Nov. 30, 1948. C. C. WICKWIRE 2,455,346

WELDER FOR WIRE MESH FABRICS

Filed July 20, 1948

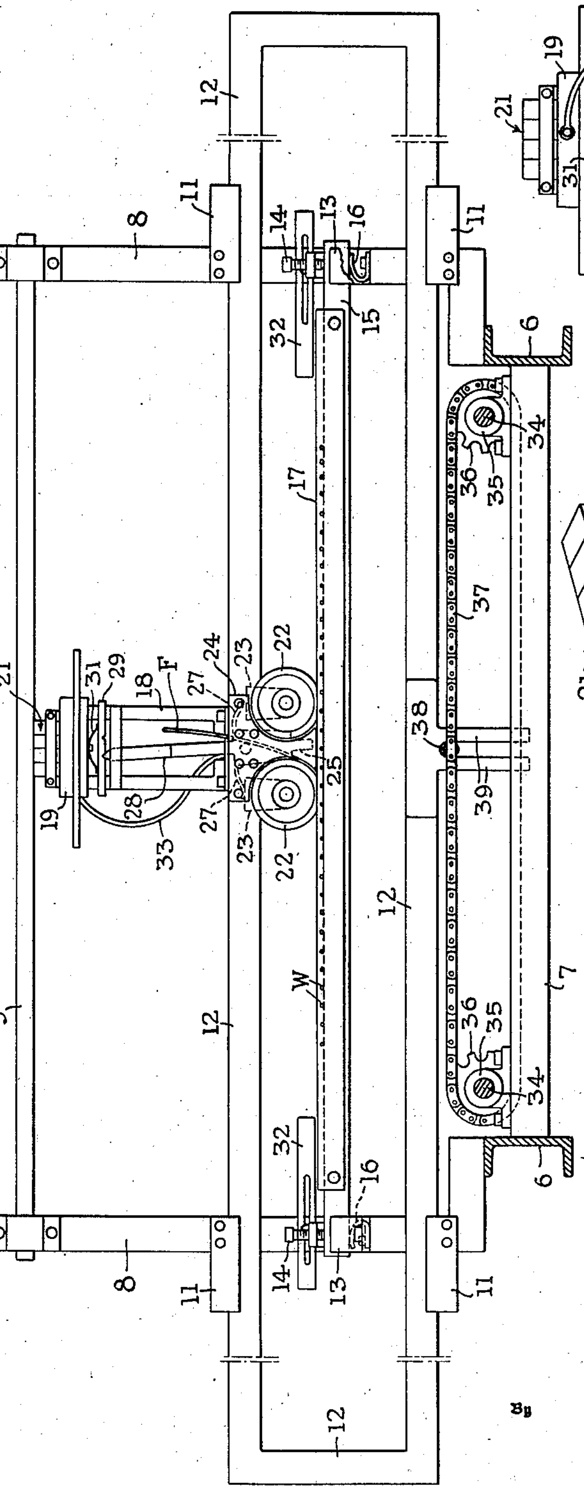


Fig.1

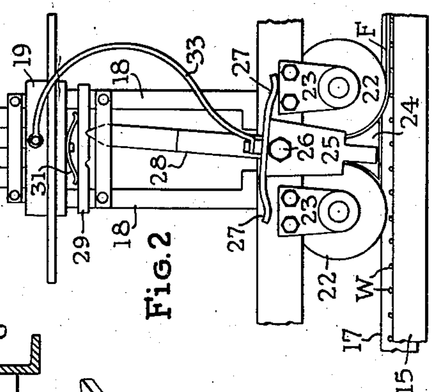


Fig.2

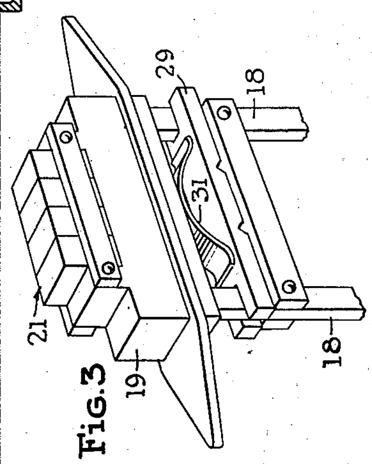


Fig.3

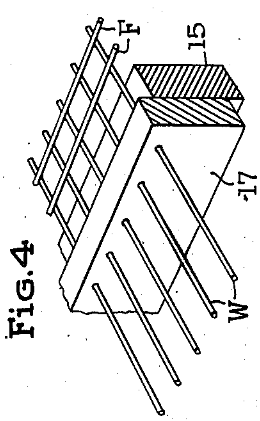


Fig.4

Inventor

Charles C. Wickwire

By Dodge and Sons.

Attorneys

Patented Nov. 30, 1948 2,455,346

# UNITED STATES PATENT OFFICE

2,455,346

## WELDER FOR WIRE MESH FABRICS

Charles C. Wickwire, Cortland, N. Y., assignor to Wickwire Brothers, Inc., Cortland, N. Y., a corporation of New York

Application July 20, 1948, Serial No. 39,785

6 Claims. (Cl. 219—4)

1

This invention relates to machines for welding square meshed fabrics, and provides a machine which lays a continuous weft wire back and forth on a warp and welds it to the warp wires as it is laid.

The operation of the machine here disclosed is similar to that of the machine described and claimed in my allowed application Serial No. 618,461, filed September 25, 1945, now Patent No. 2,451,423 dated October 12, 1948. In the machine of the allowed application an elongated rectangular frame embraced the warp and carried two pairs of roller electrodes which were energized alternately as the frame moved in opposite directions, so that only the trailing pair was energized. The weft wire was led between the upper two electrodes, so as to be rolled down on the warp and welded by the trailing electrodes.

Thus the significant aspect of the allowed application is the characteristic of welding the weft wire as it is laid. The present application covers a similar apparatus having the same characteristic.

According to the present invention the two lower roller electrodes are eliminated in favor of a copper electrode bar which extends transversely under the warp and supports the warp throughout its width. The two upper rollers cooperate electrically with the bar in alternation as the frame reciprocates and carries them back and forth across the warp. Only the trailing roller electrode is energized.

Since the present invention differs from that of the allowed application only in the electrode mechanism the illustration is confined to that feature. The warp spool stand, warp tension devices, the cloth beam and the take up are conventional or show in the prior application, and so need not be illustrated.

In the drawing:

Fig. 1 is an elevation of the mechanism which supports the electrode bar and supports and guides the roller electrodes in cooperative relation therewith.

Fig. 2 is an elevation of the roller electrode mechanism, viewed from the back, relatively to Fig. 1 and drawn on a slightly larger scale.

Fig. 3 is a perspective view of the brush mechanism and the detent used to latch the switch which controls energization of the roller electrodes.

Fig. 4 is a perspective view of the wire guide bar and conductor bar assembly.

The supporting structure comprises longitudinal side frames 6 connected by cross frames one

2

of which appears at 7 in Fig 1. Offset outward from side frames 6 and carried thereby are uprights 8. These carry at their upper ends, and insulated from the uprights, a horizontal conductor bar 9 through which electric current is supplied to the roller electrodes. One lead from the generator is connected to the bar but is not illustrated.

Fixed to uprights 8 are four guide members 11 in which a horizontally elongated rectangular frame 12 is guided to reciprocate in a horizontal direction. The frame in the form here illustrated encircles the warp, hereinafter described, and its internal length is more than twice the width of the warp so that reciprocation of the frame can carry electrodes mounted at midlength of the frame over a path longer than the entire width of the warp. In Fig. 1 portions of the frame are broken out to reduce the width of the figure.

A conductor bar 15 which serves as the lower electrode is mounted at its ends in insulating vertical guide brackets 13 and its vertical position at each end may be adjusted by stop screws 14 against which the ends of the bar are held by springs 16. In this way the bar is accurately positioned under conditions which permit it to yield downward on occasion. The adjustment is such that the springs assure adequate clamping of the warp and weft by the electrodes.

Attached to bar 15 is a bar 17 having uniformly spaced holes for guiding wires in positions tangent to the top of bar 15. Each hole guides a warp wire W, so that the bar 17 has aspects of similarity to the reed commonly used in looms. Its effect is to hold the warp wires properly spaced and in contact with bar 15, which is the lower welding electrode of the machine. In practice the other lead from the generator is connected to bar 15 but this lead also is omitted from the drawing.

Mounted on the upper member of frame 12 and projecting upward therefrom are frame members 18 which carry a housing 19, in which brushes 21 are yieldingly mounted so as to be forced firmly against conductor bar 9.

Below frames 18 and projecting downward from the upper member of frame 12 are two conducting brackets 23 on which are journaled the roller electrodes 22. The rollers are equal in size, spaced only a short distance apart and are positioned immediately above electrode bar 15. They may have shallow peripheral grooves to aline the filling (weft) wire which enters between them. To guide and confine the wire, flat insulating plates 24, spaced apart a little more than the diameter of wire F, are freely fitted to the peripheral contour of the rollers and fill the interval between the two rollers. They define a slot in which the wire may swing into engagement with one or the other electrode as the frame 12 reverses direction.

Pivoted at 26 to frame 12 and electrically insulated from brackets 23 is a switch yoke 25. The yoke has a pendant finger clearly visible in Fig. 2 which strikes a stop and shifts the switch yoke at each limit of travel of frame 12. The yoke 25 carries a bowed spring member which affords two switch contractors 27. These selectively engage corresponding brackets 23 as the yoke 25 is reversely tilted.

To hold the contacts firmly in their respective circuit-closing positions a rather long insulated detent arm 28 is fixed to yoke 25 and is impositively held in its two opposite positions by detent grooves in plate 29. The plate is mounted below box 19 and loaded by bow spring 31. Adjustable switch trips 32 are mounted on uprights 8 in position to engage the pendant finger on yoke 25 and reverse the switch as frame 12 arrives at one or the other of its limiting positions. A cable 33 connects brush box 19 and consequently bar 9 with the switch contact member 27. As the frame reverses the trailing electrode is energized just before the wire swings against it.

To reciprocate frame 12 use is made of two horizontally spaced parallel sprocket shafts 34, one of which is driven at uniform speed. The other is usually an idler. These turn in bearings 35 and carry sprockets 36. A chain 37 runs on the sprockets and carries a roller lug 38 which is confined in a slotted yoke 39 pendant from the lower member of frame 12.

This mechanism reciprocates the frame 12 at uniform speed except at reversal when the motion is harmonic and consequently favorable to smooth reversal.

The mechanism for supplying the warp wires, and feeding them a uniform distance at each reversal of the frame 12 is not involved as a novel feature in the present invention and so is not here illustrated. Any warp feed or take-up that will feed a desired distance each time frame 12 reverses may be used and many are known. The arrangement shown in my prior application is used with only minor changes.

The frame or carriage 12 reciprocates and carries the roller electrodes one trailing the other in a path parallel with the bar 15. The warp wires are guided in parallel paths so as to be on top of bar 15. The warp is fed forward one weft interval each time the carriage 12 reverses its motion.

The weft wire leads between the rollers and is rolled down on the warp wires by the trailing one of the two electrode rollers. The electrode bar 15 is so adjusted vertically that the trailing roller holds the weft wire against the warp wires with just the right pressure to effect welds. There is no weft wire beneath the leading electrode roller, so this moves idly. Reversal of direction draws the weft wire against the new trailing (former leading) roller and energizes that roller.

The new machine has certain advantages over the old one. The lower electrode supports the warp and since it does not move, it and the closely adjacent bar 17 assure the most precise spacing of the warp wires.

The bar 15 can be adjusted vertically while the machine is in operation. This facilitates precise setting. Adjustment of the lower (roller) electrodes in the prior machines required the machine to be at rest.

Since only the upper electrodes move, the electrode carrier can be variously designed. I prefer the rectangular frame encircling the warp, because it can be accurately guided and easily driven, but its use in this machine has not the importance it had in my prior machine.

The drive for the reciprocating frame is extremely simple and has excellent motion characteristics.

I claim:

1. In a fabric-welding machine including a welding circuit, the combination of a bar electrode forming part of said circuit; means for positioning a warp made up of a plurality of wires in a chosen spaced relation on said electrode with the warp wires extending transversely of the electrode; a movable electrode carrier; means for guiding said carrier in a path parallel with said bar electrode and spaced therefrom; means for reciprocating said carrier in said path with an amplitude somewhat exceeding the width of said warp; a pair of spaced, alined roller electrodes journaled on parallel axes on said carrier so that their rolling peripheries are opposed to said bar electrode and are spaced therefrom sufficiently to pass over the warp supported by the bar electrode; means for supplying a continuous weft wire to the interval between said roller electrodes, so that it will be engaged by the trailing one of said roller electrodes and progressively rolled into contact with successive warp wires; switching means for selectively interposing said roller electrodes in said welding circuit; and means effective as an incident to reversal of motion of said carrier to shift said switch means, the arrangement being such that the trailing electrode is interposed in the circuit and serves to weld the weft to the warp as it rolls it into position thereon.

2. The combination defined in claim 1 in which yielding means are provided to induce approach of the bar electrode and roller electrodes toward one another and stop means serve to limit such approach.

3. The combination defined in claim 1 in which the bar electrode is yieldingly mounted at each end and biased to move toward the path of the roller electrodes, and independently adjustable stops are provided at each end to limit motion of the bar electrode in response to said bias.

4. The combination defined in claim 1 in which the means for positioning the warp comprises a wire guiding bar adjacent the bar electrode and provided with a row of spaced holes each of which guides a corresponding warp wire into tangency with the working face of the electrode bar.

5. The combination defined in claim 1 in which the bar electrode is yieldingly mounted at each end and biased to move toward the path of the roller electrodes, and independently adjustable stops are provided at each end to limit motion of the bar electrode in response to said bias and the means for positioning the warp comprises a wire guiding bar provided with a row of spaced holes each of which guides a corresponding warp wire into tangency with the working face of the electrode bar, said wire guiding bar being attached to the electrode bar and adjustable therewith.

6. The combination defined in claim 1 in which the electrode bar is adjustable and the means for

positioning the warp comprises a wire guiding bar attached directly to the electrode bar so as to be adjustable therewith the wire guiding bar having spaced holes each of which guides a corresponding warp wire into tangency with the working face of the electrode bar.

CHARLES C. WICKWIRE.



## REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS


| Number | Name | Date |
|---|---|---|
| 2,284,403 | Marquart | May 26, 1942 |