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F. E. WOOD

2,456,036

RELAY YOKE

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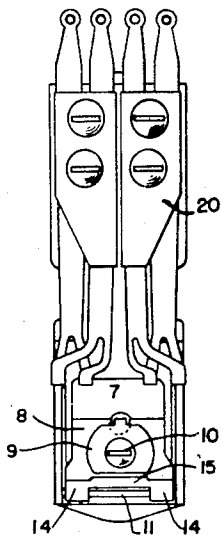


FIG. 1

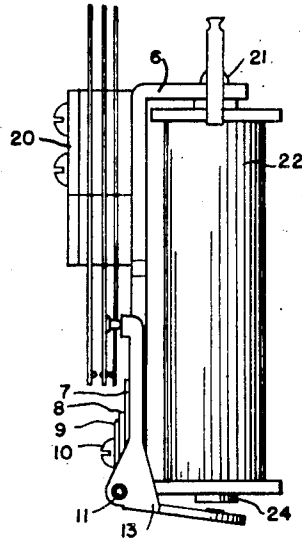


FIG. 2

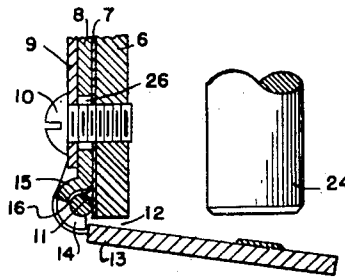


FIG. 3

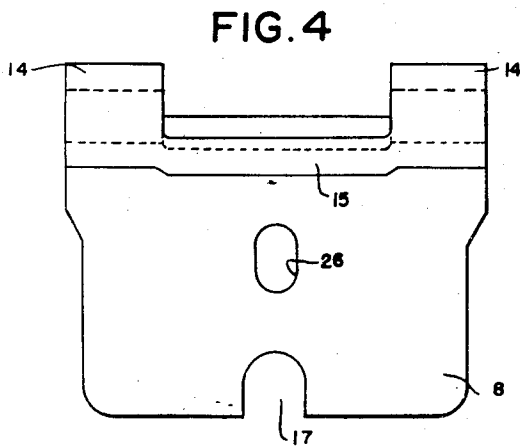


FIG. 4

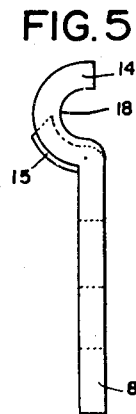


FIG. 5

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2,456,036

RELAY YOKE

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3 Claims. (Cl. 175-336)

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The present invention relates in general to switching devices and, more particularly, to an improved relay yoke, or armature clamping member for pivotally securing the armature to the end of the relay heel piece included in the relay magnetic structure.

It is the object of the present invention to provide an improved relay yoke having a reinforcement between the ears of the yoke in which the armature pivot pin rotates so that the bearing surfaces included in the ears are not easily bent out of alignment and which reinforcement is positioned so that a bent pivot pin will not bind therein while still permitting easy inspection in adjusting the air line between the armature and the end of the heel piece.

The invention will best be understood by references to the following specification taken in conjunction with the accompanying drawing in which:

Fig. 1 is a top plan view of a relay using the improved relay yoke;

Fig. 2 is a side view of the relay shown in Fig. 1;

Fig. 3 is an enlarged longitudinal sectional view taken along the center line of Fig. 1 to more clearly show the details of the assembly;

Fig. 4 is an enlarged plan view of the improved relay yoke; and

Fig. 5 is a side view of the yoke shown in Fig. 4.

Referring now more particularly to Figs. 1 to 3, inclusive, of the drawing the electromagnetic relay shown therein is substantially similar to the relay shown in the Wood Patent 2,272,496, issued Feb. 10, 1942, except for an improved contact spring assembly and the improved relay yoke of the present invention. This relay comprises the usual magnetic structure including the relay core 24, the L-shaped heel piece 6 and the L-shaped armature 13. The improved contact spring assembly 20 is being shown and fully described in a copending application S. N. 630,421 filed November 23, 1945. The contact spring assembly is secured to the heel piece 6 by means of the two screws shown. The relay core 24 is secured to the heel piece 6 by means of screw 21. The coil winding 22 wound around core 24 provides the means by which the armature 13 is actuated. Armature 13 has a bearing pivot pin 11 securely fastened to the armature 13 in the usual manner. In order to pivotally secure the armature 13 to heel piece 6, a bronze plate 7 is first placed on the heel piece 6, the pivot pin 11 is placed in the bearings 18 of ears 14 of the yoke and the yoke 8 is placed on the plate 7 after which the washer 9 and screw 10 secure the assembly

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to heel piece 6 by screwing screw 10 into a threaded hole in heel piece 6. The relay yoke 8 has a slotted mounting hole 26 near its center to allow shifting of the yoke so that a proper air line, such as 12, is provided between the armature 13 and the end of heel piece 6.

The improved yoke 8 is made of non-magnetic material and comprises two ears 14 having bearing surfaces 18 in which the armature pivot pin 11 rotates and a reinforcing section 15 extending between the ears 14. The inner surface of the reinforcing section 15, as will be noted, is swaged in offset relation to the bearing surfaces 18 to thereby have a small clearance between the armature pivot pin 11 and the reinforcing section 15 so that a slightly bent pivot pin will not bind during rotation. It should also be noted that the reinforcing section 15 does not extend the full length of the ears 14 but is cut off so that during the inspection and assembly of the armature 13 to the heel piece 6 the proper air line, such as indicated at 12, Fig. 3, may be easily provided in the magnetic circuit. This cut-away portion permits light to shine thru between the end of heel piece 6 and armature 13 so as to easily observe the air line, or distance between the heel piece 6 and armature 13, when the armature is being assembled on the heel piece.

Although this relay yoke is somewhat similar to the yoke 21 shown in the Wood Patent 2,272,496; previously mentioned, it has been found in actual practice that the yoke 8 of the present invention is far superior. For example, it has been found that the ears 22 and 23 of yoke 21 of the Wood patent are easily bent out of alignment if care is not taken when making adjustments to the armature or armature arm. In addition if the relay should be accidentally dropped then the ears 22 and 23 may be bent out of alignment causing a bind between the pivot pin and the bearings in the ears. The reinforcing section 15 in the present invention stiffens the ears 14 so that they are not easily bent out of alignment while the cut-away portion between the ears 14 permit visual observation, during assembly, of the air line 12 between the armature 13 and heel piece 6. The reinforcing section 15 has been swaged in offset relation to the bearing surfaces 18 so that if the pivot pin 11 should be slightly bent near its middle during its assembly to the armature 13, the bent pivot pin would not strike the inner surface of reinforcing section 15. This clearance is indicated at 16 in Fig. 3.

The ears 14 and the reinforcing section 15 are

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formed by a swaging process in the following manner: The yoke 8 is first cut to the proper size and shape and then a first swaging operation, including an undersized step-cut pin, partially bends the yoke 8 at the proper point. This partial bending is done so as not to break the metal. A second swaging operation using the same pin then shapes the ears 14 so that they are now semi-rounded and the bearing surfaces are undersized. A third and final swaging operation, using a larger smooth polished pin of the desired size, now swages the bearing surfaces 10 to the proper size and also compresses the ears somewhat so as to produce hardened smooth surface bearings which prolong the life of such a yoke.

What is considered new and is desired to have protected by Letters Patent is set forth in the following claims.

What is claimed is:

1. In an electromagnetic switching device, a core, a heel piece secured to said core, an armature having a pivot pin, means for rotatably securing said armature to said heel piece, said means including a relay yoke having a pair of semi-rounded ears at one extremity of said yoke, inner semi-rounded bearing surfaces in said ears for pivotally securing said pivot pin and said armature to said heel piece, a reinforcing section extending longitudinally between said ears to stiffen said ears and keep said bearing surfaces in alignment, said reinforcing section being out of alignment from said bearing surfaces of said ears to provide clearance between said section and the armature pivot pin, and said reinforcing section extending laterally only part way between said ears to provide an opening therebetween for visually observing the air line between said heel piece and said armature.

2. In an electromagnetic switching device, a core, a heel piece secured to said core, an armature, a pivot pin secured to said armature, means for rotatably securing said armature and pivot pin to said heel piece, said means including a relay yoke having a pair of semi-rounded ears at

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one extremity of said yoke, inner semi-rounded bearing surfaces in said ears pivotally securing said pivot pin and armature to said heel piece, a reinforcing section extending longitudinally between said ears to stiffen said ears and keep said bearing surfaces in alignment, and said reinforcing section being out of alignment from said bearing surfaces of said ears to provide clearance between said section and the armature pivot pin.

3. In an electromagnetic switching device, a core, a heel piece secured to said core, an armature, a pivot pin secured to said armature, a relay yoke for rotatably securing said armature and pivot pin to said heel piece; said relay yoke having a pair of semi-rounded ears at one extremity thereof, inner semi-rounded and hardened bearing surfaces in said ears pivotally securing said pivot pin and armature to said heel piece, said semi-rounded ears extending from the main body portion of said yoke in a semi-rounded continuation of said yoke, the axis of said semi-rounded ears being in a plane parallel to the plane of the main body portion of said yoke, a reinforcing section extending longitudinally between said ears to reinforce said ears and maintain said bearing surfaces in alignment, and said reinforcing section being parallel to a portion of said semi-rounded surfaces of said ears and out of alignment from said bearing surfaces to provide a clearance between said section and said armature pin.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,651,684	Erickson	Dec. 6, 1927

FOREIGN PATENTS

Number	Country	Date
448,948	Great Britain	June 18, 1936