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Jawelak

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[54] **CONTACT CLUSTER FOR ARCING AND CURRENT CARRYING MEANS IN A CIRCUIT BREAKER**

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[52] **U.S. Cl.** ..... **200/163**, 339/64 R

[51] **Int. Cl.** **H01h 1/38**

[58] **Field of Search** ..... 200/163, 282, 287, 288, 200/258, 260, 261; 339/64, 255 P, 111

[56] **References Cited**

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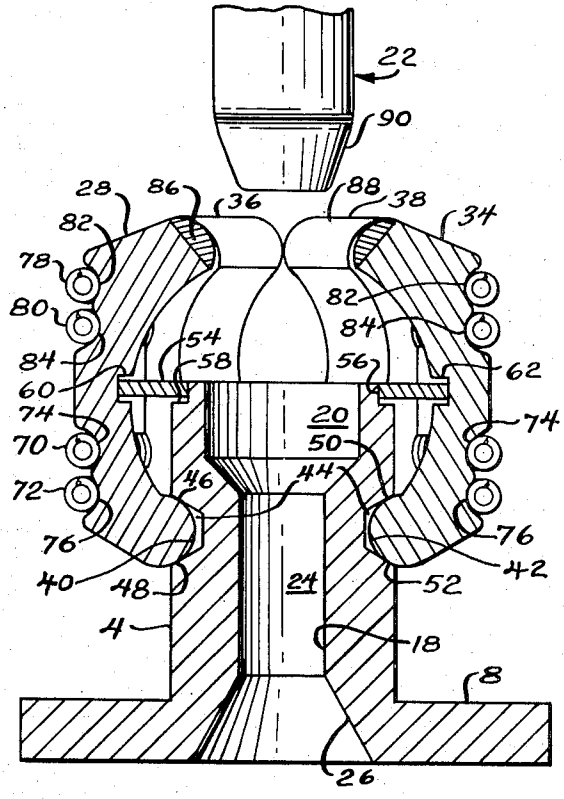
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[57] **ABSTRACT**

A contact cluster for arcing and current carrying in a circuit breaker including a plurality of contact fingers pivotally supported on a cylindrical base member and uniformly spaced about the base member by a spacer. Garter springs are provided about the contact fingers to bias them into engagement with both the base member and a movable contact inserted between the free ends of the contact fingers. Arc resistant materials are provided on the contact fingers and on the movable contact on the portions between which arcing takes place.

3 Claims, 3 Drawing Figures



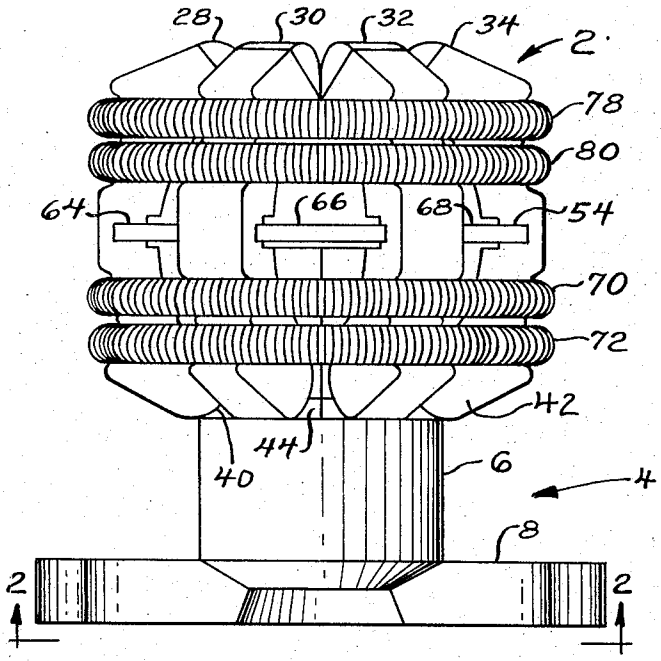
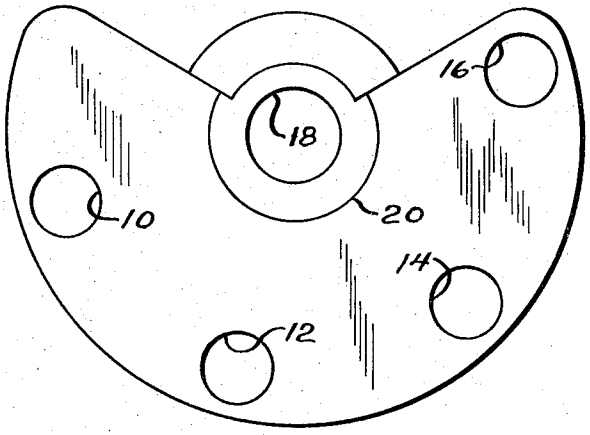


Fig. 1

Fig. 2



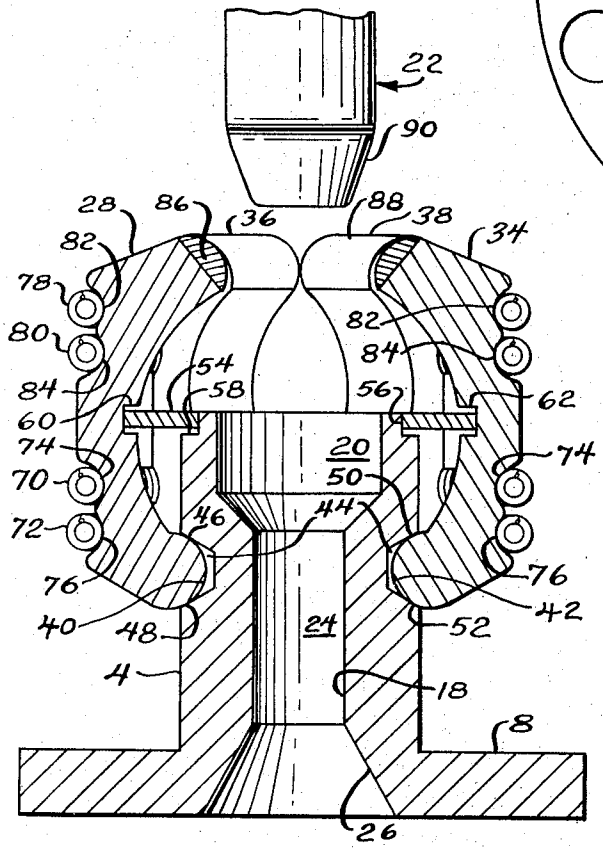


Fig. 3

CONTACT CLUSTER FOR ARCING AND CURRENT CARRYING MEANS IN A CIRCUIT BREAKER

BACKGROUND OF THE INVENTION

Various contact structures have been and are being utilized for under load circuit breaking within arc extinguishing chambers in liquid dielectric filled type circuit breakers. Generally the movable contact can be characterized as a male contact and the fixed contact as a female contact. Various arrangement have been provided for providing spring pressure on the female contact or contacts to insure contact force between the movable and fixed contacts. One such arrangement using leaf type springs is disclosed in U.S. Pat. No. 3,107,418 assigned to the assignee of the instant application. A similar arrangement using leaf type springs is also shown in U.S. Pat. No. 3,519,774-Rietz.

It is an object of this invention to provide a contact cluster for a circuit breaker which will provide improve arcing and sustained current carrying ability, while at the same time utilizing a structural arrangement, the components of which are readily manufactured and assembled without undo difficulty.

SUMMARY OF THE INVENTION

The foregoing object is accomplished in accordance with this invention in one form thereof, by providing a contact cluster base member having a mounting portion and a cylindrical contact finger supporting portion. One end of each of a plurality of contact fingers is pivotally supported in an external groove on the cylindrical portion. A spacer is also supported by the cylindrical portion and engages notches in the central portion of the contact fingers to uniformally space the contact fingers within the contact cluster assembly. Garter springs are placed around the contact fingers between the central portion engaging the spacer and the ends of the contact fingers engaging the groove in the base member to hold the contact fingers in engagement with the base member. Additional garter springs are placed around the contact fingers between the central portion engaging the spacer and the ends of the fingers which engage a movable contact to bias the fingers into contact with the movable contact. The tip of the movable contact and the ends of the contact fingers engaging the movable contact are provided with an arc resistant material such that as the movable contact is withdrawn from the contact fingers, arcing takes place only between arc resistant materials.

BRIEF DESCRIPTION OF THE DRAWING

FIG. **1** is a side elevational view of the preferred embodiment of the circuit breaker contact cluster of this invention;

FIG. **2** is a bottom elevational view of a portion of the circuit breaker contact cluster shown in FIG. **1**;

FIG. **3** is an elevation view of the circuit breaker contact cluster taken along the line **2—2** in FIG. **1.**

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawing, the contact cluster **2** of this invention is shown to be assembled on a mounting portion **4** having a cylindrical member **6** extending from a mounting portion **8.** The mounting portion **8** is a circular configuration, with a wedge shaped portion removed as best seen in FIG. **2.** The mounting portion is provided with mounting holes **10,12,14** and **16** for securing it to the circuit breaker assembly by suitable fastening means such as bolts.

The cylindrical member **6** is provided with a central bore **18** which has an enlarge diameter upper portion **20** which receives the end of the male contact tip **22** shown in a disengaged position in FIG. **3.** A smaller diameter portion **24** of the bore **18** extends from the enlarged portion **20** to a frustoconical portion **26** extending through the mounting portion **8.** The central bore **18** including portions **20,24** and **26** together with the wedge shaped open portion of the base provide a passage for exhausting arced products from the contact cluster.

A cluster of six contact fingers **28,30,32,34,36** and **38** are supported on the cylindrical member **6.** The contact fingers are provided with rounded lower ends such as **40** and **42** of fingers **28** and **34** as shown in FIG. **3.** These rounded ends are pivotally received in groove **44** formed in the outer surface of cylindrical member **6.** The geometry of the groove **44** is such as to provide two definite points of contact with each finger, **46** and **48** for finger **28** and **50** and **52** for finger **34.**

A spacer **54** is mounted at the upper end of cylindrical **6** to uniformly space the contact fingers. The spacer **54** has a cylindrical central bore **56** which is sized to fit in a notch **58** provided at the end of cylindrical member **6.** The outer periphery of the spacer **54** is provided with series of uniformly spaced notches into which the central portion of the contact fingers are received. As shown in FIG. **3,** the contact fingers are provided with notches, notches **60** and **62** for fingers **28** and **34** to hold the finger in position with respect to the spacer **54.** As shown by spacer portions **64** and **66** and **68** in FIG. **1,** the spacer extends outwardly between the contact finger to space the contact fingers.

The contact fingers are held in engagement with the spacer **54** and the groove **44** by a pair of garter springs **70** and **72.** Received in locating grooves **74** and **76** in the outer surface of the contact fingers. Similarly the upper ends of the contact fingers, the tips of which engage the male contact tip **22** are biased into engagement by a pair of garter springs **78** and **80** received in locating grooves **82** and **84.**

The tips of the contact fingers are provided with an arc resistant material as shown by **86** and **88** for fingers **28** and **34** in FIG. **3.** Similarly the end **90** of male contact tip **22** is provided with an arc resistant material. Thus, the arc resistant material on the ends of the contact fingers engages the arc resistant material on the end of the male contact tip as they are disengaged, such that any resultant arc is drawn only between arc resistant materials. The geometry of the spacer **54** with repsect to the contact tips of the contact fingers is such as to permit a slight collapse of the contact fingers as the moving contact is withdrawn. Or, in the case of moving contact insertion, the contact fingers are slightly expanded, i.e. lifted off of the bases of the notches in the spacer.

While as previously set forth, arc resistant material is provided arc interruption, the contact fingers **28,30,32,34,36** and **38,** mounting portion **8** and movable contact **22** are made of suitable conductive material for continuous current carrying ability.

It should be apparent to those skilled in the art, that while what has been described is considered at the present to be the preferred embodiment of this invention, in accordance with the Patent Statutes, changes made be made in the disclosure contact cluster without actually departing from the true spiral and scope of this invention.

What is claimed as new and is desired to be secured by Letters Patent of the United States is:

1. A contact cluster arrangement for a circuit interrupter having arc suppressive and continuous current carrying abilities comprising:

a. a base member having a mounting portion and a projecting contact support portion having a cylindrical external surface, with a groove formed therein,

b. a plurality of contact fingers each having a first pivotally supported end and a second movable contact engaging end, said pivotally supported ends engaging said groove formed in said projecting contact support portion of said base member at two separate points so as to provide improved current transfer therebetween,

c. a spacer means supported on said projecting contact support portion and positioned to engage said contact fingers between said pivotally supported ends and said movable contact engaging ends to uniformally space said contact fingers about said projecting contact support portion,

d. at least one garter spring encircling said contact fingers between the point of engagement with said spacer means and said first pivotally supported end to bias said pivotally supported ends of said contact fingers into engagement with said contact support portion,

e. at least one garter spring encircling said contact fingers between the point of engagement with said spacer means and said movable contact engaging ends to bias said movable contact engaging ends into contact with a movable contact when moved therebetween, and

f. arc resistant material provide on the movable contact engaging ends of said contact fingers and said portion of said movable contact engaging said contact fingers.

2. The contact cluster arrangement as set forth in claim **1** wherein the outer periphery of said spacer means is provided with a series of uniformly spaced notches, each of which receives the central portion of one of said contact fingers to maintain said contact fingers uniformly spaced about said central support member, the depth of said notches in said spacer means is such as to provide for slight inward movement of said movable contact engaging ends of said contact fingers upon withdrawal of said movable contact to open the circuit interrupter.

3. The contact cluster arrangement as set forth in claim **1** wherein said projecting contact support portion of said base member is provided with a central base to provide a passage for exhausting arced products from the contact cluster.

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