

To the push rod 13 driving the moving train of the clock, is further pivoted an auxiliary rod 13^a connected by means of a spring 25 to a separate pawl holder 17^a which affords bearing to the auxiliary pawl 23^a.

The object of this device is to continue to drive the moving train of the clock when an interruption in the driving of the clock takes place during the springing upward of the driving lever 3, so that no inaccuracy can occur in the movement of the said clock. The working of the said device will be hereinafter described.

To one end of the spindle of the armature 2 is secured a rod 27 provided with an adjustable transverse arm 26, so that it is forced to take part in the movements of the armature. The opposite end of the armature spindle carries a double armed lever 28, the weights 29 of which are adjusted in such manner that in the position of rest the armature is always in oblique position relatively to the electromagnets. The position of rest of the armature itself is limited by a light spring 28^a which engages in an elastic manner with one end of the lever 28 connected to it.

To an insulating part 31 secured to the bridge 30 are secured spring contacts 32 and 33 which close the circuit as soon as they touch each other (Figs. 3 and 4), whereby the armature is brought into the horizontal position. In front of the spring contacts 32 and 33 an arm 34 is rotatably secured with its upper end on the insulating part 31, the bottom end carrying a wedge shaped insulating part 35.

A spring 36 has the tendency always to keep the said arm out of engagement with the spring contacts 32 and 33. A second arm 37 arranged on the arm 34, carries at its back end a block 38 beveled in gable form, the point of said block being constantly pressed by the action of the spring 36 against

the circumference of a disk 39 mounted loose on the spindle of the armature. The said disk 39 is provided with a recess of special shape and carries, moreover, two pins 40 arranged at a certain distance from each other. Between the said pins 40 engages the short arm of a driver 41 mounted loose on the armature spindle, the longer frame-like arm of which terminates in a rod which, when the driver sinks comes to rest on the armature and forces the latter to participate in the movement of the driver. Simultaneously with the driver 41, the disk 39 rotates until the point of the block 38 resting on the same, springs into the recess, and the spring 36 which is released, withdraws the lever 34 carrying the insulating part 35.

Owing to the withdrawal of the insulating part 35, the spring contacts 32 and 33 touch each other and close the circuit, whereupon the device becomes operative, in the following manner:—The closing of the circuit forces the electromagnets 1 to attract the armature 2 with a jerk, that is to say, they bring it into a horizontal position. At the same time, the rod 27 secured to the armature, springs upward and projects upward one or both weighted levers 3 and 4 by means of its transverse arm 26. The said levers 3 and 4 by means of the rods 13 and 14 turn the pawl holders 17 and 18 to a certain extent about the spindles 19 and 20 of the clock work wheels 21 and 22 (on which the said holders are mounted). As soon as the driving movement is completed, and the pawl holders are about to move back, their spring controlled pawls 23 and 24 engage with the teeth of the clockwork wheels 21 and 22, whereby the action of the weights 5 and 6 is transmitted to the clockwork wheels and rotates them. The levers 3 and 4 sink again slowly until they come into contact with the driver 41. The driver moves downward, the disk 39 being simultaneously rotated until the block 38 springs into the recess of the disk 39, and the circuit is closed, whereupon the process described is repeated. Immediately after the closing of the circuit, a spring connected to the driver 41 forces it back into its original position, whereby the disk 39 is turned back, which results in the block 38 being again forced out from the recess of the disk and brought back on to the circumference of the disk.

When the clock is striking the weighted lever 4 controlling the striking gear, will of course sink more quickly than the weighted lever controlling the moving gear of the clock. Consequently, for each stroke, a new current impulse will be necessary for throwing the weighted lever upward again. The lever of the moving train need not, however, always participate in the said impulse, which depends entirely on the position which it occupies relatively to the striking gear lever.

In order to avoid any interruption of the regular movement of the clock during the throwing upward of the lever 3, a device already referred to in the beginning of the specification and acting in the following manner is used. As soon as the weighted lever 3 begins to sink downward, carrying with it the rod 13, it comes nearer to the rod 13^a pivoted to it, and places the spring 25 in tension, the auxiliary pawl holder 17^a being driven at the same time. At the moment of the next upward movement of the driving lever 3, the compressed spring 25 forces the auxiliary pawl holder upward. The auxiliary pawl 23^a secured to the same, engages with an interval between two teeth, so that the force of the spring 25 can act on the circumference of the wheel and rotate it until the weight of the weighted lever 3 can take its place.

What I claim as my invention and desire to secure by Letters Patent is:—

1. In clock provided with arrangements for converting mechanical operating means into electrical operating means, the combination with an armature, electro-magnetic means for operating the armature, a lever connected with the armature and provided with a cross rod, a pair of levers, resiliently supported abutments 9 and 10 on the respective levers, the driving shafts of the striking and the moving works being provided with a carrier loosely mounted thereon, a ratchet on each of said carriers, ratchet wheels connected with the said works and operated by said ratchets, and adjustable rods connecting said abutments with said carriers.

2. In an electric clock-driving device, an armature, controlling magnets therefor, means for controlling current through said magnets, an arm connected to said armature, independent driving levers engaged during movement of said arm, downwardly extending rigid arms upon said levers, thread like elastic elements between said arms, means for regulating the tension of said elements, pawl holders and pawls connected with the gear trains of the clock, and means connecting said driving levers with the pawl-holders and pawls whereby the gear trains of the clock are operated.

3. In an electric clock-driving device, an armature, controlling magnets therefor, means for controlling current through said magnets, a transversely bent arm connected to said armature, independent driving levers engaged during movement of said arm, thread like elastic elements upon said levers, pawl holders and pawls connected with the gear trains of the clock and adjustable rods connecting said levers with the pawl-holders and pawls whereby the gear trains of the clock are operated.

4. In an electric clock-driving device, an

armature, controlling magnets therefor, an arm connected to said armature, independent driving levers engaged during movement of said arm, thread like elastic elements upon 5 said levers, a driver operated by contact of said elements on the movement of said levers, means operated by said driver for controlling current through the magnets, pawl holders and pawls connected with the gear 10 trains of the clock, and adjustable rods connecting said levers with the pawl-holders and pawls whereby the gear trains of the clock are operated.

5. In an electric clock-driving device, an 15 armature, controlling magnets therefor, an arm connected to said armature, independent driving levers engaged during movement of said arm, thread like elastic elements upon said levers, a driver operated by contact of 20 said elements on the movement of said levers, an insulated wedge operated by said driver for controlling current through the magnets, spring contacts adapted to be separated by said wedge, pawl holders and pawls 25 connected with the gear trains of the clock,

and adjustable rods connecting said levers with the pawl-holders and pawls whereby the gear trains of the clock are operated.

6. In an electric clock-driving device, an armature, controlling magnets therefor, 30 means for controlling current through said magnets, a transversely bent arm connected to said armature, independent driving levers engaged during movement of said arm, thread like elastic elements upon said levers, 35 pawl holders and pawls connected with the gear trains of the clock, adjustable rods connecting said levers with the pawl-holders and pawls whereby the gear trains of the clock are operated, and means upon one of said 40 rods for maintaining the gear trains in motion during the upward movement of the driving lever.

In witness whereof I have hereunto signed my name this first day of June 1908 in the 45 presence of two subscribing witnesses.

AUGUST ANDERS.

Witnesses:

HENRY HASPER,
WOLDEMAR HAUPT.