

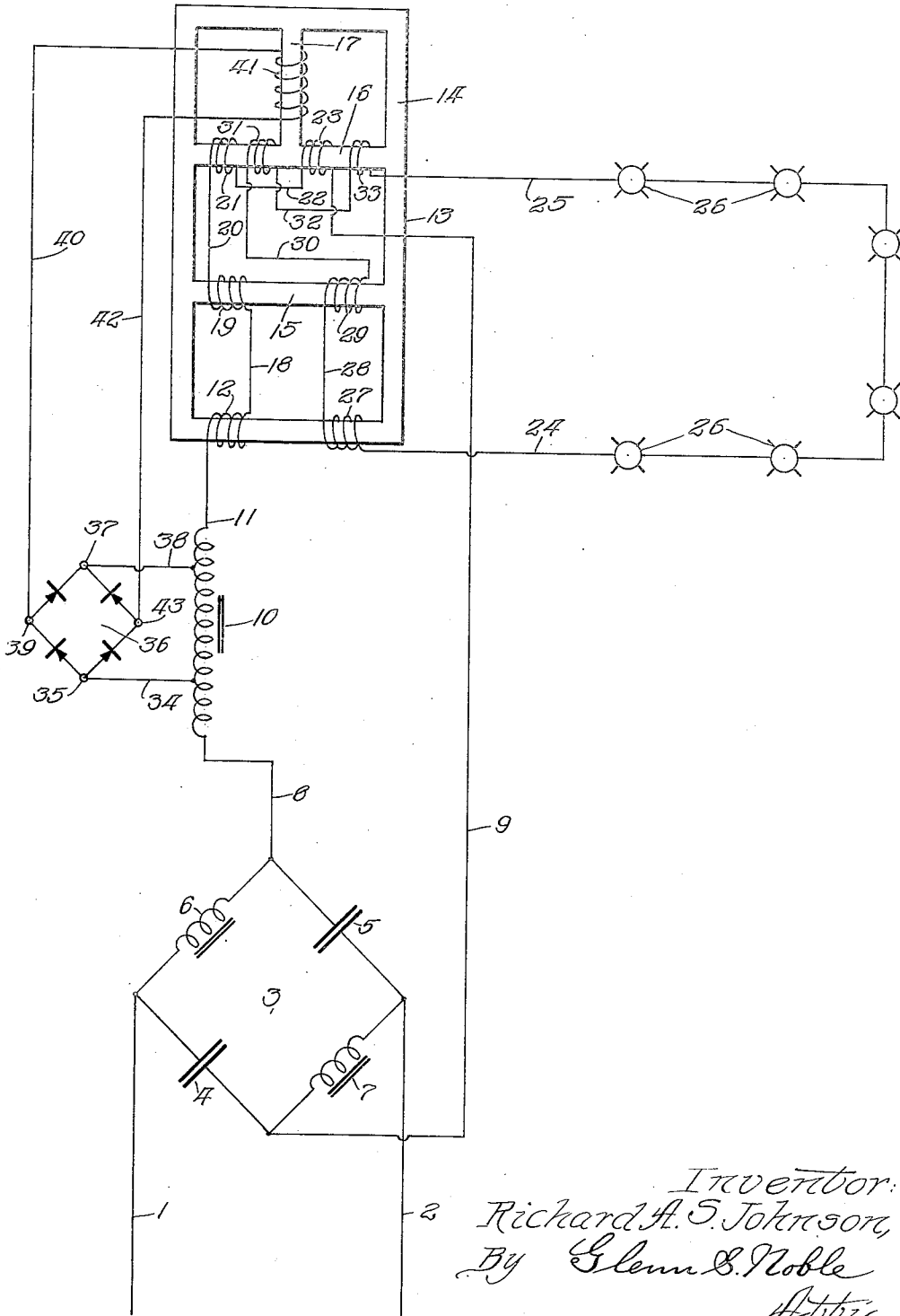
March 2, 1943.

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2,312,416

CONSTANT CURRENT TRANSFORMER

Filed Oct. 31, 1941



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UNITED STATES PATENT OFFICE

2,312,416

CONSTANT CURRENT TRANSFORMER

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Application October 31, 1941, Serial No. 417,332

6 Claims. (Cl. 171-119)

This invention relates to improvements in constant current transformers or regulators which may be utilized for providing current for various purposes, but particularly for street-lighting or other similar commercial uses. Heretofore moving-coil constant current transformers have been commonly used, but such transformers have various objectionable features which are well known to those familiar with such apparatus.

Other transformers have also been proposed embodying the use of the monocyclic square and while such systems have certain inherent advantages, they have failed to be wholly successful or to solve the problem. The present invention is directed particularly to such monocyclic square transformers or regulators and provides means for overcoming the objectionable features heretofore present in such systems.

The objects of this invention are to provide an improved apparatus or system whereby constant potential alternating current may be transformed or changed to a constant current which will have approximately no variation and which will be particularly adapted for street-lighting or other similar uses; to provide a constant current transformer which will be simple in construction and particularly effective in operation; and to provide an apparatus or system having such further advantages and improvements as will be set forth more fully hereinafter. The accompanying drawing shows a diagrammatic view of a preferred form of my invention.

As shown in the drawing, the constant potential supply wires or lines 1 and 2 are connected in the usual manner to the monocyclic square designated generally by the numeral 3. Two sides of the square are provided with capacitors 4 and 5 and the opposite sides with reactors 6 and 7. The output from the monocyclic square is through wires 8 and 9 which are also connected with the monocyclic square in the usual manner. The wire or line 8 is connected with one terminal of an autotransformer 10. The opposite terminal of the autotransformer is connected by wire 11 with a primary coil 12 of a saturation transformer 13. The core 14 of the transformer may be shaped in any suitable manner, but as shown, is of rectangular form with two transverse legs or cross-pieces 15 and 16. The leg or cross-piece 16 is connected to the end of the frame or main core piece 14 by another leg or longitudinal member 17. The coil 12 is mounted on one end or leg of the main core 14 and is connected by means of wire 18 with a second primary coil 19 mounted on the leg 15 which in turn is connected by means

of wire 20 with a third primary coil 21 mounted on one end or section of the leg 16. The coil 21 is connected by wire 22 with a fourth primary coil 23 which is mounted on the opposite end of the leg 16 as shown, and which is connected with the wire 9. The primary circuit then is wire 8, autotransformer 10, wire 11, coil 12, wire 18, coil 19, wire 20, coil 21, wire 22, coil 23, and back through wire 9.

The constant current load circuit is shown as comprising the wires or conductors 24 and 25 and the lamps 26. The wire or conductor 24 is connected with a secondary winding or coil 27 of the saturation transformer 13. This coil is mounted on the end of the core adjacent to the coil 12 and is connected by wire 28 with another coil 29 on the cross-piece or leg 15. The coil 29 is connected by a wire 30 with a coil 31 mounted on the leg 16 adjacent to the coil 21. The coil 31 is connected by wire 32 with a coil 33 mounted on the leg 16 adjacent to the coil 23. The coil 33 is connected to the wire 25 as shown. The constant current load circuit is from coil 27 through wire 28, coil 29, wire 30, coil 31, wire 32, coil 33 and through the connecting conductors to the load.

The wire or conductor 8 is connected by means of a wire 34 with one terminal 35 of an oxide rectifier 36. Another terminal or connection 37 of the rectifier is connected by wire 38 with the wire 11 thus connecting the rectifier in shunt around the autotransformer 10. Another terminal or connection 39 of the rectifier 36 is connected by a wire 40 with a coil or winding 41 on the leg or branch 17 of the saturating transformer 13. The opposite end of the coil 41 is connected by a wire 42 with another terminal 43 of the oxide rectifier 36.

When the apparatus or monocyclic-network regulator is supplied with alternating constant potential current through the supply lines 1 and 2, and if there is any variation in the voltage, the current in the output lines 8 and 9 will vary in substantially the same proportions. However, the construction and operation of the other parts of the system as shown and described is such that any variation in lines 8 and 9 is overcome and constant current is delivered to the constant current output lines 24 and 25 and consequently constant current is provided for the load 26. Since the current traverses the autotransformer 10, it causes the current to vary in the oxide rectifier 36. The direct current from this oxide rectifier will traverse the saturation winding 41 of the transformer 13 proportionately to the variation of the supply voltage. The pri-

mary coils 12, 19, 21 and 23 of the saturating transformer 13 are so positioned in relation to the secondary windings 27, 29, 31 and 33 of the transformer 13 and the cooperation or effect produced by the coil 41 is such that constant current output in the lines 24 and 25 to the load 26 will be held constant even though there is a variation in the primary voltage.

While I have shown a diagrammatic illustration of the invention, the principles embodied therein are well understood by those familiar with the art and the invention may be embodied in various forms of construction in order to provide commercial apparatus, all of which will come within the scope of the invention as set forth in the following claims in which I claim:

1. The combination with a monocyclic square regulator, a rectifier which receives current from the output of the monocyclic square, and output transformer and a coil operatively associated with the output transformer and receiving direct current from the rectifier whereby the output of the transformer will be controlled by the current from the rectifier and constant current will be delivered from the transformer.

2. In an apparatus of the character set forth, the combination of a monocyclic square, means for supplying constant voltage current to the square, a transformer, output conductors leading from the square to primary coils of the transformer, an auto-transformer connected with one of said output conductors, an oxide rectifier, connections from the rectifier leading to the conductor on either side of the auto-transformer, a coil in the output transformer and connections from the coil to the rectifier whereby the coil will receive direct current from the rectifier, the arrangement being such that constant current will be delivered from the secondary coils of the transformer to the load.

3. The combination of a monocyclic square regulator, means for supplying constant voltage current to the regulator, a transformer including a core having a plurality of primary coils, a circuit from the regulator to the primary coils for the output current of the regulator, a coil in the transformer, means for converting a portion of said output current into direct current and supplying the same to the last named coil to affect the flux of the transformer, secondary coils mounted on the transformer adjacent to the pri-

mary coils, a circuit from the secondary coils, and a load connected with said circuit.

4. In combination with a monocyclic square, a current transformer, an oxide rectifier and a regulating transformer having a control coil, said current transformer having its primary in series circuit relation between said monocyclic square and said current transformer, the secondary of said current transformer being connected to said rectifier the output circuit of which being connected to the control coil of said regulating transformer in a manner to hold the current substantially constant in the output circuit of said regulating transformer.

5. In combination with a constant current transformer, an auto-transformer, a rectifier, a regulating transformer having a direct current control coil and a constant current load circuit, said constant current transformer being connected to said regulating transformer, and said auto-transformer being connected in series circuit relation between said constant current transformer and said regulating transformer, with the output circuit of said auto-transformer connected to the input circuit of said rectifier and having the output circuit of said rectifier connected to said direct current control coil of said regulating transformer in a manner to hold the current constant in said constant current load circuit.

6. In combination with a resonant circuit constant current regulator, a current transformer having a primary and a secondary, a rectifier, a saturating regulating transformer having a direct current control coil and a constant current load circuit, said resonant circuit constant current regulator having its output circuit connected to the input circuit of said saturating regulating transformer and said current transformer having its input circuit in series circuit relation between said resonant circuit, constant current regulator and said saturating regulating transformer and the output circuit of said current transformer being connected to the input circuit of said rectifier, and the output circuit of said rectifier being connected to the direct current control coil of said regulating transformer in a manner to hold the current constant in said constant current load circuit.

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