(No Model.) 2 Sheets—Sheet 1.

W. I. BUNKER.

ELECTRIC CABLE.

No. 450,734. Patented Apr. 21, 1891.

Fig. 1.

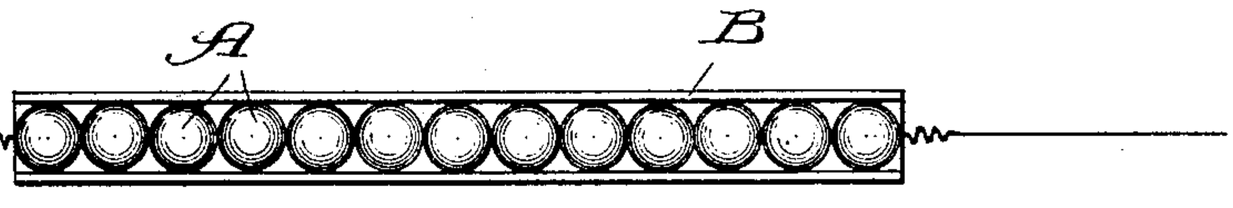


Fig. 2.

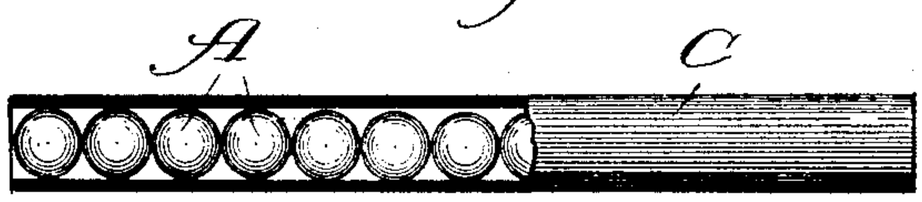


Fig. 3.

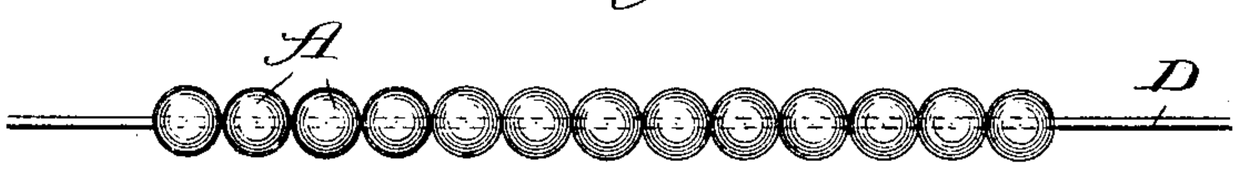


Fig. 4.

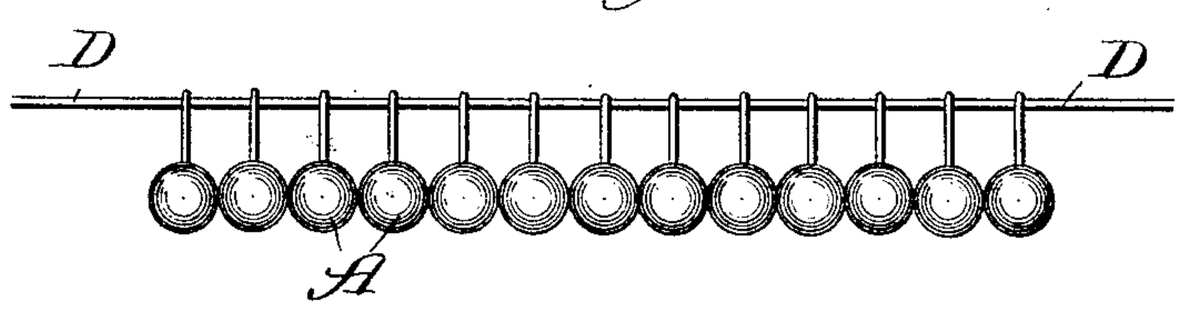


Fig. 5.

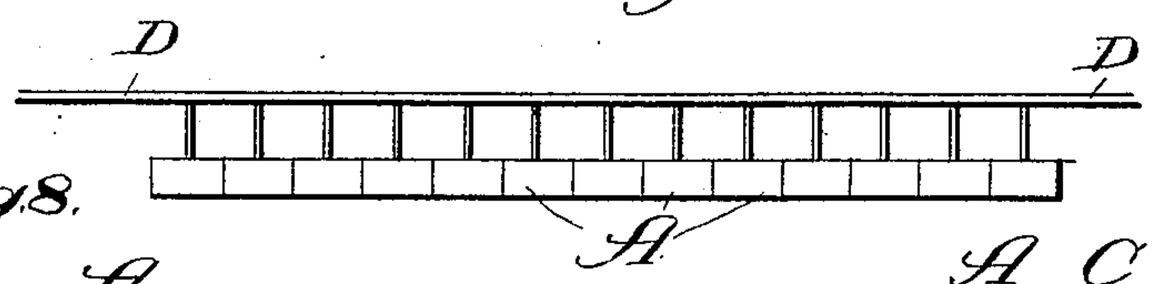


Fig. 8.

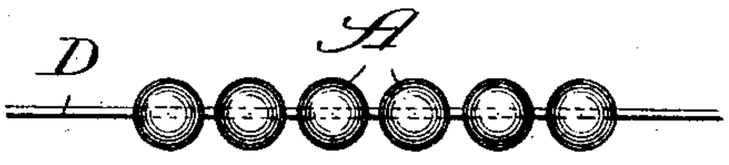


Fig. 6.

Fig. 7.

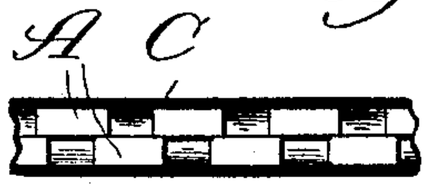
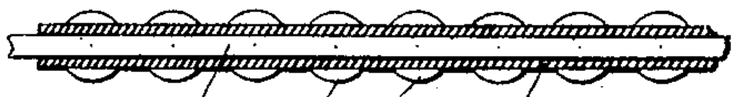


Fig. 9.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 10.

D

Fig. 11.

D

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UNITED STATES PATENT OFFICE.

WILLIAM I. BUNKER, OF LA GRANGE, ILLINOIS.

ELECTRIC CABLE.

SPECIFICATION forming part of Letters Patent No. 450,734, dated April 21, 1891.

Application filed October 7, 1890. Serial No. 367,355. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM I. BUNKER, a citizen of the United States, residing at La Grange, Illinois, have invented a new and useful Improvement in Electric Cables, of which the following is a specification.

The object of my invention is to produce an electric cable capable of modifying, breaking, or establishing an electric current by bending such cable at any point, or by separating or changing the relative position of any of its particles, and to provide means for restoring the cable to its normal state.

To this end my invention consists in forming the cable of many separate and individual parts or particles insulated from each other, except at their poles or points of contact, arranged in a series and retained in such series by any suitable means.

In the drawings I have shown several forms in which my cable may be made; but I do not desire to limit myself to such forms or any of them, since they are intended merely as illustrations of the principle of my invention.

In such drawings, Figure 1 is a plan view of one form of my improved cable; and Figs. 2 to 11, inclusive, views of various modified forms thereof.

The particles A A, which form the conducting part of the cable, are made of copper or other suitable conducting material and of any suitable shape and dimensions. In the form shown in Fig. 1 they consist of substantially spherical balls arranged in a trough B of any suitable non-conducting material. In Fig. 2 a tube C is substituted for the trough B. This tube is preferably made of non-conducting material and elastic. In the form shown in Fig. 3 the balls are strung upon a non-conducting cord or rod D, made preferably of some elastic material. In Fig. 4 they are hung in a series from a cord or rod, and in Fig. 5 the same form is used, short sections of a rod being substituted in place of the spheres of the preceding figures. In Fig. 6 the sections of Fig. 5 are shown arranged in a preferably non-conducting and elastic cylinder or tube C, similar to that of Fig. 2. In Fig. 7 the sections are shown slightly lapping over or resting upon each other and supported in a tube C, and, lastly, in Fig. 8 the particles are shown slightly separated.

I have spoken of the tubes and cords as being made of non-conducting material; but as the purpose of this is to prevent the current from passing from one particle to another through the trough or other means for supporting the particles it will be evident that, if desirable or necessary, such tube, &c., may be made of conducting material and insulated from the particles, and in such case may be used to carry the return or separate current. This form is shown in Fig. 9, where a tube of rubber E is inserted between the cord D, the particles and cord in this case being made of some conducting material. This tube may be made of hard or soft rubber or of any other suitable non-conducting material in an elastic or non-elastic form, and if the tube be elastic the conducting-cord should also be elastic, though it is not necessary that either of them should be so, since if both cord and tube were non-elastic the particles could still be separated by sliding them upon the tube. In order to make the conducting material elastic, the cord or wire should be formed in spiral or crimped shape, whereby it is given longitudinal elasticity in the same manner as an ordinary spring is elastic. In Figs. 10 and 11 I have shown these two forms of elastic conductor, the drawings being made upon an enlarged scale. In Fig. 10 the conducting-cord D is shown made in the form of a close-coiled spring and in Fig. 10 in the form of a strip of wire bent or crimped. When made in either of these forms, a pull upon the cord will tend to separate the coils of the spring or the folds of the crimp, and when the cord is released their resiliency will tend to restore them to their original condition. I have lettered the conductor in the two drawings D as referring to the elastic cord; but the form shown in Fig. 10 might be used to inclose the particles in the same manner as the tube A, if desired.

The cable being made as above described, any one of the particles is connected by suitable means with the source of electricity, and the current generated flows continuously through the series of particles so long as they remain in contact. If now the parti-

cles be separated from each other or their relative positions altered by bending the cable or in any other way, the current will be broken, ceasing to pass through the cable. For instance, if in the form shown in Fig. 3 the cord D be pulled down, the particles will separate, breaking the current, and when the cord is released its elasticity will restore the particles to their normal position, re-establishing the current, and similarly with regard to the other forms, when the particles are separated the current will be broken and when they are restored to their normal position the current will be re-established.

The current may, if desired, be modified by separating the particles a distance insufficient to break the current, and then bringing them together again, alternately weakening or modifying such current.

If desired, any number of series may be used to accomplish the results sought to be obtained.

As thus constructed this cable is adapted for use in railway-cars, buildings, telephones, and generally wherever such form of cable would be suitable.

It will be obvious that instead of having the particles normally in contact they may be separated from each other, as shown in Fig. 8, and adapted to be brought into contact to establish the current, this form being equally within the spirit of my invention, which consists, broadly, in making an electric cable composed of a series of conducting particles adapted to contact with each other to transmit a current.

I claim—

1. As an improved article of manufacture, an electric cable composed of a series of conducting particles adapted to contact with each other to transmit a current, substantially as described.

2. As an improved article of manufacture, an electric cable composed of a series of separable conducting particles adapted to contact with each other to transmit a current and to be separated from each other to break such current, substantially as described.

3. In an electric cable, the combination of a series of conducting particles adapted to contact with each other to transmit a current, and means for retaining such particles in such series, substantially as described.

4. In an electric cable, the combination of a series of conducting particles adapted to contact with each other to transmit a current, and an elastic support for maintaining the particles in such series, substantially as described.

5. In an electric cable, the combination of a series of conducting particles adapted to contact with each other and to transmit a current, and a conducting-support insulated from such particles, substantially as described.

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