

# COMMISSIONER'S DECISION

## Lack of Invention: Electrical Connector with Environmental Seal

No advance in the art was found over the art which disclosed that conductor receiving openings each covered with a membrane having a thinner central portion are known. Rejection affirmed.

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This decision deals with Applicant's request for review by the Commissioner of Patents of the Examiner's Final Action on application 313,392 (Class 339-47). The application was filed on October 13, 1978, by Bunker Ramo Corp., and is entitled ELECTRICAL CONNECTOR WITH ENVIRONMENTAL SEAL. The inventor is William A. Kailus. The Examiner in charge issued a Final Action on March 13, 1981, refusing the application. Applicant had requested an oral Hearing, but later decided to rely on his written submissions.

The invention relates to an insert placed in one end of an electrical multi-contact connector. The insert 19 provides not only a sealing means for pockets 30 situated therein but also a plurality of visible indexing recesses 40. A membrane 36 covers each of the pockets and has a thickness sufficient during normal operation to seal the pockets while still easily accepting a socket contact 26. Figures 2, 3 and 4, below, depict the arrangement:

Fig. 2

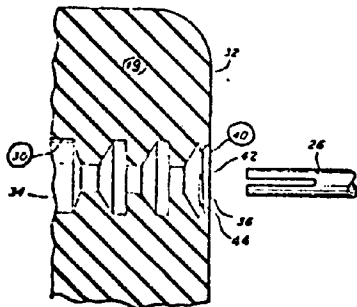


Fig. 3

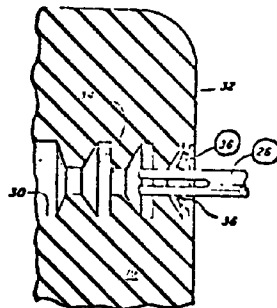
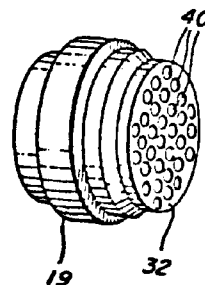


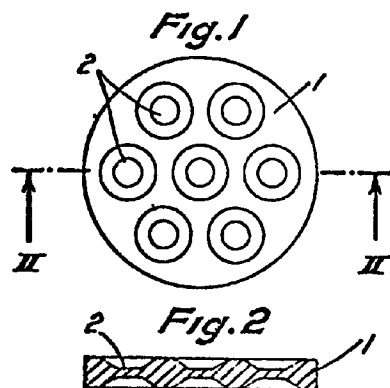
Fig. 4



In the Final Action the Examiner refused the application as lacking inventive ingenuity in view of the applied French patent:

1,202,435      Jan. 11, 1960      Bac

The Bac patent discloses an electric connector having a grommet which provides restrictive apertures 2 which, during installation, will be pierced for the passage of the number of cables equal to the connections to be used. Figures 1 and 2, below, show that arrangement:



In the Final Action the Examiner stated (in part):

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Applicant's alleged invention relates to a member for sealing the conductor of an electrical connector. The member includes a membrane having a thickness sufficient to maintain its integrity under normal operating conditions (without a conductor inserted in it), but also being thin enough to permit insertion of a conductor therethrough.

The claims are rejected because the subject matter thereof lacks inventive ingenuity in view of Bac. The Bac patent describes a connector comprising a sealing member having a plurality of openings corresponding to the number of conductors to be used. Each opening is closed by a layer of material molded integrally with said sealing member. Said layer has a thin central portion, surrounded by a thicker zone and is offset from the entrance of each opening; the cross section of an opening is greater than the cross section of an inserted conductor (figs. 2 and 3).

As can be seen from the cited patent, the structure, mode of use and purpose of applicant's alleged invention are known, and no inventive contribution can be detected therein. Minor variations introduced by the applicant such as the use of a circumferential riser do not confer patentability to the sealing member.

#### Rebuttal of Applicant's Arguments

The applicant's arguments advanced in his letter of February 16, 1981 contravene the facts as shown in the cited reference. The use of a layer (applicant's membrane) having a cross section greater than the maximum cross section of the conductor inserted through it, which layer has a central portion, surrounded by a thicker zone is well shown in the Bac's patent. Therefore, applicant's statements "Since the membrane cross-section is greater than the maximum cross section of the electrically conductive members..." and "the relatively thin central portions and relatively thick surrounding portions..." cannot be accepted as referring to novel matter. Concerning the Bac patent, the applicant states that "From the figures of this patent, it does not appear to teach or suggest...openings of cross section greater than the maximum cross section of...conductive members mounted in the connector", and "none of these references show the membranes being fixed to the periphery of the conductive-member receiving opening". However the drawings of Bac clearly show the relationships in question.

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In making his case for allowance, the Applicant submitted new claims and argued (in part):

Newly submitted claim 1 now introduces the feature of the conductive members terminated to conductors. Furthermore, the pockets are defined as having enlarged conductor member receiving openings. The membranes are thin enough to permit insertion therethrough of a conductive member and the conductor terminated thereto without a sealing engagement with either said membrane or the edge of said enlarged opening thereby reducing the likelihood that said membrane will be severed from said opening and carried into said pocket. Newly submitted claim 5 has been modified to highlight features of the structure. Neither of these claims is disclosed, suggested or even hinted in the citation relied upon by the Examiner.

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The present application differs from the prior practice in the art since it is directed to a novel membrane configuration which seals empty pockets but which is easily pierced by insertion of a contact. Applicant has recognized that as a conductive member is inserted through a sealing membrane, there is a danger that portions of the membrane will be separated from the insert and carried into the connector. The present invention eliminates or minimizes this potential problem by calling for membranes which extend across an enlarged conductive member receiving opening of cross-section greater than the maximum cross-section of the electrical conductive member.

Since the opening cross-section is greater than the maximum cross-section of the electrical conductive member, neither the electrical conductive member nor its conductor

will be sealingly engaged by either the edges of the opening or the thin flexible membrane. In other words, the structural arrangement of the present invention permits a contact to be inserted through the appropriate membrane without contacting the membrane periphery or tearing the membrane therefrom. Furthermore, since sealing is neither required nor desired at the enlarged conductive member receiving opening, the dimensions of this opening are not subject to critical tolerances which are expensive to achieve.

In a further refinement of the present invention, the sealing membranes are molded with relatively thin central portions and relatively thick surrounding portions to create a stress point at the membrane center. This stress point further helps reduce the possibility of severing the membrane from the insert body.

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The structure disclosed in Bac has a pocketed resilient member with membranes sealing empty pockets. The membranes are molded to constricted neck portions at the entry to the pockets. These neck portions are constricted to seal against conductors which extend from the pockets after a terminated contact is inserted therein. In the present application, the membranes are not mounted to the pocket openings at constricted neck portions. The structure of the present invention does not have these constricted neck portions because applicant is not concerned with obtaining a sealing effect at the entry to the pockets. Circumferential riser 34 spaced from the pocket entry provides all the sealing effect that is needed in the structure of the present invention.

Even if applicant did want to obtain sealing at the pocket entry, it could not be accomplished since the invention specifically requires that the conductive member receiving openings be of cross-section greater than the maximum cross-section of the electrical conductive members and that the membranes be fixed to the periphery of these enlarged openings. Thus, neither these enlarged openings nor the thin flexible membranes attached thereto could produce the sealing effect of Bac.

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Bac fails to anticipate the present invention; it further fails to render the present invention obvious since it contains no teaching or remote suggestion of a contact to membrane cross-sectional relationship so important to the present specification and claims. Finally, Bac does not remotely teach or suggest the thin central membrane feature of the present invention.

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The issue before the Board is whether or not the application is directed to a patentable advance in the art. Amended claim 1 reads:

A member for sealing the conductor-receiving end of an electrical connector comprising: an insert having a plurality of longitudinally extending pockets for receiving electrically conductive members terminated to conductors, said pockets having enlarged conductive-member receiving openings; said enlarged conductive-member receiving openings being of cross section greater than the maximum cross section of said

electrically conductive members and having membranes fixed to the periphery of said openings to seal said longitudinally extending pockets prior to insertion of electrically conductive membranes; said membranes being molded integrally with said insert and being of thickness sufficient to maintain the integrity of said membranes when a given pocket is empty, but being thin enough to permit insertion thereof through of a conductive member and the conductor terminated thereto without a sealing engagement with either said membrane or the edge of said enlarged opening thereby reducing the likelihood that said membrane will be severed from said opening and carried into said pocket.

We have reviewed Applicant's specification in light of the amendments to the claims and the arguments submitted, and also in view of the applied patent to Bac.

In the disclosure, we are informed at the bottom of page 2 and the top of page 3 that Applicant's "...insert or grommet includes an integrally molded membrane ...which completely seals each conductor receiving pocket," and that the thickness of the membrane is sufficient to assure and maintain a sealing effect during normal operation with the pocket empty, but not so thick as to prevent or impede insertion of the conductor.

Further in the disclosure, we are informed on page 5 that the thickness of the membrane must be such that it will not bend or damage the contact, and that the thickness of the membrane will depend on the elastomeric material used, and that the molded membrane is offset slightly from the outer edge of the insert member. On page 6, information pertaining to the thickness is provided to avoid severing the membrane from the body so that "The seal obtained by the membrane 36 is complete, and its reliability is far superior to prior art sealing techniques."

We turn now to a consideration of what has been disclosed vis-à-vis Applicant's arguments that the membrane will not be in sealing contact with the conductive member, and that sealing is not required. Nowhere do we find in the disclosure a statement or an indication that Applicant's pierced membrane does not, or ceases to, contact the conductor when the conductor is in place in the insert. Figure 3 of the drawings shows a conductor 26 in place and being contacted by membrane 36. Such configuration depicts what is stated in the disclosure, viz., that the seal obtained by the membrane is complete, and that the relative thickness of the center portion to the outer portion of the membrane covering each

pocket is so designed to avoid tearing of the membrane upon insertion of a conductor. Thus from the disclosure and the drawings we are led to the view that there is no support for the arguments that the membrane will not contact the conductor in a sealing manner, because the membrane is formed of resilient material which will tend to contact the conductor surface and thus tend to act as a seal, as shown in Fig. 3.

Considering next the Bac patent and Applicant's arguments with respect thereto, we find that Bac's insert member as described, and as shown in Figure 2, is a molded member which has a plurality of openings covered by a membrane which on being pierced allows a conductor to pass through the insert in sealing engagement. The Bac membrane covering each opening is shown to have an outer thicker portion and an inner thinner portion. We note also that the opening is greater than the cross section of the conductor, and that the thinner part of the membrane engages the conductor, just as Applicant's membrane engages the conductor as shown in Applicant's Figure 3.

In summary, we are not persuaded by Applicant's arguments that his membrane does not contact the conductor after piercing. Further, we believe that the Bac reference sufficiently shows that conductor receiving openings each covered with a membrane having a thinner central portion are known. Consequently, we do not find in Applicant's disclosure, and we are not persuaded by Applicant's arguments, that there is sufficient subject matter to overcome the prior art.

Therefore, we recommend that the rejection of the application be affirmed.

  
J.F. Hughes  
Assistant Chairman  
Patent Appeal Board, Canada

  
M.G. Brown  
Member

I concur with the reasoning and findings of the Patent Appeal Board.

Accordingly, I refuse to grant a patent on this application. The Applicant has six months within which to appeal my decision under Section 44 of the Patent Act.



J.H.A. Gariépy  
Commissioner of Patents

Date at Hull, Quebec

this 2nd. day of April, 1982

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