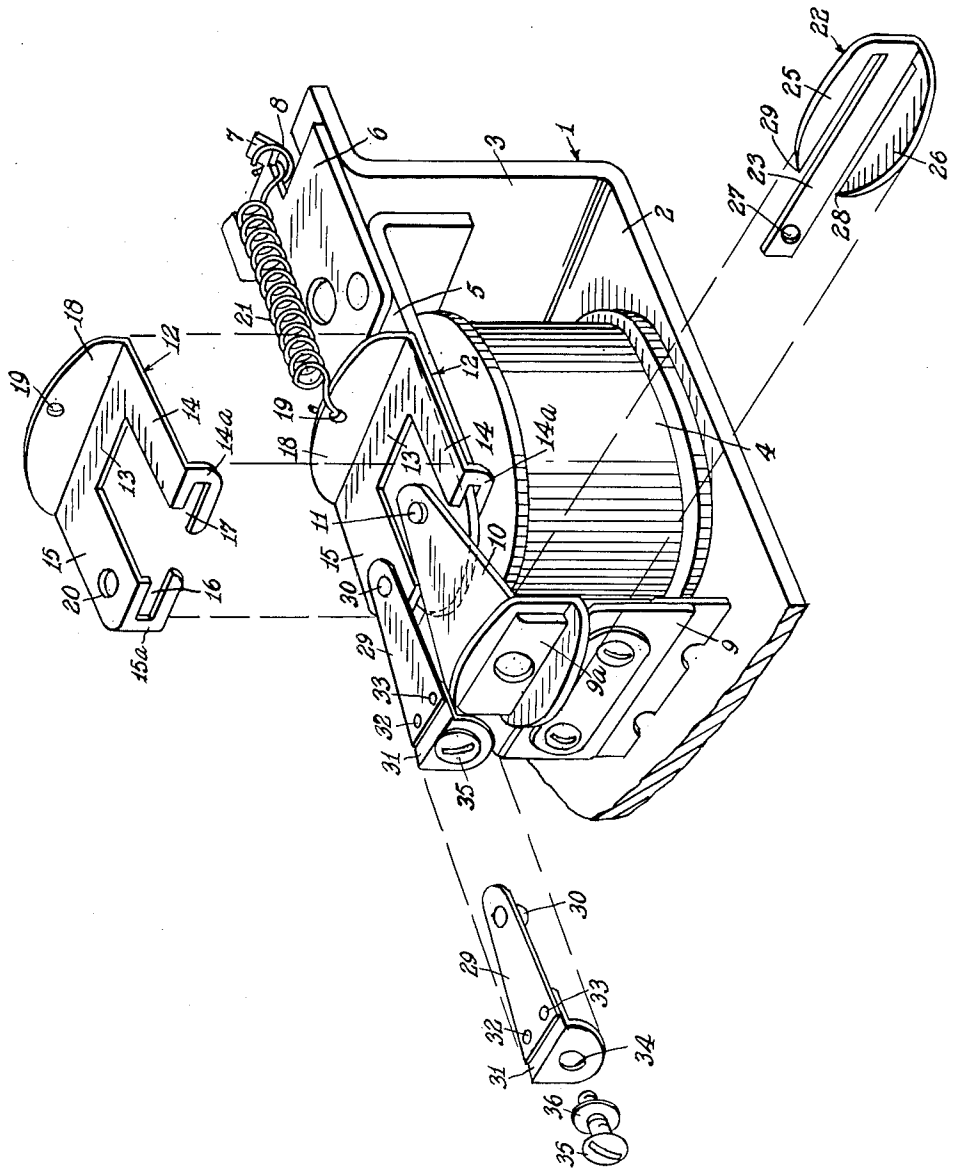
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BY-PASS ASSEMBLY FOR ELECTRICAL REGULATORS

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BY-PASS ASSEMBLY FOR ELECTRICAL REGULATORS

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The present invention deals with an electrical regulating apparatus and more particularly with a by-pass contact assembly for electrical regulating systems.

Electrical regulating assemblies of the type embodying an electro-magnetic coil operatively associated with electrical contact members slidably spaced therefrom, and electromagnetically actuated by means of the energization or deenergization of the coil, are well known in the arts. For example, such regulating assemblies of the electromagnetic contactor type are designated, especially in the automotive trade, as voltage regulators and current regulators and are generally employed in automobiles to regulate the operation of an electrical generator of known construction. Usually the voltage regulators, current regulators and an electromagnetic cut-out relay are assembled into a composite unit and employed as such a unit.

During the operation of the aforesaid unit, the contact points of the current and voltage regulators in particular are subject to wear and deterioration due to the repeated make and break of contact between such points and the arcing attendant therewith. When the wear or deterioration of the said points becomes substantially considerable, the operation of the unit, or of a component thereof, is adversely affected to the extent that desirable electrical regulation is no longer possible and the unit must be removed for repair and replacement of parts, involving considerable labor, or the entire unit must be replaced with a new unit resulting in substantial expense. This condition is definitely quite wasteful since usually the other operating parts of the assembly are in good operating condition.

It is an object of the present invention to provide a means whereby the extensive repair or replacement of a regulating unit, due to the wear or deterioration of the contact points, is avoided. It is another object of the present invention to provide a means whereby failure of desirable electrical regulation by electrical regulators is economically and easily corrected. It is a further object of the present invention to provide an easily applied corrective assembly for defective electrical regulators of the electromagnetic contactor type. Other objects and advantages of the present invention will become apparent from the description hereinafter following and the drawing forming a part hereof, which illustrates a perspective view of a regulating assembly, partly schematical, and with certain embodiments thereof shown in assembling aspects.

Referring to the drawing, a regulator of the type to which this invention is particularly directed, includes a support member 1 comprising a base 2 and an upright 3. An electromagnetic coil is mounted on the base with the axis of the coil substantially perpendicular to the base. An armature 5 is mounted on an inner upper part of the upright and extends over the free end of the coil and is spaced axially of the coil. On an upper surface of said armature and positioned oppositely of the extended end of said arm is an armature biasing plate 6 extending over

the upright. The biasing plate is provided with an ear or anchor 7 engageable with a biasing spring 8 which biases the armature 5 in spaced relation to the coil by spring tension.

The upper surface of the arm 5 is provided with a contact point (not shown). Diametrically opposite of the coil is a support, e. g. second upright support member 9, to which is secured a contact arm 10 extending over said armature 5. A contact point 11 is secured to the arm 10 so that it projects below the undersurface of the arm 10 and in axial alignment with the contact point on the arm 5. Upon de-energization of the electromagnetic coil 4, the contact points on the arms 5 and 10 are caused to contact. Upon energization of the electromagnetic coil the points are biased in operating spaced relation to each other by means of biasing plate 6 and spring 8.

When the contacts on arms 5 and 10 become defective, a by-pass assembly according to the present invention is mounted on the regulator to correct the defectiveness and permit the regulator to operate efficiently without resort to extensive repair of replacement of the regulating unit.

According to the invention, I provide a substantially U-shaped plate 12 having a base portion 13 and leg portions 14 and 15. The end portions 14*a* and 15*a* of the legs 14 and 15 are preferably bent downwardly and are provided with slots 16 and 17 in their inner edges. The base portion 13 is provided with an upwardly extending flange 18, or the like, having an aperture 19 formed therethrough. A contact point 20 is positioned on an upper surface of one of the said legs 14 and 15. In assembly, the plate 12 is positioned on top of the said armature 5 with the legs 14 and 15 substantially straddling the arm 10 and the bent portions 14*a* and 15*a* embracing the said armature 5 which rides in slots 16 and 17. In order to keep the plate 12 in secure position and to preclude longitudinal movement thereof on armature 5, a spring 21 is engaged with the aperture 19 and anchored to the ear or anchor 7. Preferably, the plate 12 is dimensioned so that the spring tension of spring 21 maintains the plate 12 in abutment with the biasing plate 6.

Having positioned the plate 12 as described, I provide a key 22 having a shank 23 with an aperture 27 formed through an end portion thereof, and blades 25 and 26 parallel with the shank and angularly disposed with respect to each other, e. g. at right angles to each other. Slots 24 and 28 parallel to the shank 23 are formed in the blades 25 and 26.

In assembly, the key 22 is slidably affixed to the bracket 9*a* in such manner that one leg of the bracket is positioned or engaged in slot 27 and the other leg is engaged in the slot 28, with the apertured end portion of the shank 23 extending laterally beyond the arm 10 or the bracket support 9*a*.

Having assembled the plate 12 and key 22, I provide a second contact arm 29 substantially similar to the contact arm 10. The second arm is provided with a contact point 30 formed therethrough or otherwise secured thereto with the said contact point projecting below its undersurface, and with a bracket support 31 therefor and to which the arm 30 is secured by a securing means, e. g. rivets 32 and 33. The side of bracket 31 which is disposed angularly of the arm 29 is provided with an aperture 34, e. g. a threaded aperture.

In assembly, the aperture 34 of bracket 31 is aligned with aperture 24 of key 22 with the arm 29 extending over leg 15 of the plate 12 so that the contact point 20 is in axial alignment with the contact point 30 of arm 29. Thereafter, a securing means 35, e. g. a threaded bolt with washer 36, is caused to engage both apertures 34 and 24 thereby securing the arm 29 in assembled position and in lateral alignment with the arm 10 by virtue of

the aligning afforded by means of the slots **27** and **28** of key **22**.

Having so assembled the plate **12**, key **22** and second contact arm **29**, I have provided a by-pass contact assembly with contact points **20** and **30** operating independently of the old contact point **11** and its old cooperating contact point on the armature **5**.

Since the path of electrical conductivity follows the path of least resistance, it is apparent that the new contact points **20** and **30** will conduct independently of the old contact points, and the voltage or current regulator will function as efficiently as a new unit avoiding the detriments of the old contact points, whereby extensive repair or the replacement of a defective regulator by a new regulator is avoided.

What I claim is:

1. An electric regulator comprising an electromagnetic coil positioned between a pair of spaced support members, an armature connected to one of said support members and positioned over an axial end of said coil, a first arm connected to the other support member and positioned over said armature in spaced relationship therewith and contactable therewith upon de-energization of said coil, a by-pass contact assembly comprising a U-shaped plate positioned on said armature with the said first arm directed between the legs of said U-shaped plate, a key member engageable with the support member connected to said first arm extending laterally beyond said support member, a second arm secured to the extended portion of said key member and positioned over a leg of said U-shaped member, contact points on said leg and on said second arm positioned for contact with each other, and spring means connecting said U-shaped plate with an anchor means positioned rearwardly of said plate.

2. In an electrical regulator according to claim 1, a bracket member secured to said second resilient arm, an aperture through a leg of said bracket, an aperture through said extended key, a securing means in engagement with said apertures.

3. An electric regulator according to claim 1, wherein said member supporting said first arm is in the form of a bracket, said key member comprising a shank having a pair of blades parallel therewith and angularly disposed with respect to each other, a longitudinal slot between each blade and said shank and positioned to engage said bracket member, said shank extending laterally beyond said bracket member.

4. In an electrical regulator according to claim 3, an apertured flange on the said plate rearwardly of said legs, a spring member engageable with said aperture and anchored rearwardly of said flange.

5. An electric regulator according to claim 3, the end portions of the legs of said U-shaped plate being angularly disposed in a common direction, a slot through the inner edges of each of said angularly disposed portions and engageable with said armature.

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