

(No Model.)

J. H. DALZELL.

MANUFACTURE OF DIMINISHING ELECTRIC CABLES.

No. 369,594.

Patented Sept. 6, 1887.

Fig. 1.

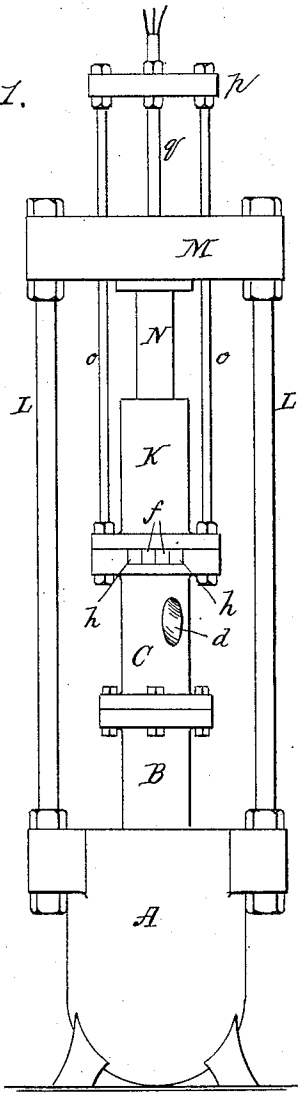
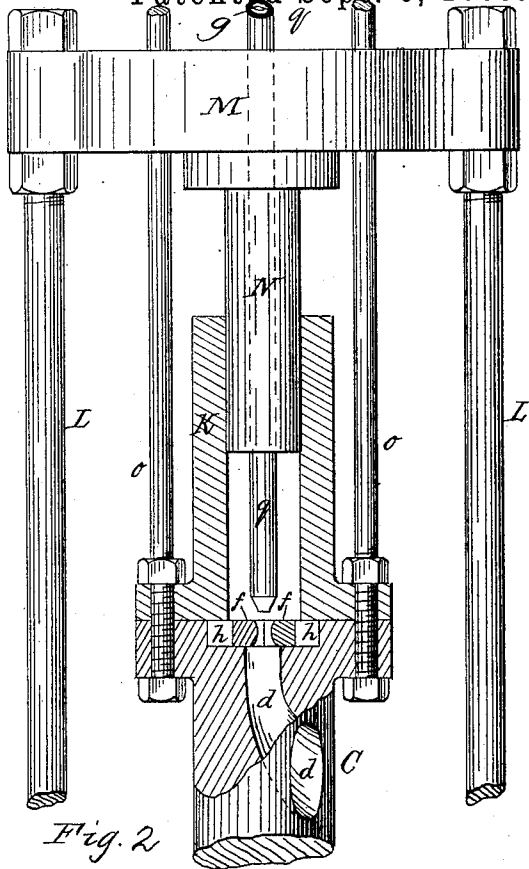


Fig. 2.

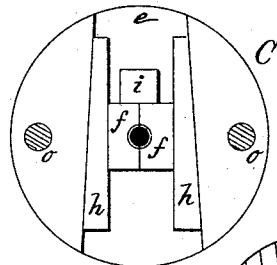


Fig. 3.

Fig. 4.

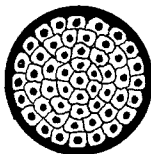
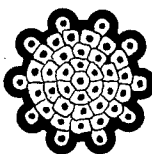
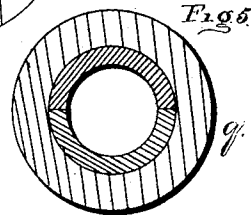


Fig. 5.

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UNITED STATES PATENT OFFICE.

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MANUFACTURE OF DIMINISHING ELECTRIC CABLES.

SPECIFICATION forming part of Letters Patent No. 369,594, dated September 6, 1887.

Application filed November 26, 1886. Serial No. 219,964. (No model.)

To all whom it may concern:

Be it known that I, JOHN HENRY DALZELL, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in the Manufacture of Diminishing Electric Cables; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

In another application, Serial No. 219,963, filed November 26, 1886, I have described a new form of electric cable, the same being composed of a number of wires inclosed in a lead envelope, the wires being of varying lengths. In practice I prefer to make the wires in groups, so that the cable, starting from a given point, will have the whole number of wires for a certain length, then dropping, say, one outside layer, continue on with the remainder a further distance, then dropping another layer, and so on; but instead of dropping a whole layer any portion may be dropped.

The present invention relates to a method of and apparatus for manufacturing such diminishing cable regularly.

The invention consists in passing the insulated wires through a hydraulic press or the die thereof, which is adapted to surround it with an envelope of lead, and at suitable intervals terminating more or less wires and changing the size of the die-aperture. Further, in a hydraulic lead-cable press having dies adapted to be removed and replaced, or their aperture changed, while the cable is in a state of formation and without severing it.

The invention further consists in certain other improvements, all as hereinafter more fully described and claimed.

In the drawings, Figure 1 is an elevation of the form of press I prefer to use. Fig. 2 is an enlarged detail showing the die and surrounding parts. Fig. 3 is a plan view of the pillow-block and removable two-part die. Fig. 4 shows a series of transverse sections taken at different parts of a cable made by this method, and Fig. 5 is an enlarged transverse section of the core-bar and its removable lining.

The press is vertical, with water end below.

A is the water-cylinder; B, its ram, carrying on its upper end the pillow-block C, which

has the recess *d* cored out and extending up axially to the die, forming an exit for the cable. I form the upper face of the pillow-block with a wide groove, *e*, as shown, and of sufficient depth to receive the die neatly. The sides of groove *e* are preferably convergent, forming a wedge-shaped recess. The dies are all alike in external dimensions, differing only in the aperture, and are made in two similar halves, *f*. I prefer to set an abutment, *i*, on the pillow-block to serve as a guide for the position of the dies. I also provide two wedges, *h*, adapted, when the half-dies are brought together, to be driven in between them and the inclined sides of the recess or groove *e* and prevent the half-dies from spreading apart. When the wedges *h* are withdrawn, there is room for the separation of the dies and their withdrawal.

On the pillow-block C is fixed the lead-cylinder K, and this and pillow-block C move with the water-ram B.

From the water-cylinder A extend upwardly the tie-rods L, and to their upper ends the head-block M is fixed. This is stationary and carries the lead-ram N, which fits the cylinder K. To the latter are attached the guide-rods *o*, which pass up through the head-block and above it carry the yoke *p*. This at its center carries the tube or core-bar *q*, which is hollow from end to end and passes downwardly through the head-block M and lead-ram N into the lead-cylinder K, to a point just above the die *ff*. The core-bar *q* thus moves with the lead-cylinder and pillow-block and preserves its relation to the die at all times.

The operation is as follows: I take the insulated wires from a series of reels, or otherwise, and pass them down through core-bar *q* to the die which corresponds to the smallest end of the cable. I then pour the lead into the cylinder K and start the press. The lead is forced out through the die, covering the bunch of wires thoroughly and compressing them tightly together and drawing them downwardly by its friction, emerging at *d* finished. The operation continues till the proper length is about attained for that particular diameter. Before this point has entered the core-bar the desired additional wires are passed down from reels and the operation of pressing continued till the added wires have arrived at a point just above the dies *ff*. The press is then mo-

mentarily stopped, wedges *h* forced out, the dies *f* removed, and a pair substituted slightly larger or so shaped as to impart the necessary configuration to the lead covering. Wedges *h* are then replaced and the press again started and operated till it is about time for more wires to be added, when the dies are removed, as before, and larger dies substituted. The shoulders left externally on the lead covering indicate where to cut the envelope for access to these ends when connection is to be made to them. In this manner a cable of any number of wires and length of sections may be readily produced.

The core-bar may, if desired, be fitted with a removable lining, *g*, of split tube, and by the use of various sizes of this the bunch of wires may be kept central at all times. Just before bringing in a new series of wires this split lining would be removed and one substituted having the proper enlarged internal bore.

The particular form and arrangements of parts are used as illustrating my invention, but may be greatly varied and modified without departing from the spirit thereof.

What I claim is as follows:

1. In the manufacture of lead-covered cables by the use of a lead-press, the method of varying the diameter or cross-section of the cable at intermediate points by altering the aperture of the forming-die while the cable is still unfinished, substantially as set forth.

2. In the manufacture of lead-covered cables having a variable number of conductors at different points in its length, the method of forming the same by passing the insulated wires through a lead-press adapted to cover the bunch with lead, beginning at the smaller section of the cable and at the required intervals adding more wires and changing the die or aperture of the lead-press, substantially as described.

3. In a hydraulic lead-press for covering electric cables, the combination therewith of a removable two-part die and removable means for holding the same in position, substantially as described, whereby, during the process of covering a cable, the die may be removed and substituted.

4. In a hydraulic lead-cable press, the combination of the cylinder *K*, ram *N*, core-bar *g*, and divisible interchangeable dies *f*, having apertures of different diameters, with suitable means for holding said dies in position, substantially as described.

5. The combination of the cylinder *K*, ram *N*, pillow-block *C*, having groove *e*, dies *f*, and wedges *h*, substantially as described.

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

JOHN HENRY DALZELL.

Witnesses:

J. A. CHAMBERS,
K. T. MEAD.