Nov. 4, 1941. F. MENZEL 2,261,887

ELECTROMAGNETIC CONTACT DEVICE

Filed March 29, 1940

Fig. 1

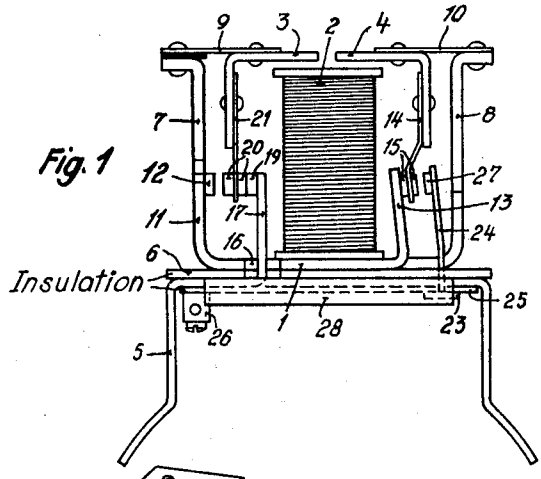


Fig. 2

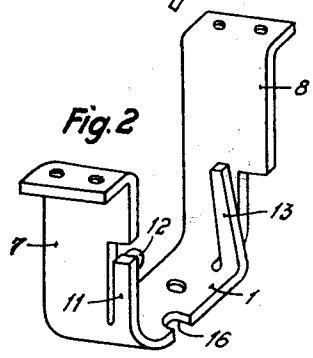
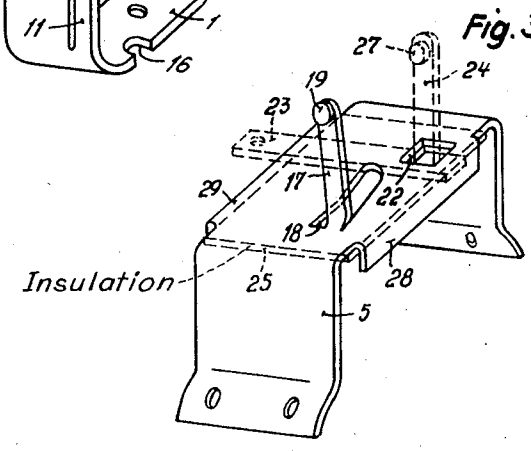


Fig. 3



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ELECTROMAGNETIC CONTACT DEVICE

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5 Claims. (Cl. 200—87)

This invention relates to an electromagnetic contact device of the type comprised in regulators or governors, switches and combined control switches or switch governors, in electric plants in vehicles and the like and whose components, such as, base member, magnetic parts, armature, etc., are stamped out of metal sheets of the materials used for the various parts.

It is an object of the present invention to provide a contact device, of the type referred to, saving material and labour and being easy to make.

With this and further objects in view, as may become apparent from the within disclosures, the invention consists not only in the structures herein pointed out and illustrated by the drawing, but includes further structures coming within the scope of what hereinafter may be claimed.

The character of the invention, however, may be best understood by reference to certain of its structural forms, as illustrated by the accompanying drawing in which:

Fig. 1 is a side view of a combined electromagnetic regulator-switch having the invention applied thereto;

Fig. 2 is a perspective view of a U-shaped magnetic core member comprised in said switch;

Fig. 3 is a perspective view of a base member comprised in the switch.

Similar reference numerals denote similar parts in the different views.

Referring now to the drawing in greater detail, it will be seen from Fig. 1, that an electromagnetic regulator switch or relay switch comprising a U-shaped magnetic core 1 having a central core portion (not visible) extending into the winding or coil 2 and armatures 3 and 4 is mounted on a base member 5 which is also substantially U-shaped. The U-shaped magnetic member 1 is electrically insulated from the base 5 by means of an intermediate insulating plate 6. The armatures 3 and 4 are resiliently connected to the legs 7 and 8 of the U-shaped member 1 by means of leaf springs 9 and 10.

The base 5, the U-shaped magnetic member 1 and the armatures 3 and 4 are stamped out of metal sheets of the various materials suitable for the various parts.

A tongue or lug 11 is stamped out of the leg 7 of the magnetic member 1 and carries a governor contact 12. Another tongue 13 is stamped out of the leg 8 of the magnetic member 1 and serves as a stop for a contact spring 14 secured on a depending arm of the armature 4 and provided with a contact 15. A tongue 17 is punched out of the base member 5 and extends through a recess 16 in the magnetic member 1. The point where the tongue 17 projects from the base member 5 is positioned near the downward bend of the U-shaped member 5 and the tongue 17 is stamped out of the central part of the base member 5 at an acute angle to the lateral edges of the said central part so as to extend upwardly in an oblique inward direction from the said central part after being bent up, as best seen from Fig. 3, in such a manner that a governor contact 19 secured at the extreme end thereof is exactly juxtaposed to the governor contact 12 on the extreme end of the tongue 11 of the magnetic member 1. A recess 18 is provided in the aperture formed in the central part of the base member 5 by the bending up of the tongue 17 for facilitating the oblique adjustment of the tongue 17. This arrangement permits the tongue 17 to be provided on the base member 5 besides the magnetic member 1 without necessitating an unduly large recess 16 in the magnetic member 1. A spring 21 carrying a contact 20 is mounted on the depending arm of the armature 3 of the governor for cooperation with the contacts 12 and 19. A tongue 24 welded to a connecting bar 23 extends through a recess 22 in the base member 5. The connecting bar 23 is secured under the base member 5 and insulated therefrom by means of an insulating plate or sheet 25 which moreover may carry further connecting devices, such as, a terminal 26. A switch contact 27 on the tongue 24 is opposed to the contact 15 on the switch armature 4.

In order to increase the strength of the base member 5, the lateral portions 28 and 29 of its central part are bent down as shown in Fig. 3.

It will be understood that the component parts of the governor switch or switch governor, such as, the base member 5, the magnetic member 1 and the armatures 3 and 4 can be made in automatic machines so that there is no manual labour required except for assembling the parts.

The tongues 11, 17, 13 and 24 are arranged all on the same side of the switch governor and lie flush with each other whereby the tongues are easily accessible and can be bent to the correct contact distance by means of suitable tools, such as, pliers or pincers. Since the tongues form an integral part of the base member or of the magnetic member, respectively, no additional fixing or electric insulation means are required. Again the set screws normally required for adjusting the contacts are disposed of, since the tongues can be readjusted by a simple bending operation and

maintain their position by reason of the inherent stiffness of the material, whereby the accuracy required for a faultless working of the switch governor is also ensured.

It will thus be understood that the invention comprises the provision of the stationary contacts 12, 19, 27 and of a stationary stop face 13 for an electromagnetic contact device on tongues or lugs 11, 17, 24 and 13 which partly are stamped out of the U-shaped base member 5 and magnetic member 1 and bent off from the same and partly extend through the base member from a connecting bar 23 arranged underneath and insulated from the base member in such a manner that said contacts 12, 19, 27 and said stop member 13 can be adjusted to the required position or mutual spaces by simple bending operations.

It has already been proposed to use punched pieces as components for such electromagnetic contact devices. Also it is known to stamp out tongues or lugs from the components of such contact devices and to bend off such tongues to form stop members. However, compared to these known electromagnetic contact devices important advantages are attained by the invention as follows:

Hitherto, contact holders were required which were in the form of separate pieces secured on the base member 5 or on the U-shaped magnetic member 1 with intermediate insulating layers and additional electric connections, if desired. Expensive set screws were required in this case to adjust the distances between the contacts. In my novel contact device on the other hand the contact arms or fingers form an integral part of the base member 5 or of the U-shaped magnet member 9, respectively, from which they are stamped out. In spite of this simple arrangement and adjustment of the contact tongues, high accuracy of operation is ensured, the more so as the contact arms maintain their positions once adjusted owing to the inherent stiffness of the material.

In other words, the invention contemplates the consequent practical application of the novel principle that the electromagnetic contact device should be made substantially of stamped pieces, and of as few stamped pieces as possible. This permits quick and simple production and economy of material and labour. Any expensive components requiring much time to be mounted are avoided while my contact device is at least equivalent as to its operation and reliability to known contact devices made of many expensive individual parts.

The method and apparatus of the present invention have been described in detail with reference to specific embodiments. It is to be understood, however, that the invention is not limited by such specific reference but is broader in scope and capable of other embodiments than those specifically described and illustrated in the drawing.

I claim:

1. An electromagnetic contact device comprising a base member, a U-shaped magnetic member, insulating means between said members, an electromagnet carried by said magnetic member, a least one armature operated by said electromagnet and carrying movable contacts, and a plurality of contact arms including a contact secured to each contact arm and cooperating with said movable contacts, said contact arms being in the form of tongues formed integral with said base member and said magnetic member, respectively, and separated therefrom tongue-fashion along two long and one short edge by stamped cuts, for adjustment of the contacts by mere bending of the tongues.

2. An electromagnetic contact device, comprising a base member, a U-shaped magnetic member, insulating means between said members, an electromagent carried by said magnetic member, at least one armature operated by said electromagnet and carrying movable contacts, a connecting bar secured under said base member, an insulating member for insulating said connecting bar from said base member, and a plurality of contact arms including a contact secured to each contact arm and cooperating with said movable contacts, a part of said contact arms being in the form of tongues formed integral with said base member and said magnetic member, respectively, and separated therefrom tongue-fashion along two long and one short edge by stamped cuts, and another part of said contact arms extending from said connecting bar through a recess in said base member and said magnetic member, for adjustment of the contacts by mere bending of the contact arms.

3. An electromagnet contact device, comprising a base member, a U-shaped magnetic member, insulating means between said members, an electromagnet carried by said magnetic member, at least one armature operated by said electromagnet and carrying movable contacts, a connecting bar secured under said base member, an insulating member for insulating said connecting bar from said base member, a stop, and a plurality of contact arms including a contact secured to each contact arm and cooperating with said movable contacts, a part of said stop and said contact arms being in the form of tongues formed integral with said base member and said magnetic member, respectively, and separated therefrom tongue-fashion along two and one short edge by stamped cuts, and another part of said contact arms extending from said connecting bar through a recess in said base member and said magnetic member, for adjustment of the stop and contacts by mere bending of said tongues.

4. An electromagnetic contact device, comprising a base member, a U-shaped magnetic member, insulating means between said members, an electromagnet carried by said magnetic member, at least one armature operated by said electromagnet and carrying movable contacts, a connecting bar secured under said base member, an insulating member for insulating said connecting bar from said base member, a stop, and a plurality of contact arms including a contact secured to each contact arm and cooperating with said movable contacts, a part of said stop and said contact arms being in the form of tongues formed integral with said base member and said magnetic member, respectively, and separated therefrom tongue-fashion along two long and one short edge by stamped cuts, and another part of said contact arms extending from said connecting bar through a recess in said base member and said magnetic member, at least a part of said tongues being bent off from their carrier member, for adjustment of the contact distances by mere rebending of the tongues.

5. An electromagnetic contact device of the

character described comprising a base member, a magnetic member secured thereto, insulation means between said members, an electromagnet carried by said magnetic member, at least one armature operated by said electromagnet and carrying movable contacts, a plurality of contact arms, and contacts carried by said contact arms and cooperating with said movable contacts, said contact arms comprising tongues formed integral with said base member and said magnetic member, respectively, and bendable to provide for adjustment of said contacts.

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