

(No Model.)

J. T. WILLIAMS.  
CORE FOR ELECTRIC SOLENOIDS.

No. 460,926.

Patented Oct. 6, 1891.

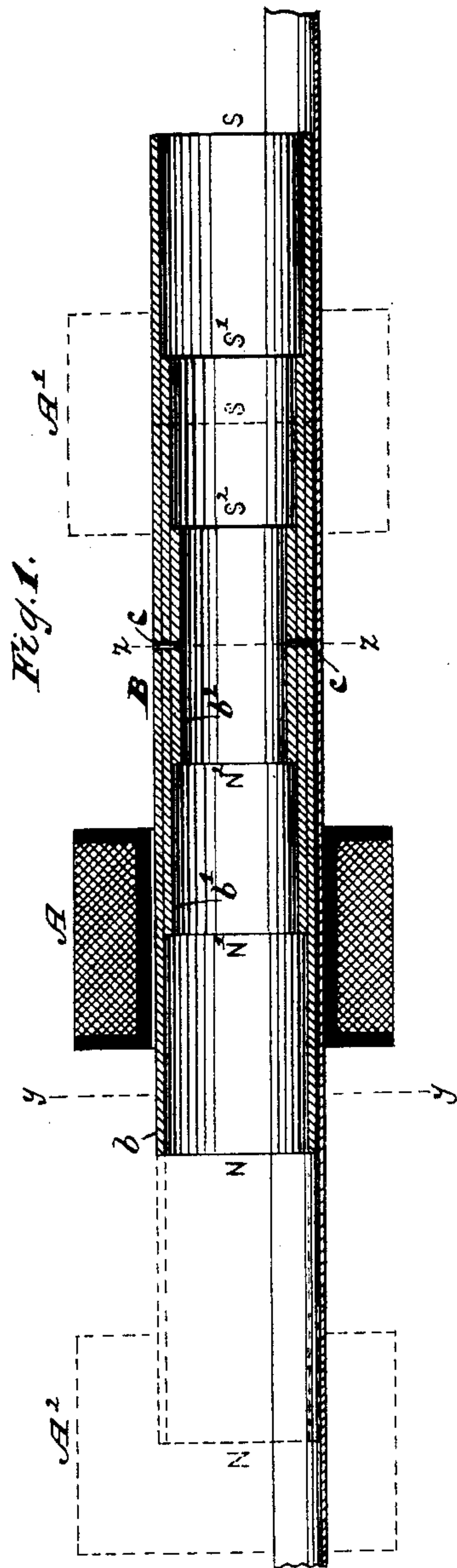
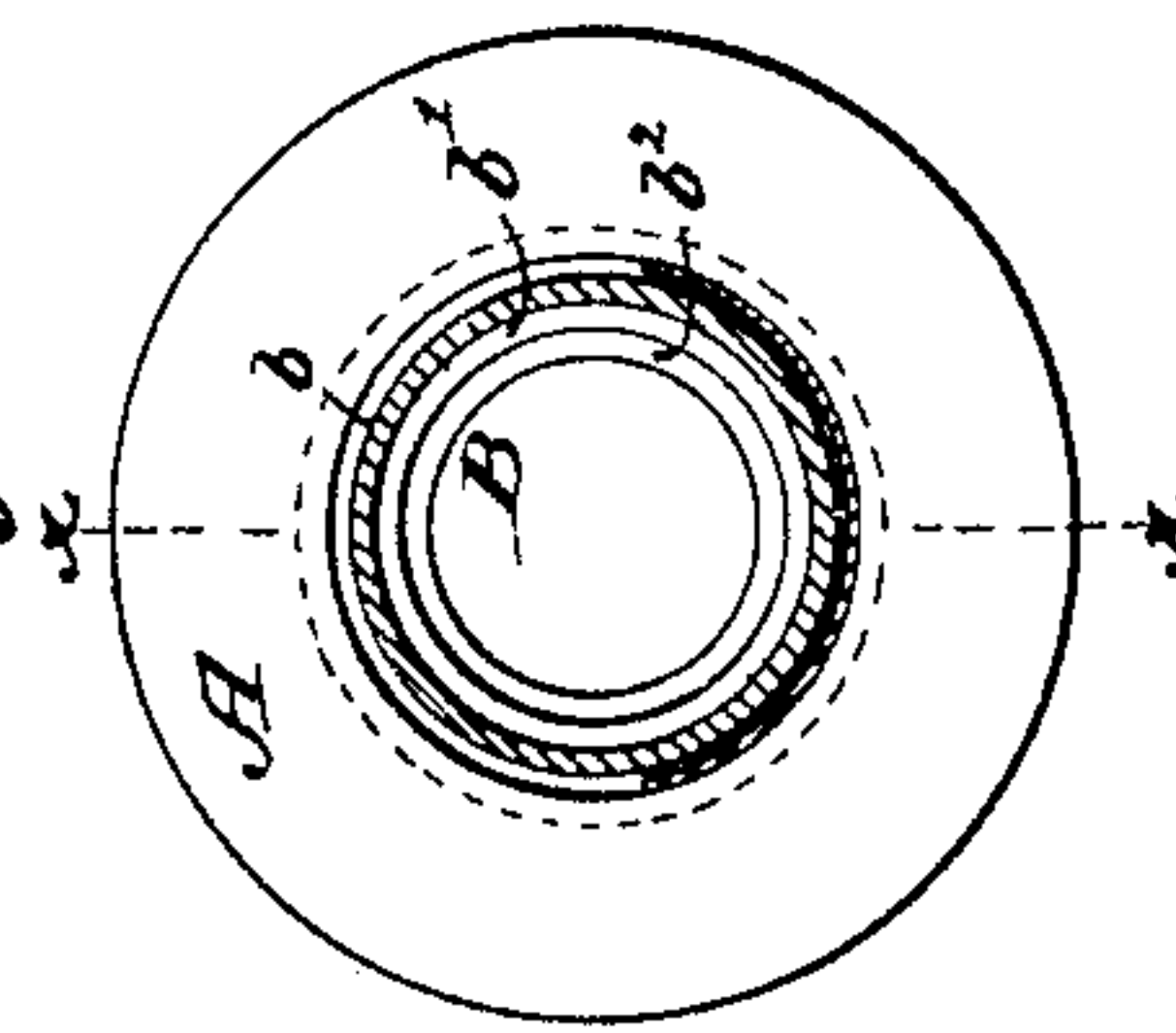


Fig. 2.



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# UNITED STATES PATENT OFFICE.

JOHN T. WILLIAMS, OF MOUNT VERNON, ASSIGNOR TO THE INTERNATIONAL  
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## CORE FOR ELECTRIC SOLENOIDS.

SPECIFICATION forming part of Letters Patent No. 460,926, dated October 6, 1891.

Application filed December 18, 1890. Serial No. 375,137. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN T. WILLIAMS, a citizen of the United States, residing at Mount Vernon, in the county of Westchester and State of New York, have invented new and useful Improvements in Cores for Electric Solenoids, of which the following is a specification.

This invention has for its object to provide a novel core for an electric solenoid; and it consists in the combination, with a coil, of a magnetic core movable axially through the coil and composed of a series of members of different length and varying diameter, which are fitted one within the other in metallic contact.

The invention also consists in the combination, with a coil, of a magnetic core movable axially through the coil and composed of a series of tubular members of different length and varying in diameter, which are fitted one within the other in metallic contact and have their middle arranged in the same plane.

Figure 1 is a longitudinal central section in the plane  $xx$ , Fig. 2. Fig. 2 is a transverse section in the plane  $yy$ , Fig. 1.

In the drawings, the letter A designates a motor or solenoid-coil, and B a magnetic core, which fits the interior of the coil, so that when the coil is vitalized said core is drawn into the coil by the axial magnetism. This axial magnetism exerts its maximum traction upon the core at the time when the core enters the coil, but the traction decreases as the coil advances, and it ceases to act when the middle zone  $zz$  of the coil has reached the middle zone of the coil. In order to enable the motor or solenoid-coil to exert a uniform or nearly uniform traction upon the core as the latter is drawn into the coil, I construct the core of a series of tubular members  $b\ b'\ b^2$ , which are of different lengths and varied in diameter, so as to be fitted concentrically one into the other, as shown in Fig. 1. It is desirable that the various members of the core shall be so arranged in relation to each other that their middle zones are situated in one and the same plane.

In Fig. 1 of the drawings the end N of the outer member of the core has already passed through the motor-coil A and the end N' of the second member has reached the middle

zone of said coil, so that while the traction of the coil on the first member has commenced to decrease the traction of the coil on the second member is added to that still exerted on the first member, and after the core has advanced still farther the coil begins to exert a traction upon the third member of the core, so that the traction exerted by the coil upon the core remains as near as possible uniform.

If a reciprocating motion is to be imparted to the core B, a second motor-coil A' is provided, which is so arranged that it will exert a traction upon the core in a direction opposite to that exerted by the coil A, and after the core has been drawn into the coil A to the desired point the electric current is changed from the coil A to the coil A', so that the latter will cause the core to move in the opposite direction. If the core B is to be moved in one and the same direction, a motor-coil A<sup>2</sup> is provided, which will be vitalized at the proper time, so as to exert a traction upon the core in the same direction as the coil A after the latter coil has been devitalized.

In order to retain the different members of the core in the proper relation to each other, they may be connected by rivets  $c$  or by other suitable means.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with a coil, of a magnetic core movable axially through the coil and composed of a series of members of different length and varying diameter, which are fitted one within the other in metallic contact, substantially as described.

2. The combination, with a coil, of a magnetic core movable axially through the coil and composed of a series of tubular members of different length and varying in diameter, which are fitted one within the other in metallic contact and have their middle zones arranged in the same plane, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JOHN T. WILLIAMS.

Witnesses:

WM. C. HAUFF,

E. F. KASTENHUBER.