Aug. 22, 1933. H. L. THOMPSON 1,923,402

WARP FEEDING MECHANISM FOR WIRE WEAVING MACHINES

Filed March 30, 1931 3 Sheets-Sheet 1

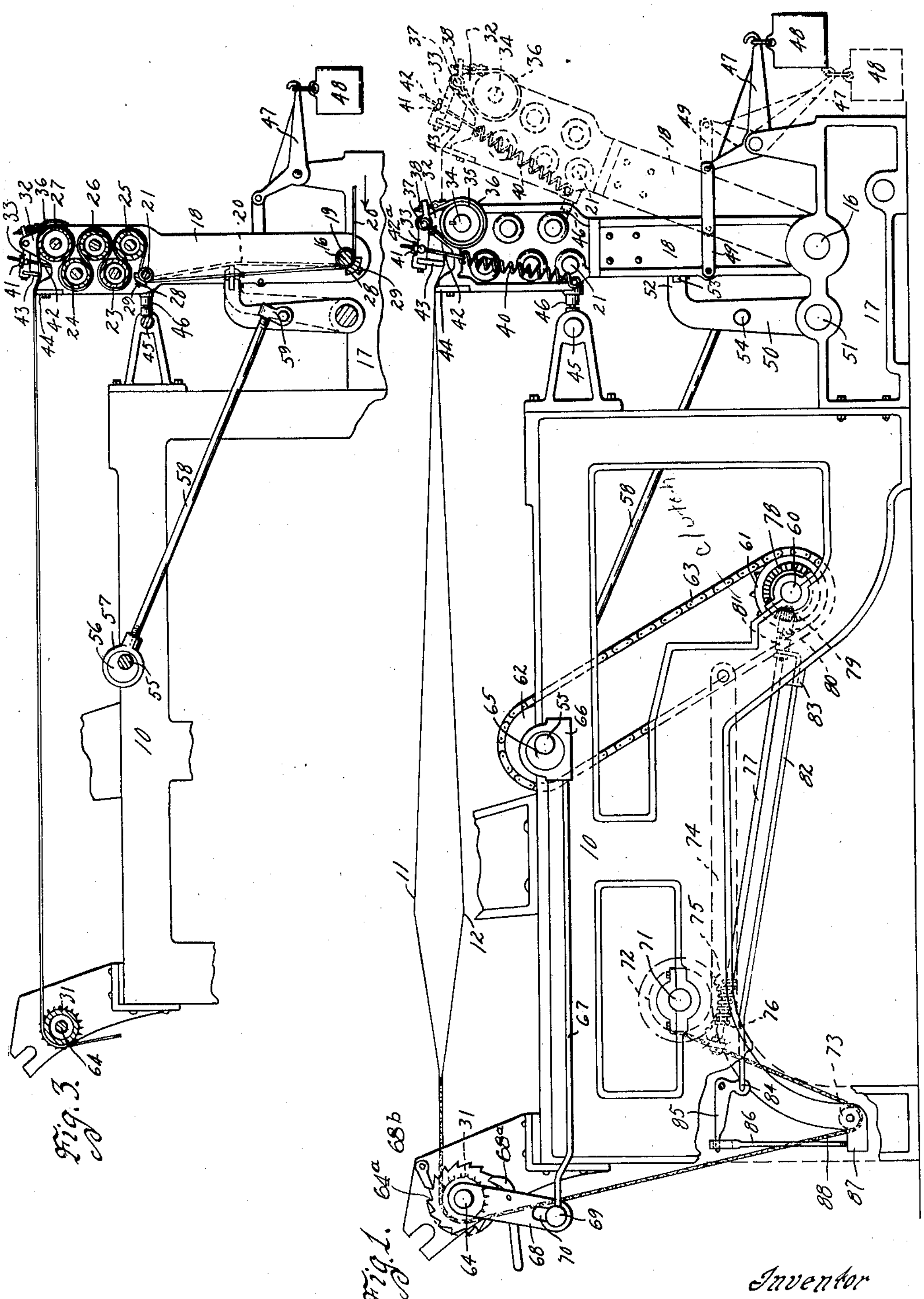

Fig. 3.

Fig. 1.

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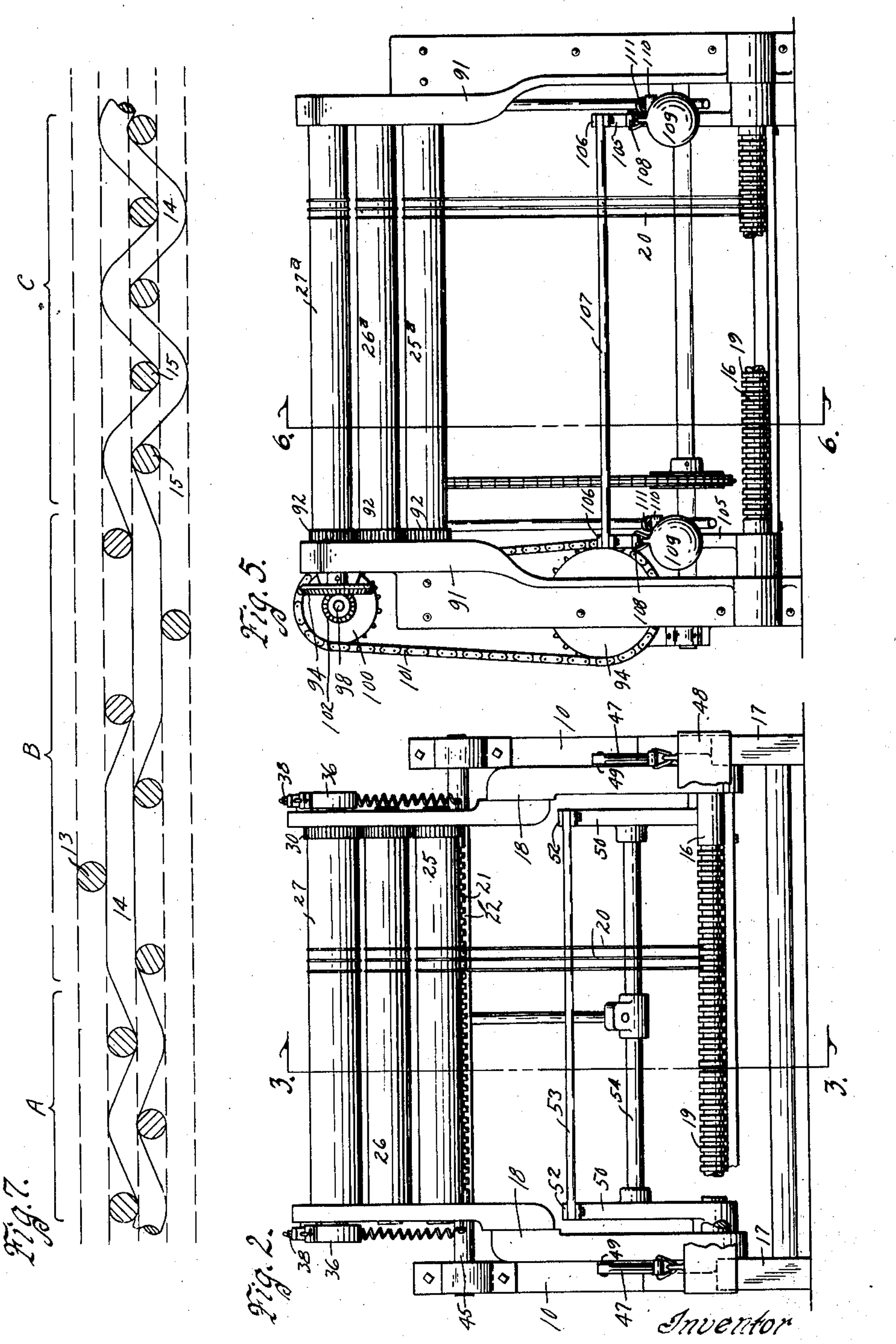
WARP FEEDING MECHANISM FOR WIRE WEAVING MACHINES

Filed March 30, 1931 3 Sheets-Sheet 2



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WARP FEEDING MECHANISM FOR WIRE WEAVING MACHINES

Filed March 30, 1931 3 Sheets-Sheet 3

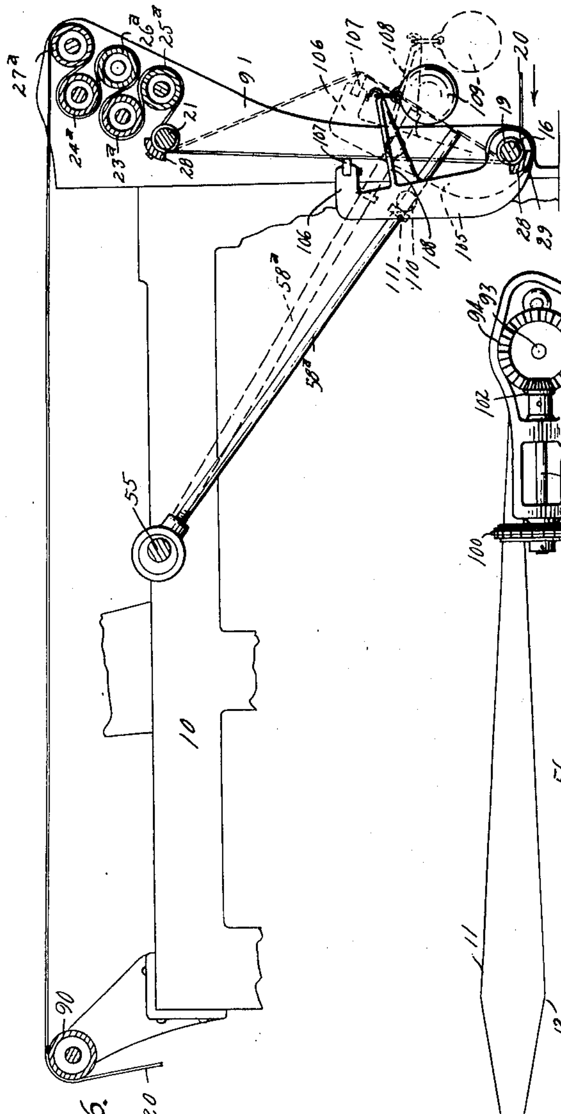

Fig. 6.

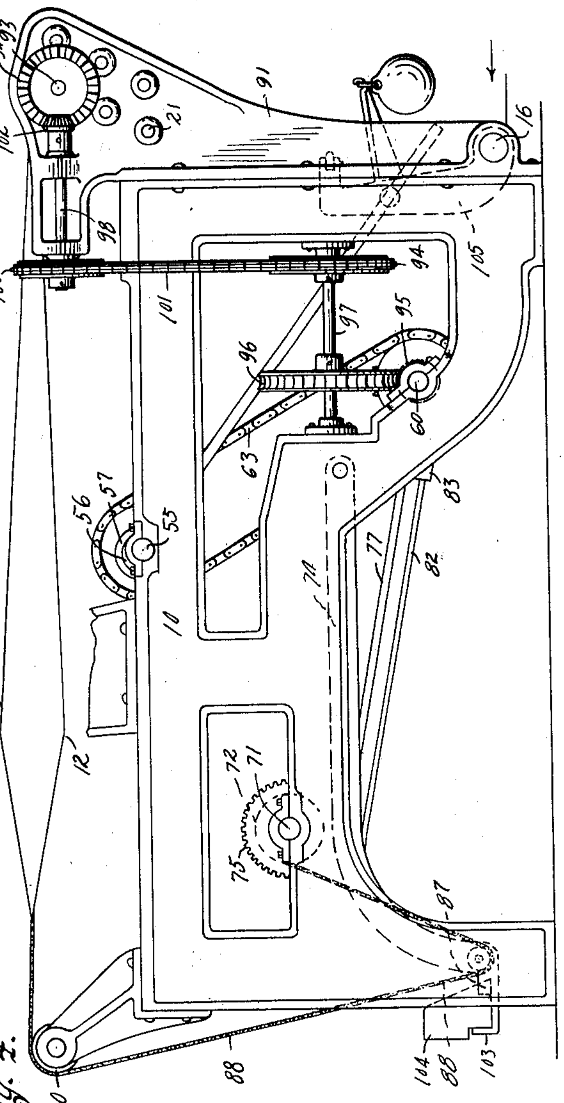

Fig. 4.

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UNITED STATES PATENT OFFICE

1,923,402

WARP FEEDING MECHANISM FOR WIRE WEAVING MACHINES

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Application March 30, 1931. Serial No. 526,321

15 Claims. (Cl. 139—100)

The object of my invention is to provide a warp feeding mechanism for wire weaving machines, which mechanism is simple of construction and accurate in operation and is adapted to insure the feeding of the respective warp wires to the weaving mechanism at the same rate of speed per lineal foot.

It is also my purpose to provide such a mechanism so constructed and arranged as to provide for backward feeding of the loom, which may be temporarily necessary.

Another object is to provide in such a mechanism an associated means for acting on the warp wires so that they will be fed to the mechanism at uniform and preferably minimum tension.

With these and other objects in view, my invention consists in the construction, arrangement and combination of the various parts of my warp feeding mechanism for wire weaving machines, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawings, in which:

Figure 1 shows a side elevation of a wire weaving machine equipped with a warp feeding mechanism embodying my invention, parts of the machine being omitted.

Figure 2 is a rear elevation of the mechanism and machine shown in Figure 1, parts being broken away and parts being omitted.

Figure 3 is a detail, sectional view taken on the line 3—3 of Figure 2, parts being broken away and parts being omitted.

Figure 4 is a side elevation generally similar to that of Figure 1, illustrating another form of my warp feeding mechanism.

Figure 5 is a rear elevation of the mechanism and machine shown in Figure 1, parts being omitted.

Figure 6 is a detail, sectional view taken on the line 6—6 of Figure 5; and

Figure 7 is a sectional view somewhat diagrammatic illustrating certain conditions which sometimes exist in woven wire screen.

In order to make the description of my mechanism clearer and easier to understand, I shall refer briefly to the problems which have given rise to my invention and to the general manner in which I have sought to meet and solve those problems.

I have shown in the accompanying drawings the frame 10 of a wire weaving machine. In such machines, the warp wires are fed in at the rear end of the machine and are slowly advanced through the machine. Every other warp wire passes through one heddle frame and the remaining warp wires pass through the other heddle frame. During the movement of the warp wires through the machine, these heddle frames move respectively up and down and at each movement half the warp wires are raised and half of them are lowered.

Between movements of the heddle frames, the shuttle carries the weft wire across between the two layers or groups of warp wires. This weaving mechanism is not shown in my drawings and will not be particularly further described.

In Figures 1 and 4 for example, I have shown the warp wires at 11 and 12 as spread between the heddles to permit the shuttle to pass between them.

One of the most annoying defects existing in the manufacture of woven wire is its tendency to "pull". Even though the cloth looks even and square in the loom, it will sometimes not lie straight or flat upon the inspection floor. This imperfection is apparently due to an uneven feed of the warp wires.

Heretofore the practice has been to feed the warp wires to a wire weaving loom from a large drum upon which the wires have been preferably wound from spools without definite guidance, so that the individual coils on the drum vary in diameter after winding.

Where such drums are used, a uniform speed of rotation will give a slightly varying speed of feed to the individual warp wires as they pass to and through the loom.

As the wire is gradually removed from the drum, the speed of the wire feed is lowered as the radii of the coils on the drum grow shorter.

Since the spacing of the weft lengths is dependent upon the warp feed, this reduction in the speed of the wire feed results in a shorter weft spacing in the final weave, making the wire cloth inaccurate in the spacing of the weft wires and causing the use of more weft wire than is necessary for a given area of cloth.

As a result of the varying feed of the warp wires from the drum, the tension of the wires will differ. Those passing off the high coils will be loose and will tend to feed into the loom too rapidly. Those being delivered from low coils will be too tight, because they will be traveling at less than the average speed of the warp.

As a drum of warp represents a definite length of finished cloth, it follows that each one of the warp wires should be of precisely the same length as the others. However, as an actual fact, there is considerable difference in their length due to the inaccuracies of windings on the drum.

Since a length of wire cloth is held together by its warp, it is readily seen why it doesn't remain flat and is not free from strains when the individual warp wires are of different lengths and are fed to the weave at random tensions.

It is desirable to feed to the loom exactly the same lengths of each warp wire. The wire fed must be under considerable tension in order that the wires may be crimped properly, but the mere providing of means whereby the individual warp wires are fed to the loom at the same tension will not result in a uniform cloth.

This is due to the fact that uniform tension can only produce uniform crimp in wires of equal diameter and temper. It is not now practical to control either temper or size of wire within exact limits.

The tension of the weft wire is subject to correction at each passage of the bobbin and therefore slight variations are not cumulative and do not materially influence the quality of the cloth unless grossly out of normal.

In order to get straight flat cloth not under strain, it is essential that each warp wire must be fed in the same length and should be tensioned to produce a crimp over the weft wires uniformly equal in height to that of the other warp wires. Variation in height of crimp necessarily involves variation in the wire length required to form it and when the cloth is bound into a roll, subjected to pressure, tension or heated, the actual differences in length will become manifest. Winding the cloth into a roll subjects each convolution to pressure between the preceding and following ones. Pressure upon the prominently crimped wires causes them to be straightened and therefor apparently lengthened. The wire thus lengthened will appear as loose. If there are several of them adjacent to each other, they may cause a wave of deformation in the cloth.

Where wire cloth is uniformly and properly crimped, it should be uniformly two wires thick. In Figure 7, I have shown a sectional view illustrating variation in the crimp of wire cloth. Section A represents wire cloth properly woven and with the proper crimp. Section B represents wire cloth in which the weft wire does not have its proper crimp, and section C represents a portion in which the weft wire has too much crimp.

If the crossing warp and weft wires are uniformly and equally crimped as illustrated for instance in section A of Figure 7, such a cloth would be ideal and would stand a maximum of rolling and handling without deformation. It would be the most economical cloth because it would contain the absolute minimum of wire for its cloth area.

However if some of the warp wires, as for instance the wire 13 shown in Figure 7, is loose, it will be seen that the crossing weft wire 14 will not be properly crimped, and the wire cloth will be three wires thick for a certain area. So in section C, I have shown the weft wire 14 to be slack and taking all the crimp, while the warp wires 15 are not properly crimped.

Warp wire feeding unit

I shall now describe my mechanism for feeding the wire to the loom in such manner that the same lengths of warp wires are fed and will then explain how this mechanism eliminates the disadvantages above referred to.

Where my apparatus is used, the drum which has heretofore been so commonly used is done away with and I provide a new feeding mechanism at the rear of the machine.

Preferably a transverse shaft 16 is journaled at its ends in the frame 10 in the base 17 as shown at the lower right-hand part of Figure 1 and the lower part of Figure 2.

Fixed on the shaft 16 near its ends are side frame members 18 extending upwardly parallel with each other.

The shaft 16 is provided with grooves 19 to receive the warp wires 20 for keeping them properly separated and spaced and facilitating tracing in case of breakage or changing.

At a substantial distance above the shaft 16 is a transverse shaft or rod 21, having its ends fixed in the frame members 18 and having similar grooves 22. Spaced vertically above the rod or shaft 21 are two rolls 23 and 24. Just rearwardly with relation to the rolls 23 and 24 are three vertically spaced rolls 25, 26 and 27. The rolls 23 and 24 are staggered vertically with relation to the rolls 25, 26 and 27. The rolls 23 and 24 are quite close together and the rolls 25, 26 and 27 are quite close together, and the two series of rolls are close together, so that the rolls 23 and 24 are arranged to nest with relation to the rolls 25, 26 and 27 as shown in Figure 3.

The warp wires 20 are drawn around the shaft 16 as illustrated for instance in Figures 2 and 3.

A wooden retainer strip or the like 28 is fastened to the shaft 16 and serves to confine the warp wires in their respective grooves. The strip 28 is held in place by screws or the like 29, which can be readily removed.

The warp wires are threaded from the shaft 16 over the rod 21.

The rod 21 has a similar strip 28 for holding the warp wires in place in their grooves.

From the rod 21, the warp wires are threaded around the rolls 25, 23, 26, 24 and 27 respectively. The arrangement is such that the wires embrace each roll to the greatest possible extent.

The wires slide over the shaft 16 and rod 21.

The rolls 23, 24, 25, 26 and 27 are journaled in the frame members 18 and are geared together by gears 30, to travel at the same rate of speed. They are all of the same diameters, so that all the warp wires are supplied to the loom from the rolls, at the same speed per lineal foot. This result could be accomplished, however, even though rolls of different sizes were used, providing they were so geared that their surface speeds were the same.

The form of said control shown in Figures 1, 2 and 3 is intended for use with a loom equipped with a breast roll feed 31.

With such an arrangement the wire cloth after weaving is passed over the toothed breast roll 31, which is given a certain rotation at each loom cycle. This reverses the whole drum feed arrangement in that the warp wires are positively pulled space by space through the loom instead of being released by rotation of a drum toward a weighted tension device.

The use of a breast roll involves necessarily the employment of some means for resisting its pull to establish certain tension upon the warp wires for weaving purposes. Otherwise the wires would be subject only to sufficient tension to rotate the rolls, which would vary somewhat according to wear, lubrication conditions and so forth.

For this purpose, I have provided an automatic tensioning device, which will now be described. The details of the construction of this tension device may be varied considerably, but it may be constructed as follows:

Adjacent the ends of the upper roll 27, the frame members 18 are provided with lugs or ears 32, to which brake levers 33 are pivoted between their ends as by pins 37. On the spindles or gudgeons 34 of the roll 27 are brake drums 35, which are embraced by the brake bands 36. One end of each brake is pivoted as to a pin 37, preferably in alignment with the pivot of its brake lever 33 and the other end is secured to a projecting end of brake lever 33 as indicated at 38 in Figure 1.

Pivotally and adjustably secured to the brake levers 33 near their other ends are springs 40, which are also secured to the frame members 18 as illustrated for instance in Figure 1. These springs tend to hold the brake bands in engagement with their respective drums with a certain degree of tension, which may be regulated by means of the nuts 41 on the rods 42 projecting from the springs 40 as shown in Figure 1, and extended through pins 42*a* pivoted to the brake levers 33. It thus appears that the warp wires are pulled around the rolls 23–27 tending to rotate them. The pull of the springs 40 tightens the brakes on their bands and resists the rotation of the rolls. The friction between the wires and the rolls and the arrangement disclosed is sufficient to hold the wires against slipping on the rolls. Since the rolls are geared together, any rotation thereof must give uniform surface speed for their entire length and for all their surfaces engaged by the wires, and it follows that all of the wires must pass through the roll series at the same speed. The rolls thus function both as feed and as tension rolls.

The forward ends of the levers 33 are connected by a downward projecting smooth-edged steel bar 43, which rests upon the warp wires as they advance to the loom mechanism.

Just forwardly with relation to the bar 43, the frame members 18 are provided with an upwardly projecting similar bar 44 over which the warp wires slide. The lower edge of the bar 43 being below the plate connecting the top of the roller 27 and the upper edge of the bar 44, causes a deflection downwardly of all the warp wires as shown for instance in Figure 1.

As the loom is operated, the increasing tension upon the warp wires tends to straighten them out and thus to lift the bar 43 against the tension of the springs 40 and thus to loosen the brakes 36, so as to permit the rolls to feed more freely.

By adjusting the nuts 41, it is possible to regulate and control the tension required for lifting the bar 43 and thus release the feed rolls.

It is obvious that the motion of the heddles in raising and lowering the two sets of warp wires would necessarily bring about a change in length of the wire between the rigidly held breast roll 31 and the stationary feed rolls. Therefore some provision must be made for affording elasticity or otherwise allowing for this change. As shown, I have provided on the frame 10, a cross bar 45 and on the frame members 18 resilient bumper elements 46.

It is sometimes necessary to feed a movement backward momentarily to correct a mistake in the weave or for other reasons. In that case, the feed roll unit herein described may swing backwardly toward the dotted line position shown in Figure 1. The backward movement of the feed roll unit may be brought about in a great variety of ways, but as here shown, I have provided at each end of the base 17 a bell crank lever 47 on one arm of which is hung the weight 48. The other end of each of said levers is connected by a link 49 with one of the members 18. The levers 47 and the weights 48 are so arranged that the weights normally exert a constant back pull on the feed roll unit nearly equal to the warp tension.

If it is desired to feed the warp wires backward, the power is disconnected and the breast feed roll 31 is manually rotated with a reverse motion. There is then no forward pull on the warp wires and the weight 48 functions to swing the members 18 backward and keep the warp wires under tension.

It will be understood that in practice, the tension on the various warp wires which travel over the shaft 16 varies quite considerably. Ordinarily these wires are fed from spools having different weights and diameters of wires upon them and varying in their frictional contacts with their supporting pins. It therefore becomes desirable to provide some means for insuring the feeding of the wires to the feed rolls at uniform tension which in this case is minimum tension.

Two arms 50 have their lower ends journaled as at 51 in the base 17 and normally project upwardly therefrom and have rearward extensions 52 at their upper ends. The rearward extensions are connected by a cross bar 53. The arms 50 may also be connected by a rod 54 between their ends.

Rocker

Mounted in the frame 10 at opposite sides thereof is a shaft 55, which has between its ends the eccentric disc 56 on which is journaled the strap 57 connected to the rod 58, which is in turn pivoted to the cross rod 54 as indicated at 59 in Figure 3.

As the shaft 55 rotates, reciprocatory movement is imparted to the rod 58 for thus rocking the bar 53 back and forth through a short stroke. This bar 53 presses against the warp wires between the shaft 16 and the rod 21 at each beat of the loom and forces just enough slack into the warp wires to provide freedom for the next succeeding feed.

In this way, the device just now described, which for convenience I may call a rocker, always actually pulls the wire from the spools or other source of supply and the rolls feed only the already loosened wire.

Driving mechanism

Suitably supported on the frame 10 is a power shaft 60, which is operated from any suitable source of power.

The shaft 55 is rotated from the shaft 60 by means of sprockets 61 and 62 and a sprocket chain 63. The shaft 64 of the breast roll 31 is operated in the following manner:

On the shaft 55 is an eccentric disc 65 on which is journaled a block or the like 66, from which a rod 67 projects forwardly in the machine. On the shaft 64 is pivoted an arm 68 to which the forward end of the rod 67 is pivoted by means of a pin 69 extended through a radially elongated slot 70. On the shaft 64 is fixed a ratchet 64*a*. Pivoted to the arm 68 is a pawl 68*a*, properly weighted to cause it to engage the teeth of the ratchet. A pawl 68*b* is pivoted to the frame and engages the ratchet 64*a* to prevent reverse movement thereof except when the pawl 68*b* is released. Thus the continuous rotation of the shaft 55 serves to impart intermittent motion to the shaft 64.

Suitably mounted in the frame 10 is the shaft 71 for the take-up drum 72 for the woven wire. The woven wire after having traveled over the breast roll 31 extends downwardly and is threaded around the roll 73, shown for instance in Figure 1, carried between two pivoted frame arms 74.

The roller 73 and arms 74 serve as a weight. The pivotal movement of the arms 74 is regulated and the operation of the take-up drum 72 is brought about in the following manner:

The woven wire is, of course, wound around the drum 72 after it leaves the roll 73. On the shaft 71 of the drum 72 is a worm wheel 75 with which meshes a worm 76 on a shaft 77. On the shaft 60 is a beveled gear 78 which meshes with a small beveled gear 79, which is rotatably supported on the shaft 77 and has the clutch member 80 formed on there. Non-rotatably but slidably mounted on the shaft 77 is a coacting clutch member 81. A rod 82 is slidably mounted in a bearing 83 and is operatively connected with the clutch member 81 for sliding said clutch member on the rod 78 and for permitting the free rotation of said clutch member. The other end of the rod 82 is pivoted as at 84 to one arm of the bell crank lever 85. The other end of the bell crank lever 85 is pivoted to a link 86, which in turn supports the cross bar 87 between the arms 74. Thus the roll 73 hangs in the slack of the woven wire cloth indicated by the reference character 88. When the slack drops down, the bell crank lever actuates the rod 82 and brings the clutch members 81 and 80 into engagement, whereupon motion is imparted from the shaft 60 to the shaft 71 for winding the screen wire on the drum 72.

As soon as enough screen wire has been wound upon the drum 72 to begin to take up the slack, then the roll 73 is lifted, carrying with it the link 86, and so actuating the bell crank lever 84 as to throw the clutch members 81 and 80 out of engagement.

Thus with the type of mechanism heretofore described, the warp wires are drawn through the machine by the operation of the breast roll.

By means of the rolls 23, 24, 25, 26 and 27, I assure the feeding of all the warp wires at the same speed and thus insure the same length of all the warp wires in any given length of wire cloth. By means of the take-up, the woven wire is wound on the drum 72 without interfering with the operation of the breast roll, and with proper allowance for the diameter of the roll of woven wire.

In this form of feeding mechanism, the feed rolls are idle rolls and before referring more fully to the way in which a feed device of this kind eliminates the difficulties heretofore mentioned, I will describe a slightly modified form of said unit.

Power driven feed unit

In Figures 4, 5 and 6, I have shown a slightly different form of feed unit in which driven rolls are provided. The loom and the general mechanism thereof are the same as in the apparatus already described, except that instead of the breast roll 31, there is an idler breast roll 90.

The feed unit of the modified form includes two wide frame members 91, which are rigidly connected to loom frames 10.

In this form of unit, there is provided a shaft 16 similar to that already explained and also a rod 21 similar to that already explained, and also rolls 23*a*, 24*a*, 25*a*, 26*a*, and 27*a* similar in size and location and arrangement to the rolls 24–27 except for the differences hereinafter referred to.

It will have been noted that the frame members 91 are not pivoted as are the frame members 18.

The feed rolls 23*a*–27*a* are connected and operated at the same surface speed by means of a chain of gears 92. The shaft 93 of the roll 24*a* has on one end the beveled gear 94, which is operated from the shaft 60 in the following manner:

On the shaft 60 is a worm 95 meshing with a worm wheel 96 on a counter-shaft 97.

One of the frame members 91 carries a driven shaft 98.

Motion is transmitted from the shaft 97 to the shaft 98 by means of sprockets 99 and 100, and a sprocket chain 101.

On the shaft 98 is a beveled pinion 102 meshing with the beveled gear 94.

Thus the rotation of the shaft 60 imparts continuous rotation to the shaft 93 and therefore to the feed rolls, so that the unit in this case provides a positive feed.

In the form of the feeder device now under consideration, the connecting member 87 supports a carrier 103 for a heavy weight 104 for maintaining sufficient tension on the wire cloth.

Modified rocker mechanism

Where this second form of feed unit is employed, a slightly different form of rocker mechanism is used.

In order to maintain full frictional contact between the surfaces of the rolls and the warp wires, it is essential that the wire be under some tension, both as it leaves and as it enters the rolls.

The leaving tension of course is provided by means of the carrier 103 and the weight 104. It is therefore desirable to have some tension on the wires as they enter the feed rolls not only in order to maintain full frictional contact between the wires and the rolls, but also to provide for any reversing movement of the loom.

I therefore provide a rocker which will put considerable weight against the vertical warp wires and between the members 16 and 21, and which will have a long stroke, so that if the rolls are reversed, the rocker will pull the loose wires backwardly enough to maintain tension.

I have provided the laterally spaced rocker arms 105 having the rearwardly inclined portions 106 at their upper ends connected by the rocker bar 107. An arm 108 projects rearwardly from each arm 105 and carries a heavy weight 109.

Instead of the rod 58, I provide in this form of my feed, rods 58*a*, which are slidably extended through rotatable studs 110 on the arms 105. The rods 58*a* are connected with the shaft 55 in the same way as the rod 58.

On each rod 58*a* is a collar 111 to engage the studs 110 so that in the ordinary operation, between each "beat" of the loom, the bar 107 will be swung to draw some wire over the shaft 16 and leave some slack between the shaft 16 and rod 21. Even this slack will be under some tension on account of the weight 109. The weight 109 is sufficiently heavy to pull the warp wires back and maintain them in perfectly tangential contact with the periphery of the roll 25*a* when the direction of the rolls is reversed, but it does not exert a pull sufficient to unwind the warp supply spools. As a consequence, it draws wire from the spools only when forced rearward by the collars 111 upon the rods 58*a*. However, it readily takes up the slack in the warp between the members 16 and 20 if the loom and feed rolls are reversed.

In case the loom is reversed for brief action, the weights 109 will swing the rocker bar 107 rearwardly farther than the collar 111 will follow. Then when forward movement of the loom is resumed, the slack in the warp wire will be gradually taken up until the parts are in normal position, whereupon the reciprocating rod and the collar 111 will create a proper amount of slack in the warp wires at each beat of the loom.

Operation

I have found that with the devices of the kind described herein, whereby the warp wires are fed at an equal speed to the loom mechanism, the difficulties mentioned earlier in this specification are almost eliminated.

Any tendencies arising from slight tension errors or variations in size or hardness of the wires are automatically corrected.

An example will illustrate how this occurs.

Suppose a loom equipped with my feed is started with all warp wires under the same tension. After the passage of the shuttle laying the first weft wire the following heddle reversal will crimp all warp wires. Those that are soft or small will crimp the most. The next weft wire will crimp the warp again, but as the warp wires that were crimped the most at the prior passage of the shuttle will have utilized a little additional length in so doing, and they can not pass through the feed faster than their neighbors, it follows that they will then have acquired a little more tension than their neighbors, depending upon the amount of extra crimp to which they have been subjected.

This additional tension will reduce the next crimp, and each succeeding crimp, until the extra tension developed in each individual small or weft wire exactly balances the extra size or hardness of the average wire in crimp production.

At the same time that the small and soft wires are acquiring tension to reduce their crimp, the large and hard wires are losing tension, because their smaller crimp does not utilize so much length.

As the loom continues to run, the extra tension of the soft and small wires balances as it were the hardness and size of the hard and large wires, so far as crimp producing ability is concerned, and from then on wire cloth of uniform crimp will continue to be produced with a minimum of variation from the ideal.

Such wire cloth will roll properly and will lie straight and flat when unrolled.

It is, of course, true that the warp wires used must be of reasonably uniform size and temper, but a feed of this kind will take care of the usual variations found in wire selected with reasonable care.

The advantages of a feeder unit which operates as does the unit herein described will, of course, be understood from the foregoing explanation of the problems involved.

I am able by means of my unit to weave wire with more nearly a uniform crimp than has been possible with mechanisms heretofore employed.

This makes a better wire which arouses less complaint from customers and produces the wire cloth with a minimum amount of wire.

It is, of course, obvious that changes may be made in the details of the construction and arrangement and combination of the parts of my feeder unit, and it is my purpose to cover by my claims, any modified forms of construction or use of mechanical equivalents, which may be reasonably included within their scope and which are within the true spirit and scope of my invention.

I claim as my invention:

1. In a wire cloth weaving loom, a plurality of warp wire feeding rolls arranged for providing for the feeding of a plurality of warp wires at the same rate of speed, a grooved guide shaft arranged in the path of the warp wires ahead of the rollers, and a rocker bar for intermittently pulling the wires around the shaft for affording a relatively slack section of wires between the shaft and the rollers.

2. In a wire cloth weaving loom, a pair of spaced frame members, a plurality of rolls carried thereby for supplying a plurality of warp wires in equal lengths to the weaving mechanism, a grooved guide shaft spaced from the rolls in the path of the warp wires, and a rocker bar arranged to reciprocate across the path of said wires between the guide shaft and the rolls.

3. In a wire cloth weaving loom, a warp wire feeding unit comprising a tiltable frame, rolls thereon, arranged to travel at the same surface speed over which warp wires may be threaded, to cause them to travel at the same speed, resilient means for limiting the movement of the frame in one direction, a guide shaft on the frame for the warp wires, a rocker bar associated with the frame for reciprocation across the path of the wires between the shaft and the rollers.

4. In a wire cloth weaving loom, a warp wire feeding unit including a frame, pivotally mounted to move the rolls mentioned below toward and from the fell of the cloth, warp wire rolls carried by the frame, arranged to travel at the same surface speed over which warp wires may be threaded, to cause them to travel at the same speed, means for resiliently limiting the pivotal movement of the frame toward the fell, means tending to pull the frame away from the fell, means adapted to intermittently move across the path of the warp wires before they reach the rolls for producing slack in them, wire guide means on opposite sides of said last named means, a device for pulling the warp wire from the feeding unit, a brake for said rolls, and means for controlling the brake according to

the tension of the warp wires between the unit and said device.

5. In a wire cloth weaving loom, a warp wire feeding unit including a frame, pivotally mounted to move one end and the rolls mentioned below toward and from the fell of the cloth, warp wire rolls carried by the frame, arranged to travel at the same surface speed, over which warp wires may be threaded, to cause them to travel at the same speed, means for resiliently limiting the pivotal movement of the frame toward the fell, a device for pulling the warp wire from the feeding unit, a brake for said rolls, and means for controlling the brake according to the tension of the warp wires between the unit and said device.

6. In a wire cloth weaving loom, a warp wire feeding unit including a frame, pivotally mounted to move one end and the rolls mentioned below toward and from the fell of the cloth, warp wire rolls carried by the frame, means for resiliently limiting the pivotal movement of the frame toward the fell, means adapted to intermittently move across the path of the warp wires, before they reach the rolls, for producing slack in them, a device for pulling the warp wire from the feeding unit, a brake for said rolls, and means for controlling the brake according to the tension of the warp wires between the unit and said device.

7. In a wire cloth weaving loom, a warp wire feeding unit including a frame, warp wire tensioning and feeding rolls carried by the frame and geared to travel at the same surface speed, means for imparting rotation to said rolls, a guide for the warp wires just prior to their reaching the rolls, a guide for the warp wires, substantially spaced from the rolls, a rocker bar, means for positively moving the rocker bar intermittently across the path of the wires before they reach the rolls, and means for yieldingly holding the said bar against the wires.

8. In a wire cloth weaving loom, a warp wire feeding unit including a frame, warp wire feeding rolls carried by the frame and geared to travel at the same surface speed, means for imparting rotation to said rolls, and means for putting slack in the warp wires before they reach the rolls.

9. In a wire cloth weaving loom, a warp wire feeding unit including a frame, warp wire rolls carried by the frame and geared to travel at the same surface speed, means for imparting rotation to said rolls, means for imposing tension on the warp wires before they reach the rollers, comprising a rocker bar, and means for yieldingly holding the said bar against the wires.

10. In a wire cloth weaving loom, a warp wire feeding unit including a frame, warp wire feeding rolls carried by the frame and geared to travel at the same surface speed, means for imparting rotation to said rolls, a rocker bar, means for positively moving the rocker bar intermittently across the path of the wires before they reach the rolls, and means for yieldingly holding the said bar against the wires.

11. In a wire cloth weaving loom, a warp wire feeding unit including a frame, warp wire rolls carried by the frame, the frame being mounted to move these rolls toward and from the loom, and means for resiliently limiting the movement of the frame toward the loom.

12. In a wire cloth weaving loom, a warp wire feeding unit including a frame, warp wire rolls carried by the frame, the frame being mounted to move these rolls toward and from the loom, means for resiliently limiting the movement of the frame toward the loom, means adapted to intermittently move cross the path of the warp wires before they reach the rolls for producing slack in them, and wire guide means on opposite sides of said last means.

13. In a wire cloth weaving loom, a series of rolls, arranged to travel at the same surface speed, arranged in rows in nested relation so that warp wires threaded over them will travel at the same speed, spaced wire guide means in the path of the wire ahead of the rolls, and means for imparting relative slack to the wires between the guides.

14. In a wire cloth weaving machine, warp wire rolls, a breast roll for drawing the cloth from the machine, a take-up drum for cloth passing from the breast roll, a swinging roller resting on the cloth between the breast roll and the take-up drum, and thus move it out of line between said breast roll and drum, and means for rotating the drum controlled by the position of said swinging roller.

15. In a wire cloth weaving machine, a frame, a plurality of warp wire rolls thereon, a warp wire guide roll spaced from said first-named rolls, a rocker bar adapted to rest against the wires extending between the last-described roll and the first-described rolls, and means tending to hold the rocker bar against such wires for taking up slack when the operation of the machine is temporarily reversed.

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