MAKING METAL-PLASTIC GASKET MATERIALS

18 Claims, 10 Drawing Figs.

ABSTRACT: Compressible, resilient electrically conductive sheets or sheets or strips are made by forming a block containing compressive, conductive plastic members. These members have a parallel orientation so as to provide a plurality of parallel conducting paths. The block is then sliced into sheets or strips with the conducting paths providing electrical conductivity between opposite surfaces of each sheet or strip. By using highly thermally conductive members, one can provide enhanced thermal conductivity between opposite surfaces of a resilient, compressible plastic sheet or strip.
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BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates primarily to compressible, resilient, electrically conductive plastic components. A component of this type is used between two surfaces that should be electrically connected together. Because of its compressibility and resilience, the component conforms to the surfaces and thereby maintains electrical contact over large areas in spite of cocking of the surfaces, irregularities therein or variations in the spacing between the surfaces.

An important application is electrical sealing of wave guide joints. The components are formed as sheetlike gaskets that are interposed between the flanges of adjacent wave guide sections, the flanges being drawn together to compress the gaskets. The gaskets ensure continuity of the electrical paths along the wave guide walls and they prevent leakage of electromagnetic energy at the joints; they also provide gas and moisture-tight seals for the interior of the wave guide.

The invention also relates to highly compressible, resilient plastic components having relatively high thermal conductivity between opposite surfaces. These components can be inserted between parts which are to be closely thermally connected. If the parts do not have closely conforming surfaces, direct contact between them may not provide the desired level of thermal conductivity. The resilient plastic components alleviate this problem by conforming to the opposing surfaces of the parts and thereby improving the thermal contact with these surfaces.

As used herein, the term "plastic" includes both thermoplastic and thermostetting materials in all ranges of compressibility. Thus, it includes all types of elastomers, as well as the harder, less stretchable plastics.

2. Prior Art

Resilient, compressible electrically conductive plastics have been used for a number of years. In their simplest form, they comprise compressible plastic materials loaded with conductive particles whose particle-to-particle contacts provide electrical conductivity throughout. In applications where relatively high conductivity is needed, as in wave guide gaskets, the conductive particles are generally of silver or silver-coated plastic particles.

More recently, a newer material has been introduced in which precured compressible particles are mixed together with silver flake and uncured plastic, preferably of the same material as the precured particles. Essentially, this coats the precured particles with the silver flake. The mixture is compressed and the uncured resin is then cured, resulting in a monolithic plastic matrix with a reticular conducting structure extending throughout. This material has enhanced physical properties, particularly compressibility and resilience, because a large portion of the volume is unloaded, i.e., contains no metallic particles. The unloaded volume has the compressibility of unloaded plastic, and because of its predominance in the total volume, it increases the compressibility of the gasket as compared with a gasket that is loaded throughout. For the same reason, the silver content is lower, with a consequent lower overall cost for the final cured material.

An object of the present invention is to provide compressible, resilient electrically conductive plastics and components made therefrom.

Another object of the invention is to provide plastics and components of the above type that have a relatively low cost.

A further object of the invention is to provide components of the above type that are characterized by substantial retention of the physical properties of the plastics, such as compressibility, recovery after compression and compressive strength.

A still further object of the invention is to provide compressible gasketing of the above type suitable as a sealing member for components operating at radio and higher frequencies.

Yet another object of the invention is to provide a method of making components having the foregoing characteristics.

Another object of the invention is to provide gasketing of the above type in either sheet form, as for wave guide flange seals, or strip form, as for door seals.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

SUMMARY OF THE INVENTION

Most of the following description of the invention is specifically directed to electrical conductivity in compressible, resilient plastic parts. However, the same description also applies, almost in toto, to improved thermal conductivity. There are also some embodiments of the invention that provide high thermal conductivity and low electrical conductivity, and these are discussed in detail below.

For the purpose of this invention, "thermally conductive" relates to paths having thermal conductivities approaching the conductivities of metals, rather than those of unfilled plastics; "conductive," when not otherwise modified, means electrically conductive or thermally conductive.

Also, the term "elastomer" as used herein refers to members in which one dimension is substantially greater than the third dimension. Thus, "elastomer" includes rods and strips as well as sheets.

The structure of the components which are the subject of the invention will be readily understood from a description of the process of making them. To begin with, a set of elongated electrically conductive members are formed. They are conductive from one end to the other and they may have either volume conductivity or surface conductivity. That is, the conductive paths may extend through them or along their surfaces.

If the ends are rods, they are oriented in the same direction and a plastic block containing the rods is then formed. The rods are preferably made of a cured thermosetting elastomer such as silicone rubber and the uncured form of the same plastic is dispersed between them and then cured. The clock is therefore an essentially monolithic structure in which the rods provide a set of parallel conducting paths. The block is then sliced repeatedly in the crosswise direction, i.e., perpendicular to the rods so as to provide a number of sheets, each of which contains parallel segments of the rods.

If the rods have volume conductivity they are spaced from each other; if they have surface conductivity, which may be provided by means of very thin coatings, they may be spaced apart or closely packed. In any case, the large predominance of the area of each sheet contains pure, i.e., unfilled, elastomer; the metal particles that provide conductivity occupy a small portion of the area. Therefore, the conductive material has little effect on such important characteristics of the plastic as compressibility, recovery from compression and compression strength.

Accordingly, a sheet can be readily compressed between a pair of members whose joint is to be sealed, with the surfaces of the plate closely conforming to the members and thereby providing good electrical contact with ends of the conductive paths, as well as an effective fluid seal. At the same time, the resilience in the material maintains the integrity of the seal and the electrical contact over long periods of time, and in the face of changes in the spacing between the sealed members due to such factors as temperature changes and vibration.

Moreover, the extremely low conductive particle content of the material makes for a relatively low material cost, even though such expensive materials as silver are used for the conductive particles. For example, the amount of silver may be as low as 1 volume percent compared with more than 10 percent in one of the prior conductive gasketing materials. The method of making the material is simple and easily practiced. Additionally, it permits the slicing of sheets to order, so to speak. Therefore, since the slicing operation is quickly and easily performed, one need not stock a large number of sheets of different thicknesses in advance of orders.
The tensile and tear strengths of the sheet are not so great as in some plastic materials per se. However, they are more than sufficient for handling of the sheet and the uses for which it is intended.

Instead of the rods, sheets can be used in forming the block, which will then have a number of their conducting layers spaced apart by pure elastomer layers. The block can be sliced to form strips having multiple conducting layers extending from top to bottom and from end to end. These strips are particularly useful as resilient door seals for enclosures into which, or out of which, r.f. leakage is to be prevented.

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description taken in connection with the accompanying drawings, in which:

FIG. 1 is an enlarged perspective view of a coated rod used in manufacturing conductive plastic sheets;

FIG. 2 is a section taken along line 2-2 of FIG. 1;

FIG. 3 is a perspective view of a block comprising a bundle of conductively coated rods;

FIG. 4 is a perspective view of a sheet formed by slicing the block of FIG. 3 and 4;

FIG. 5 is a plan view of a wave guide joint sealed by a gasket made from the sheet of FIG. 5;

FIG. 6 is a perspective view of another sheet made in accordance with the invention;

FIG. 8 depicts a conductive strip sliced from the block of FIG. 7;

FIG. 9 is a fragmentary section of plastic sheet in the process having conductive strips formed therein; and

FIG. 10 is an enlarged perspective view of a block comprising sheets of the type shown in FIG. 9.

As mentioned above, the basic building blocks for the elastomeric conductive components provided by this invention are elongated members made from compressible, plastic material. FIGS. 1-4 illustrate the use of rods in manufacturing conductive sheets. As shown in FIGS. 1 and 2, the rods, indicated at 10, are preferably provided with surface conductivity by means of conductive coatings 12. The material of the rods is preferably elastomeric. A very satisfactory material is silicone rubber. The rods can be formed by extrusion or, alternatively, a block of the material can be formed and then sliced to form rods.

The term "rod" as used herein does not imply a rigid member. Ordinarily, the rods will be rather limp, since they are not only elastomeric, but also relatively soft, i.e., compressible. However, they should be form stable. That is, they should not deform unduly under their own weight, nor should they plastically deform during the remaining steps of the procedure by which the conductive sheets are made. Therefore, the rod material is preferably the cured form of a thermosetting plastic. Sheets or strips used instead of the rods will have similar characteristics.

The coatings 12 preferably comprise flakes of a noble metal such as silver. The coatings are applied by first wetting the rods 10 with a bonding agent and then immersing the rods in the flakes. Then bonding material is cured and excess flakes are wiped from the rods. The coated rods are then wet again with the bonding material and laid side-by-side and on top of each other to form a block, as shown in FIG. 3. Next, the bonding material is cured, so that the block 14 becomes a solid, cohesive mass.

Preferably, the bonding material is the uncured phase of the material of which the rods are made. This optimizes both bonding of the flakes to the rods and bonding of the coated rods into the block. In cases where the cured resin still has reactive sites, this is probably due to chemically bonding of the bonding material to the previously cured material.

The block 14 is then sliced transversely as indicated by the dotted lines 16 (FIG. 3) to provide sheets 18 as shown in FIG. 4. Each sheet comprises a set of rod segments 10a whose lateral surfaces are covered by coating segments 12a. The segments 12a extend to the surfaces 20 and 22 of the sheet 18 so as to provide numerous conducting paths between the surfaces.

Finally, the sheet 18 may be cut to the shape of a gasket, such as the gasket 24 of FIG. 5, and interposed between the flanges 26 and 28 of wave guide sections 30 and 32. The gasket 24 is sufficiently compressible and resilient to effectively seal the interior of the wave guide and, at the same time, provide sufficient conductivity between the sections 30 and 32 by means of the conductive segments 12a (FIG. 4).

With further reference to FIG. 4, one might ordinarily expect that a grid-like, "egg crate" structure such as the overall configuration of the coating segments 12a would result in rigidity and incompressibility in the sheet 18. Indeed, similar configurations are used in so-called "honeycomb" sandwich structures to provide these very characteristics. However, the coatings are so thin that individually and collectively they have little effect on compressibility. We believe that this property is enhanced by the use of particulate coatings. When the sheet 18 is compressed, the particles tend to slide over each other (within the constraints provided by the enveloping plastic material) and therefore they have little effect on compression and resilience. At the same time, they maintain contact with each other so that electrical conductivity between the surfaces 20 and 22 is not materially affected by compression and subsequent release of the sheet 18. We believe that this characteristic is more pronounced in flakes than round particles. Flakes are also preferred because the coatings can be thinner when they are used.

The particulate conductive paths should be contrasted paths formed with metallic foil or wires. Foil extending from one face of a sheet to the other will crumble inelastically when the part is compressed. With a reasonably soft (compressible) plastic, there will be insufficient restoring force to return the foil to its original, straightened condition after compression is removed. The sheet will therefore suffer diminution of conductive contact on its surfaces. The same problem is encountered when the compressive force is only partly reduced, as in applications where temperature changes alter the gap between surfaces that are to be interconnected by the sheet.

In a closely packed structure, the preferred cross section of the rods 10 (and segments 10a) is rectangular. This permits tight packing of the rods in the block 14 with a resulting interrod contact over substantial areas, and therefore a relatively high lateral conductivity in the block 14 and the sheet 18. Moreover, one can generally make rectangular rods more easily than those with other cross sections. First a sheet is formed and then it is slit to form the individual rods. In many cases, however, such a dense conducting structure will not be needed, and other rod cross sections, such as circular, will be perfectly suitable. The interposition of additional bonding material in the interstices between rods when these other cross sections are used provides increased tensile and tear strengths in the sheet 18. The same result can be obtained with rectangular rod cross sections if the rods are not so closely packed, as shown in FIG. 6.

In any case, the surfaces of the rods are preferably rough to maximize internal contact between the rods and the bonding material through the intervening conductive coatings 12. Rough surfaces are readily obtained by forming the rods from a foam material, as described below, so that they are naturally rough even if the rods are formed by extrusion or by slicing them from a previously cast member. The tensile and tear strengths of the sheet 18 as a whole then approach their values in its unloaded portions. Another reason for using rods of foam is the high compressibility of the foam, which makes for a more compressible conductive gasket.

Even with smooth surfaces, cohesion between each rod 10 and the rest of the block 14 can be improved by eliminating the conductive coating from one or more sides of the rod. This permits direct contact between the rod and the interrod bonding material, with a consequent increase in the strength of the bond between the two.
The cross sectional dimensions of the rod segments 10a in the sheet 18 and the spacings between the rods should be such as to render the sheet opaque at the highest frequency of interest in the direction in which shielding is to be effective. Ordinarily, this will mean that if the rods are not closely packed, the spaces between them should be less than one-eighth wavelength. These constraints are approximate. They depend upon such factors as the amount of permissible leakage in RF scaling applications, the degree of permissible penetration on the RF field into the sheet where it is used as a waveguide gasket as in FIG. 5, the randomness of the positions of the rod segments 10a, and other factors.

As noted above, the gaskets 24 can be cut from the sheet 18. Alternatively, if a number of gaskets of the same shape are to be made, the block 14 can be formed with the same cross section as the gaskets by laying the rods around a mandrel that is later withdrawn. Then the individual gaskets are formed merely by slicing the block 14.

The use of sheets instead of rods is illustrated in FIGS. 7 and 8. A set of elongated elastomeric sheets or strips 34 are made. Each sheet is then wet on one face with bonding material, silver flake is dusted on and the bonding material is cured. The excess flake is wiped off and additional bonding material is applied over the adhered flake. Next, the sheets 34 are stacked to form the block 36 of FIG. 7 and the uncured bonding material is cured to bond the block 36 together. The layers 40 of silver flake provide the sheets 34 with surface conductivity.

The block 36 is then sliced as indicated by the dash lines 38 to form strips 42 (FIG. 8). Each strip 42 contains unfilled sheet segments 34a and conductor segments 40a extending from end to end and from top to bottom. The strip 42 is highly suitable for use as a seal, with the opposite longitudinal edges of the conductor segments 40a contacting the door and door frame, respectively.

Wherever the electrically conductive paths are formed by highly thermally conductive particles such as silver, they are also thermally conductive and they provide the plastic parts with increased thermal conductivity in the direction of the conductive paths. This is especially true of closely packed structures such as in FIGS. 3 and 4. If thermal conductivity is desired along with electrical nonconductivity, the conductive paths can be formed from particles that are not electrically conductive; an example is shown in FIG. 4, where aluminum is highly thermally conductive, and the oxide surface layers on the flakes largely prevent electrical contact between them.

FIGS. 9 and 10 illustrate another embodiment of the invention, in which the conductive paths are formed within plastic sheets. The plastic sheets, as shown at 44, are sliced part way through to provide a series of slits 46. Each sheet 44 is then pulled around a curved surface 48 to open the slits and the slits are coated with a suitable bonding material. The sheet is then removed from the curved surface and squeeze out the excess bonding material. Additional bonding material is applied to one or both faces of the sheet 44, and the sheet is then returned to the curved surface so that the conductive particles can be dusted into the reopened slits 46. The particles are also dusted onto the bonding material on the faces of the sheet. The excess particles are then removed, e.g. by gently shaking the sheet.

Next, the sheet 44 is placed on a flat surface to close the slits 46 once again, and the bonding material is cured. In addition to the conductors on its surfaces, the sheet 44 now contains a series of internal parallel conductive paths similar to the conductive coatings on the rods of FIGS. 1–4. Indeed, the sheet may be viewed as comprising a series of adjoining plastic strips 50, each of which has a conductive coating on all sides, i.e. on the top and bottom and on the sides defined by slits 46.

A number of sheets 44 prepared in this manner are coated on the surfaces with further bonding material, and the sheets are then stacked to form the block 52 of FIG. 10. The bonding material is then cured, with the block under slight pressure to ensure the absence of voids between the sheets 44. Finally, the block is sliced as indicated by the dashed lines 54 to provide a series of conductive segments 56 and 47 between the opposing surfaces of the resulting sheet. Alternatively, if the block is thinner, it will be sliced into conductive strips. For greater internal adhesion, the conductive coatings on the faces of the sheets 44 may be omitted.

The arrangement of FIGS. 9 and 10 is particularly desirable because it provides multiple conductive paths similar to those on the rods of FIGS. 1–4, for example, without the need for handling individual rods.

The following examples illustrate the practice of the present invention:

**EXAMPLE I**

Square rods (3/32-inch x 3/32 inch) of silicone rubber having a hardness of 50 Shore A are cut from 3/32-inch-thick sheet stock. The rods are coated with uncured liquid silicone rubber to a thickness of approximately 1.5 mils (0.0015 inch). The liquid silicone contains 4 parts by weight silicone resin (General Electric Co. RTV 615A) and 1 part curing agent (General Electric RTV 615B). (Except where otherwise specified, all liquid silicone formulations in these examples have the same 4:1 resin-curing agent ratio.)

Then an excess of silver flake (Handy & Harmon Silflake 135) is sprinkled on the coated rods. The coated rods are individually cured in an oven at 310° F. for 30 minutes, after which the excess flake is cleaned off.

The conductively coated rods are then positioned in an array with a spacing of three-thirds seconds inch between adjacent rods, and the spaces in the array are filled with uncured silicone rubber (RTV 615). Then, the uncured rubber is cured for 30 minutes at a temperature of 310° F. to form a solid block. The cured block is then sliced crosswise into sheets having a thickness of three-thousandths inch, resembling the sheet of FIG. 6.

**EXAMPLE II**

The cured, conductively coated rods of example I are coated with uncured silicone rubber (RTV 615). The coated rods are closely stacked to form a block of the type shown in FIG. 3 and slight pressure is applied to eliminate voids and squeeze excess silver flake, flaking material. The block is cured for 30 minutes at 300° F., after which it is sliced crosswise to the direction of the rods to form sheets as in FIG. 4, having a thickness of one-sixteenth inch. The conductive sheets are then die cut into gaskets for radiofrequency connectors.

**EXAMPLE III**

Silicone rubber rods (1/16-inch x 1/16 inch cross section) are molded from RTV 615 resin. The rods are then coated as in example I and formed into a block as in example II. The block is then sliced into 1/16-inch sheets of the type shown in FIG. 4.

**EXAMPLE IV**

Silicone rubber sheets are made from the RTV 615 resin. The sheets, which are one-sixteenth inch thick, are coated on one side with uncured silicone rubber bonding material (RTV 615) to a thickness of approximately 2 mils. The coated sheets are covered with an excess of silver flake (Silflake 135). The excess silver flake is removed and the bonding material is then cured for 15 minutes at 330° F.

The resulting conductive, coated sheets are then coated on both sides with the same bonding material and stacked under slight pressure to eliminate voids. The stack, which has a thickness of about three-eighths inch, is cured for 30 minutes at 310° F. to form a block such as shown in FIG. 7. The block is then cut crosswise into strips about one-eighth inch thick, as shown in FIG. 8, which are useful primarily as compressive RF stripping.
EXAMPLE V

This example illustrates the use of rods having volume conductivity as contrasted with the surface conductivity of the rods in examples I-III.

A compressible 30-mil conductive plastic sheet is by mixing 4.25 parts RTV 615A resin, 0.75 parts RTV 615B curing agent, 212 parts ground silicone foam (approximately 10-mil particle size) and 15 parts Silflake 135 silver flake, and then curing the mixture in a 30-mil high chase press at 310° F. for 20 minutes under a force of 50,000 p.s.i. The sheet is then post cured for 3 hours at 400° F. The resulting conductive sheet, which has volume conductivity, is cut into ⅛-inch-wide conductive strips.

A series of 1/16-inch-thick silicone rubber sheets are made with RTV 615 silicone resin. These sheets and the conductive strips are coated with uncured RTV 615 resin to a thickness of approximately 2 mils.

A block is then built up by stacking the sheets and strips in alternate layers, the strips being spaced apart by approximately one-eighth inch. The block is cured for 30 minutes at 310° F. During curing, sufficient pressure is applied to squeeze excess liquid resin into the voids between the conductive strips so that the cured block is solid.

The cured block is then sliced transversely to the conductive paths provided by the included strips to form conductive stripping having a thickness of approximately one-eighth inch. By spacing the conductive strips apart in the more compressible bonding medium we provide greater compressibility than would be obtainable in a part consisting solely of the conductive material of the strips.

EXAMPLE VI (A)

Sheets of firm density silicone foam one-sixteenth inch thick are cut into 1/16-inch square rods. Liquid silicone resin (RTV 615) is applied to the rods to form coatings approximately 3 mils in thickness. An excess of silver flake (Silflake 135) is sprinkled on the coated rods, and after a few minutes the excess silver flake is removed.

The rods are then individually cured for 30 minutes at 300° F. The resulting conductively coated rods are again coated with the silicone resin, this time to a thickness of approximately 2 mils. They are then closely stacked, as in FIG. 3, to form a block that is then cured under slight pressure for 30 minutes at 310° F. The cured block is then sliced crosswise to form highly compressible sheets, as in FIG. 4, from which RF gaskets may be die cut.

EXAMPLE VI (B)

This example is the same as example VI (A) except that carbon black (Cabot Corporation, Vulcan XC-72R) is substituted for the silver flake.

EXAMPLE VI (C)

This example is the same as example VI (A) except that silver powder (Handy & Harmon, Silpowder 130) is substituted for the silver flake.

EXAMPLE VI (D)

This example is the same as example VI (A) except that fine aluminum flake is substituted for the silver flake. The aluminum flake forms conductive coatings that are highly thermally conductive; yet, they are essentially nonconductive electrically because of the oxide layers inherent in such flakes.

In this case, the block is cut into sheets which are particularly useful in providing good thermal conductivity between parts that are to be electrically isolated. The high compressibility of the sheets makes them conform to both of the parts, thereby providing good thermal contact with them.

EXAMPLE VII

This example is similar to Example VI (A). However, the conductively coated foam rods are alternated with nonconductive foam rods in the block, so as to provide a checkerboard arrangement of the conductive rods in the sheets or gaskets ultimately formed.

EXAMPLE VIII (A)

This example is similar to example IV except that the cured sheets are of firm density silicone foam.

EXAMPLE VIII (B)

A mixture containing 2.5 parts uncured RTV 615 silicone rubber and 7.5 parts Silflake 135 is applied to one-sixteenth inch thick silicone foam sheets (firm density) to form coatings approximately 6 mils in thickness. The sheets are stacked on top of each other and under slight pressure the resulting block is cured for 30 minutes at 300° F. The block is then sliced to form RF stripping similar to that of FIG. 8.

EXAMPLE IX (A)

An approximately 2 mil coating of uncured silicone rubber (RTV 615) is applied to both sides of ⅛-inch sheets of silicone foam (firm density). An excess of silver flake (Silflake 135) is dusted onto the uncured resin, the latter is then cured for 30 minutes at 310° F. and the excess silver flake is removed.

The resulting conductively coated sheets are then slit into 1/16-inch rods, each of which has two conductive surfaces and two nonconductive surfaces. More of the uncured resin is applied to the rods, and they are then closely, randomly stacked to form a block. The uncured resin is cured and the resulting block is sliced crosswise to provide compressible sheets having conductivity between their opposite faces.

EXAMPLE IX (B)

This example illustrates the use of thermoplastic material, together with a plastisol bonding agent. Fifteen parts crosslinkable 19, chloride plastisol (W. R. Grace, Daxene A-95) are mixed with 5 parts plasticizer (Monsanto Company, Sanitizer 160). The mixture is then coated onto one-sixteenth inch wide strips of one-sixteenth inch thick polyvinyl chloride floor tile (Sears Roebuck & Co., Shade Code 19, Stock No. 2059-4). The thickness of the coating is about 3 mils.

An excess of carbon black (Vulcan XC-72R) is dusted onto the coated vinyl strips, and the binding material is then cross linked by subjecting the strips to a temperature of 300° F. for 15 minutes. Next, the strips are coated with the same bonding material to a thickness of approximately 2 mils, following which they are stacked closely. The resulting block is subjected to a temperature of 320° F. for 15 minutes to cure the uncured binding material, and the block is then cut into strips in which segments of the carbon black coatings extend between opposite facing.

EXAMPLE X

Sheets of firm density silicone foam one-sixteenth inch thick are partially slit from one surface to within approximately 5 mils of the opposite surface. Two sets of slits are made in perpendicular directions to form a grid in which adjacent parallel slits are spaced apart by one-sixteenth inch.

The partially slit sheets are stretched to open the slits and uncured silicone rubber (RTV 615) is applied to the slits, as well as the top and bottom surfaces of the sheets. The thickness of the resin coating is approximately 2 mils.

Silver flake (Silflake 135) is then dusted into the slits and onto the surfaces of the sheet, and the excess flake is removed. Next, the sheet is subjected to a temperature of 310° F. for 30 minutes while in a flat condition, i.e., with the slits closed, to cure the silicone bonding material. The cured conductively
coated sheets are coated on top and bottom surfaces with the same bonding material to a thickness of approximately 2 mils, and the coated sheets are stacked and placed under slight pressure while the additional bonding material is cured for 30 minutes at a temperature of 310° F. The resulting block is similar to the block 52 of FIG. 10, except for the addition of the crosswise conducting paths corresponding to the transverse slits in this example. The block is sliced to form one-sixteenth inch thick sheets useful as RF gasketing material.

The foregoing examples emphasize the desirability of silicone rubber in the gasketing material and RF seals. This material is generally preferred because of its aging characteristics, elasticity, and retention of physical characteristics at temperature extremes. It should be understood, however, that other materials are also suitable, as illustrated by example IX (B), in which vinyl is used. Other compressible plastics, preferably elastomers, may also be used.

It will thus be seen that the objects set forth above, among those made apparent from the description, are efficiently attained and, since certain changes may be made in carrying out the above method and in the article set forth without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

We claim:

1. A method of making a resilient, conductive, plastic sheet suitable for use as gasketing material said process comprising the steps of:
   A. assembling in parallel relationship a plurality of compressible resilient elongate conductive plastic elements, of a compressible resilient resin having a conductive pathway therealong, into a block structure whereby a cross section of said block taken transverse to said elongate elements comprises a major portion of area defined by a compressible plastic which is free of conductive filler and a minor portion area defined by said conductive pathways; and
   B. slicing said block transversely to said pathways thereby to provide a sheet or strip in which said conductive pathways provide conductivity between opposite surfaces thereof and said insulating material forms conductive-filler-free paths between opposite surfaces of said sheet.

2. The method defined in claim 1 including the steps of preforming said elongate conductive elements by:
   A. forming elongated, compressible, resilient members, and
   B. coating said members with conductive particles to form said conductive coating.

3. The method defined in claim 2 wherein said elongated conductive plastic member is a compressible foam element.

4. The method defined in claim 3 wherein in said coating step is accomplished by adhering said particles to said elongate members by means of a plastic bonding material, and

5. The method defined in claim 4 wherein said bonding material is a cured thermosetting material.

6. The method defined in claim 5 wherein said bonding material is an uncured plastic that chemically bonds to said thermosetting material, and

7. The method defined in claim 6 wherein said bonding material after forming said block.

8. The method defined in claim 7 wherein said bonding material is an elastomer.

9. The method defined in claim 8 wherein said bonding material is an elastomer.

10. The method defined in claim 9 wherein said bonding material is an elastomer.