

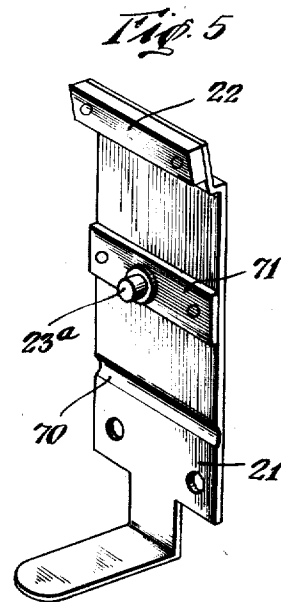
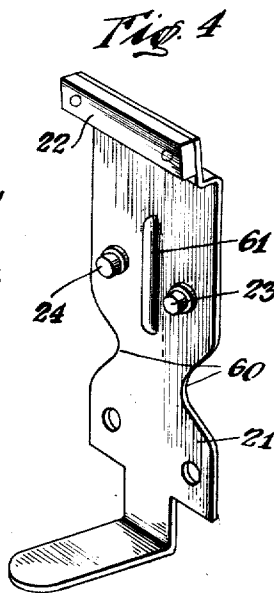
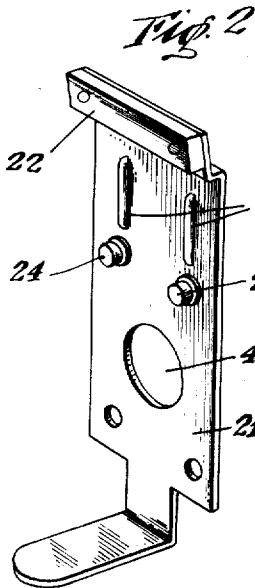
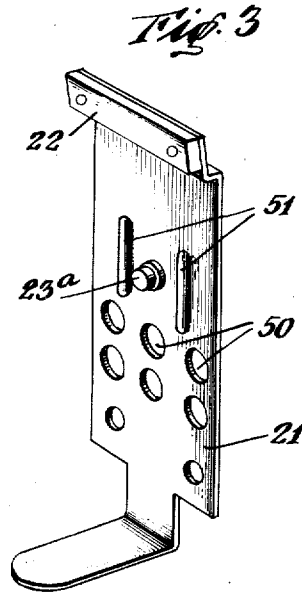
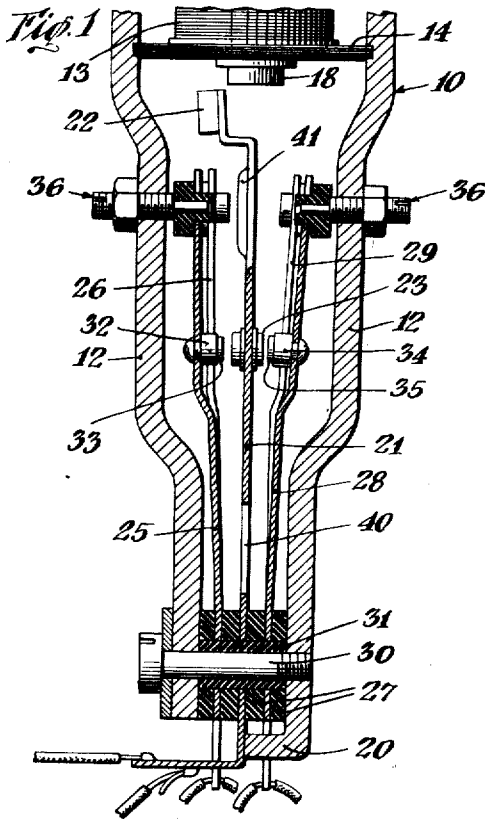
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8 Claims.. (Cl. 200—90)

This invention relates to mechanical inter-
rupter units for electrical systems and, more par-
ticularly, to magnetic interrupters of the type
having vibratory reeds adapted to make and break
5 electrical circuits.

The invention is applicable, for example, to
contact interrupters of the type comprising a
vibratory member or reed carrying contacts which
are rapidly opened and closed during the vibra-
10 tions of the reed to interrupt the current in the
power supply circuit for radio receivers and the
like.

An object of the present invention is to im-
prove the operating characteristics of an inter-
15 rupter of the above type.

Another object is to provide uniform and satis-
factory operation over extended periods of time
and after the device has been subjected to con-
siderable wear and usage.

20 A further object is to insure perfect starting
of the apparatus at all times.

Other objects of the invention will be appar-
ent from the following description and accom-
panying drawing taken in connection with the
25 appended claims.

According to one form of the present inven-
tion the above objects may be achieved by con-
trolling the flexibility of the reed member in in-
terrupter units of the above type by punching,
30 cutting or forming suitable cut-out portions in
parts of said reed members and by providing suit-
able ribs in other parts thereof. This may be
done, for example, by providing suitably located
holes in the reed member or by providing suitable
35 cut-away portions along the sides of the reed in
order to increase their flexibility in places and by
drawing or pressing suitable rib portions or secur-
ing suitable rib members in other parts of the
reed.

The invention accordingly comprises the fea-
tures of construction, combination of elements,
arrangement of parts, and methods of manu-
facture referred to above or which will be further
brought out and exemplified in the disclosure
45 hereinafter set forth, including the illustrations
in the drawing, the scope of the invention being
indicated in the appended claims.

For a fuller understanding of the nature and
objects of the invention as well as for specific
50 fulfillment thereof, reference should be had to the
following detailed description taken in connec-
tion with the accompanying drawing, in which;

Figure 1 is a sectional elevation of the mag-
netic interrupter mechanism with parts broken
55 away;

Figure 2 is a perspective view of a reed em-
bodying one form of the invention;

Figure 3 shows a reed made according to a
modified form of the invention;

Figure 4 shows a reed made according to a fur- 5
ther modified form of the invention; and

Figure 5 shows a reed made according to
another form of the invention.

While a preferred embodiment of the invention
is described herein, it is contemplated that con- 10
siderable variation may be made in the method
of procedure and the construction of parts with-
out departing from the spirit of the invention.

Referring to the drawing, Figure 1 shows the
reed and contact members, with part of the sup- 15
porting structure of an interrupter mechanism.

The mechanical interrupter unit comprises a
U-shaped base 10 of magnetic permeable mate-
rial having electrical conductivity. The base 10
is provided with a transversely extending mid- 20
portion (not shown) from which project the two
substantially parallel arms 12, 12. A magnetic
coil 13 is provided with end plate 14 of any suit-
able insulating material and a core of magnetic
permeable material provided with a pole piece 18 25
situated between said arms 12, 12.

Between the ends of arms 12, 12 of base 10 is
fixedly mounted one end of a vibratory reed 21
having the free end thereof extending toward
the pole piece 18 and provided with a reed pole 30
piece 22 disposed in offset relationship to the pole
piece 18. A portion 20 of the end of an arm 12
of the base 10 is bent substantially at right angles
to make contact with the fixed end of the vibra- 35
tory reed 21 so that a complete magnetic circuit
will be formed about said coil through the coil
core, base 10, portion 20, reed 21, reed pole piece
22, whereby the pole piece 18 serves as one pole
of the magnetic coil 13 and the vibratory reed 21 40
provided with the reed pole piece 22 serves as the
other pole of the magnetic coil.

The vibratory reed 21 is provided with a pair
of double-faced contacts 23 and 24 with the faces
of each disposed on opposite sides of the vibra- 45
tory reed 21, as shown in Figures 1 and 2.

Between one side of the clamped end of the
vibratory reed 21 and the end of one of the base
arms 12, 12 is mounted a pair of spaced spring
arms 25 and 26 insulated from both the arm 12
and the vibratory reed 21 by sheets of insulating 50
material 27. In like manner a similar pair of
spring arms 28 and 29 are mounted between the
other base arm 12 and the vibratory reed 21. The
assembly is secured together by bolts 30 project-
ing through holes in the end of one of the arms 12, 55

12 and threaded into tapped holes in the other arm 12. Contact between the bolts 30 and the spring and reed assembly is prevented by insulating collars 31.

5 The spring arms 25 and 26 are provided with circuit contacts 32 and 33 respectively and spring arms 28 and 29 are provided with circuit contacts 34 and 35 respectively. The circuit contact points 32 and 34 are adapted to cooperate with the double faced contact 23 and the circuit contacts 33 and 35 with double faced contact 24. Adjust-
10 ment of the gaps between these cooperating contacts is obtained through the use of adjustable supports 36 for each of the free ends of the
15 spring arms 25, 26, 28 and 29.

The reed member 21 is preferably formed of a magnetically permeable metal and is of such dimensions and of such metallurgical treatment and composition as to provide a flexible member
20 with its free end, carrying pole piece 22, adapted to oscillate responsive to interrupted magnetic impulses generated by coil 13. It has been found, however, that if a reed member is constructed in the usual manner from a piece of metal of uni-
25 form thickness throughout that the stiffness may be undesirably high in places thus rendering starting difficult, especially after the contacts have become considerably worn, and at the same time the reed will not be stiff enough in other
30 places, resulting in premature breakage or undesirable secondary vibrations.

It is proposed, therefore, according to the present invention, to increase the flexibility of the reed in places by providing cutaway portions of
35 desired shape, location and dimensions and to increase the stiffness of the reed in other places by providing ribs at these other places.

In the form of the invention illustrated in Figures 1 and 2 the cut-away portion comprises
40 punched hole 40 located between the contacts 23 and 24 and the clamping insulating sheets 27, preferably very close to the clamping sheets. The size of the hole is determined by the degree of flexibility required.

45 The stiffening members consist of ribs 41 drawn or pressed in the reed itself. The reed is preferably made from a steel of sufficient ductility to enable these ribs to be formed. If clock spring type of steel is used the drawing of the ribs can preferably be done before tempering.
50 As shown in Figures 1 and 2 the ribs 41 serve to prevent undesired secondary vibrations or oscillations in the end of the reed which would interfere with the normal motion of the reed. Likewise they serve to prevent breakage at this
55 point after repeated operation over an extended period of time.

According to the modified form of the invention shown in Figure 3 the flexibility is achieved
60 by punching a plurality of smaller holes 50 of desired size, shape and location in reed 21. In this figure only one centrally located contact 23a is shown and the stiffening ribs 51 are placed alongside the contact parallel to the edges of the reed in order to prevent breakage at the
65 contact, where the greatest bending forces are encountered.

Figure 4 shows another modified form of the invention in which greater flexibility is obtained
70 by providing cut-away portions 60 along the sides of the reed. A stiffening rib 61 is here shown between the two contacts 23 and 24 to prevent breakage in the region of the contacts.

In the modification shown in Figure 5 a trans-
75 verse groove or hollowed portion 70 across the

body of the reed is provided so that a thinner area will be provided extending entirely across the reed body. If desired, the groove may extend only part of the distance across the reed. In this modification a plate member 71 is riveted
5 or welded across the reed underneath the single contact 23a to serve as a lateral and longitudinal stiffener.

Not only does the present invention make it possible to adjust any reed to obtain a desired
10 flexibility at all points along its length but it provides a method which is economical and simple from a manufacturing standpoint. Likewise the above method of adjustment of the flexibility may be used to correct and improve the
15 operation of interrupters which have been in use for a considerable period and have become worn and out of adjustment.

In operation of the device the magnetic coil 13 is first energized to draw pole piece 22 toward
20 pole piece 18. This causes contacts 23 and 24 on reed 21 and co-operating contacts 34 and 35 on spring arms 28 and 29 to close. With the circuit arrangements most commonly used for this type of device contacts 24, 35, in closing, short-
25 circuit the magnet coil 13 thereby de-energizing it and allowing the reed member 21 to spring back and momentarily close contacts 23, 32 and 24, 33. The short-circuiting contacts being now open the process is repeated to continuously pro-
30 duce a vibratory motion in the reed and intermittently close the contacts on the reed and spring arms. The cut away portions, such as
40 in Figures 1 and 2, provide the required flexibility to insure starting and to insure perfect
35 contacting during operation. The rib portions, such as ribs 41 in Figures 1 and 2 prevent undue flexing at points of severe strain or undesired activity.

While the structure and arrangements described are cited to exemplify the type of de-
40 vice to which the present invention is applicable it is obvious that the invention is also applicable to a considerable variety of forms of mechanism and circuit.

While the present invention as to its objects and advantages, has been described herein as carried out in specific embodiments thereof, it is not desired to be limited thereby but it is
45 intended to cover the invention broadly within the spirit and scope of the appended claims.

What is claimed is:

1. In a magnetic interrupter, a base member, an electromagnet mounted thereon, a vibratory reed member having one end clamped to said
50 base and the other end free to vibrate within the sphere of magnetic influence of said electromagnet, a first contact mounted on said reed member, a second contact supported from said base and co-operating with said first contact to
60 open and close a circuit, said reed having portions formed at different parts of its length between its clamped and free end to locally correct the flexibility characteristics thereof, one of said
65 portions being formed with a smaller cross section than portions on either side thereof whereby the flexibility is increased and another of said portions being provided with a stiffener of material extending above the surface of the reed.

2. In a magnetic interrupter, a base member, an electromagnet mounted thereon, a vibratory reed member having one end clamped to said
70 base and the other end free to vibrate under influence of said electromagnet, a first contact mounted on said reed member, a second contact

supported from said base and co-operating with said first contact to open and close a circuit, said reed member having a hole punched through a portion thereof, said portion being located between said clamped end and said contact and said reed having a stiffening rib located between said hole and said free end.

3. A vibratory member for a magnetic interrupter comprising a metal reed of substantially uniform width and thickness and having one end adapted to be clamped to a base and the other end adapted to serve as a vibratory portion, a contact mounted on said reed intermediate of said ends, a first portion intermediate of one of said ends and said contact having a hole punched therethrough to increase the flexibility of said portion and a second portion intermediate of the other of said ends and said hole having a stiffening rib formed therein to decrease the flexibility of said second portion.

4. A vibratory member for a magnetic interrupter comprising a metal reed of substantially uniform width and thickness and having one end adapted to be clamped to a base and the other end adapted to serve as a vibratory portion, a contact mounted on said reed intermediate of said ends and a portion having inwardly extending cuts along the edges of said reed intermediate of one of said ends and said contact whereby the cross-sectional area of said portion is less than that of the remainder of said reed.

5. A vibratory member for a magnetic interrupter comprising a metal reed of substantially uniform width and thickness and having one end adapted to be clamped to a base and the other end adapted to serve as a vibratory portion, a portion of said reed between its clamped and vibratory ends being formed with a smaller cross section than portions on either side thereof, a contact mounted on said reed intermediate of said ends and a stiffening rib across said reed in the immediate vicinity of said contact.

6. In a magnetic interrupter, a base member, an electromagnet mounted thereon, a vibratory

reed member having one end clamped to said base and the other end free to vibrate within the sphere of magnetic influence of said electromagnet, a first contact mounted on said reed, a second contact supported from said base and cooperating with said first contact to open and close the circuit, said reed member having a re-enforcing rib located between said clamped end and said free end, the cross sectional area of said reed being substantially the same in a section through said re-enforcing rib and a section through said reed beyond the end of said re-enforcing rib.

7. In a magnetic interrupter, a base member, an electromagnet mounted thereon, a vibratory reed member having one end clamped to said base and the other end free to vibrate within the sphere of magnetic influence of said electromagnet, a first contact mounted on said reed member, a second contact supported from said base and cooperating with said first contact to open and close a circuit, said reed member having a re-enforcing rib located between said clamped end and said free end, said rib being an integral part of said reed member and comprising a projecting hump on one face of said reed and a corresponding depression on the other face thereof.

8. In a vibratory interrupter device, the combination of a base, an electromagnet mounted thereon and a flexible vibratory reed mounted thereon, one end of said reed being clamped to said base and the other end being free to vibrate under influence of said electromagnet, a first contact supported on said reed, a second contact supported from said base and co-operating with said first contact to open and close a circuit during vibration of said reed, a rigid plate secured to the face of said reed intermediate the clamped and free end thereof and supporting said first contact and said reed having material removed from substantially its entire width in the region between its clamped end and said rigid plate to reduce its cross-sectional area and locally increase its flexibility.

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