

(No Model.)

S. H. STUPAKOFF.
ELECTRO MAGNET.

No. 495,125.

Patented Apr. 11, 1893.

FIG. 1.

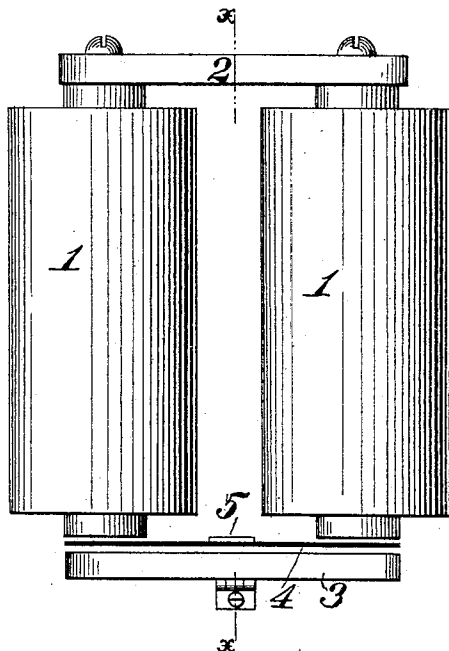


FIG. 2.

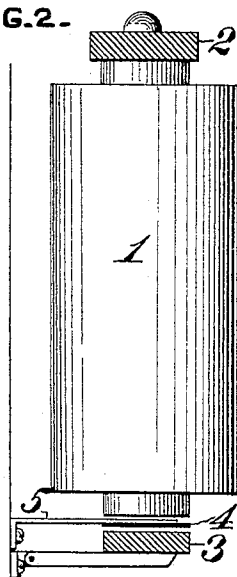


FIG. 3.

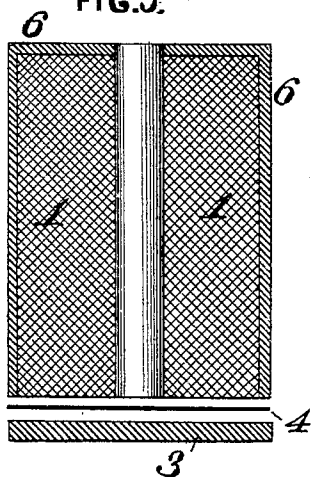
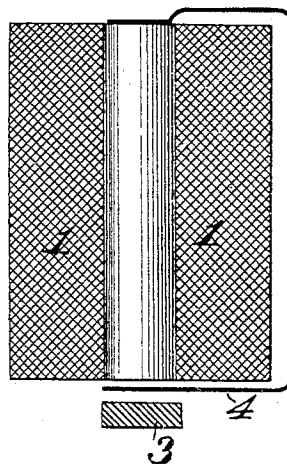


FIG. 4.



WITNESSES:

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by George H. Christy
Att'y.

UNITED STATES PATENT OFFICE.

SIMON H. STUPAKOFF, OF PITTSBURG, ASSIGNOR TO THE UNION SWITCH
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ELECTRO-MAGNET.

SPECIFICATION forming part of Letters Patent No. 495,125, dated April 11, 1893.

Application filed September 5, 1892. Serial No. 445,084. (No model.)

To all whom it may concern:

Be it known that I, SIMON H. STUPAKOFF, a citizen of the United States, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented or discovered a certain new and useful Improvement in Electro-Magnets, of which improvement the following is a specification.

The invention described herein relates to certain improvements in electro-magnets.

As is well known, considerable difficulty and annoyance are experienced in the use of the electro-magnet by reason of the adherence of the armature thereto after the current has been cut off, such adherence being caused by the residual magnetism. The effects of this residual magnetism have been destroyed by the interposition of a thin plate of diamagnetic material, as brass, between the poles of the magnet and the armature. This plate is made of such thickness as to hold the armature without the comparatively feeble field of force of the residual magnetism. Although a very thin sheet of diamagnetic material will effect this purpose, the use of such plate is objectionable as it will, however thin, appreciably diminish the power of the magnet when excited, such power decreasing generally stated as the square of the distance of the armature from the poles of the magnet.

The object of the present invention is to neutralize the effect of the residual magnetism on the armature without, in any way, impairing its attractive effect when excited, on the armature, and, in general terms, the invention consists in the construction and combination substantially as hereinafter described and claimed.

In the accompanying drawings forming a part of this specification, Figure 1 is a plan view of a two-pole electro-magnet having my improvement applied thereto. Fig. 2 is a sectional view on the line *x, x*, Fig. 1. Figs. 3 and 4 are sectional views showing the application of my improvements to different forms of electro-magnets.

In the practice of my invention the electro-magnets 1 are constructed in the usual or any suitable manner and in this case two pole magnets are connected at their upper ends to the metal bar 2. The armature 3 is mounted

in suitable relation to the poles of the magnet in the usual or any desired manner. In order to avoid the adherence of the armature after the current has been cut off, by reason of residual magnetism, a strip or sheet 4 of magnetic material, as iron, &c., is interposed between the armature and the poles, so as to extend across from one pole of the magnet to the other. This strip of metal is made of sufficient size or bulk to absorb the lines of force of residual magnetism radiating from the poles of the magnets. Or considering magnetism as similar to electricity, the strip 4 is sufficient in size to conduct the comparatively small current of residual magnetism but not to conduct the full current when the magnets are excited. This strip may be supported a short distance away from the poles of the magnet by a resilient tongue 5, attached at its outer end to the frame supporting the magnets, or it may be held in contact with the poles or permanently attached thereto.

When the magnets are excited by the passage of the electric current, the strip, if held away by a resilient support, will be first attracted to the poles, but as the quantity of metal in the strip is insufficient to serve as a path for the magnetic current or lines of force from one pole of the magnet to the other, the armature will be drawn up against the strip and as both strip and armature are of magnetic material, they will be practically an integral structure, the armature being held against the strip with nearly the same force as it would be held against the poles themselves. When the electric current is broken, the strip will conduct or absorb any currents of residual magnetism in the cores and thereby free the armature from all material attractive force.

The strip of magnetic material serves to absorb or prevent the lines of force of residual magnetism from extending to the armature, and does not operate to limit or materially decrease the attractive action of the magnet when excited upon the armature. The diamagnetic shield, however, holds the armature at such a distance from the poles that the residual magnetism will not affect it, and in proportion to the distance at which it holds the armature away from the poles, diminishes

the attractive power when the magnet is excited.

In Fig. 3 I have shown the application of my improvement to an electro-magnet where one pole is formed by a core and the other by an outer iron case 6. With such a magnet the connecting strip or sheet is preferably made in the form of a circular disk.

In Fig. 4 the poles of a unipolar magnet are connected by a strip passing down along the side of the magnet as shown.

I claim herein as my invention—

1. The combination of an electro - magnet, an armature and a strip or sheet of magnetic material for conducting currents of residual

magnetism from one pole of the magnet to the other, substantially as set forth.

2. The combination of an electro - magnet, an armature and a strip or sheet of magnetic material arranged between the armature and poles of the magnet and adapted to conduct currents of residual magnetism from one pole to the other, substantially as set forth.

In testimony whereof I have hereunto set my hand.

SIMON H. STUPAKOFF.

Witnesses:

DARWIN S. WOLCOTT,
R. H. WHITTLESEY.