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2,484,251

WEAR ADJUSTING SHIM FOR A RELAY

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FIG. 2

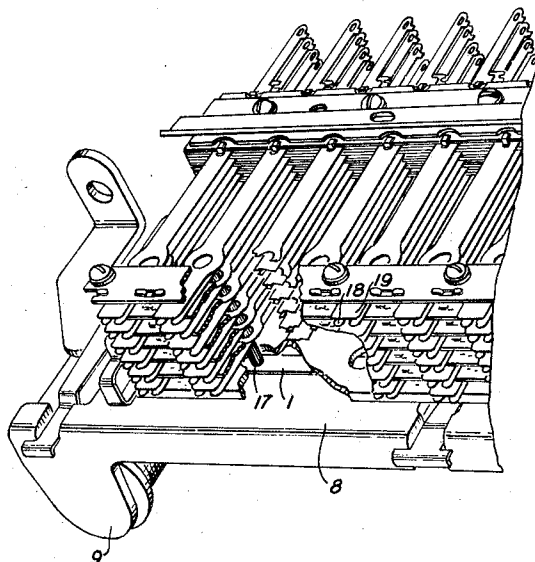


FIG. 4

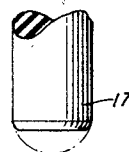


FIG. 3

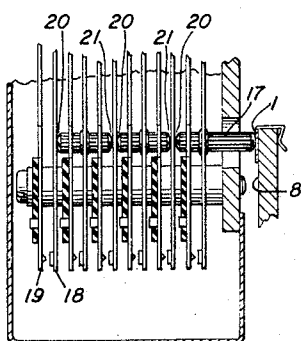
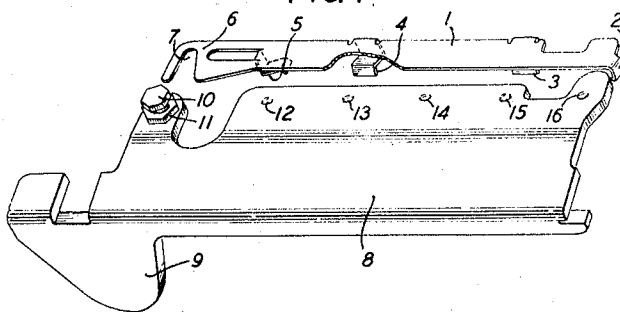


FIG. 1



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WEAR ADJUSTING SHIM FOR A RELAY

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1 Claim. (Cl. 200—104)

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This invention relates to armatures of relays and more specifically to attachable plates for these armatures, the purpose of which is to build up the working surfaces of these armatures to compensate for wear of members actuated thereby.

In the relay art, as exemplified in the disclosure of Patent 2,169,551 to C. I. Baker et al., dated August 15, 1939, it is a well-known structure which enables an armature of a relay to actuate a plurality of circuit contact springs by reason of engaging and moving an insulating member which actuates in turn the movable ones of pairs of fixed and movable contact springs. There generally are several movable spring contacts actuated by each insulating member and of course each of these movable contacts cooperates with a fixed or stationary spring contact. Also there are generally several separate such insulating members actuated simultaneously by the same armature.

The foregoing is a general picture of what is well known in the art and detailed description of the matter so presented may be found in the referenced patent.

Associated with the above-described function of the armature of such relays in actuating a plurality of insulating members, hereinafter referred to as contact separators, has been at least one widely recognized problem. This problem manifests itself in the wear of the separator and armature contact surfaces resulting from the necessary innumerable operations of such a relay while in service. This wear eventually results in loss of contact follow of the contacts since the armature can no longer move the contact carrying rods far enough to effect satisfactory contact.

As will be shown later in more detail in the specification there are generally, as on the type of relay referred to in the patent above, in the order of 30 to 60 pairs of movable and stationary contact springs on these relays. These springs are generally found to exist in five groups of six pairs associated with each armature, the movable springs of each of the latter groups being actuated by the separator as previously outlined.

Over a period of time, due mainly to wear of the contact surfaces of the separators, the movement of the armature fails to produce enough movement of the separators to permit sufficient contact follow to set up satisfactory contact between the movable and stationary spring contacts associated with the respective separators. There is wear of the armature surface where the sepa-

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rators are actuated but this wear is slight and not of consequence in this discussion.

The previously accepted manner of remedying this unsatisfactory operating condition of wear of the separators was to immobilize the relay in question and by means of a special tool reset by hand each movable spring contact closer to its cooperating stationary contact such that when the former was moved by the separator it would engage the latter contact sooner in the armature stroke and thus once again obtain sufficient contact follow to insure a satisfactory electrical contact. This former maintenance method, as will be appreciated by those skilled in the art, was delicate and slow and consequently evidenced a challenge to provide a simple, quick and less laborious remedy.

The invention herein set forth is such as to permit the above-mentioned maintenance operation to be done quickly by means of a simple device which is manufactured easily and cheaply, when compared to the saving in time and effort permitted by its employment. The use of this invention may extend the useful life of such relays to the life of the telephone exchange employing same; whereas, if it were not used, the replacement of worn parts would be of appreciable expense in labor and materials over the same period.

The invention herein described is a plate having spring clips integral thereto such that the plate may be readily attached to the armature of a relay as a shim between the armature and spring contact separators actuated by this armature. Various thicknesses of plates may be used to provide the required adjustment when the armature, and of course its separator actuating extension, are in the unoperated position.

From the following detailed description of the invention it is readily understood that the described device embodying the invention is a solution to the problem set forth previously and thus is recognized by those skilled in the art as a substantial contribution thereto by virtue of having solved what was previously recognized by maintenance personnel as a vexing situation.

The following are general descriptions of the drawings forming a part of this disclosure, the relay parts shown being those of the relay disclosed in the above-referenced patent.

Fig. 1 is a perspective view in explosion of the invention associated with the relay armature and extension thereof to which it is attached for use;

Fig. 2 is a part of a relay in perspective, a cut-away section thereof showing the assembled asso-

ciation of the armature extension, the plate attached thereto and the contact spring separators actuated by the plate on the armature extension;

Fig. 3 is a sectional view of the armature with plate attached showing one of the separators resting on the plate such that the separator has been given a displacement in its unoperated position, relative to the normal position of same when resting directly on the armature extension; and

Fig. 4 is a magnified partial view of an end of one of the contact separators, such as that one which rests on the extension of the armature. The dotted portion of this figure represents the original shape of the end of the separator and so indicates the degree of wear of this separator which necessitates the use of the invention.

Referring in detail to Fig. 1, the plate referred to as the invention is made up of a strip of standard relay contact spring material 1, having been punched out of sheet stock by a suitable punch and die combination. The strip 1 is punched out so as to have integral thereto ears which are bent to form clip portions 2, 3, 4 and 5. One end 6 of the strip 1 is enlarged and provided with an aperture 7. The remaining detail of the strip 1 is the special configuration given same during the punching operation to allow the strip 1, with its clips 2 through 5 and aperture carrying end 6, to fit onto the extension 8 of an armature 9 as is readily seen by the exploded presentation in Fig. 1. The aperture 7 of the end 6 of the strip 1 fits around the back-stop screw 10 of the armature 9 and is locked under the lock nut 11 of said screw. This armature 9 is one armature of the relay disclosed in the referenced patent as are all of the herein presented views of relay parts other than the armature plate.

In Fig. 1 the areas 12, 13, 14, 15 and 16 represent depressions in the surface of the extension 8 of armature 9 caused by minor wear due to numerous operations of said armature 9 in actuating its associated relay contact separators such as 17, as shown in part on the perspective view of Fig. 2. This latter view is a part of the relay disclosed in the referenced patent, the section of interest having been broken away to show the cooperative relationship of the strip 1, carried by the extension 8 of armature 9, upon which strip 1 rest the contact spring separators such as 17.

Fig. 3 is a cross-section of Fig. 2 taken through the relay section so as to split one of the separators such as 17. It is seen that the strip 1 is interposed between the armature extension 8 and the separator 17 in order to shift the unoperated position of said separator 17 by the thickness of the strip 1. This will permit the armature extension 8 of Fig. 2 to effectively move the separator 17 a greater distance than was formerly possible without the use of the strip 1, which is being referred to in the meaning of the plate as the invention was described in the introduction to this specification.

The minor wear of the armature extension surface, referred to as the depressions 12 through 16 of Fig. 1, as well as the more serious wear on the ends of the separators such as 17 of Fig. 4 and minor wear between pairs of movable and fixed contacts, such as 18 and 19, will all vary

along the direction of the length of the armature extension 8. The use of the strip 1 will not in all cases completely compensate for the wear on the separators but it invariably will remedy a large majority of the inoperative conditions resulting from this type of wear. This will enable a maintenance man to complete the job by the hand method previously mentioned in a short period of time compared to that necessary if he were required to reset by hand all of the inoperative springs. It is to be noticed also that the type of wear described in connection with the ends of the separators, such as 17 of Fig. 4, will occur also at points 20 and 21 of Fig. 3.

These plates or strips, these words being synonymous in this disclosure, may of course be of any thickness deemed necessary as a result of various degrees of wear. They also may be made of various configurations to fit different armatures or extensions thereof. The positions of the clips and apertures required for attaching the plates to their cooperating armatures may assume various positions on the plate or they may be deleted in part as not being necessary in particular applications. There are numerous deviations from the description given herein which will come within the scope of this invention which is limited only to the scope of the appended claim.

What is claimed is:

An electromagnetic relay comprising an armature, an extension thereof having a working surface, insulating members with worn ends thereof resting on said surface, said worn ends adapted to be actuated by said armature extension, pairs of fixed and movable contacts, said movable contacts arranged to be actuated by said members to make closure with said fixed contacts, said members failing to cause such closure because of lost motion of said member due to said worn ends, and a shim comprising a thin plate having integral thereto spring clip means along its length and an end thereof provided with an aperture, whereby said plate may be fastened to the aforementioned armature extension surface and interposed between said surface and the worn ends of the insulating members previously resting on said surface to compensate for said lost motion to thereby insure complete closure of said fixed and movable contacts, the spring clips on said plate adapted to clamp same to an edge of said armature extension and the aperture on one end of said plate adapted to accommodate a clamping screw therefor attached to the armature.

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