Aug. 2, 1932. A. H. NEUREUTHER 1,869,610

ELECTRIC SWITCH

Filed Jan. 19, 1928

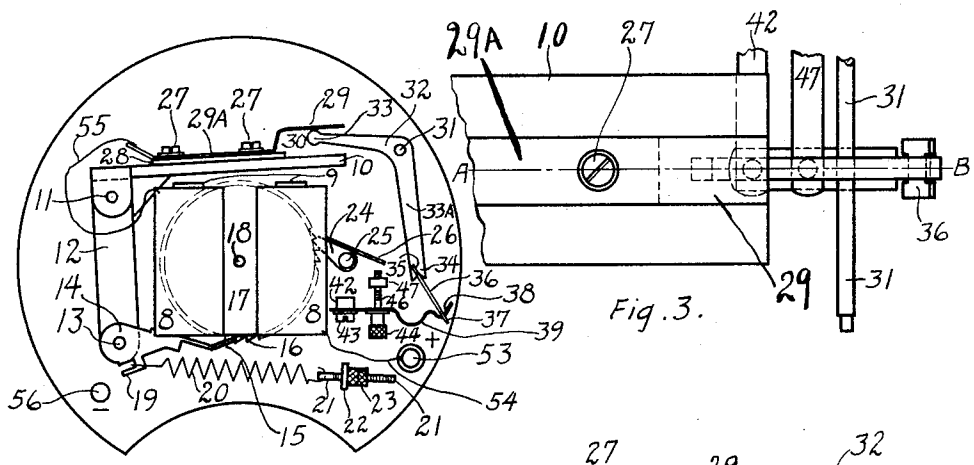


Fig. 3.

Fig. 1.

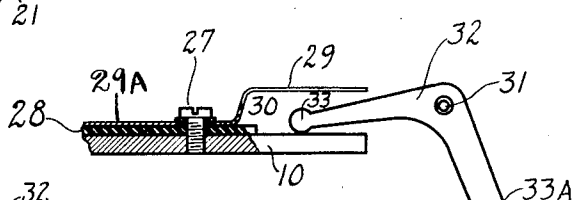
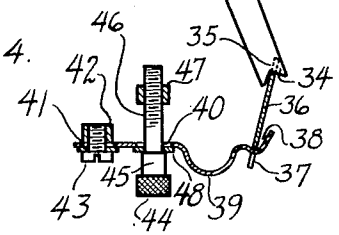


Fig. 4.



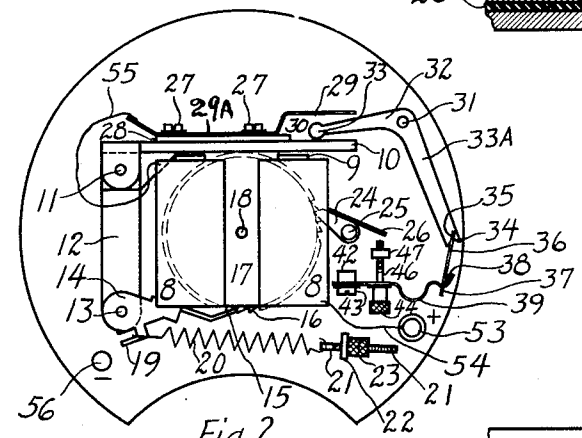


Fig. 2.

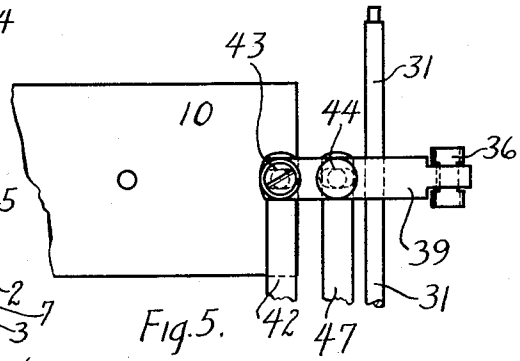


Fig. 5.

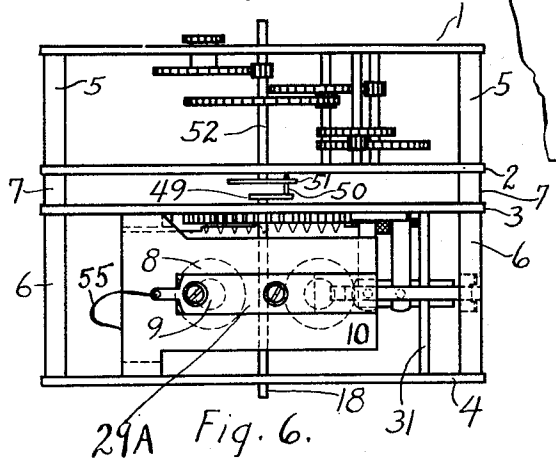


Fig. 6.

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UNITED STATES PATENT OFFICE

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ELECTRIC SWITCH

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My invention relates to improvements in electrical driving mechanisms for clocks and the like and has for its object the production of such a device in which the contacts are closed and opened extremely rapidly or with the so called "snap" action. A further object is the production of a wiping action when said contacting parts are touching each other when said mechanism is actuated. A further object is the creation of an actual increased pressure on said contacting points immediately after the initial closing of the circuit takes place, so that the wiping action takes place under the increased pressure placed on the contacting parts thus tending to rather scrape the contact parts in addition to the wiping action.

A further object is to provide means to produce a sustained contact action whereby the initial resistance caused by the contact actuating mechanisms is the smallest when the moving power transferring member is furthest out of the control of the power actuating source and is gradually increased to produce greater contact pressure as said power transferring member is more definitely and completely under the control of the power actuating source, and also thereby continuing and sustaining the contact action through a considerably greater range of action and at the same time assisting the "snapping" action of the contacts to produce an extremely rapid action at the time the circuit is broken as well as increased "wiping action".

A further object is to enable the use of the lower priced metals for the contacting parts and to produce a construction so simple that it can be readily assembled and adjusted to function by a person of average skill making it very inexpensive to produce and yet very rigid for service where there is a large amount of vibration and rough usage such as required for automobile clocks.

I attain these objects by the means shown in the accompanying drawing in which:

Fig. 1 is a view of one of my driving mechanisms looking at it from the rear and having sufficient of the rear plate removed to show the operative mechanism with the armature (power transferring member) of the electric-magnet in its position at its greatest distance away from the electro-magnet, or power actuating source and ready to be actuated by said magnet or power actuating source.

Fig. 2 is a similar view of my driving mechanism showing the armature (power transferring member) of the electro-magnet (or power actuating source) in its position at its nearest distance to said electro-magnet.

Fig. 3 is an enlarged top view of the tripping mechanism shown in Fig. 2.

Fig. 4 is an enlarged view of the tripping contact mechanism shown in Fig. 2 showing partial cross-sections of same along a line AB of Fig. 3.

Fig. 5 is an enlarged bottom view of the tripping mechanism shown in Fig. 2.

Fig. 6 is a top view of my driving mechanism shown associated with a clock.

The same numbers represent the same parts throughout the several views.

In the drawing 1 represents the front plate of the time movement part of an electric clock, 2 the rear part of same. 3 represents the front plate of my driving mechanism and 4 the rear movement plate of same. 5 represents the pillars or posts by means of which the plates 1 and 2 are held together and 6 the pillar or posts that holds the plates 3 and 4 together. The driving mechanism is fastened to the clock movement by any of the usual well known means such as is indicated by the pillars 7 shown.

Fastened between the plates 3 and 4 is an electro-magnet 8 having cores 9. Pivotally mounted on a pin 11 adjacent to the electro-magnet 8 is an armature 10 which has an arm 12 projecting therefrom which has a pin 13 fastened to it on which pin is pivotally mounted the pawl 14 whose end 15 engages the teeth 16 of the ratchet wheel 17 which is fastened on a shaft 18 which is journaled in the plates 3 and 4 as shown. The pawl 14 has a hook 19 to which is fastened one end of a spring 20 the other end of said spring being fastened to a threaded bolt 21 which passes through an aperture in a part 22 projecting from plate 3 which bolt 21 has the nuts 23 by means of which the tension on

the spring 20 is adjusted and regulated. A pawl 24 pivoted on a pin 25 and held in engagement with the teeth 16 of ratchet wheel 17 by means of a spring 26 prevents the ratchet wheel 17 from turning in a clockwise direction. It is evident that the spring 20 will pull the end 15 of the pawl 14 against the teeth 16 of gear 17 and rotate said gear 17 in a counter clock-wise direction by virtue of the power stored therein and this will occur each time the armature 10 is drawn against the cores 9 of the electro-magnet 8.

Mounted on and fastened to armature 10 by means of the screws 27 and electrically insulated therefrom by means of the insulating material 28 is a suitably shaped preferably electrically conducting member 29A. Said member 29A has a contacting part 29 so shaped that it leaves a space 30 between 29 and the armature 10 and may be made up so that it will be rigid but is preferably made to have more or less resiliency the function of which will be explained below. Fastened on a shaft 31 is a bell crank or bent lever member 32 one end of which terminates into head 33 which is smaller than and projects into said space 30. Bell crank lever member 32 has a part 33A which has a suitable notch 34 into which enters a similarly shaped notched part 35 on a strut member 36 which strut member 36 has a notch 37 which engages a notch 38 in a suitably shaped resilient member 39 which has a plurality of elongated apertures 40 and 41 as shown, said member 39 being fastened to a part 42 projecting from plate 3 by means of a screw 43 passing through said elongnated aperture 41 nearest the end of member 39, the purpose of said elongated aperture being to permit of positioning the notch 38 to control the "snapping" action of said bell crank or bent lever member 32 as will be explained below. Passing through the other elongated aperture 40 is a knurled headed thumb screw 44 which has a shouldered part 45, and a threaded part 46 which fits in to a part 47 which is also fastened to a plate 3. A washer 48 is placed on the threaded part 46 between said shouldered part 45 and member 39, the function of the thumb screw 44 being to increase or decrease the pressure action of the resilient member 39 and the resultant snapping action of the bent lever 32.

Shaft 18 terminates in a crank part 49 adjacent to plate 3 which crank part 49 carries a pin 50 which engages the end of the usual resilient member 51 which is fastened to the clock movement power driving shaft 52 which actuates the clock movement, said resilient member 51 always having enough tension transferred to it to drive the clock movement. A binding or externally electrically connecting post 53 is fastened to one of the plates 3 or 4 but is electrically insulated therefrom and is connected to one line of the source of electrical power. A wire 54 connects the connecting post 53 to the winding of said electro-magnet 8 and a further flexible wire 55 completes the electrical circuit through the windings of said electro-magnets 8 to said insulated member 29A. The other side of the line from the source of power is connected to the movement at any point 56 so that the current is conducted through the metallic conducting parts to bent lever member 32 through its head 33 and when head 33 is in contact with the contacting part 29 as shown in the position indicated in Fig. 1, the electrical current is complete and the electro-magnet 8 is energized and the armature 10 is immediately drawn toward its cores 9 until the bent lever member mechanism is in the position shown in Fig. 2, when the electrical circuit is open and no further current can flow until the bent lever member mechanism is returned to the position shown in Fig. 1.

My driving mechanism operates as follows:

In the position of the bent lever mechanism shown in Figure 1 as above mentioned the electrical circuit is closed complete so that the electro-magnet 8 is energized by the electrical current so that the armature 10 is immediately drawn and moved toward the cores 9 of the electro-magnet and in so moving the contacting part 29 presses the head 33 of the bent lever member 32 downwardly so that its part 33A moves to the right and in doing so its end 34 takes the end 35 of the strut member 36 to the right, said strut member 36 being pivoted in notch 38 on resilient member 39 which resilient member 39 exerts a pressure on the end 34 through said strut member 36, so that as soon as the part 34 moves to the right sufficiently so that it passes to the right of a line connecting the point 38 of resilient member 39 and the center of the shaft 31, the above mentioned pressure from resilient member 39 exerted on 34 by means of strut member 36 immediately "snaps" the bent lever member 33A into the position shown in Figure 2 and Figure 4, in which position the head 33 is in contact with the armature 10 and away from contact part, thus opening the electrical circuit and 29 de-energizing the electro-magnet 8. The drawing down of the armature 10 as above described puts tension power in the power storing spring 20 which will transfer it to the ratchet wheel 17 as above menioned. In so transferring its power to ratchet wheel 17 and to the driven mechanism the pawl 14 moves to the right and the right hand end of armature 10 rises and raises the head 33 of bent lever member 32 upwardly so that notched end 34 of part 33A is moved to the left and this will continue until a point is reached when the center of the notched part 34 passes to the left of said line from the notch 38 in resilient mem-

ber 39 to the center of the shaft 31 when the member 33A is immediately "snapped" to left into position shown in Figure 1 where the part 33 comes into engagement with contacting part 29 closing the electrical circuit when the action above described is repeated. The head 33 is shown rounded in shape and can even be a roller journalled on the end of the part 32.

It is evident from the above description that as the part 32 draws down the armature 10 that the contacting part 29 presses very substantially on the head 33 thereby having a thorough scraping and wiping action that will keep the contacting surfaces very clean and in good condition even though there may be some corroding or burning action due to current at the making and breaking of the contacts which will enable me to use the cheaper metals in my contacting parts and thus eliminate such expensive metals as gold, silver or platinum. As above mentioned the contacting part 29 may be rigid but it is preferable to have it more or less resilient to facilitate its action the part 29 if more or less resilient will give and enable a less force to move the armature as it starts toward the energized electro-magnet at the time when the armature is furthest from the core of the electro-magnet and therefore at the point where and when it is exerting its least attractive force on the armature. And further as the armature moves down said resilient contacting part 29 stores up considerable tension which will assist in snapping the bent lever member 32 when the armature is approaching the point of greatest attractive force.

It is evident from the above description that my electric driving mechanism is very simple and inexpensive to produce and that it can be readily assembled and adjusted by persons of ordinary skill and that it is effective and positive in operation so that it will meet the rigid requirements as an electric driving mechanism for automobile clocks.

It will be understood of course, that while I have here shown one form of my invention I do not wish to limit myself to the exact form shown but desire to have it taken in a sense illustrative of any or all the forms of my invention as will come fairly within the scope of my claims.

I claim:

1. In an electric driving mechanism, a pivotally mounted actuating member, a conducting part mounted thereon and electrically insulated therefrom, an electrically conducting lever pivotally mounted adjacent to said actuating member having a contacting portion positioned between said conducting part and said member and resilient positioning means co-acting with said lever and said actuating member.

2. In an electric driving mechanism, a pivotally mounted actuating member, a resilient conducting part mounted thereon and electrically insulated therefrom, an electrically conducting lever pivotally mounted adjacent to said actuating member having a contacting portion positioned between said conducting part and said member and resilient positioning means co-acting with said lever and said actuating member.

3. In an electric driving mechanism, a pivotally mounted actuating member, a resilient conducting part mounted thereon and electrically insulated therefrom, an electrically conducting lever pivotally mounted adjacent to said actuating member having a contacting portion positioned between said conducting part and said member with means co-acting with said lever and said actuating member whereby the contacting portion of said lever alternately contacts with said conducting part and said actuating member, said means comprising an adjustably mounted resilient member and strut pivotally mounted on said lever and said resilient member.

ANDREW H. NEUREUTHER.