W. W. SMITH.

Electro Magnet.

No. 106,418. Patented Aug. 16, 1870.

Fig. 1.

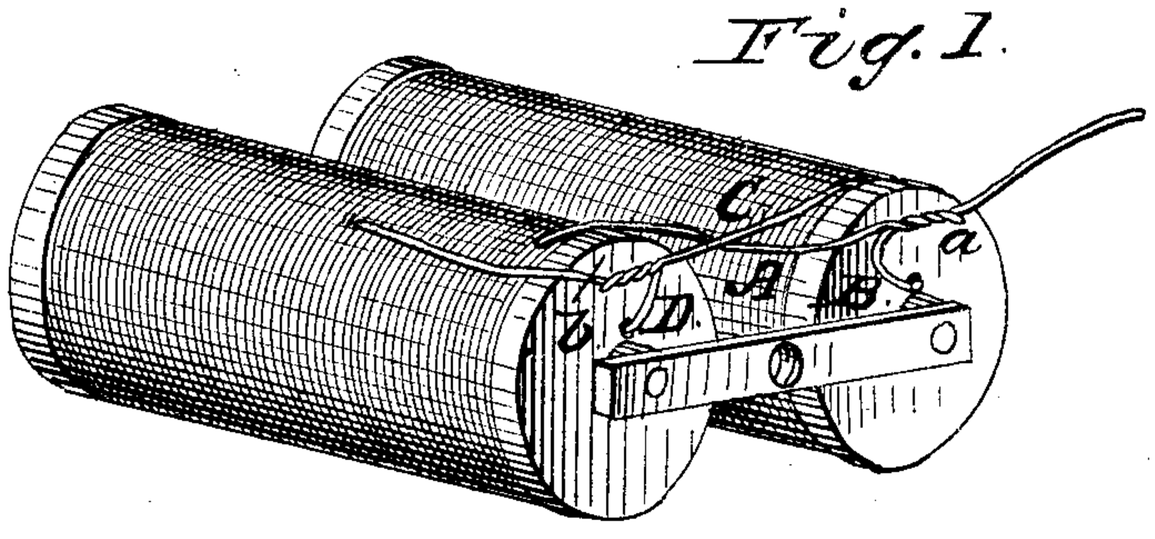
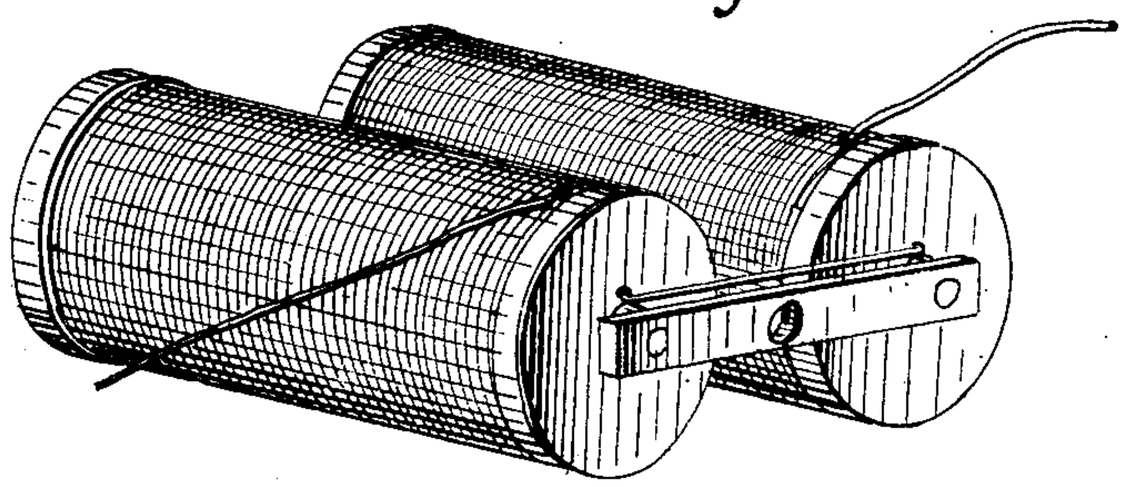


Fig. 2



WITNESSES

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WILLIAM W. SMITH, OF CINCINNATI, OHIO.

Letters Patent No. 106,418, *dated August* 16, 1870.

IMPROVEMENT IN ELECTRO-MAGNETS.

The Schedule referred to in these Letters Patent and making part of the same

To all whom it may concern:

Be it known that I, WILLIAM W. SMITH, of Cincinnati, Hamilton county, State of Ohio, have invented a certain new and useful Improved Method of Connecting the Coils of Electro-Magnets on Telegraph Lines; and I do hereby declare the following to be a sufficiently full, clear, and exact description thereof to enable one skilled in the art to which my invention appertains to make and use it, reference being had to the accompanying drawings making part of this specification.

The object of my invention is to materially lessen the resistance to the passage of electric currents through the coils of electro-magnets, as applied to telegraphic lines; and

My invention consists in so connecting and attaching the coils as to divide the current, and conduct it through the coils simultaneously, instead of passing the whole current through the coils consecutively, as heretofore.

In the accompanying drawings, illustrative of my invention—

Figure 1 is a perspective view of the electro-magnetic coils and connecting-wires embodying my invention.

Figure 2 exhibits the old method of connecting the wires, they being so attached that the entire current passes through one coil before reaching the other.

In order to construct an apparatus embodying my invention, it is not necessary to make or wind coils especially for it, as the improvement can be applied to all electro-magnets as now used on telegraph-lines, by changing the arrangement of the connecting wires.

For the alteration of old electro-magnets, and the construction of new, my direction is to connect together (as at 2) the wires A B, leading into the coils from one pole of the battery, and at 6, the wires C D leading from the coils to the other pole of the battery. The only precaution necessary to be observed is to so conduct the current through the coils as to obtain the proper polarity of the cores, as in other magnets.

By practical application of this improvement to telegraph lines, and by tests with differential galvanometers capable of accurate measurement, it is found that the resistance of electro-magnets made according to my invention is decreased quite seventy-five per cent. The great decrease in resistance is owing to the decreased distance traversed by the current, and increased conducting-surface.

The operation can be likened to the motion of water in pipes. There is, for example, much more resistance offered to the passage of water through a continuous line of one-inch pipe a mile in length than there is to the passage of the same current, divided and conducted through two half-mile lengths of one-inch pipe simultaneously.

The application of my invention will be more immediately beneficial to railway telegraphs and other lines having a large number of offices on the same circuit, as their condition will then more nearly approach that of the "through-circuits" having but few offices, and they will be enabled to work with more certainty in all weather. The signals on these magnets are more distinct than when connected in the old way.

As an illustration of the practical advantage of my invention, I will state that a telegraph line having twenty offices would, by the old method, have a resistance of from three hundred to five hundred miles in the magnets, and the same line, with the same number of offices, constructed to embody my improvement, would have but from seventy-five to one hundred and twenty-five miles resistance.

I claim herein as new and of my invention—

The herein-described method of dividing and simultaneously passing the electric current through the coils of electro-magnets, as applied to telegraph lines, by the connection or junction of wires A B and wires C D, in the manner substantially as shown, for the purpose of greatly reducing the resistance to the passage of electric currents through the coils of the magnets, as set forth.

In testimony of which invention I hereunto set my hand.

W. W. SMITH.

Witnesses:

FRANK MILLWARD,

J. L. WARTMANN.