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C. C. ROE

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AMPERAGE FLOW CONTROLLING DEVICE

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Fig. 1

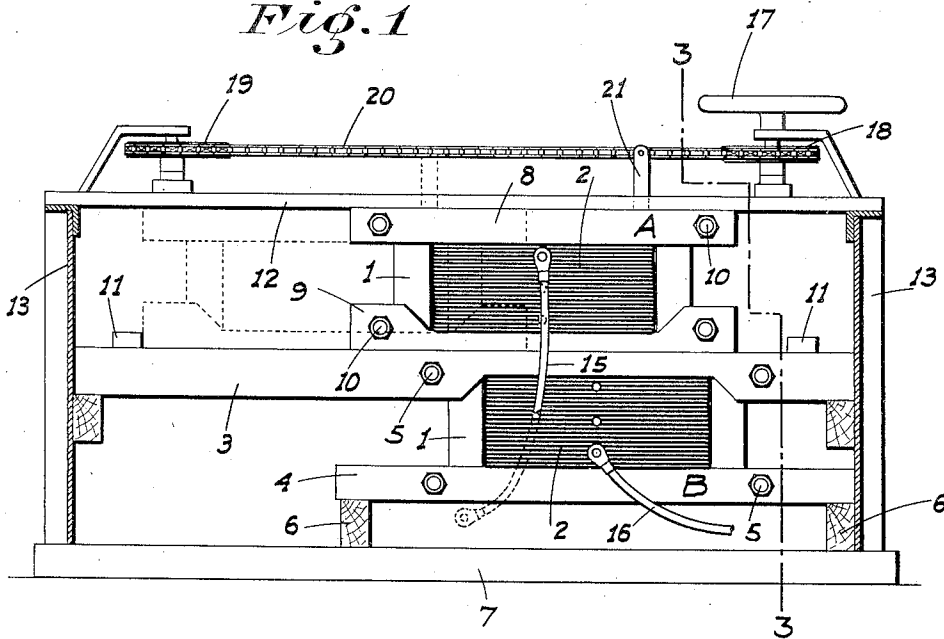


Fig. 2

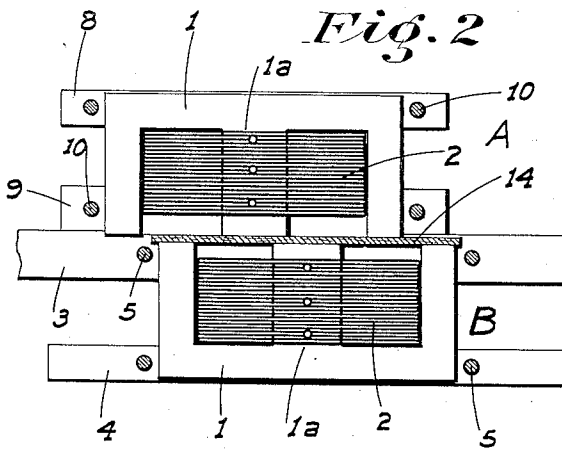


Fig. 3

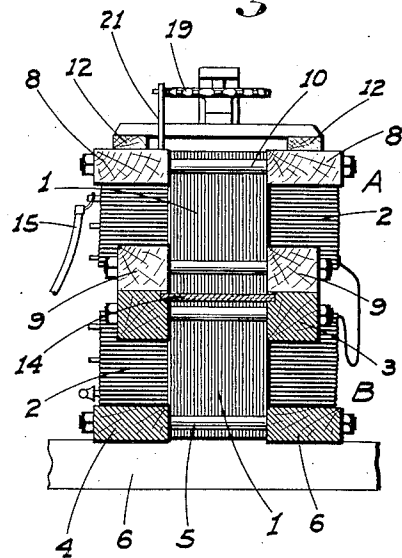
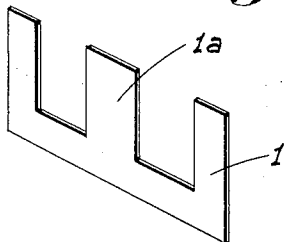


Fig. 4



INVENTOR

C. C. Roe

BY

Permy. W. Watson
ATTORNEY

UNITED STATES PATENT OFFICE

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AMPERAGE FLOW CONTROLLING DEVICE

Charles C. Roe, Stockton, Calif.

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4 Claims. (Cl. 171-242)

This invention relates to devices for controlling the amperage flow of A. C. current, from a given voltage, and particularly to devices of this kind used in connection with electric welding tools, to enable the amperage of the current to be altered as the particular operation of work may require.

The principal object of my invention is to provide a device of this character so constructed that a very stable welding arc will be obtained, together with a maximum heat at the arc without the "spattering" action such as is frequently had, and yet which will keep relatively cool in operation.

The device consists essentially of a pair of induction coil units or sections arranged for movement relative to each other so as to alter the air gap therebetween and give the desired results; and another object of this invention is to so mount said units relative to each other that they may be easily and quickly adjusted in their relative position and without any undue heating of the mounting and control mechanisms.

A further object of the invention is to produce a simple and inexpensive device and yet one which will be exceedingly effective for the purpose for which it is designed.

These objects I accomplish by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawing similar characters of reference indicate corresponding parts in the several views:

Figure 1 is a side elevation of my improved flow controlling device with the side of the enclosing case removed.

Figure 2 is a side elevation of the coil units or sections detached, the mounting means of the units being removed on the near side.

Figure 3 is a transverse section on the line 3-3 of Figure 1.

Figure 4 is a perspective view of one of the core laminations.

Referring now more particularly to the characters of reference on the drawing, the device consists essentially of separate upper and lower inductance coil sections A and B respectively, the former being preferably movable while the latter is stationary. Each section is identical in construction with the other and comprises a laminated core built up of a number of E-shaped plates 1, as shown in Figure 4, having the coil winding 2 about the central leg 1a of the core; the windings of the two coil sections being flex-

ibly connected so that one section may move the required distance relative to the other.

The cores of the two coil units are disposed in horizontally extending and facing relation to each other or so that the axes of the windings are vertically disposed. The core laminations of the lower coil are clamped together at the top and the bottom by side bars 3 and 4 respectively, secured together by bolts 5 beyond the ends of the core; the corresponding coil winding projecting outwardly of said bars on both sides as shown in Figure 3. The top bars 3 extend beyond one end of the coil unit B a distance greater than the amount the coil unit A is to be shifted, while the lower bars 4 may be relatively short and supported at their ends by cross rails 6 mounted on the foundation or base 7 of the device. The bars are of non-magnetic and non-conducting material so that they will not be affected by and heated with the energizing of the coils, and since wood fulfills these requirements and is much cheaper than other insulating materials of like strength, I preferably use it for this purpose.

The core laminations of the top coil unit A are similarly clamped between top and bottom bars 8 and 9 respectively by bolts 10, the bars 9 being supported by and slidably resting on the bars 3 of the lower coil unit. Stops 11 may if desired be provided on the bars 3 to limit the sliding movement of the bars 9 and coil unit A, these stops being disposed so that at one end of its travel the legs of the core of the coil A are vertically aligned with the corresponding parts of the core of the coil B; while at the opposite end of its travel one of the endmost legs of the core of coil A vertically aligns with the opposite endmost leg of the core of the coil B. In this position of the cores a maximum air gap between the coils is provided, increasing the amperage flow of the current to the maximum from what is had when the cores are in a directly aligned position.

Hold down bars 12 engage the upper faces of and extend parallel to the bars 8 to prevent possible upward displacement of the coil A without restraining its horizontal travel, and are preferably supported at their ends from uprights from the end walls 13 of the enclosing case which is surmounted on the base 7. A strip of wood 14 or the like extends between the bars 3 over the core of the lower coil B. This forms a spacer between the adjacent ends of the core legs, preventing the inherent magnetic pressure from pulling the cores together which would cause them to bind and resist relative movement, and avoiding

the need of any heavy supporting rails or bars between the coil units to counteract this pressure.

The coils are tapped at various points in their length for selective connection to input and take-out cables 15 and 16; the cable 15, which is connected to the movable coil A, being of course arranged to allow of the necessary sliding movement of said coil.

The coil A is slid along the bars 3 and held in any desired adjusted position by suitable means. Such means preferably takes the form of a hand wheel 17 disposed with its axis vertical and mounted in connection with an end wall 13 at one end of the device a suitable distance above the coil unit A. Fixed with this hand wheel is a sprocket wheel 18, another sprocket wheel 19 being mounted in horizontal alinement therewith adjacent the opposite end of the device. An endless chain 20 passes about said sprocket wheels so that one run of the chain is above and parallel to one of the bars 8, to which it is connected by a rigid upstanding arm or strap 21.

When the hand wheel is turned in one direction or the other therefore the coil unit A will be moved lengthwise of the coil B in one direction or the other. This control arrangement enables the same to be mounted where it is out of the induction zone of the coil units so that it will remain cool when the device is in operation. Coolness of operation is also attained by the use of the wood supporting members for the coil units as previously described. The use of the E-shaped cores gives very high efficiency and also an exceedingly stable welding arc even when a maximum heat is being used.

From the foregoing description it will be readily seen that I have produced such a device as substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described my invention, what I claim as new and useful and desire to secure by Letters Patent is:

1. An amperage flow-controlling device comprising a pair of inductance coil units whose wind-

ings are flexibly connected and having E-shaped cores the central legs of which project through the corresponding windings, and disposed in close facing relation to each other, means mounting the units for relative sliding movement lengthwise of the cores, and means to control such sliding movement.

2. An amperage flow-controlling device comprising a pair of inductance coil units arranged in upper and lower relation, the windings of the units being flexibly connected together and said units having laminated cores disposed in close facing relation to each other, means clamping the laminations of the upper core together and including bars extending along the core on opposite sides and below the winding thereof, means clamping the laminations of the lower core together and including relatively long bars extending on opposite sides of said core above the corresponding winding, the bars of said upper core slidably resting on the bars of the lower core, and means applied to the upper coil unit to slide the same.

3. An amperage flow-controlling device comprising a pair of inductance coil units arranged in upper and lower relation, the windings of the units being flexibly connected together and said units having cores of E-shaped form disposed in close facing relation to each other, and the central legs of said cores projecting through the corresponding windings, means supporting one unit for movement in a plane parallel to and lengthwise of the core of the other unit, and means to thus move said one unit.

4. An amperage flow-controlling device comprising a pair of inductance coil units arranged in upper and lower relation, the windings of the units being flexibly connected together, means supporting the upper unit for horizontal movement relative to and lengthwise of the core of the lower unit, an endless chain mounted above the upper unit with one run parallel to the path of movement of said unit, a rigid connection between the upper unit and a link of the chain, and means to move the chain in either direction selectively.

CHARLES C. ROE.