A. S. KNAPP.

LOOM FOR WEAVING WIRE CLOTH.

APPLICATION FILED SEPT. 24, 1919.

1,352,610.

Patented Sept. 14, 1920.

2 SHEETS—SHEET 1.

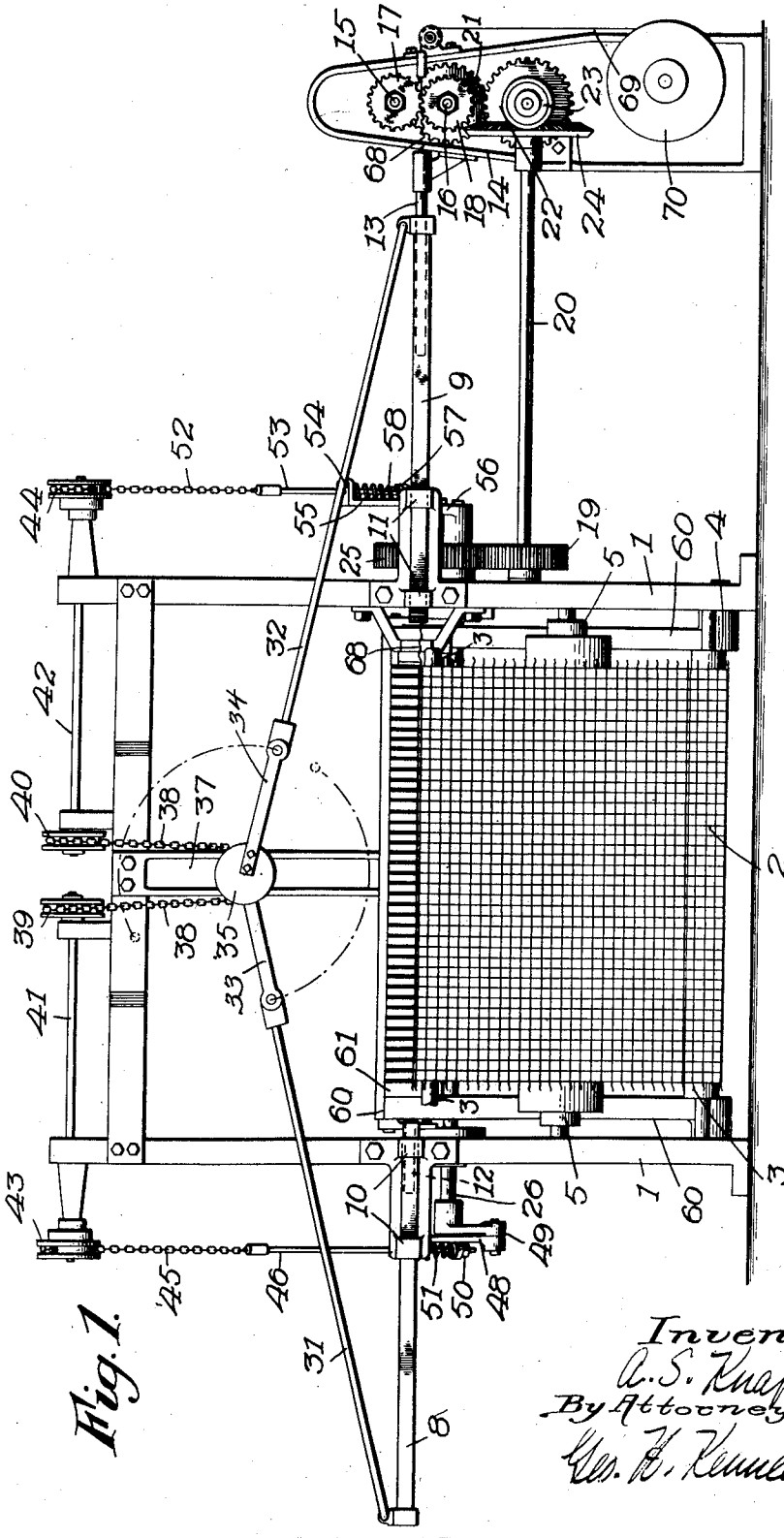


Fig. 1.

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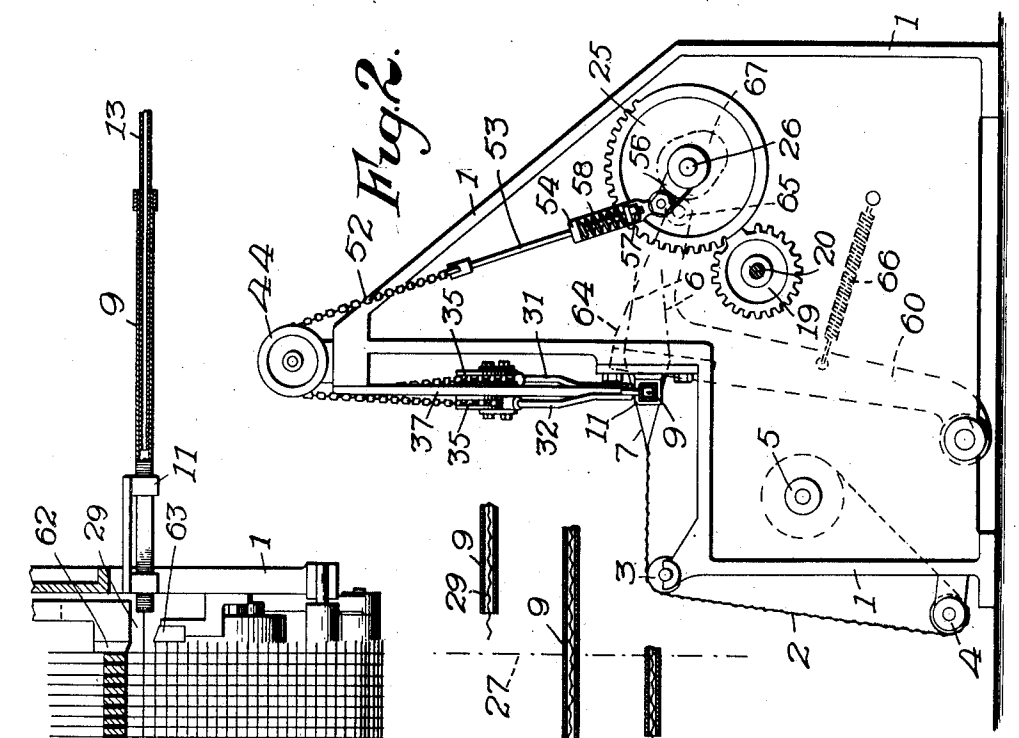


Fig. 2.

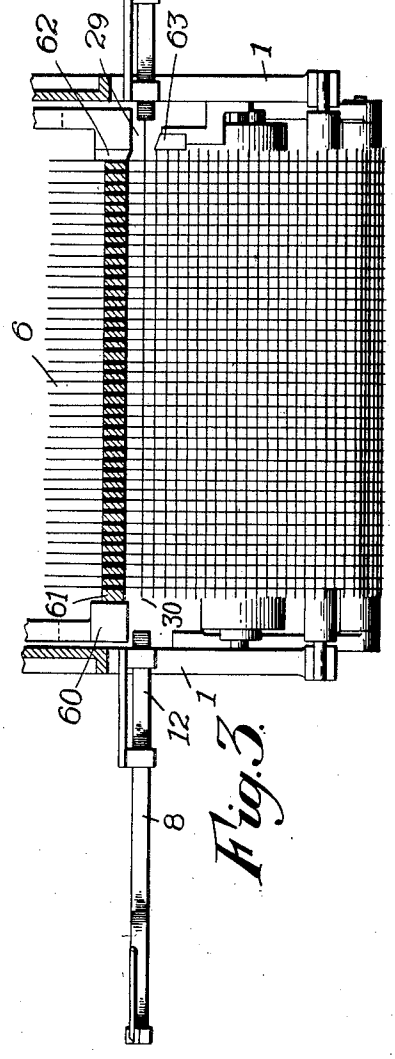


Fig. 3.

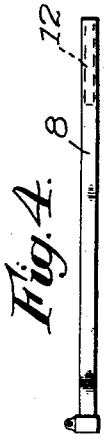


Fig. 4.

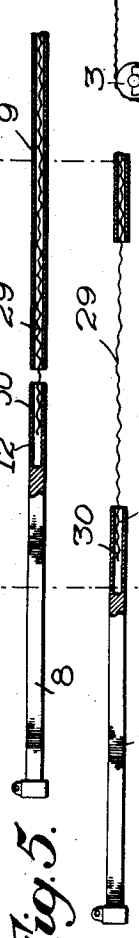


Fig. 5.



Fig. 6.

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LOOM FOR WEAVING WIRE CLOTH.

1,352,610. Specification of Letters Patent. Patented Sept. 14, 1920.

Application filed September 24, 1919. Serial No. 326,061.

To all whom it may concern:

Be it known that I, ALBERT S. KNAPP, a citizen of the United States, residing at Worcester, in the county of Worcester and Commonwealth of Massachusetts, have invented a new and useful Improvement in Looms for Weaving Wire Cloth, of which the following, together with the accompanying drawings, is a specification.

My present invention relates to a new and improved means for inserting the weft wires in the process of weaving wire cloth. In the following specification I have described my invention in connection with a loom for weaving wire cloth in which the component wires are crimped, but my invention is equally applicable to wire weaving looms of the type employed for weaving plain wire cloth. It is the object of my invention to provide means for inserting the weft wires in the open shed of a wire weaving loom without the use of a shuttle, thereby avoiding the complicated mechanism required in this class of looms to effect the transmission of a shuttle through the shed formed by the warp wires. In carrying my invention into effect, the means for delivering the warp wires to the loom, and commonly known as the let-off mechanism; the means for winding the woven fabric, known as the take-up mechanism; and the means for opening the warp wires to form the shed and known as the harness mechanism, may be of any known type as these mechanisms form no part of my present invention, which relates to an improved means for inserting the weft wires as hereinafter described, the novel features being pointed out in the appended claims.

Referring to the accompanying drawings,

Figure 1 represents a front elevation of a loom, showing such parts as are necessary to illustrate the character of my present invention.

Fig. 2 is an end elevation showing a portion of the mechanism for reciprocating the weft guiding tubes.

Fig. 3 is a plan view of a portion of the loom, showing the cutting mechanism for severing the weft wires.

Figs. 4, 5 and 6 are diagrammatic views, showing the relative positions of the weft guiding members to the warp at different periods in the operation of the loom.

Similar reference characters refer to similar parts in the different figures.

Referring to the accompanying drawings, 1 denotes a portion of the framework of the loom and 2 denotes the woven fabric which, in the present instance, is conducted over rolls 3, 4 and wound upon a roll 5 by any suitable take-up mechanism now in use for that purpose. The warp wires 6 are separated to form a shed as represented at 7, Fig. 2, by any suitable warp-shedding mechanism, as will be well understood by those conversant with the art of weaving. Neither the take-up mechanism, nor the warp-shedding or harness mechanism have been shown or described, as their construction and use form no part of my present invention and will be well understood by loom builders and weavers.

Located upon opposite sides of the loom frame 1 and in alinement with the shed 7 as it is formed by any suitable harness mechanism, are the wire guiding means 8 and 9, each capable of a reciprocating movement in bearings 10 and 11 supported by the framework of the loom. The wire guiding means 8 consists of a bar preferably hollow at one end, as indicated by the broken lines 12, Figs. 1 and 3. The wire guiding means 9 consists of a sleeve slidable upon a tube 13 supported upon a rigid framework 14 erected at one side of the loom. The tube 13 is held in alinement with the peripheries of a pair of feed rolls carried upon the shafts 15 and 16 connected by gears 17 and 18. An intermittent motion is given to the shafts 15 and 16 by means of a gear 19 carried on a shaft 20, which is connected with the feed roll shafts 15 and 16 by intermediate gearing comprising spur gears 21 and 22 and bevel gears 23 and 24, Fig. 1. An intermittent motion is imparted to the gear 19 by means of a mutilated gear 25 on the rotating shaft 26 suitably connected with the driving power of the loom.

The rotation of the feed rolls carried upon the shafts 15 and 16 is suitably timed to synchronize with the operation of the loom, as hereinafter described. When the shed 7 has been formed by the harness mechanism, the rotation of the feed rolls, carried on the shafts 15 and 16, is sufficient to project the weft wire a sufficient length to pass through the open shed and extend a short distance

upon each side of the warp wires. While the weft wire is being projected by the feed rolls, a reciprocating motion is imparted to the bar 8 and the sleeve 9, carrying them from the position shown in Figs. 1, 3 and 4 to the position shown in Fig. 5, in which the advancing ends of the elements 8 and 9 approach nearly to the center of the warp shed, indicated diagrammatically in Figs. 4, 5 and 6 by the broken lines 27 and 28. During the reciprocating motion of the elements 8 and 9 toward the center of the shed, the weft wire 29 is being projected by the feed rolls to correspond with the reciprocating movement of the sleeve 9, so that the advancing end 30 of the weft wire will be received in the tubular section 12 of the bar 8, thereby protecting the advancing end 30 of the weft wire, as shown in Fig. 5. A reverse movement is then imparted to the bar 8 and sleeve 9 to withdraw them from the shed, but during this reverse movement of the bar 8 and sleeve 9 the weft wire 29 is being projected by the feed rolls, so as to maintain the advancing end 30 within the tubular section 12 of the bar 8 as shown in Fig. 6, thereby protecting the advancing end 30 of the weft wire 29 until the bar 8 has been fully withdrawn from the shed into the position indicated in Figs. 1, 3 and 4.

The reciprocation of the elements 8 and 9 may be effected by any suitable mechanism driven by the operation of the loom. In the present instance, the elements 8 and 9 are reciprocated by the mechanism illustrated in front view in Fig. 1 and in side view in Fig. 2. The outer ends of the bar 8 and sleeve 9 are pivotally connected by links 31, 32 with crank arms 33, 34, attached to connected disks 35, 35 journaled on a short stud, not shown, which is rigidly held in a plate 37 attached to the framework of the loom. The disks 35 35 are connected by chains 38 with pulleys 39 and 40 carried upon the inner ends of shafts 41 and 42 journaled in the framework of the loom, and carrying upon their outer ends pulleys 43 and 44. Attached to the pulley 43 is a chain 45 connected at its opposite end with a rod 46 slidable in a lug not shown on a plate 48 pivoted to a crank arm 49, said lug being similar to the lug shown at 54 on the opposite side of the loom. Attached to the lower end of the rod 46 is a nut 50, and between the nut 50 and the lug on the end of plate 48 is interposed a spiral spring 51 for the purpose of taking up slack which may occur in the chain 45. Attached to the pulley 44 is a chain 52 connected with a rod 53 slidable in a lug 54 on a plate 55, which is pivoted to the free end of a crank arm 56. The lower end of the rod 53 carries a nut 57 and between the nut 57 and the lug 54 is inserted a spiral spring 58 for the purpose of taking up any slack which may occur in the chain 52. The crank arms 49 and 56 are carried upon a rotating shaft 26 journaled in the loom frame.

The crank arms 49 and 56 at opposite ends of the shaft 26 are oppositely disposed diametrically, that is, when one crank is up, the other crank is down. The rotation of the shaft 26 will impart an oscillating movement, through the connecting mechanism, to the disks 35, 35 which, through the crank arms 33, 34 and links 31, 32, will impart a reciprocating movement to the bar 8 and sleeve 9 carrying them toward and away from the center of the shed, or from the position shown in Fig. 4 to that shown in Fig. 5, and by their reverse movement back to the position shown in Fig. 4. In the position of the elements 8 and 9 as shown in Fig. 3, the bar 8 will have been drawn entirely free from the end of the weft wire 29, as represented in Figs. 3 and 4.

Pivoted in a convenient position upon the framework of the loom is a swinging lay 60, Figs. 1 and 3, and indicated by broken lines in Fig. 2. The lay carries the usual reed 61 by which the weft wire is beaten up at the fell of the fabric. The lay also carries a cutting knife 62 which coöperates with a stationary cutting knife 63 to sever the weft wire between the warp and the end of the sleeve 9, leaving a short end of the weft wire projecting from the warp, corresponding to the projecting end 30 upon the opposite side of the warp. The lay may be given a swinging motion by any known and suitable mechanism, in the present instance consisting of arms 64 carrying cam rolls 65 which are held by springs 66 in contact with cams 67 carried upon the driving shaft 26. When the woven fabric is to be crimped, the feed rolls carried upon the shafts 15 and 16 are corrugated in order to impart short, repeated bends to the weft wire, as shown at 68, Fig. 1, imparting crimps to the weft wire as a strip of plain wire 69 is drawn from a coil or drum 70.

The intermittent rotation of the feed rolls carried on the shafts 15 and 16 is so adjusted with reference to the operative movements of the weaving mechanism of the loom, that a weft wire will be projected at proper intervals into the open shed and, during the projection of the weft wire, a reciprocating movement will be given to the bar 8 and sleeve 9 so that when they approach each other in the center of the shed, the weft wire will have been projected through the tube 13 and sleeve 9 into the tubular end 12 of the bar 8, causing the advancing end of the weft wire to be carried by the bar 8 during its entire passage through the shed and until the final reverse movement of the bar 8 withdraws it from the end of the weft wire. By the

above described mechanism and method of inserting weft wires, either crimped or plain, I avoid the necessity of using a shuttle and the complicated mechanism of transferring the shuttle from one side to the other of the fabric. The liability of entangling the advancing end of the weft wire is entirely obviated and the speed of the loom is materially increased over any of the methods for inserting weft wires known to me.

I claim,

1. In a wire weaving loom, the combination with a warp shed, of means for projecting a weft wire through said shed, and means for protecting the advancing end of the weft wire during its passage through the shed, comprising a reciprocating member adapted to inclose the advancing end of the weft wire, and means for moving said reciprocating member to correspond with the movement of the weft wire.

2. In a wire weaving loom, the combination of means for projecting a weft wire through a warp shed, means for inclosing the advancing end of the weft wire during its passage through the shed, and means for withdrawing said inclosing means from the end of the weft wire.

3. In a wire weaving loom, the combination with a warp shed, of a pair of reciprocating members on opposite sides of the shed and in alinement with the shed and with each other, means for projecting a continuous weft wire through one of said members and into the other of said members, and means for moving said members to protect the advancing end of the weft wire as it is projected through the shed.

4. In a wire weaving loom, the combination with a warp shed, a sleeve at one side of the shed, a hollow bar at the opposite side of the shed, means for imparting a longitudinal movement to said sleeve and said bar to bring them substantially together near the center of the shed, means for projecting a weft wire through said sleeve into said bar, and means for withdrawing said sleeve and bar from the shed.

5. In a wire weaving loom, the combination with a warp shed, of a tube at one side of the shed, a sleeve telescoping said tube, and slidable thereon, a bar upon the opposite side of the shed, having a hollow end to receive the advancing end of a weft wire, means for projecting a weft wire through said tube and sleeve into the hollow end of said bar, means for imparting a reciprocating motion to said sleeve and said bar, and means for severing said weft wire.

6. In a wire weaving loom, the combination with a warp shed and means for projecting a weft wire through said warp shed, of means for inclosing the advancing end of the weft wire during its passage through the warp shed.

7. In a wire weaving loom, the combination with a warp shed, of a tube at one side of the shed and in alinement therewith, a sleeve telescoping with said tube, means for projecting a weft wire through said tube and sleeve, and means for imparting a reciprocating motion to said sleeve.

8. In a wire weaving loom, the combination with a warp shed, of a hollow sleeve in alinement with the warp shed, means for imparting a reciprocating motion to said sleeve partially through said shed, a hollow bar in alinement with said warp shed, means for imparting a reciprocating motion to said hollow bar opposite to the movement of said sleeve, means for projecting a weft wire through said sleeve and into said hollow bar during their reciprocating movement into and out of said warp shed, whereby the advancing end of the weft wire is protected from contact with the warp shed.

Dated this 15th day of September, 1919.

ALBERT S. KNAPP.

Witnesses:

NELLIE WHALEN,

PENELOPE COMBERBACH.