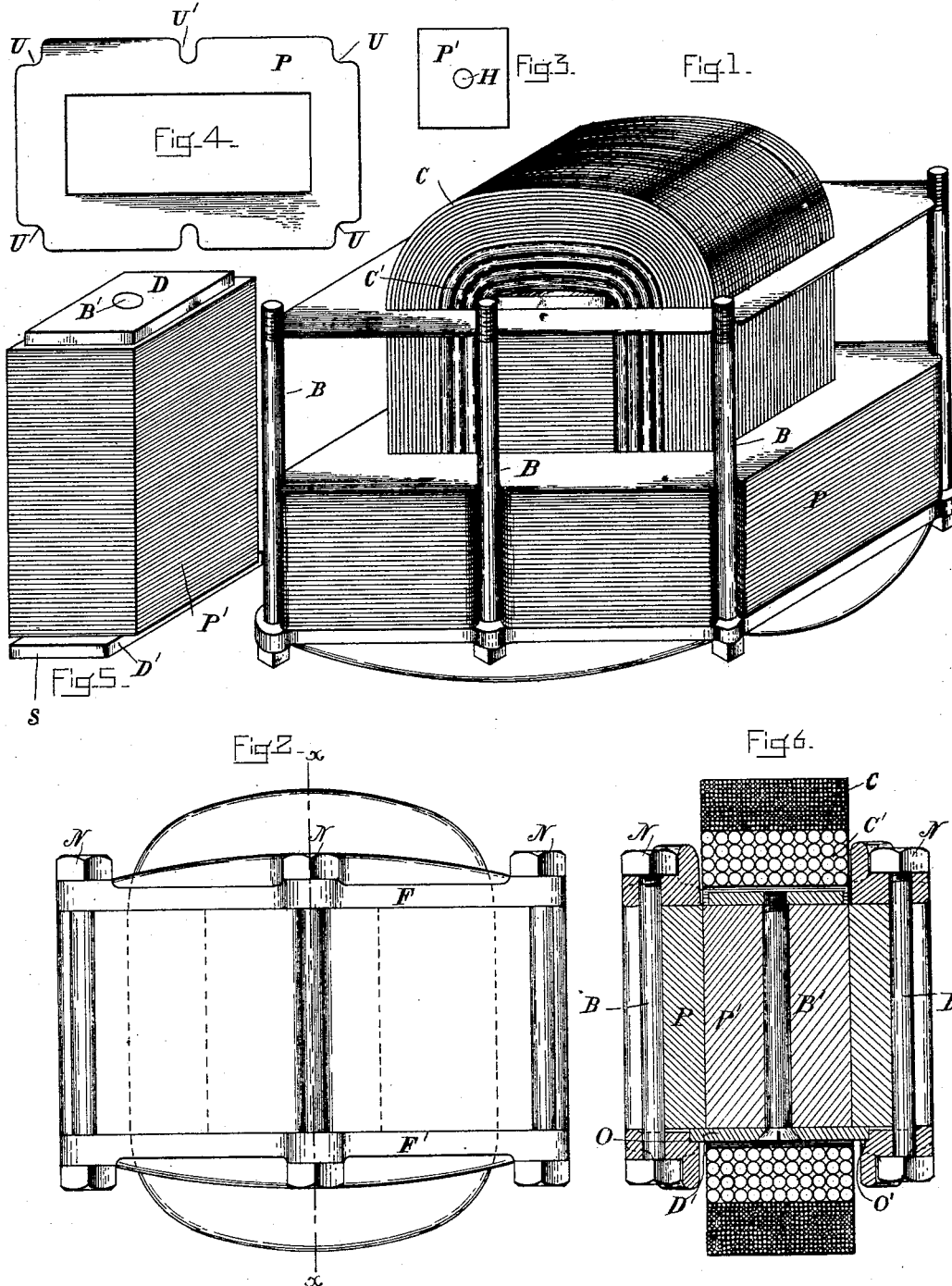


(No Model.)

E. THOMSON.
TRANSFORMER.

No. 454,090.

Patented June 16, 1891.



WITNESSES.

A. G. McDonald.
John H. Giboney

INVENTOR -

Elihu Thomson
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UNITED STATES PATENT OFFICE.

ELIHU THOMSON, OF SWAMPSCOTT, MASSACHUSETTS.

TRANSFORMER.

SPECIFICATION forming part of Letters Patent No. 454,090, dated June 16, 1891.

Application filed October 11, 1890. Serial No. 367,851. (No model.)

To all whom it may concern:

Be it known that I, ELIHU THOMSON, a citizen of the United States, residing at Swampscott, in the county of Essex and State of Massachusetts, have invented a certain new and useful Improvement in Transformers, of which the following is a specification.

The invention herein described relates to the construction of transformers or self-inductive coils, such as are used in systems of alternating-current distribution. The general method of building the transformer consists in winding the primary and secondary coils around a sectional core, and then surrounding the coils and core with a separate sheath of magnetic material, which completes the magnetic circuit.

My present improvements consist in certain details of construction in a transformer of the character outlined, all as hereinafter pointed out in the claims.

In the accompanying drawings, Figure 1 shows in perspective a transformer partly built up. Fig. 2 is a side view of the transformer when completed. Figs. 3 and 4 respectively illustrate one of the core-blanks and closed iron frames from which the outside magnetic sheath is built up. Fig. 5 shows the core completed; and Fig. 6 is a sectional view taken on line *x x*, Fig. 2.

The central core of the transformer consists of a number of blanks or laminae of thin sheet-iron or other magnetic material, preferably rectangular in shape, which are piled up one upon another, and at either end of the block thus formed is an end plate *D D'*. The blanks and end plates are securely bound together by an insulated transverse bolt or bolts *B'*, which may be varied in number and location, though the preferred arrangement is that shown, wherein a single bolt passes up through registering holes *H* in the centers of the blanks and is screwed into one of the end plates *D*.

Upon the core, and substantially covering its ends and two of its sides, are the primary and secondary coils *C C'*, which are arranged side by side or one upon the other, as desired. Surrounding the core and coils is a sectional magnetic sheath, which completes the magnetic circuit, as will be readily understood, and which is built from individual closed

frames of iron or other magnetic material. These frames may be slipped over the coils one by one, as indicated in Fig. 1, or, if desired, the sheath may be built up separately and the core and coils passed through the central opening left therein. Bottom and top plates *F F'*, of considerable weight and strength, serve as clamping-plates, and the bottom plate is recessed, as at *O O'*, so as to receive the ends of core-plate *D'*, which project, as shown at *s*, a short distance beyond the sides of the core, and lock the exterior sheath when complete to the core in such a way as to form a rigid compact structure. The outside edges of the frame *P* and clamping-plates are notched or recessed at the corners and at intervals along the sides, as at *U U'*, and binding-bolts *B*, which hold the parts of the exterior sheath together, are seated in these recesses, thus adding to the compactness of the transformer by bringing the bolts within the space bounded by the sides of the sheath. The bolts *B* may be insulated, so as to prevent their establishing an electrical connection transversely of the sheath, although this is not absolutely essential in practice, because the position given them precludes their becoming the cause or seats of induced electric currents. The bolts are held in place by nuts *N* on the outside of one of the clamping-plates or by any other suitable means, many of which will readily suggest themselves to the constructor.

It is preferred to alternate the iron plates constituting the core and exterior sheath with zinc blanks, after the manner described in a patent granted to me January 28, 1890, and numbered 420,396; but this is not necessary, as the iron can be used simply in the ordinary scaled or blackened condition in which it is after being subjected to heat during annealing.

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

1. The combination, with a rectangular sectional core having two of its sides covered by the primary and secondary coils wound thereon, and its other sides flush with the ends of the coils, of the closed iron frames of magnetic material surrounding the core and coils and completing the magnetic circuit, as described.

2. The combination, in a transformer, of

the core composed of blanks or laminæ and end plates secured together by a transverse central bolt passing therethrough, with the primary and secondary coils, and the closed
5 iron frames forming a sheath exterior to said core and coils and completing the magnetic circuit, as described.

3. The combination of a sectional core and primary and secondary coils wound thereon,
10 with the exterior closed frames of magnetic material notched or recessed in their outer edges, and bolts seated therein binding the frames together.

4. The combination, in a transformer, of

the primary and secondary coils, sectional 15 core-blanks, and end plates D D', one of which projects beyond the sides of the core, with the closed iron frames and end plates surrounding the core and coils and completing the magnetic circuit, the projecting end 20 plate interlocking with the external sheath, as described.

In testimony whereof I have signed this specification this 9th day of October, 1890.

ELIHU THOMSON.

Witnesses:

JOHN W. GIBBONEY,
DUGALD MCKILLOP.