United States Patent

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Continuation-in-part of application Ser. No. 814,183, Apr. 7, 1969, Continuation-in-part of application Ser. No. 779,376, Nov. 27, 1968, Continuation-in-part of application Ser. No. 730,933, May 21, 1968, now abandoned.

[54] **CIRCULAR ELECTRIC SERVICE CABLE**
16 Claims, 8 Drawing Figs.

[52] U.S. Cl. 174/115, 174/113, 174/115
[51] Int. Cl. H01b 7/00
[50] Field of Search 75/138; 174/113, 110, 110.44, 115, 117

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ABSTRACT: An electric service cable of substantially circular cross-sectional configuration and including a pair of conductors extending in side-by-side relationship and defining flat juxtaposed surfaces and rounded remote surfaces. Insulation material surrounds the pair of conductors, a stranded tubular sheath surrounds the conductors and their insulating materials, and outside insulation materials surround the tubular conductor. In order to enable the cable to be bent during installation, its conductors are fabricated of aluminum or copper having good elongation properties.

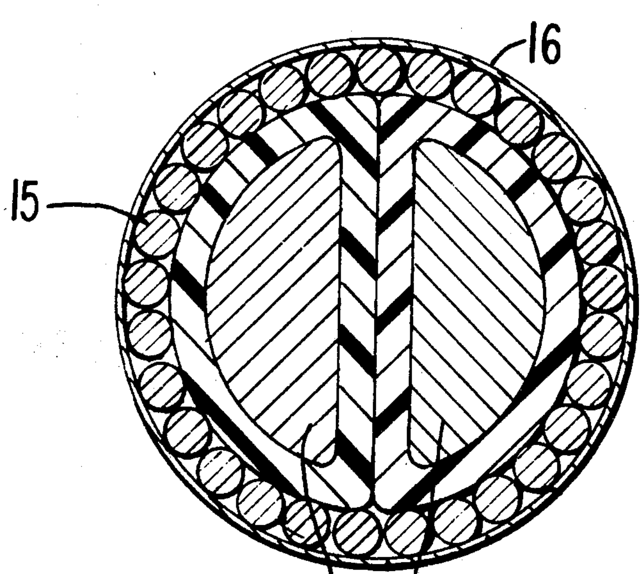


FIG. 1

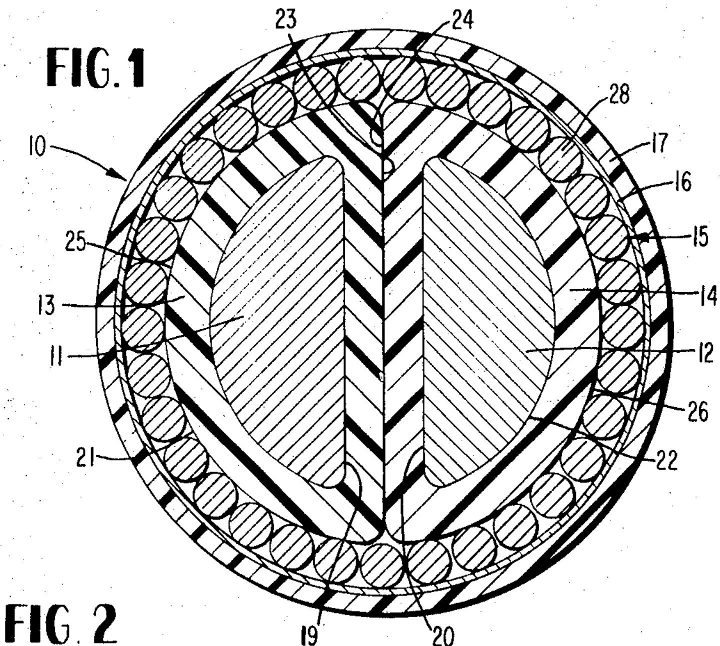


FIG. 2
PRIOR ART

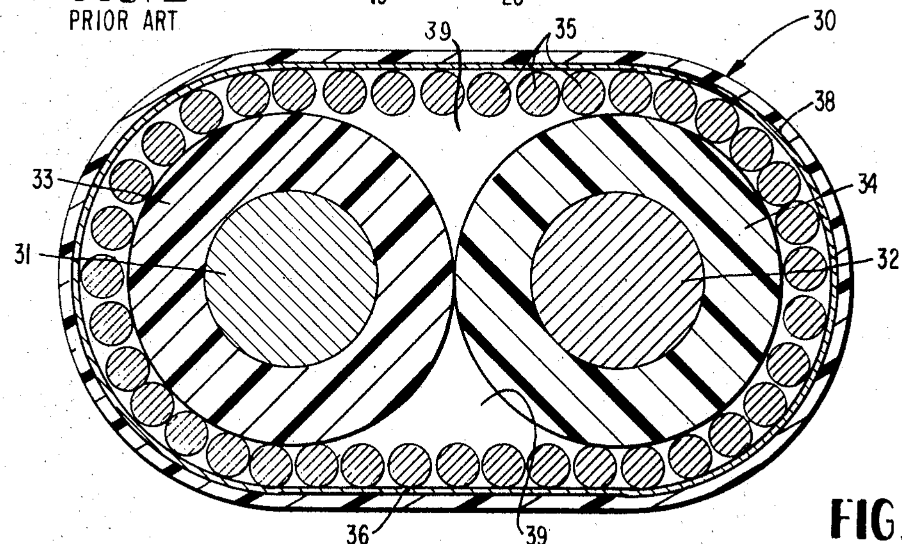


FIG. 3e

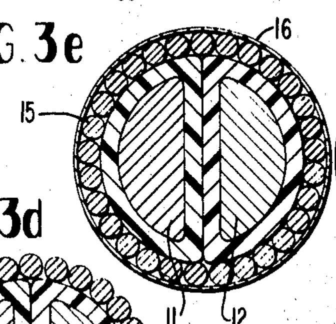


FIG. 3f

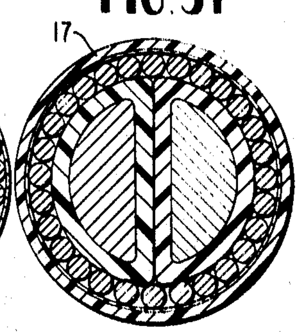


FIG. 3a

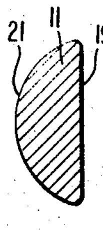


FIG. 3b

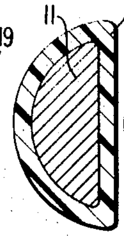


FIG. 3c

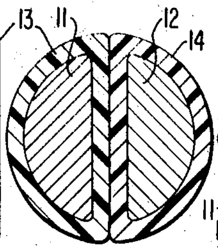
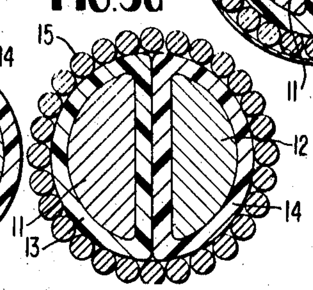


FIG. 3d



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CIRCULAR ELECTRIC SERVICE CABLE

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation-in-part of my copending application Ser. No. 814,183, filed Apr. 7, 1969 which is in turn a continuation-in-part of my copending application Ser. No. 779,376 filed Nov. 27, 1968 which in turn is a continuation-in-part of my copending application Ser. No. 730,933 now abandoned filed May 21, 1968.

BACKGROUND OF THE INVENTION

Electric service cable of the type used for service entrance cable to houses, office buildings or the like usually comprises three conductors insulated from one another, two of the conductors for providing electric service, and one of the conductors for grounding purposes. Typically, the two conductors providing the electrical service are coated with an insulating material so as to insulate all three conductors from one another, and the three conductors are gathered together and surrounded with an outside insulating material. The three conductors are gathered with the larger insulated electric service conductors being placed in longitudinal side-by-side relationship and the grounding conductor either comprising a single wire fitted into the longitudinal groove or recess formed by the converging surfaces of the insulated conductors, or comprising a tubular conductor surrounding the insulated conductors. Since the single wire grounding conductor is usually not individually insulated, its overall cross-sectional area is substantially less than the overall cross-sectional areas of the electric service conductors and their surrounding insulation materials, and the configuration of the three juxtaposed cables is usually somewhat oval in cross section, so that when the outside insulation is applied to the three gathered cables, the outside configuration of the assembly is also substantially oval, Similarly, when the tubular grounding conductor is used, the outside configuration of the assembly will also be substantially oval.

While one recess or groove formed by the outside merging surfaces of the insulation surrounding the paired electric service cables is substantially filled with the single wire grounding conductor, the opposite groove or recess on the other side of the paired electric service conductors is not filled, and neither of the recesses is filled in the service cable having the tubular grounding conductor. Thus, a substantial amount of "dead" space is present in the prior art service cable, and the cross-sectional area of the service cable is significantly larger than it would be without the dead space.

While the oval electric service cable has been widely utilized in the past, it has certain disadvantages. The oval cross-sectional configuration makes the cable difficult to bend across its wider thickness, so that the installer of the cable is usually required to twist the cable so it can be bent across its narrower thickness. When holes are formed in the studs and joints of a building to pull the cable through to a junction, the holes are usually round in cross section so that the holes must be of significantly larger cross-sectional area than the cross-sectional area of the oval cable. Furthermore, when the oval cable is pulled through a round hole, the sliding friction between the cable and its hole is applied primarily only to a small portion of the rounded longitudinal surfaces of the cable, while the flattened longitudinal surfaces of the cable encounters substantially no friction. Thus, the rounded surfaces of the cable are required to bear substantially all of the damage done to the cable from sliding friction, with virtually no help being derived from the flattened surfaces.

SUMMARY OF THE INVENTION

Briefly described, the present invention comprises an electric service cable of substantially circular cross-sectional configuration, which is bendable in virtually any direction, and which is of smaller diameter and cross-sectional area than the conventional oval electric service cable. A pair of insulated

"D"-shaped conductors are prepared from aluminum or copper having good elongation properties, such as from aluminum alloy wires containing substantially evenly distributed iron aluminate inclusions in a certain concentration. The conductors are placed with their flat sides in abutment, and a stranded grounding cable surround the paired "D"-shaped cables. The assembly is then coated with insulating material.

Thus, it is an object of this invention to provide an aluminum alloy service cable which is substantially circular in cross-sectional configuration, and which is smaller in cross-sectional area then the conventional oval cable.

Another object of this invention is to provide an electric service cable which requires less insulating material than the conventional cable and defines virtually no "dead" space.

Another object of this invention is to provide an electric service cable that is safer under overloaded conditions, which is easier to pull through circular openings of a building structure, and which is bendable in virtually any direction.

Another object of this invention is to provide an electric service cable which requires a smaller amount of insulating material per running foot of cable, which is economical to manufacture, and which is convenient and safe in use.

Other objects, features and advantages of the present invention will become apparent upon reading the following specification, when taken in conjunction with the accompanying drawing.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a cross-sectional view of the electric service cable,

FIG. 2 is a cross-sectional view of a prior art electric service cable.

FIGS. 3*a*, 3*b*, 3*c*, 3*d*, 3*e*, and 3*f* are cross-sectional views of the electric service cable as it is prepared and assembled.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now in more detail to the drawing, in which like numerals indicate like parts throughout the several views, FIG. 1 shows the electric service cable **10** which includes a pair of electric service conductors **11** and **12**, insulation **13** surrounding conductor **11**, insulation **14** surrounding conductor **12**, tubular sheath **15** surrounding conductors **11** and **12** and their insulation, insulating tape **16** surrounding tubular sheath **15**, and jacket **17** surrounding tape **16**. The pair of electric service conductors **11** and **12** each define a cross-sectional configuration similar to a segment subtended by a chord on a circle, and include flat surfaces **19** and **20** and rounded surfaces **21** and **22**, respectively. Each segment is generally "D"-shaped and is less than one-half of a circle in cross section, and their respective insulation coatings **13** and **14** conform in shape to their outside surfaces. Ideally, the thickness of the insulation **13** and **14** adjacent flat surfaces **19** and **20** of the conductors is gauged so that conductors **11** and **12** are spaced apart a distance so that their curved surfaces **21** and **22** define a circle with each other; that is, the curved surfaces **21** and **22** of conductors **11** and **12** define with each other a circle, except for the gap between the conductors. Similarly, the outer curved surfaces **25** and **26** of insulation **13** and **14** define with each other a circle generally concentric to the circle formed by the outer surfaces of conductors **11** and **12**.

Tubular sheath **15** comprises the grounding conductor of service cable **10** and is fabricated by stranding circular wires **28** to form a tubular protective sheath about service conductors **11** and **12** and their respective insulation. After sheath **15** has been stranded, it is wrapped with an insulating tape, such as high temperature-resistant polyethylene terephthalate tape, and insulating jacket **17**, such as polyvinyl chloride, extends about and protects both tubular sheath **15** and insulating tape **16**. Of course, jacket **17** must be fabricated from a substance that is capable of withstanding abrasion and friction.

FIG. 2 shows a typical prior art electric service cable **30** which includes a pair of electric service conductors **31** and **32**, insulating material **33** and **34** surrounding conductors **31** and

32, protective grounding sheath 35, wrapping 36, and outside insulating material 38. Conductors 31 and 32 are generally circular in cross-sectional configuration, and grounding sheath 35 defines grooves or dead spaces 39 with the converging surfaces of insulating materials 33 and 34. When outer insulating material 38 is applied to the assembly, the overall configuration of cable 30 is oval in cross section.

In comparison with the disclosed invention of FIG. 1, the prior art service cable has a longer diameter which extends across conductors 31 and 32 and which is larger than the diameter of service cable 10, and a short diameter which extends from the flat outer surfaces of the service cable which may be slightly smaller than the diameter of service cable 10. Also, the cross sectional area of the prior art cable of FIG. 2 is substantially larger than the cross-sectional area of the service cable 10. In comparison, the flat surfaces 23 and 24 of insulating materials 13 and 14 of service cable 10 abut and substantially support each other across their entire flat surfaces, while insulating materials 33 and 34 of the cables 31 and 32 of the prior art service cable 30 abut each other on a point or a longitudinal line extending along the length of the service cable. Thus, the portions of the insulating materials of service cable 10 which extend between the conductors are not likely to become compressed or crushed, while the same is not true of the rounded conductors of the prior art. When the service cables of the prior art and of the disclosed invention are overloaded and become excessively hot, the insulating materials of the prior art of FIG. 2 will tend to break down along the line of contact, particularly if they have become compacted or crushed, whereas under similar conditions the insulating materials between the service conductors 11 and 12 will resist rapid breakdown because of their flat abutment with each other and their resistance to becoming compacted or crushed; that is, the flat configuration of the abutting insulation materials between service conductors 11 and 12 will normally not be damaged or destroyed by twisting or crushing the service cable as when installing the service cable in a building, and this portion of the insulation will virtually always maintain its thickness, whereas the bending or crushing of the prior art service cable 30 occasionally functions to compress or crush, crack or tear the insulating material between conductors 31 and 32, so that conductors 31 and 32 come into contact with each other, or so that the heat from the conductors more easily deteriorates the insulating material.

In further comparison, when the prior art service cable of FIG. 2 is installed in a building structure, it is usually inserted through various holes in the studs, walls, and other support elements of the building structure, and since these holes are almost always round holes formed by drills, etc., the sliding friction between the inner surfaces of the holes and the outer surfaces of the service cable will virtually always be felt primarily on the relatively small rounded side surfaces of the cable, with virtually no frictional contact being encountered by the flat outside surfaces. Thus, only small portions of the outside surface of the prior art service cable must withstand virtually all of the friction occurring between the cable and the surfaces of the holes through which the cable is passed. Also, when the prior art service cable is pulled through a hole in the building structure and then guided in a different direction, it is necessary for the workmen to orient the cable so that it will bend across its smaller dimension as it passes from the hole in the building structure in order to prevent excessive frictional wear on the outside surface of the cable and to allow the workmen to pull with less force, so that the hazard of stretching and breaking the cable is reduced.

As is shown in FIGS. 3*a*–3*f*, electric service cable 10 is formed by first forming conductors 11 and 12 with a flat side and a curved side (FIG. 3*a*), coating the conductors with their respective insulating materials (FIG. 3*b*), placing the insulated conductors 11 and 12 in juxtaposition where the flat surfaces of their insulating materials about each other (FIG. 3*c*), stranding the tubular sheath 15 about the juxtaposed conductors (FIG. 3*d*), applying the insulating tape 16 about the tubular sheath (FIG. 3*e*), and applying protective jacket 17 about insulating tape 16. Under normal conditions conductors 11 and 12 will be fabricated and stored in coils, and the steps shown in FIGS. 3*b*, 3*c*, 3*d*, 3*e*, and 3*f* will be carried out continuously, by continuously passing conductors 11 and 12 through a coating stage to apply insulating materials 13 and 14, guiding the conductors into abutment with each other, stranding the tubular sheath 15 about the conductors, applying the insulating tape 16 about the sheath, and applying the jacket 17 about the insulating tape. Of course, the flat sides of conductors 11 and 12 after they have been coated with the insulating materials aids in properly aligning and guiding conductors into their respective positions with respect to each other.

Because of the protective function of tubular sheath 15 and because of the decreased hazard of deterioration of the insulation between service conductors 11 and 12 due to crushing and overload conditioning, a thinner application of insulating material 13 and 14 may be applied about conductors 11 and 12 in comparison with the insulation required about the conductors of the prior art of FIG. 2. Thus, the cross-sectional area of electric service cable 10 can be even further reduced because of the smaller insulation materials required.

While it is desired that the electric service cable be of circular cross-sectional configuration, it will be understood that its actual shape may be noncircular. The noncircular shape results from many manufacturing and handling conditions. For instance, the conductors may not be perfectly formed, the insulation material between the paired conductors may be more than necessary to displace the curved surfaces of the paired conductors beyond a circular arrangement, as the conductors may be tightly packed together along one length of the cable and loosely held together in another length of cable. Generally speaking, however, the cross-sectional configuration will be substantially circular as opposed to decidedly oval as in the prior art.

In order to bend the service cable without having to exert extreme force and without hazard of having the conductors crack or break, it is desirable to have the conductors fabricated from a metal having a high percentage of elongation while retaining high tensile strength and conductivity. Various metals are available, including aluminum and copper, which are suitable for use as the conductors in that they have acceptable levels of conductivity, elongation, and tensile strength. A metal highly suitable for use in the service cable is prepared from an aluminum alloy comprising less than about 99.70 weight percent aluminum, more than about 0.30 weight percent iron, and no more than 0.15 weight percent silicon. Preferably, the aluminum content of the present alloy comprises from about 98.95 weight percent to less than about 99.45 weight percent aluminum with particularly superior elongation properties and tensile strength being achieved when from about 99.15 to about 99.40 weight percent aluminum is employed. Preferably, the iron content of the present alloy comprises about 0.45 weight percent to about 0.95 weight percent with particularly superior results being achieved when from about 0.50 weight percent to about 0.80 weight percent iron is employed. Preferably, no more than 0.07 weight percent silicon is employed in the alloy of the present conductor. The ratio between the percentage iron and percentage silicon must be 1.99:1 or greater. Preferably, the ratio between percentage iron and percentage silicon is 8:1 or greater. Thus, if the present aluminum alloy conductor contains an amount of iron within the low area of the present range for iron content, the percentage of aluminum must be increased rather than increasing the percentage of silicon outside the ratio limitation previously specified. It has been found that a properly processed individual conductor having aluminum alloy constituents which fall within the above-specified ranges possesses an acceptable conductivity of at least 61 percent IACS and improved tensile strength and percent ultimate elongation when compared to conductors prepared from conventional electrically conductive alloys.

The present individual aluminum alloy conductors are prepared by initially melting and alloying aluminum with the necessary amounts of iron or other constituents to provide the requisite alloy for processing. Normally the content of silicon is maintained as low as possible without adding additional amounts to the melt. Typical impurities or trace elements are also present within the melt but only in trace quantities such as less than 0.05 weight percent each with a total content trace impurities generally not exceeding 0.15 weight percent. Of course, when adjusting the amounts of trace elements, due consideration must be given to the conductivity of the final alloy since some trace elements, affect conductivity more severely than others. The typical trace elements include vanadium, copper, manganese, magnesium, zinc, boron and titanium. If the content of titanium is relatively high (but still quite low compared to the aluminum, iron and silicon content), small amounts of boron may be added to tie up the excess titanium and keep it from reducing the conductivity of the wire. Iron is the major constituent added to the melt to produce the alloy of the present invention. Normally about 0.50 weight percent iron is added to the typical aluminum component used to prepare the present alloy. Of course, the scope of the present invention includes the addition of more or less iron together with the adjustment of the content of all alloying constituents.

After alloying, the melted aluminum composition is continuously cast into a continuous bar. The continuous bar is then hot-rolled to form continuous rod.

One example of a continuous casting and rolling operation capable of producing continuous rod as specified in this application is as follows:

A continuous casting machine serves as a means for solidifying the molten aluminum alloy metal to provide A cast bar that is conveyed in substantially the condition in which it solidified from the continuous casting machine to the rolling mill which serves as a means for hot-forming the cast bar into rod or another hot-formed product in a manner which imparts substantial movement to the cast bar along a plurality of angularly disposed axes.

The continuous casting machine is of conventional casting wheel-type having a casting wheel with a casting groove partially closed by an endless belt supported by the casting wheel and an idler pulley. The casting wheel and the endless belt cooperate to provide a mold into one end of which molten metal is poured to solidify and from the other end of which the cast bar is emitted in substantially that condition in which it solidified.

The rolling mill is of conventional type having a plurality of roll stands arranged to hot-form the cast bar by a series of deformations. The continuous casting machine and the rolling mill are positioned relative to each other so that the cast bar enters the rolling mill substantially immediately after solidification and in substantially that condition in which it solidified. In this condition, the cast bar is at a hot-forming temperature within the range of temperatures for hot-forming the cast bar at the initiation of hot-forming without heating between the casting machine and the rolling mill. In the event that it is desired to closely control the hot-forming temperature of the cast bar within the conventional range of hot-forming temperatures, means for adjusting the temperature of the cast bar may be placed between the continuous casting machine and the rolling mill without departing from the inventive concept disclosed herein.

The roll stands each include a plurality of rolls which engage the cast bar. The rolls of each roll stand may be two or more in number and arranged diametrically opposite from one another or arranged at equally spaced positions about the axis of movement of the cast bar through the rolling mill. The rolls of each roll stand of the rolling mill are rotated at a predetermined speed by a power means such as one or more electric motors and the casting wheel is rotated at a speed generally determined by its operating characteristics. The rolling mill serves to hot-form the cast bar into a rod of a cross-sectional area substantially less than that of the cast bar as it enters the rolling mill.

The peripheral surfaces of the rolls of adjacent roll stands in the rolling mill change in configuration; that is, the cast bar is engaged by the rolls of successive roll stands with surfaces of varying configuration, and from different directions. This varying surface engagement of the cast bar in the roll stands functions to knead or shape the metal in the cast bar in such a manner that it is worked at each roll stand and also to simultaneously reduce and change the cross-sectional area of the cast bar into that of the rod.

As each roll stand engages the cast bar, it is desirable that the cast bar be received with sufficient volume per unit of time at the roll stand for the cast bar to generally fill the space defined by the rolls of the roll stand so that the rolls will be effective to work the metal in the cast bar. However, it is also desirable that the space defined by the rolls of each roll stand not be overfilled so that the cast bar will not be forced into the gaps between the rolls. Thus, it is desirable that the rod be fed toward each roll stand at a volume per unit of time which is sufficient to fill, but not overfill, the space defined by the rolls of the roll stand.

As the cast bar is received from the continuous casting machine, it usually has one large flat surface corresponding to the surface of the endless band and inwardly tapered side surfaces corresponding to the shape of the groove in the casting wheel. As the cast bar is compressed by the rolls of the roll stands, the cast bar is deformed so that it generally takes the cross-sectional shape defined by the adjacent peripheries of the rolls of each roll stand.

Thus, it will be understood that with this apparatus, cast aluminum alloy rod of an infinite number of different lengths is prepared by simultaneous casting of the molten aluminum alloy and hot-forming or rolling the cast aluminum bar.

The continuous rod produced by the casting and rolling operation is then processed in a reduction operation designed ro produce continuous conductors of various gauges having the "D"-shaped configuration as previously specified. The reduction operation consists of a process whereby unannealed rod (i.e., as rolled to *f* temper) is cold-drawn through a series of progressively constricted dies without intermediate anneals to form a continuous conductor of the desired configuration. At the conclusion of this drawing operation, the alloy wire will have an excessively high tensile strength and an unacceptably low ultimate elongation, plus a conductivity below that which is industry accepted as the minimum for use in electrical cable, i.e., 61 percent of IACS. The wire is then annealed or partially annealed to obtain a desired tensile strength and cooled. At the conclusion of the annealing operation, it is found that the annealed alloy wire has the properties of acceptable conductivity and improved tensile strength and percent ultimate elongation. The annealing operation may be continuous as in resistance annealing, induction annealing, convention annealing by continuous furnaces, or radiation annealing by continuous furnaces; or may be batch annealed in a batch furnace. In addition, the present aluminum alloy wire may be partially annealed by resistance or induction annealing and then additionally annealed by batch annealing. When continuously annealing, temperatures of about 450° F. to about 1200° F. may be employed with annealing F. F. times of about 5 minutes to about 1/10,000 of a minute. Generally, however, continuous annealing temperatures and times may be adjusted to meet the requirements of the particular overall processing operation so long as the desired tensile strength is achieved. In a batch annealing operation, a temperature of approximately 450° F. to about 750° F. is employed with resistance times of about 24 hours to about 30 minutes. As mentioned with respect to continuous annealing, in batch annealing the times and temperatures may be varied to suit the overall process so long as the desired tensile strength is obtained.

During the continuous casting of this alloy, a substantial portion of the iron present in the alloy precipitates out of solution as iron aluminate intermetallic compound ($FeAl_3$). Thus after casting, the bar contains a dispersion of $FeAl_3$ in a supersaturated solid solution matrix. The supersaturated matrix may contain as much as 0.17 weight percent iron. As the bar is rolled in a hot-working operation immediately after casting, the $FeAl_3$ particles are broken up and dispersed throughout the matrix inhibiting large cell formation. When the rod is then drawn to its final gauge size without intermediate anneals and then aged in a final annealing operation, the tensile strength, elongation and bendability are increased due to the small cell size and the additional pinning of dislocations by preferential precipitation of $FeAl_3$ on the dislocation sites. Therefore, new dislocation sources must be activated under the applied stress and this causes both the strength and the elongation to be further improved.

The properties of the present aluminum alloy wire are significantly affected by the size of the $FeAl_3$ particles in the matrix. Coarse precipitates reduce the percent elongation and bendability of the wire by enhancing nucleation and, thus, formation of large cells which, in turn, lowers the recrystallization temperature of the wire. Fine precipitates improve the percent elongation and bendability by reducing nucleation and increasing the recrystallization temperature. Grossly coarse precipitates of $FeAl_3$ cause the wire to become brittle and generally unusable. Coarse precipitates have a particle size of above 2,000 angstrom units and fine precipitates have a particle size of below 2,000 angstrom units.

When conductors fabricated by this process are used in the service cable, the service cable can be bent in any direction without hazard of cracking or breaking the conductors because of the elongation properties of the conductors, yet the conductivity and tensile strength of the conductors remains at an acceptably high level. Fabrication of the conductors of the service cable is not limited to the metal specifically disclosed since various soft aluminum and copper metals can be used, such as copper or and electrically conductive aluminum alloy comprising a minimum of 99.60 percent Al, and a maximum of 0.01 percent Mg, 0.10 percent Cu, 0.01 percent Cr, 0.15 percent Si, 0.01 percent Mn, 0.50 percent Fe, 0.10 percent Zn, and 0.10 percent other materials; however, the metal specifically disclosed provides the best known combination of bendability, electrical conductivity, and elongation.

While this invention has been described in detail with particular reference to preferred embodiments thereof, it will be understood that variations and modifications can be effected within the spirit and scope of the invention as described hereinbefore and as defined in the appended claims.

I claim:

1. Electric Service Cable of substantially circular outside cross-sectional configuration including a pair of aluminum alloy conductors extending side-by-side and defining in cross section flat juxtaposed surfaces and arcuate remote surfaces substantially defining a circular surface with each other, said conductors having a minimum conductivity of 61 percent IACS and consisting essentially of from about 0.55 to about 0.95 weight percent iron, from about 0.01 to about 0.15 weight percent silicon, from about 0.0001 to less than 0.05 weight percent each of trace elements selected from the group consisting of vanadium, copper, manganese, magnesium, zinc, boron, and titanium, and from about 98.95 to about 99.4399 weight percent aluminum, said alloy containing from about 0.004 to about 0.15 total weight percent trace elements and having an iron to silicon ratio of 8:1 or greater.

2. Electric Service Cable of claim 1 wherein the silicon content is from 0.01 to 0.15 weight percent, the individual trace element content is from 0.0001 to 0.05 weight percent, and the total trace element content is from 0.004 to 0.15 weight percent.

3. Electric Service Cable of claim 1 wherein the conductors are covered with an insulating material selected from the group consisting of poly(vinyl chloride), neoprene, polypropylene, and polyethylene.

4. Electric Service Cable of substantially circular outside cross-sectional configuration including a pair of aluminum alloy conductors extending side-by-side and defining in cross section flat juxtaposed surfaces and arcuate remote surfaces substantially defining a circular surface with each other, said conductors having a minimum conductivity of 61 percent IACS and containing substantially evenly distributed iron aluminate inclusions in a concentration produced by the presence of about 0.45 to about 0.95 weight percent iron in an alloy mass consisting essentially of about 98.95 to about 99.4399 weight percent aluminum, from about 0.01 to about 0.15 weight percent silicon and from about 0.0001 to less than 0.05 weight percent each of trace elements selected from the group consisting of vanadium, copper, manganese, magnesium, zinc, boron, and titanium, the total trace element content being from about 0.004 to about 0.15 weight percent, the iron aluminate inclusions having a particle size of less than 2,000 angstrom units, and the iron to silicon ratio being at least 8:1.

5. Electric Service Cable of claim 4 wherein the silicon content is from 0,01 to 0.15 weight percent, the individual trace element content is from 0.0001 to 0.05, and the total trace element content is from 0.004 to 0.15 weight percent.

6. Electric Service Cable of claim 4 wherein the conductors are covered with an insulating material selected from the group consisting of poly(vinyl chloride), neoprene, polypropylene, and polyethylene.

7. Electric Service Cable of substantially circular outside cross-sectional configuration including a pair of conductors extending side-by-side and defining in cross section flat juxtaposed surfaces and arcuate remote surfaces substantially defining a circular surface with each other, insulation material extending about and between each of said conductors and a tubular conductor surrounding said pair of conductors their insulation material, said the tubular conductor being formed from an aluminum alloy which has a minimum electrical conductivity of 61 percent IACS and consists essentially of about 0.55 to about 0.95 weight percent iron, from about 0.01 to about 0.15 weight percent silicon, from about 0.0001 to less than 0.05 weight percent each of trace elements selected from the group consisting of vanadium, copper, manganese, magnesium, zinc, boron, and titanium, and from about 98.95 to about 99.4399 weight percent aluminum, said alloy containing from about 0.004 to about 0.15 total weight percent trace elements and having an iron to silicon ratio of 8:1 or greater.

8. Electric Service Cable of claim 7 wherein the silicon content is from 0.01 to 0.15 weight percent, the individual trace element content is from 0.0001 to 0.05 weight percent, and the total trace element content is from 0.004 to 0.15 weight percent.

9. Electric Service Cable of claim 7 wherein the insulation material is selected from the group consisting of poly(vinyl chloride), neoprene, polypropylene, and polyethylene.

10. Electric Service Cable of substantially circular outside cross-sectional configuration including a pair of conductors extending side-by-side and defining in cross section flat juxtaposed surfaces and arcuate remote surfaces substantially defining a circular surface with each other, insulation material extending about and between each of said conductors and a tubular conductor surrounding said pair of conductors and their insulation material said tubular conductor being formed from an aluminum alloy which has a minimum electrical conductivity of 61 percent IACS and contains substantially evenly distributed iron aluminate inclusions in a concentration produced by the presence of about 0.45 to about 0.95 weight percent iron in an alloy mass consisting essentially of about 98.95 to about 99.4399 weight percent aluminum; from about 0.01 to about 0.15 weight percent silicon; and about 0.0001 to less than 0.05 weight percent each of trace elements selected from the group consisting of vanadium, copper, manganese, magnesium, zinc, boron, and titanium, the total trace element content being from about 0.004 to about 0.15 weight percent, the iron aluminate inclusions having a particle size of less than 2,000 angstrom units, and the iron to silicon ratio being at least 8:1.

11. Electric Service Cable of claim 10 wherein the silicon content is from 0.01 to 0.15 weight percent, the individual trace element content is from 0.0001 to 0.05 weight percent and the total trace element content is from 0.004 to 0.15 weight percent.

12. Electric Service Cable of claim 10 wherein the tubular conductor is covered with an insulating material selected from the group consisting of poly(vinyl chloride), neoprene, polypropylene, and polyethylene.

13. Electric Service Cable of claim 7 wherein the pair of conductors are formed from an aluminum alloy having a minimum electrical conductivity of 61 percent IACS and consisting essentially of about 0.55 to about 0.95 weight percent iron, from about 0.01 to about 0.15 weight percent silicon, about 0.0001 to less than 0.05 weight percent each of trace elements selected from the group consisting of vanadium, copper, manganese, magnesium, zinc, boron, and titanium, and from about 98.95 to about 99.4399 weight percent aluminum, said alloy containing about 0.004 to about 0.15 total weight percent trace elements and having an iron to silicon ratio of 8:1 or greater.

14. Electric Service Cable of claim 13 wherein the pair of conductors has a silicon content of from 0.01 to 0.15 weight percent, an individual trace element content of from 0.0001 to 0.05 weight percent, and a total trace element content of from 0.004 to 0.15 weight percent.

15. Electric Service Cable of claim 10 wherein the pair of conductors are formed from an aluminum alloy having a minimum electrical conductivity of 61 percent IACS and containing substantially evenly distributed iron aluminate inclusions in a concentration produced by the presence of about 0.45 to about 0.95 weight percent iron in an alloy mass consisting essentially of about 98.95 to about 99.4399 weight percent aluminum; from about 0.01 to about 0.15 weight percent silicon; and about 0.0001 to less than 0.05 weight percent each of trace elements selected from the group consisting of vanadium, copper, manganese, magnesium, zinc, boron, and titanium, the total trace element content being from about 0.004 to about 0.15 weight percent, the iron aluminate inclusions having a particle size of less than 2,000 angstrom units, and the iron to silicon ratio being at least 8:1.

16. Electric Service Cable of claim 15 wherein the pair of conductors has a silicon content of from 0.01 to 0.15 weight percent, an individual trace element content of from 0.0001 to 0.05 weight percent, and a total trace element content of from 0.004 to 0.15 weight percent.