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R. F. AGNEW

WELDING APPARATUS

Filed Aug. 18, 1926

Fig. 1.

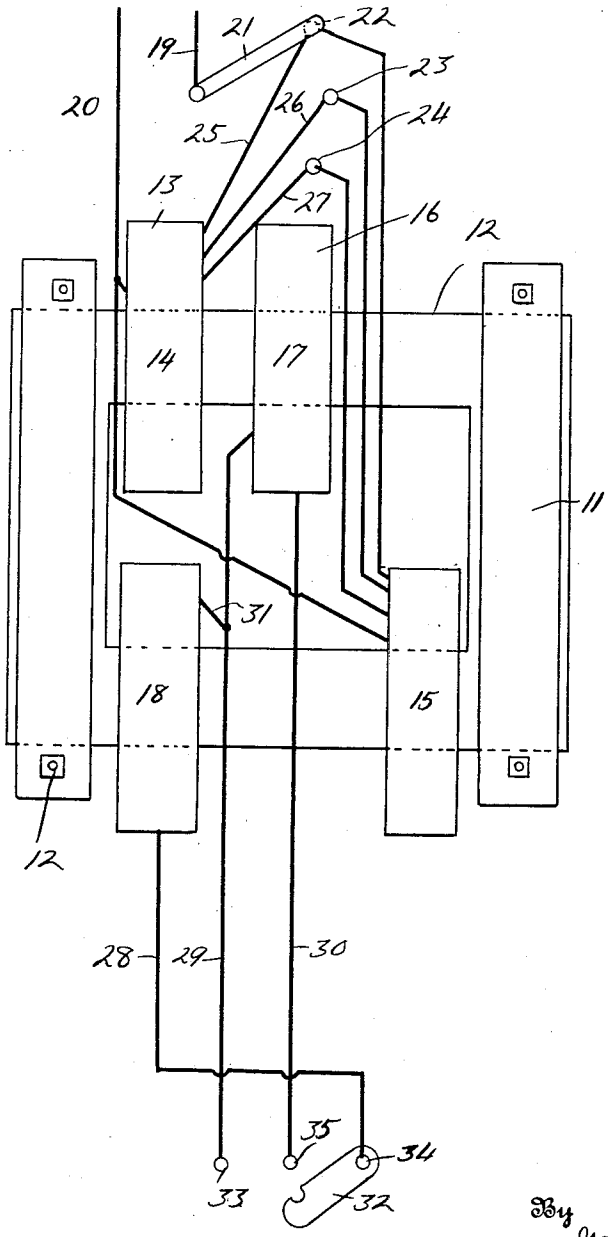
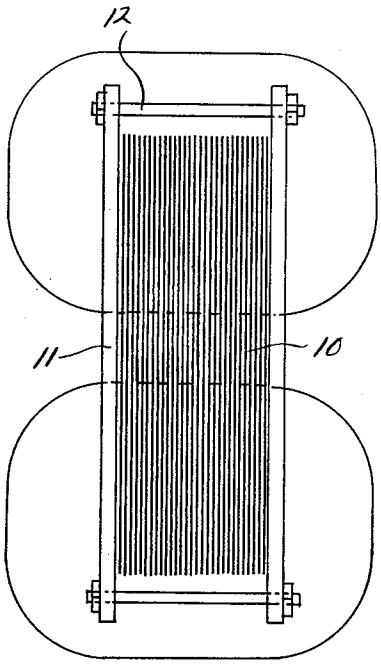


Fig. 2.



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UNITED STATES PATENT OFFICE.

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WELDING APPARATUS.

Application filed August 18, 1926. Serial No. 130,063.

This invention relates to welding apparatus and more particularly to improvements in apparatus of this character providing for the ready regulation of the current.

The invention contemplates a transformer for welding machines in which the primary and secondary coils are formed in sections or units with the corresponding sections of the primary and secondary coils differently or relatively spaced so that variable currents may be obtained in the secondary circuit by selectively including any or all of the sections of the secondary coil.

The invention also contemplates a primary circuit regulatable by including different numbers of turns of the primary coil whereby the ratio between the primary and secondary coils may be varied for the purpose of further regulating the current in the secondary circuit.

The several objects, advantages and novel details of construction of this invention will be made more apparent as this description proceeds, especially when considered in connection with the accompanying drawings wherein

Figure 1 is a semi-diagrammatic view of a transformer constructed in accordance with this invention and

Figure 2 is an end elevation of the core and coils of the transformer.

Referring now particularly to the drawings wherein like reference characters indicate like parts it will be noted that there is illustrated a core 10 of a laminated construction held assembled by means of frame members 11 and bolts 12.

The primary coil 13 consists of a plurality, herein shown as two, sections 14 and 15 wound around the core 10 in the customary manner. The secondary coil 16 comprises a similar number of sections or units 17 and 18 also wound around the core 10.

For obtaining a variable current in the secondary circuit the sections or units of the secondary coil are dissimilarly associated with the corresponding sections of the primary coil, it being noted that the section 17 of the secondary coil is arranged in relatively close proximity to the section 14 of the primary coil while the section 18 of the secondary coil is spaced a greater distance from its corresponding section 15 of the primary coil.

Leads 19 and 20 are connected to a suitable source of current (not shown), the lead 19 connecting with a switch 21 selectively engageable with contacts 22, 23 and 24. Branch leads 25, 26 and 27 respectively connect the contacts 22, 23 and 24 to the sections 14 and 15 of the primary coil and are connected to the turns of these primary coil sections at different points so that variable numbers of turns of the primary coil sections may be included in the primary circuit, depending upon the position of the switch arm 21. The other lead 20 will be connected to one end of the windings on the primary coil sections to complete the primary circuit. Thus by properly regulating the switch arm 21 the number of turns of the primary coil sections may be varied so that the ratio between the primary and secondary coils may be varied.

The secondary circuit includes three leads indicated by the reference characters 28, 29 and 30. These may be flexible leads of an extended length so that they may be connected, for instance, to welding tools (not shown). The leads 29 and 30 are connected respectively to the ends of the secondary coil section 17, the lead 29 being connected by a branch lead 31 to one end of the secondary coil section 18. The other lead 28 is connected to the other end of the secondary coil section 18 and for selectively including these secondary coil sections in the secondary circuit a bridge 32 is provided which is connected to the lead 28 and adapted to be brought into contact with the lead 30.

With the bridge 32 in the position illustrated in the drawings the secondary circuit will include only the relatively distantly spaced secondary coil section 18, the circuit being from terminal 33, through lead 29, branch 31, secondary coil section 18 and branch 28 back to terminal 34 of the lead 28. A current of the next greatest intensity may be obtained through terminal 33 of lead 29 and terminal 35 of lead 30, this circuit being from terminal 35 through lead 30 to the relatively closely spaced section 17 of the secondary coil then through lead 29 to terminal 33. The current of maximum intensity is obtainable by bridging terminals 34 and 35 by means of bridge 32. In this position of the parts both of the sections 17 and 18 of the secondary coil are included in the circuit, the section 17 being included by leads 30 and 29 and section 18 by lead 28, branch 31 and lead 29.

Obviously the regulation of the current influenced as just described by selectively in-

cluding either or both of the secondary coil sections 17 is in addition to the regulation obtainable by the operation of the contact arm 21 so that in each position of the contact arm 21 the three stages of regulation just described are obtainable. Thus it will be seen that the apparatus contemplates a regulation of the current ample for various types of work so that a single apparatus may be efficiently employed in connection with work of varying requirements.

While the particular design herein diagrammatically illustrated has been found to give especially good results in practice nevertheless it is obvious that various changes may be resorted to without departing from the spirit and scope of the invention and to this end reservation is made to make such changes as may come within the purview of the accompanying claims.

What I claim as my invention is:

1. In a welding apparatus, a transformer including a primary coil and a multi-unit secondary coil with the units thereof variably spaced with relation to said primary coil and a welding circuit with means for selectively including therein any or all of said secondary coil units.

2. In a welding apparatus, a transformer including a primary coil and a multi-unit secondary coil with the units thereof variably spaced with relation to said primary coil and a welding circuit with means for selectively including therein any or all of said secondary coil units, a circuit including said primary coil and means for selectively including variable numbers of turns of the primary coil in said circuit.

3. In a welding apparatus, a transformer including multi-unit primary and secondary coils the units of the secondary coil being variably spaced with relation to the units of the primary coil and means for selectively coupling the units of said secondary coils for regulating the current.

4. In a welding apparatus, a transformer including multi-unit primary and secondary coils there being one primary coil unit for each secondary coil unit, the said secondary coil units being variably spaced with relation to their respective primary coil units and a heating circuit with means for including either or both of the units of said secondary coils therein.

5. In a welding apparatus, a transformer including primary and secondary coils each comprising a pair of units, with one unit of each coil arranged adjacent one another and the other unit of each coil arranged in spaced relation to one another, a welding circuit including said secondary coil units and means for selectively including either or both of said units in said circuit.

6. In a welding apparatus, a transformer including primary and secondary coils each comprising a pair of units, with one unit of each coil arranged adjacent one another and the other unit of each coil arranged in spaced relation to one another, a welding circuit including said secondary coil units and means for selectively including either or both of said units in said circuit, a circuit including said primary coil and means for cutting into said circuit variable numbers of turns of said primary coils.

7. In a welding apparatus, a transformer including a closed core having parallel legs, a primary coil on one leg of the said core, a second primary coil on the other leg of the said core, a circuit including both of the said primary coils, means for cutting into said circuit variable numbers of the turns of the said primary coils, a secondary coil mounted on the same leg of the core as the first mentioned primary coil and adjacent the said first mentioned primary coil, a second secondary coil mounted on the same leg of the core as the second mentioned primary coil but spaced substantially from the said second mentioned primary coil, a welding circuit, and means for including in the welding circuit either or both of the said secondary coils.

In testimony whereof I affix my signature.

RAY F. AGNEW.