No. 652,990. Patented July 3, 1900.

J. J. WOOD.

ELECTRIC TRANSFORMER.

(Application filed Mar. 31, 1900.)

(No Model.)

FIG. 1.

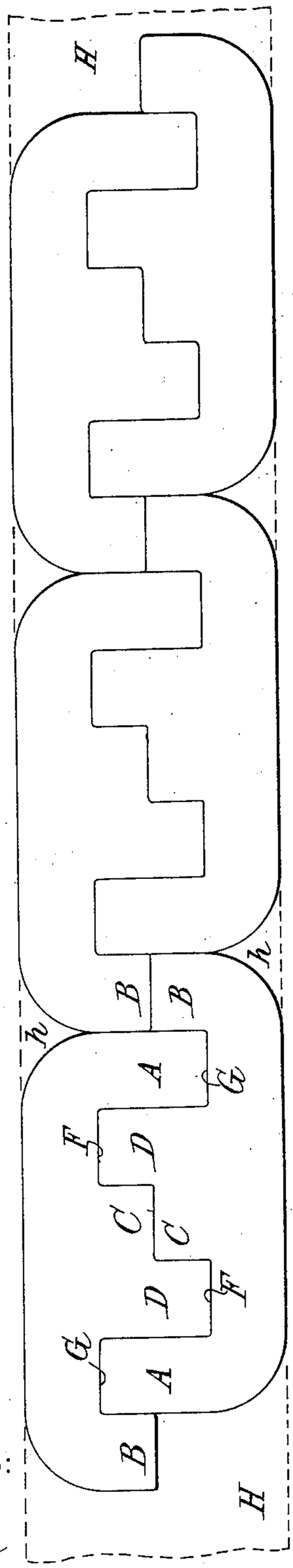

FIG. 3.

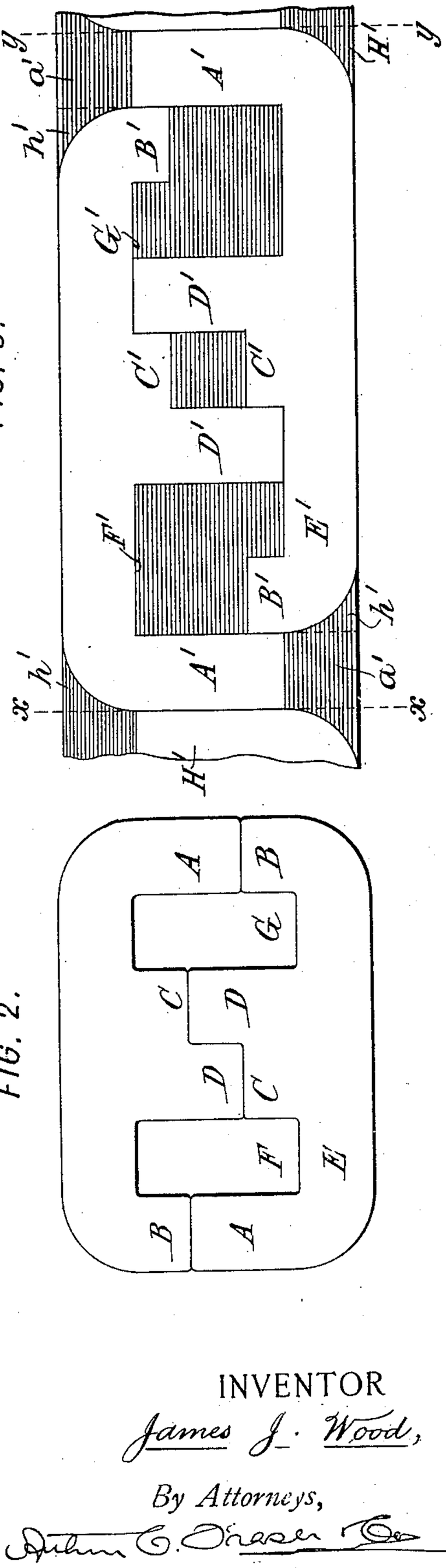

FIG. 2.

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ELECTRIC TRANSFORMER.

SPECIFICATION forming part of Letters Patent No. 652,990, dated July 3, 1900.

Application filed March 31, 1900. Serial No. 10,904. (No model.)

To all whom it may concern:

Be it known that I, JAMES J. WOOD, a citizen of the United States, residing at Fort Wayne, in the county of Allen and State of Indiana, have invented certain new and useful Improvements in Electric Transformers, of which the following is a specification.

Electric transformers as usually constructed have their primary and secondary coils wound together in any suitable arrangement and a laminated iron envelop entering within and surrounding the coils thereof. Each lamina of the envelop is composed of two or more sections composed of sheet-iron punchings and fitting together from opposite sides of the coil—as, for example, in my Patent No. 511,574, dated December 26, 1893.

My present invention provides an improved punching which by reason of the proportions and relative position of its parts is adapted to be punched out from a continuous strip of sheet-iron with a minimum amount of waste.

My invention also provides a punching whereby a complete lamina of the core is made up of but two sections, identical in shape, introduced from opposite sides of the coil and with joints at one side of the center, whereby the adjacent laminæ may break joints, as in the most effective constructions now built. Whereas in the previous types, in which each lamina is composed of but two sections, a waste of from twenty to forty per cent. of the strip from which they are punched is necessary, with my construction but three per cent. of waste occurs.

In the accompanying drawings, illustrating in its most specific form an embodiment of my invention, Figure 1 is a strip of sheet-iron, showing the outline of my punchings in the position in which they are punched from the strip, the strip being outlined in dotted lines. Fig. 2 is a lamina composed of a pair of my punchings. Fig. 3 is a strip of sheet-iron, showing the outline of the punchings illustrated in Fig. 7 of my Patent No. 511,574, above referred to, in the position in which they are most economically punched from a continuous strip, the shaded portions indicating the waste material for each pair of punchings, said punching have the same magnetic cross-section as my improved punching.

Referring to the drawings, A and B are limbs of unequal length at opposite ends of the punching, the shorter limb B being one-half as long as the longer limb A.

C and D are portions of an intermediate limb of unequal length and on opposite sides of the middle thereof. The shorter portion C is one-half as long as the longer portion D.

The width of the portions A, B, C, and D is the same. They are also, as is common, of the same width as the back or body E. Between the limbs A and C and D and B are the coil-spaces F and G, and for greater economy these spaces are made of the same width as the end limbs and the halves of the central limb, whereby the solid portions of one section may be cut out exactly from the spaces of another section without waste, as hereinafter explained. The shorter portion C of the intermediate limb is adjacent to the longer end limb A and the longer portion D of the intermediate limb adjacent to the shorter end limb B.

In laying out my sections for punching from a continuous strip H, Fig. 1, they are placed opposite each other in pairs, with one of the pair moved along the other a distance equal to the width of one of the end limbs and in a direction to bring the two shorter end limbs B on the outside. The longer end limb A and the longer portion D of the middle limb of one section then fit exactly into the spaces F and G of its opposite, the shorter portion C of the middle limb of one extends directly to the corresponding portion C of its opposite, and the shorter end limb B of one is outside of its opposite, but exactly meets the corresponding limb B of the following section on the opposite side of the strip. The only portion of the strip wasted is the approximately-triangular portion *h* due to the rounded corners of the laminæ.

In laying out the sections of the shape shown in Fig. 3 for punching a continuous strip the portion between the lines *x x* and *y y* represents the total amount of metal used and wasted, and the portions between said lines which are shaded represent the waste in obtaining a single pair of punchings. A′ and B′ in this case are the opposite end limbs, of different lengths, but not bearing any specific ratio to each other. C′ and D′ are the por-

tions of the intermediate limb, also of different lengths and bearing no specific ratio, except that it is the same as that of the end limbs, the longer end limb A′ being adjacent to the longer portion D′ of the intermediate limb and the shorter end limb B′ adjacent to the shorter portion C′ of the intermediate limb, and the spaces F′ and G′ between the adjacent limbs being about twice the width of the end limbs. By reason of this construction there is a wastage beyond the end of the long outer limb A′ and the edge of the strip H′, (shown by the rectangular shaded portion *a*′,) between the end of the shorter end limb B′ and the opposite side of the space F′, into which it projects, between the opposing but separated shorter portions C′ of the intermediate limb, between the inner edges of the opposed bodies E′ of a width of about half the space F′ or G′, all of which may be avoided in the manufacture of my improved punching, and at the rounded corners of the laminæ the portions *h*′ corresponding in amount to the portions *h* in Fig. 1.

Though I have described with great minuteness a punching embodying my invention, yet I am not to be understood as limiting myself to the precise form and dimensions set forth, as it is obvious that it may be slightly departed from in various directions while still retaining at least some of the benefits of my invention.

What I claim, therefore, and desire to secure by Letters Patent, is the construction having the following-defined novel points, substantially as described:

1. A transformer-punching having end limbs of unequal length and an intermediate or core limb which is longer on one side of its middle than on the other, and having the shorter end limb adjacent to the longer side of the intermediate limb.

2. A transformer-punching having end limbs one of which is twice as long as the other, and an intermediate or core limb which is twice as long at one side of its middle as at the other.

3. A transformer-punching having end limbs of unequal length and an intermediate or core limb which is longer on one side of its middle than on the other, and having the shorter end limb adjacent to the longer side of the intermediate limb, the distance between the adjacent limbs being the same as the width of the end limbs, and the intermediate limb being twice as wide as the end limbs.

4. A transformer-punching having end limbs one of which is twice as long as the other and an intermediate or core limb which is twice as long at one side of its middle as at the other, its shorter end limb being adjacent to the longer side of its intermediate limb.

5. A transformer-punching having end limbs one of which is twice as long as the other and an intermediate or core limb which is twice as long at one side of its middle as at the other, the distance between the adjacent limbs being the same as the width of the end limbs, and the intermediate limb being twice as wide as the end limbs.

6. A transformer-punching having end limbs one of which is twice as long as the other and an intermediate or core limb which is longer on one side of its middle than on the other, and having the shorter end limb adjacent to the longer side of the intermediate limb, the distance between the adjacent limbs being the same as the width of the end limbs, and the intermediate limb being twice as wide as said end limbs.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JAMES J. WOOD.

Witnesses:
F. S. HUNTING,
A. L. HADLEY.