

B. W. GATES.
CABLE CONSTRUCTION.
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Fig. 1.

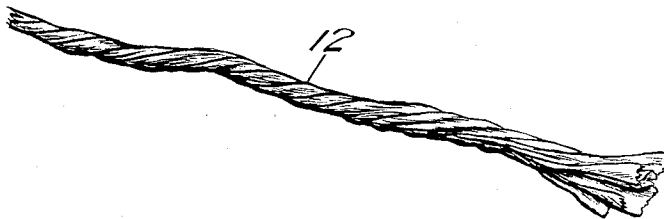
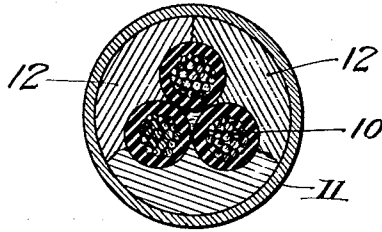


Fig. 2.

Witnesses
H. H. Lybrand
A. G. Potts

Inventor
Bernard W. Gates,
By William S. Dorn,
Attorney.

UNITED STATES PATENT OFFICE.

BERNARD W. GATES, OF WASHINGTON, DISTRICT OF COLUMBIA.

CABLE CONSTRUCTION.

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To all whom it may concern:

Be it known that I, BERNARD W. GATES, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Cable Construction, of which the following is a specification.

My invention relates to improvements in cable construction, and more particularly to the filling material employed therein.

In the manufacture of cables and especially in that type involving the inclosing of a plurality of wires or other individual conductors, it is desirable that the cable as an entirety have a cross-sectional periphery substantially circular, and to provide this result, where a plurality of independent wires are employed necessitates the use of a filling material for the purpose of occluding the interstices which exist externally of these independent wires. This filling is also required where the number of wires forming the cable differs from the normal arrangement provided by the apparatus for assembling and completing the cable. For instance, certain cable forming apparatus is designed for using various numbers of strands or wires, twenty-four or thirty being examples. Where it is desired to use a number of strands intermediate these, it is necessary in order to retain the original circular form, to employ the standard or normal formation used for the larger number and provide the difference in the form of fillers, these being generally of jute and being placed in the cable instead of the strands or wires for which they are substituted. So far as I am aware, jute is substantially the principal material employed for these purposes, being cheaper and more readily introduced than other materials, but in practice, there have been found a number of disadvantages resulting from its use, these being accepted principally for the reason that no satisfactory substitute therefor has been provided. Among these disadvantages is the fact that the character of jute strand employed is such that there is a tendency to frazzle and produce dust, litter or waste which clogs the gears of the machines. Another disadvantage lies in the fact that the jute twine adapted to be employed is not uniform in size and cannot well be made so owing to the nature of the material of which it is formed; this irregularity provides an uneven filling of the cable and destroys the

uniformity of the periphery of the cable itself. Furthermore, the jute material is such as to make it somewhat difficult to properly pack or fill the interstices, it not having a sufficient spongy or soft character as will lend itself to providing this result with maximum efficiency.

I have found that it is possible to produce a twine formed of one or more strands, the material of which is paper twisted into a cord or strand formed of one or more individual strands, the individual strands being twisted together to present what may be termed a stranded cord of any desired number of plies. This form of filler provides a material which is uniform in size, is relatively soft and spongy to enable a proper packing effect to be produced, will operate in connection with cable forming machines without frazzling or becoming fuzzy or creating dust, and, which has a decidedly minimum specific gravity and which possesses equal dielectric properties, as compared with fillers now employed.

I am aware of the fact that paper strips have been employed for insulating purposes, but when used for this purpose they are simply wrapped spirally about the strands being covered, a form which will not produce the result aimed at in the present invention since it will not fill or pack the irregular-shaped interstices which extend lengthwise of the cable.

My invention, therefore, has for its objects the provision of a filling material for cables, etc., formed of paper twisted into a strand or a plurality of such strands twisted together to form a stranded cord.

To these and other ends, the nature of which will be readily understood as the invention is hereinafter disclosed, said invention consists in the improved construction and combination of parts hereinafter fully described, illustrated in the accompanying drawings, and more particularly pointed out in the appended claim.

In the accompanying drawings, in which similar reference characters indicate similar parts, in each of the views—Figure 1 is a cross-section of a cable showing my improved filling material in position therein. Fig. 2 is a detail view of a portion of a cord employed to provide the filling material.

In the drawings I have shown, as an example, a three-wire cable, the wires being indicated at 10 and the outer coating at 11.

The particular form of the wires 10 is immaterial, the invention being equally applicable whether the wires are in single strands or formed of a plurality of strands; further-
5 more, they may be provided with a suitable insulating wrapper such as paper wrapped spirally therearound, the particular cross-sectional form of the wires, or the number of wires employed, being immaterial, the
10 present invention relating more particularly to the filling, indicated at 12. As heretofore pointed out, this filling is in the form of a strand or stranded cord formed of twisted paper, the number and size of plies em-
15 ployed in producing the cord being as may be found desirable, the completed product forming a twine or cord formed of paper. This twine or cord in its completed form is of uniform size, of minimum weight and
20 is somewhat soft and spongy in character so that when introduced into the cable structure it will tend to more completely fill the interstices than is possible in the use of jute. And since the paper not only possesses these
25 qualities but also is of maximum dielectric qualities, it will be readily understood that it will better absorb insulating and weather-proof materials or compounds than jute or any of the other materials which have here-
30 tofore been employed, and obviously it will pack in a far superior manner. Since the paper has a practically smooth surface and

edge, it will be readily understood that even when twisted the surface of the cord or strand will not be changed in this respect, 35 so that projecting fibres, etc., common in the jute product, will be absent, thus enabling it to operate within the cable forming machine with facility and accuracy, and consequently increasing the capacity of the ma- 40 chines through the prevention of clogging and the greater facility with which it can be employed. The cord so formed has a resistance against breaking closely approaching that of the jute product and it follows 45 that no difficulty will be had in this connection in machines capable of employing the jute product.

Having thus described my invention, what I claim as new, is:— 50

The combination with a cable embodying a plurality of insulated conductors and a sheath, of a filling composed wholly of paper having a clearly defined cord-like structure, laid longitudinally of the insu- 55 lated conductors and closely compacted longitudinally of the conductors and sheath and filling all spaces between such parts.

In testimony whereof I hereunto affix my signature in presence of two witnesses.

BERNARD W. GATES.

Witnesses:

J. E. CLEGG,

H. F. CHAMBERLAIN.