

F. J. SPRAGUE.

FIELD MAGNET FOR DYNAMO ELECTRIC MACHINES.

No. 461,552.

Patented Oct. 20, 1891.

Fig. 1.

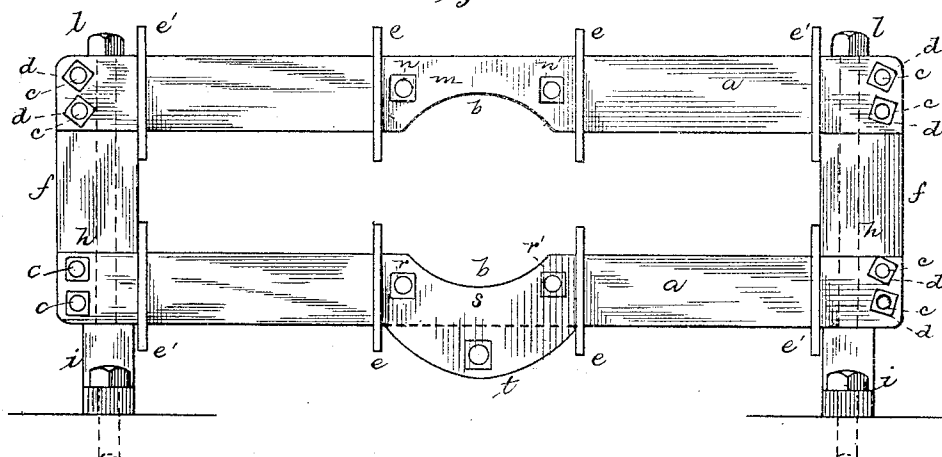


Fig. 2.

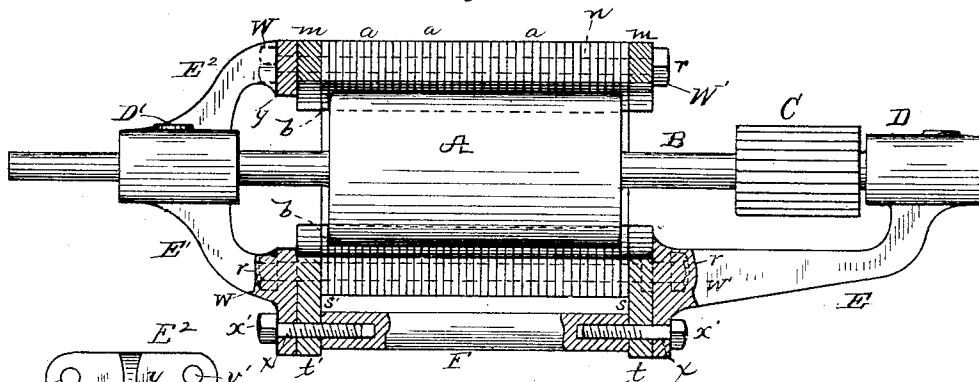


Fig. 4.

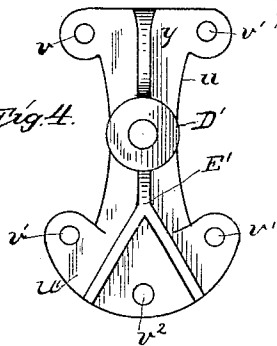


Fig. 3.

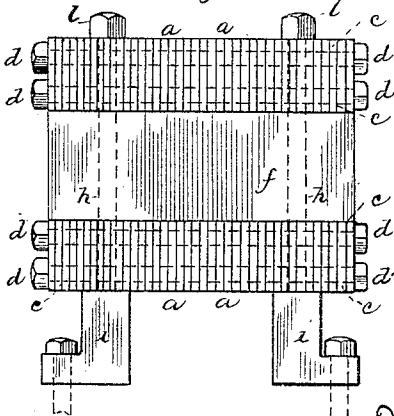
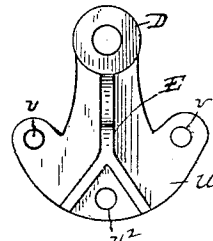


Fig. 5.



ATTEST:

E. Rowland
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INVENTOR:

Frank J. Sprague
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attys

(No Model.)

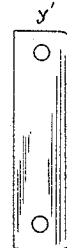
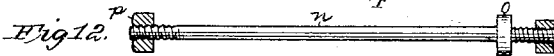
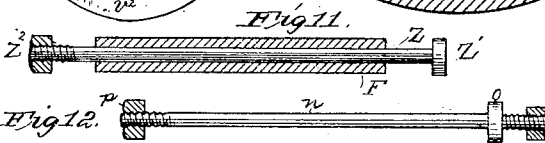
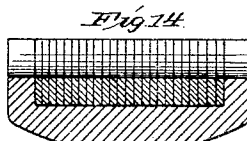
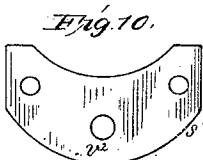
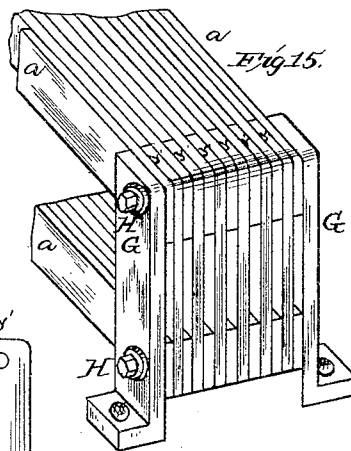
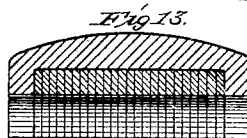
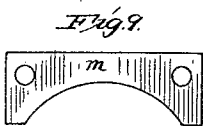
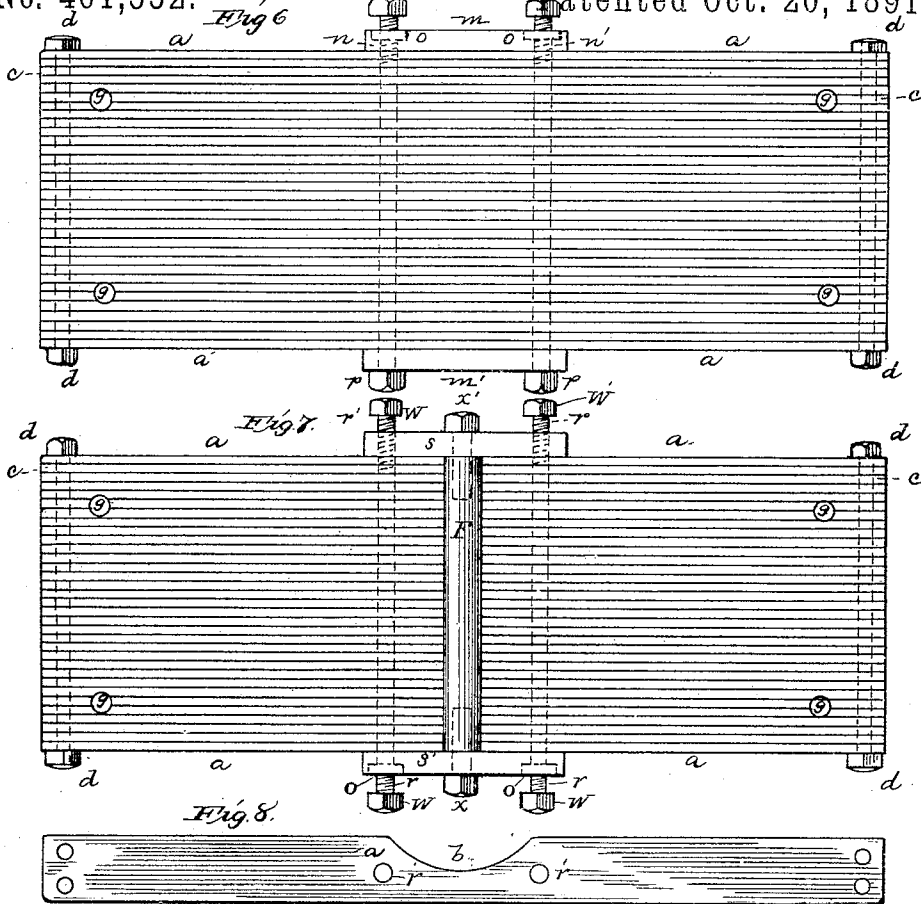
2 Sheets—Sheet 2.

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UNITED STATES PATENT OFFICE.

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FIELD-MAGNET FOR DYNAMO-ELECTRIC MACHINES.

SPECIFICATION forming part of Letters Patent No. 461,552, dated October 20, 1891.

Application filed January 19, 1885. Serial No. 153,250. (No model.)

To all whom it may concern:

Be it known that I, FRANK J. SPRAGUE, of New York, in the county and State of New York, have invented a certain new and useful
5 Improvement in Dynamo-Electric Machines, of which the following is a specification.

This invention relates to the construction of dynamo-electric machines, particularly of that class in which the field-magnet cores extend in different directions from the same pole-pieces; and its object is mainly to so form and arrange the field-magnets as to increase the efficiency of the machine, and also to permit of the machine being readily taken apart,
15 when necessary.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is a side view of the field-magnets of a machine embodying the invention in its preferred form; Fig. 2, a transverse vertical section through the poles, showing the armature; Fig. 3, an end view of the same; Fig. 4, a view of one end of the shaft-bearing; Fig. 5, a view of the other end; Fig. 6, a top
25 view of the field-magnet; Fig. 7, a bottom view thereof; Fig. 8, a view of one of the plates which form the cores. Figs. 9 and 10 are views of clamping-plates employed to hold the cores together; Figs. 11 and 12, views of the bolts used with said plates. Figs. 13 and 14 represent a different way of securing the plates together at the poles. Fig. 15 is a view showing a different way of clamping the plates at the ends and forming the yoke or back piece,
30 and Fig. 16 a view of one of the short end plates employed with the last construction.

The field-magnet coils are omitted throughout the drawings, it being desired to show the construction of the cores upon which such
40 coils are wound.

Referring first to Figs. 1 to 12, to form one side of the field-magnet—that is, two cores whose poles are joined together—I mass together a suitable number of soft-iron plates
45 *a a* of the same length. Preferably I arrange them so that the grain of the iron runs in the same direction in all the plates. At the middle portion of this series of plates a curved portion of the iron is bored or cut out
50 or otherwise removed, as seen at *b*. Thus

when the two sides of the magnet are placed in position is formed the cylindrical space in which the armature revolves. By thus constructing the cores and the pole-pieces of separate plates massed together the formation
55 of Foucault currents is prevented. The plates of each series forming a pair of cores are first secured together by bolts *c c*, extending transversely through the cores near their ends and having nuts *d d*, by means of which the
60 plates are held closely together. Pieces *c* and *c'*, of vulcanized fiber, are placed upon the cores, between which the coils are wound. It is preferred to wind the coils upon the cores at this stage of the construction. The
65 space between disks *e e* being left bare forms the polar extensions of the two magnets. The pairs of cores are then to be secured together and the yokes or back pieces formed. For
70 this purpose I use at each end a block or casting *f*, which is placed between the cores. Each block *f* has a bolt-hole drilled through it, and corresponding holes *g* are formed in the cores edgewise of the plates. The bolts
75 *h h*, each made in one piece with a foot or standard *i*, are then passed through the holes *g* in the cores and through the casting *f*, and nuts *l l* are screwed upon the bolts, whereby the cores and the casting *f*, which forms the yoke, are secured closely and firmly together.
80 The field-magnet or pair of field-magnets is thus completely formed and is ready for the armature which is to be supported by the said magnet.

A is the armature, *B* its shaft, and *C* the
85 commutator.

D D' are the bearing-sleeves for the shaft, one at each end. The bearing at *D* is supported by a knee *E*, made in one piece with *D*, which extends to one side of the polar
90 extensions of the lower pair of cores of the field-magnet, while from *D'* a shorter knee *E'* extends to the other side of the same pair of cores. This part *E* is cast with a plate *u* at its inner end, provided with bolt-holes
95 *v v*, and the part *E'* has a plate *u'*, with bolt-holes *v' v'*. Against each side of the lower series of plates *a*, at the middle or polar portion thereof, is placed a short clamping-plate
100 *s* or *s'*. Plate *u* is brought into contact with

plate *s* and plate *u'* with plate *s'*, and these parts are all secured together by bolts *r r*, the plates *a* being here provided with bolt-holes *r'* for this purpose. The bolts *r* are screw-threaded at both ends, and each has a flange *o* near one end. They are first passed through the plates *s*, *a*, *a*, and *s'*, and the flange *o* enters a square depression in plate *s*, the screw-threaded ends projecting beyond the outer plates at both sides. The plates *u* *u'* are then brought into position, the screw-threaded ends of the bolts passing through the holes *v* and *v'*, and nuts *w* and *w'* are then screwed upon these screw-threaded ends, whereby the whole is secured together. In addition, however, to form a stronger support for the armature-shaft, a cross-brace *F* is employed, extending beneath the magnet-cores from the part *t* of plate *s* to part *t* of plate *s'*, and through the bolt-holes *v² v²* of plates *u u'*, through *t t* into *F*, are passed bolts *x x*, having nuts *x' x'* to secure the parts in place. For the upper pair of cores a curved supporting-knee *E²*, terminating in a plate *y*, extends from bearing-sleeve *D'*. Short plates *m m*, of the same width and curvature as the plates *a a*, are placed one on each side of said plates, and bolts *n n*, similar to the bolts *r r*, are passed through these parts to hold them together.

The cross-brace, instead of being solid, may have the form shown in Fig. 11, having an opening entirely through it, through which is passed a continuous bolt *z*, having an enlarged head *z'*, and a securing-nut *z²*.

Instead of the plates *m m* and bolts *n n* or plates *s s'* and bolts *r r'*, I may employ for securing the core-plates together the device shown in Figs. 13 and 14, which consists, simply, of a half-sleeve placed over each series of plates and of such size as to fit closely thereon and secure the plates tightly together. This construction may be used in machines of small size.

The ends of the two pairs of cores may be secured together, if desired, in the manner shown in Fig. 15. In this form alternate plates *a* are shorter than the rest, and at the ends of these short plates transverse plates *y'* are placed across from one set of plates *a* to the other.

Vertical standards *G G* are placed on each side, and bolts are passed through said standards and the long plates *a* and transverse plates *y'* and secured by nuts *H H*.

It will be seen that by my invention all the parts are attached together removably and yet firmly and securely. If it is desired to remove the armature, the nuts are removed from the bolts *r*, when the bearing-sleeve *D*, knee *E*, and plate *u* are readily taken off, and the armature is free to be removed. If one of the plates *a* is injured or in any way defective, by removing the bolts that plate can be removed and a new one substituted. The back pieces are also readily removable.

By means of the feet *i i* the machine is secured to a floor or a suitable bed-plate.

What I claim is—

1. In a dynamo-electric machine, the combination, with the series of longitudinal plates forming a field-magnet core, of the outer clamping-plates having extended portions and the cross-brace extending from one of said extended portions to the other, substantially as set forth.

2. In a dynamo-electric machine, the combination, with the field-magnet core composed of plates, of the clamping-plates, the supports for the armature-bearings, and the flanged bolts securing all said parts removably together, substantially as set forth.

This specification signed and witnessed this 8th day of January, 1885.

FRANK J. SPRAGUE.

Witnesses:

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E. C. ROWLAND.