July 5, 1932. H. E. WHITE 1,866,382

ELECTRODE MOUNTING FOR WELDING MACHINES

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Fig. 1.

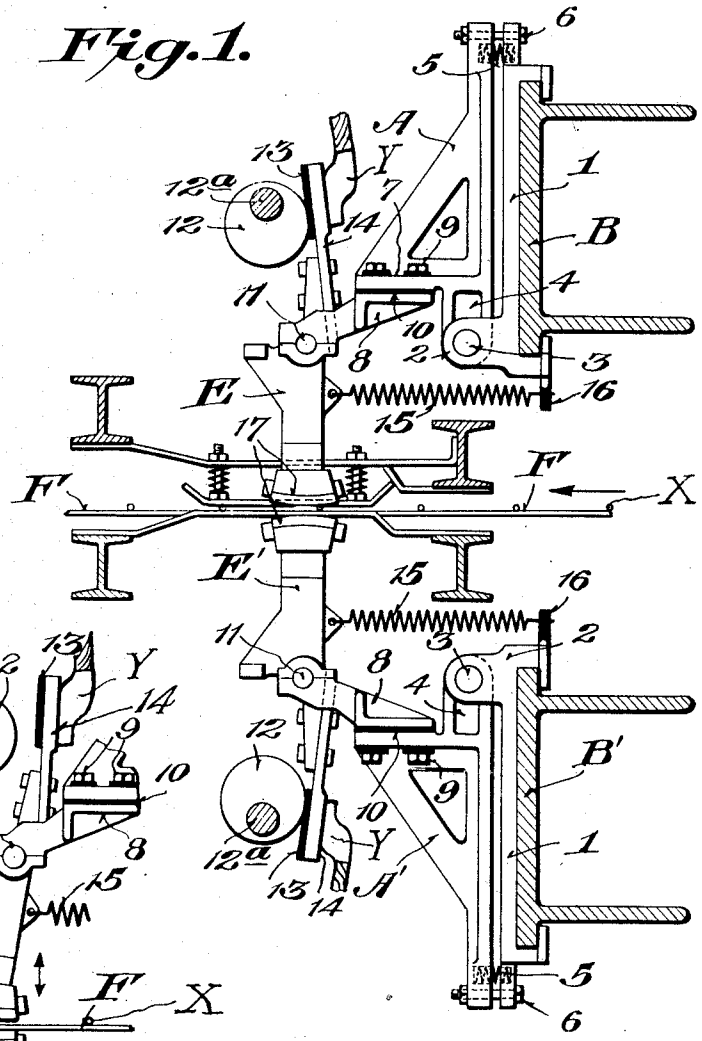
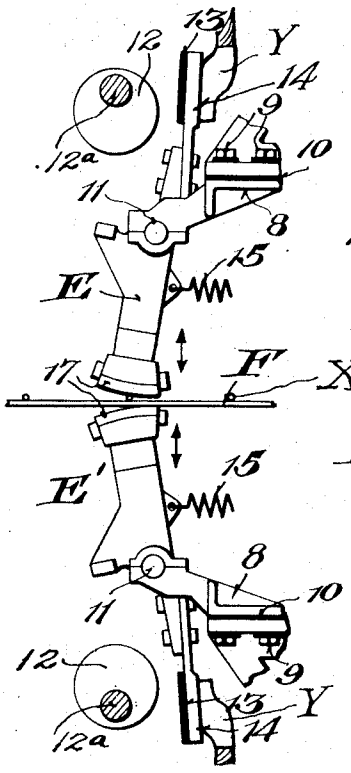



Fig. 2.




Inventor

Herbert E. White,

By L. F. Wilhamson

Attorney

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# UNITED STATES PATENT OFFICE

HERBERT E. WHITE, OF YOUNGSTOWN, OHIO, ASSIGNOR TO TRUSCON STEEL COMPANY, OF YOUNGSTOWN, OHIO, A CORPORATION OF MICHIGAN

## ELECTRODE MOUNTING FOR WELDING MACHINES

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This invention relates to an improvement in machines for electrically welding the cross-wires of wire fabric, and more particularly to an improved mounting for the electrodes.

To that end the invention contemplates a simple, practical and reliable construction for mounting the electrodes whereby the welding surfaces or shoes thereof may be adjusted to avoid concentration of wear on any particular points of the shoes, thereby materially increasing their efficiency and prolonging their usefulness. In that connection the invention contemplates a mounting which will permit of the adjustment of a plurality of electrodes accurately and uniformly so that the electrodes may be readily synchronized with the movement of the wire fabric through the machine and properly grip the cross wires at each operation.

A further object of the invention is to provide means for automatically effecting the adjustment of the position of the electrodes so that during the course of the operation of the machine fresh surfaces thereof will be progressively brought into operation.

With the above and other objects in view which will more readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination and arrangement of parts hereinafter more fully described, illustrated and claimed.

A preferred and practical embodiment of the invention is illustrated in the accompanying drawing, in which:—

Figure 1 is a vertical sectional view of a portion of the machine at the welding station illustrating the relative position and arrangement of the electrodes and the novel construction constituting the present invention.

Figure 2 is a detail, more or less diagrammatic view, illustrating the setting of the electrodes in a different position from that shown in Figure 1.

Similar reference characters designate corresponding parts throughout the several figures of the drawing.

In carrying the present invention into effect it is proposed to mount the upper and lower electrodes E and E′ on similar supporting structures whereby both electrodes will have the advantage of a double pivot, as will hereinafter more fully appear, so that the electrodes at their points of contact with the cross wires will have a relatively straight line motion in the direction of travel of the wire rather than a rocking or rolling motion in the general line of travel, thereby eliminating certain objections found to a mounting involving such a motion as heretofore employed.

Referring more particularly to the detail features and characteristics of the present mounting it will be observed that each electrode is supported by the yieldingly mounted electrode brackets A and A′ respectively carried by the cross rails or frame parts B and B′ in such a manner that both electrodes will be subject to the same degree of control, and responsive to the same movement of the fabric whose cross wires are being welded by the electrodes.

Since the construction of the mounting for each electrode is the same a description of one will suffice for the other and referring more particularly to the electrode bracket A it will be observed that the same includes an attaching base 1 secured to the frame part B and having at one end a bifurcated arm portion 2 for receiving a pivot or bearing 3 which carries the offset leg 4 of the bracket. The upper end of the bracket is yieldingly forced away from the attaching base 1 by means of a spring 5 arranged in suitable sockets in the bracket and base and compressed through the action of the screw bolt or its equivalent 6. By adjusting the bolt 6 it will readily be apparent that the position of the bracket A on the pivot 3 may be changed so as to allow the position of the shelf portion 7 thereof to be set to accommodate wires of different gauge, while at the same time varying the degree of compression of the spring 5 to meet different conditions of use.

The shelf 7 of the bracket carries therewith an offset bearing arm 8 which is secured to the shelf portion of the bracket by the insulated fastenings 9. The said arm is also insulated from the bracket by the insulation 10

as will be readily apparent from the drawing, and the outer end thereof pivotally supports the fulcrum or bearing 11 of the electrode E so that the latter may be shifted or moved by the cam or eccentric 12 which engages the insulating face 13 of the extension 14 carried by the body of the electrode proper. At the side of the pivot 11 opposite the eccentric 12 the body of the electrode is engaged by a spring 15 whose opposite end is anchored as at 16 to a suitable stationary part of the machine whereby the tension of the spring will always cause the insulated face 13 of the arm 14 to return to the periphery of the cam or eccentric 12, after passing wires have traveled but from between the upper and lower electrodes.

As shown in the drawing the electrodes E and E′ are provided with the welding shoes or contacts 17, which preferably have arcuate faces and are removably attached to the electrodes so that they may be renewable. The arcs of the faces of the shoes 17 are struck on such a radius that the straight line of movement of the fabric F is tangential to the shoes whereby a definite and accurate clamping action may be imposed on the cross wires and at a predetermined point on the faces of the shoes. This point of engagement however, is progressively changed due to the action of the eccentric 12 on the arm 14, the said eccentric rotating slowly thereby to change the position of the arm 14 and consequently the position of the electrode so that the entire operating surface of the shoe on each electrode will be brought into action during each half revolution of the cam or eccentric 12. In other words upon each complete revolution of the eccentric 12 the welding surfaces of the shoe 17 will be brought into play one way across and back again thereby insuring a better distribution of the wear across the face of the arcs of the electrodes.

In operation the crossed wires constituting the fabric F are moved or advanced in the direction of the arrow in Figure 1. As the crossed wires engage the arcuate surfaces of the shoes 17 the electrodes E and E′ are uniformly forced or spread apart due to the fact that both have a pivotal and yielding mounting through the medium of the brackets A and A′ respectively supported on the pivots 3. The springs 5 are set so that the pressure established by forcing the crossed wires between the electrodes is sufficient to insure good contact. The temperature is then raised to the welding point by the passage of an electric current which is cut off after welding is complete as the fabric continues to move on out from between the shoes. It will therefore be apparent that the springs 5 maintain sufficient pressure on the electrodes E and E′ to perfect the welding operation between the arcs of the electrodes and that the function of the eccentric 12 is to positively shift or turn the electrodes on the pivots 11 to bring fresh surfaces of the arc into play as the successive cross wires of the fabric are presented for welding.

The eccentric 12 is preferably carried on a shaft 12ª operated from any suitable and convenient source of power to give the eccentric, or eccentrics, a slow rotating motion to effect a gradual shifting of the welding points of the arcuate shoes 17. It will also be understood that the electrodes E and E′ are electrically connected with a source of electric energy through a suitable transformer, which may be controlled by a circuit breaker that is timed to close just after the cross wires reach a position where they are clamped or gripped between the shoes 17, at which time the secondary circuit is also finally completed through the electrodes. This causes a current to flow through the electrodes to the cross wires and longitudinal wire heating the same to the welding point.

From the foregoing it will be apparent that a distinctive feature of the present invention resides in the provision of the pivotally mounted upper and lower electrode units E and E′. This double pivoting of the electrodes namely, the pivoting of the brackets A and A′ at the points 3 permits both electrodes to spring or move away laterally from the fabric when the cross wires are forced therebetween, thereby causing both electrodes to have a movement in a straight line parallel to the feed of fabric following along with the wires long enough to effect the welding operation. The electrodes are then returned to their normal position by the springs 15.

In this machine the passage of the wires "F" is continuous. The cross wires, which have been designated "X", are dropped on the longitudinal wires somewhere at the right of the section shown in Figure 1 and carried along at the same speed as the line wires "F" by means of a chain conveyor which forms no part of the present invention. The space between the upper and lower electrodes 17 is so adjusted by the bolts "6" that the line wires "F" may pass between the electrodes freely, contacting possibly with either one but not with both. The arc of the electrodes 17 is struck with the center of the pivot "11" as its center, so that the position of the eccentrics "12" has no influence whatever on the space between the electrodes 17. The space between the electrodes 17, while more than sufficient to pass the line wires "F", will not pass a line wire "F" with a cross wire "X" on top of it, the result being that when a cross wire passes in between the arc of electrodes 17 it wedges them apart compressing the springs "5" which operate to establish a good electrical contact between the cross wire "X" and the line wires "F".

A timer, very much like that used for igni-

tion purposes on an automobile engine, now completes the electrical circuit through the electrodes and the crossed wires, heating the wires to the welding point. The springs "5" are all this time exerting a pressure on the crossed wires so that when the temperature becomes high enough the wires are forced together and welded. Meanwhile, the line wires "F" are continually travelling and the electrodes 17, by means of their yielding mounting on the two pivots 11 and 3, are carried along with the wires "F" and "X". Manifestly this condition cannot continue indefinitely and there comes a time when the electrodes move about their pivots sufficiently to release themselves from the cross wires "X", whereupon the springs "15" immediately return them to their normal positions of the pad "13" against the eccentric "12". By this time another cross wire "X" is about ready to enter in between the electrodes "17" and the operation repeated.

It may be noted that the time required to affect welding is a function of the diameters of the wires, of the grade of steel used in the wires, of the voltage of the welding current, of the pressure employed and the condition of the surface of the wire. These conditions are all within control, within practical limits, and the timer is set to establish contact during the proper interval and thereafter needs no attention until some of the variable elements are changed. In order to prevent arching at the electrodes, the timer is set to establish contact after a cross wire has become wedged between the electrodes and to open the circuit before the cross wire passes out from between the electrodes, or in other words, the current is flowing only while the wires were under pressure between the electrodes.

It will be observed from the foregoing that a feature of practical importance in this invention is the construction that permits the electrodes to yield in the direction of the passage of the wire, to remain in contact with the wire long enough to effect the welding operation, and then return to their normal position ready for the next wire to come along, wedge itself between the electrodes, and carry them along again long enough to become welded.

The connections to the secondaries of the transformers are indicated at Y. These connections are, of course, flexible. The timer controls the primary, or high tension coil of the transformer since the current in the secondaries is too heavy to be handled satisfactorily by any such device.

Without further description it is thought that the features and advantages of the invention will be readily apparent to those skilled in the art, and it will of course be understood that changes in the form, proportion and minor details of construction may be resorted to, without departing from the spirit of the invention and scope of the appended claims.

I claim:—

1. In a machine for welding wire fabric, an electrode mounting including a pair of cooperating electrode members, a pair of electrode brackets carrying said electrodes and pivotally mounted on the machine, and means engaging said brackets for yieldingly forcing said electrodes toward each other.

2. In a welding machine for welding wire fabric, an electrode mounting including a pair of oppositely disposed electrodes mounted to yield in a direction in line with the feed of fabric through the machine, and means for bringing different portions of the welding surface of said electrodes into play, said means comprising automatically moving elements synchronized with the movement of the machine for shifting the welding surfaces of said electrodes to progressively bring different surfaces thereof into welding position.

3. In a machine for welding moving wire fabric including a pair of electrodes moved with and by the fabric and arranged at opposite sides of the plane of feed of the wire fabric, and means for mounting each of the said electrodes whereby both may be forced apart upon the entrance of the cross wires between the welding faces of the electrodes to place the fabric under pressure, said means comprising a bracket pivotally connected with the machine at one end, a spring at the other end of the bracket for yieldingly forcing the same in a direction to cause the welding face of the electrodes to engage the wire fabric, a bearing arm carried by the bracket and insulated therefrom, and means for mounting the electrode in said bearing arm.

4. In a machine for welding wire fabric, an electrode mounting including a pair of electrodes disposed at opposed sides of the line of feed of the wire fabric, and means for mounting said electrodes whereby both may be forced apart upon the entrance of the crossed wires of the fabric, said means comprising a bracket pivotally connected with the machine at one end, a spring at the other end of the bracket for yieldingly forcing the bracket in a direction to cause the electrode to engage the wire fabric, a bearing arm carried by the bracket and insulated therefrom, means for pivotally mounting the electrode in the bearing arm, and means for engaging with a part of the electrode on the side of said pivot bearing opposite its welding face thereby to change the point of welding contact of said face.

5. A welding machine for welding wire fabric and the like, including in combination, a pivotally mounted electrode having an arcuate welding face, an adjusting cam engaging the electrode at the side of its pivot opposite the arcuate face thereof, said cam

being rotatable to bring different portions of the arcuate welding surface of the electrode into engagement with the fabric, and means for causing said electrode to engage with the cam.

6. In a welding machine for welding wire fabric and the like, a pivotally mounted electrode having an arcuate welding surface and an extension, an eccentric for engaging the extension to move the electrode on its pivot, and a spring connected with the electrode for causing the extension to return to the eccentric when moved away therefrom and released.

7. In a welding machine for welding wire fabric and the like, a pivotally mounted electrode having an arcuate welding surface and an offset extension, an insulation facing for said extension, a power actuated eccentric engaging said insulation and adapted by its movement to spring different parts of said arcuate welding surface of the electrode into welding position and a spring engaging the electrode and causing the extension to return to the eccentric when moved away therefrom and released.

8. In a welding machine for welding wire fabric and the like, an electrode mounting including a bracket mounted on a fixed part of the machine, means for yieldingly forcing said bracket to operative position, an electrode member pivotally mounted on said bracket and having an arcuate welding surface and cam means for shifting said electrode on its pivot in the bracket.

9. In a welding machine for welding wire fabric and the like, an electrode mounting including a bracket mounted on a fixed part of the machine, means for yieldingly forcing said bracket to operative position, an electrode member pivotally mounted on said bracket and having an arcuate welding surface and cam means for engaging a portion of the electrode and a spring engaging the electrode on the side of its pivot opposite the cam.

10. In a machine for welding moving wire fabric, a pair of cooperating electrode members mounted at opposite sides of the plane of the fabric for free pivotal movement, and means for yieldingly forcing said electrode members toward each other to grip the crossed wires of the fabric together under pressure, and whereby the said electrodes are moved by and with the fabric while the cross wires are being welded to the longitudinal wires of the fabric, and means for returning the electrodes to their original position.

11. A machine for welding wire fabric while moving including a pair of cooperating electrode members mounted for free pivotal movement at opposite sides of the plane of movement of the fabric and adapted to supply welding current to the fabric, means for forcing said electrode members toward each other to grip the crossed wires of the fabric and force them together under pressure, and the movement of the fabric while said wires are gripped under pressure causing movement of the electrode members, and means for returning the electrodes to their original position after welding.

12. In a machine for welding moving wire fabric, an electrode mounting including a pair of cooperating electrode members mounted for free pivotal movement, and means for yieldingly forcing said electrode members toward each other to grip the cross wires under pressure, and whereby the said electrodes are moved by and with the fabric while the cross wires are being welded to the longitudinal wires of the fabric, and means for returning the electrodes to their original position after welding.

13. In a welding machine, a pair of electrodes mounted to yield at right angles to the line of movement of the parts to be welded passing between them, and said electrodes also being pivotally mounted whereby the movement of the work engaging therewith will simultaneously impart movement to the electrodes, and means for returning the electrodes to their original position after welding.

14. In a machine for welding wire fabric, an electrode mounting including a pair of rockable current carrying electrode members respectively mounted at opposite sides of the plane of movement of the fabric, means for yieldingly urging said electrode members toward each other to place the parts of the fabric to be welded under pressure, said electrodes having arcuate welding surfaces for engaging with the fabric and adapted to be moved with and by the fabric, and means for shifting the arcuate welding surfaces of said electrodes to progressively bring different portions thereof into engagement with the wire.

In testimony whereof I hereunto affix my signature.

HERBERT E. WHITE.