July 31, 1934. F. E. FOWLER 1,968,755

NEEDLE WEAVING ATTACHMENT FOR LOOMS

Filed Aug. 24, 1932 4 Sheets-Sheet 1

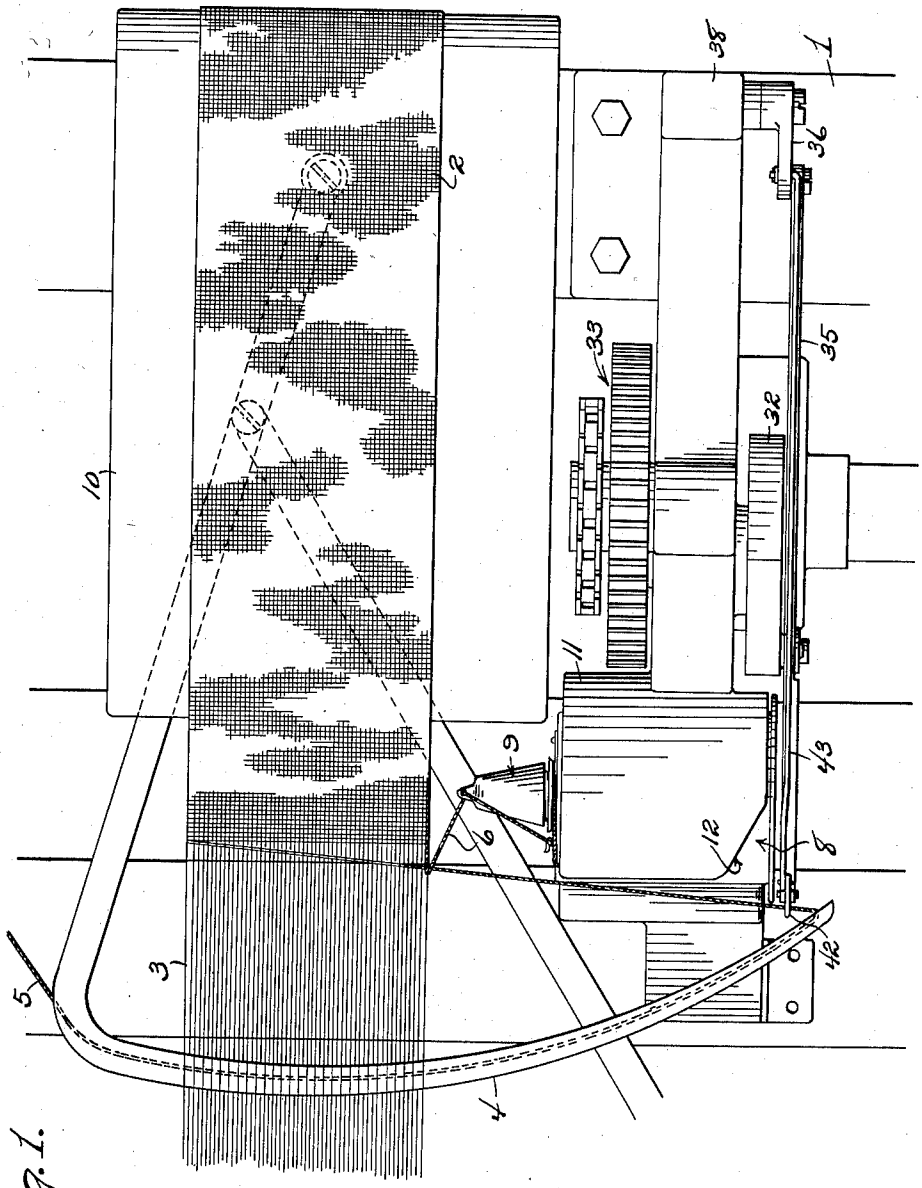

Fig. 1.

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Fig. 2.

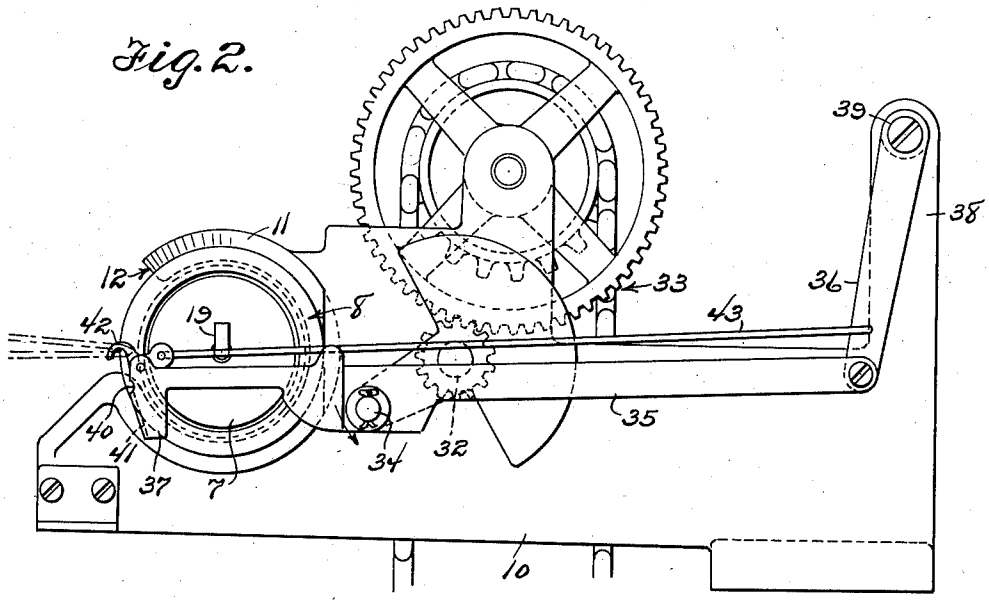

Fig. 3.

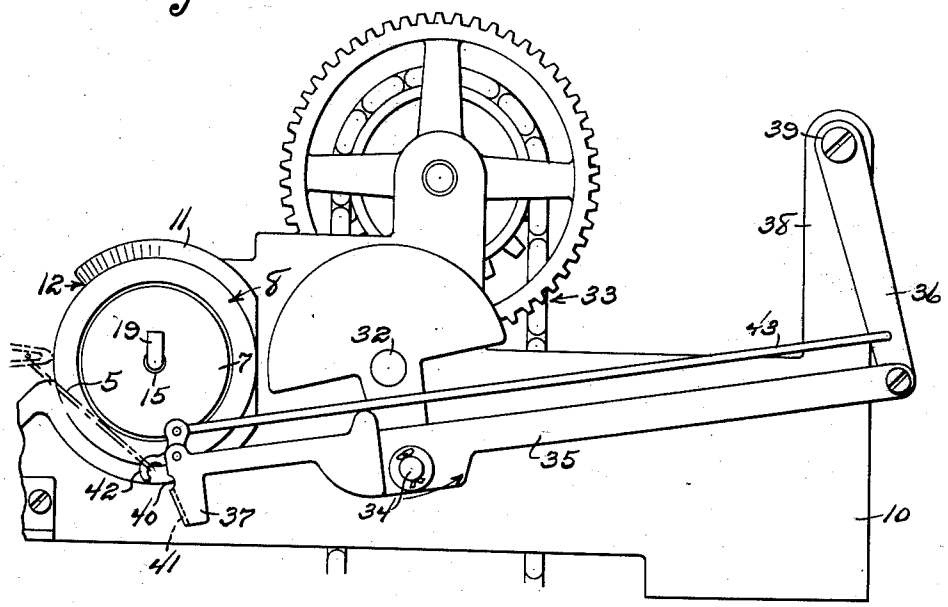

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Fig. 4.

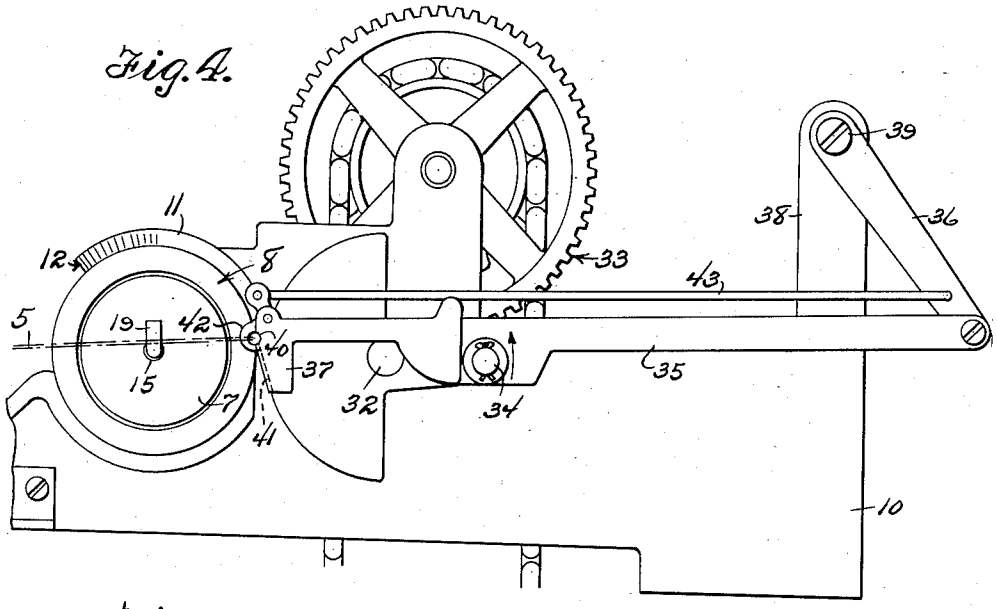

Fig. 5.

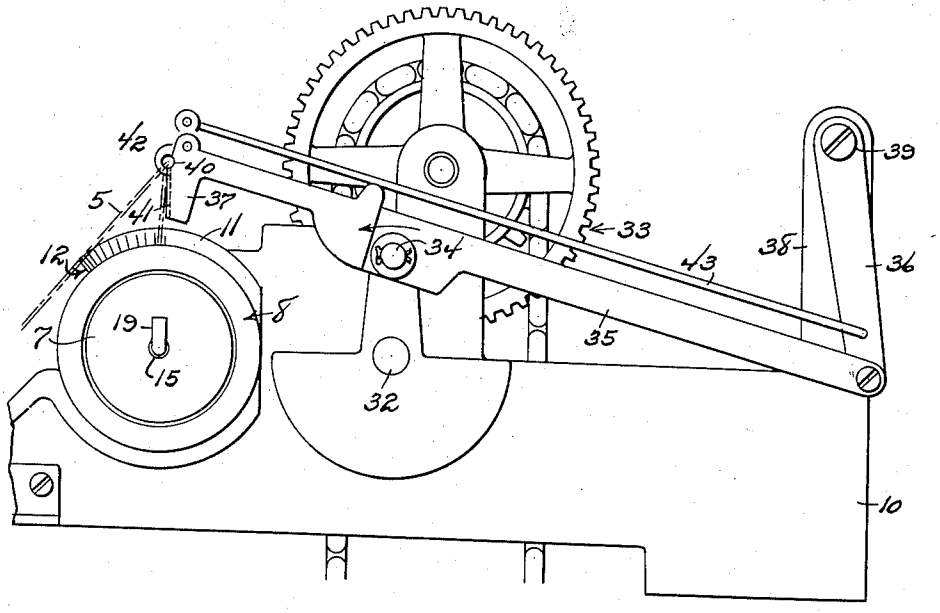

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Fig. 6.

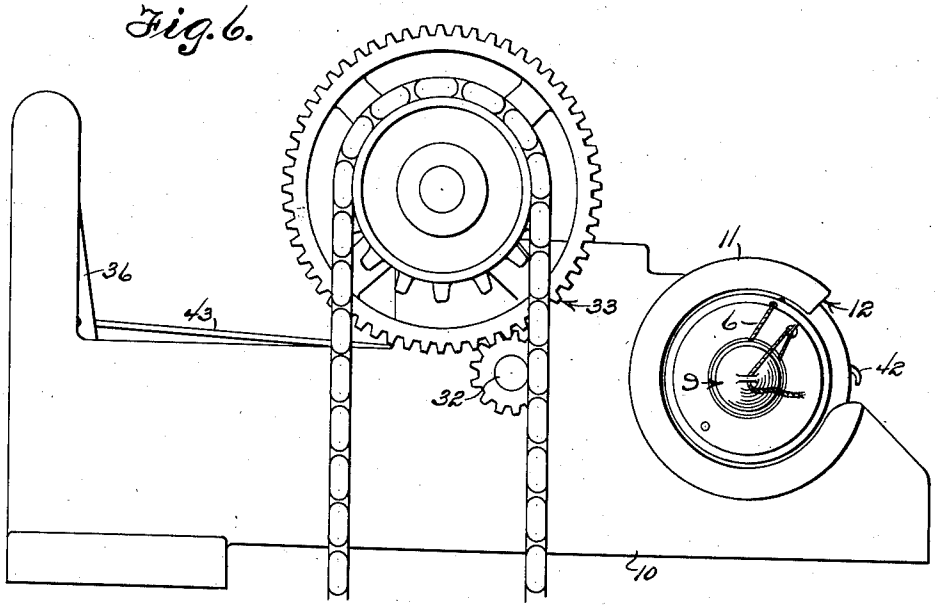


Fig. 7.

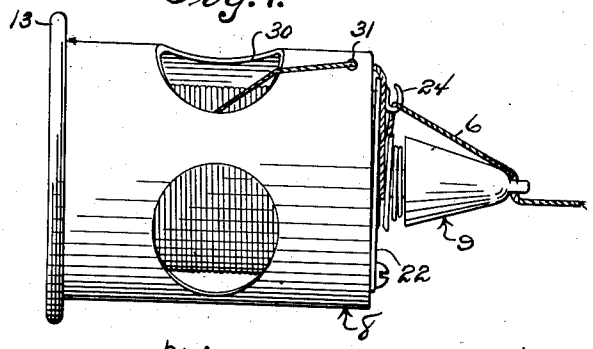


Fig. 8.

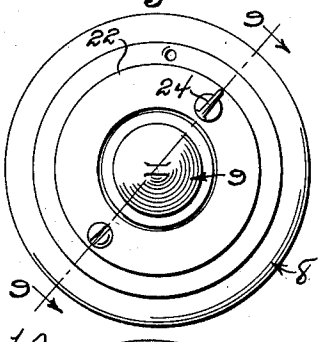


Fig. 9.

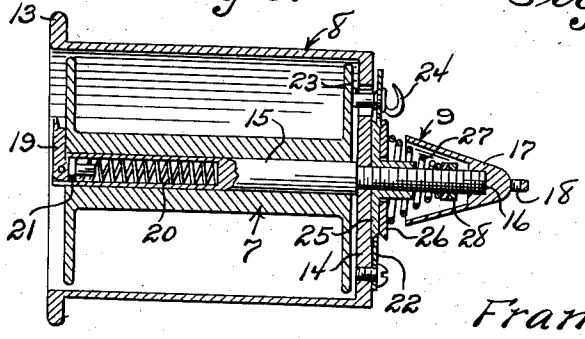
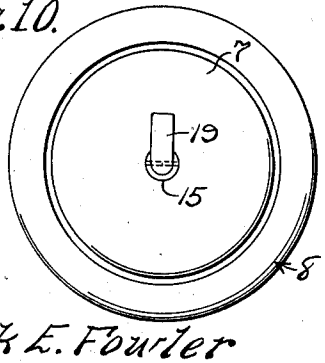


Fig. 10.



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Patented July 31, 1934 1,968,755

UNITED STATES PATENT OFFICE

1,968,755

NEEDLE WEAVING ATTACHMENT FOR LOOMS

Frank Edward Fowler, Athens, Ga.

Application August 24, 1932, Serial No. 630,297

5 Claims. (Cl. 139—124)

This invention relates to needle weaving attachments for looms, of the character set forth in my United States Letters Patent granted February 21, 1928 and numbered 1,659,728 and has for the primary object the provision of an improved means for looping or entwining the filling thread around the holding or selvage thread and which consists of a minimum number of parts of the simplest construction to render the device fool-proof and free from adjustment, will efficiently operate at any speed practical to the operation of the loom to which it is applied, and will permit any kind of yarn to be employed in weaving the fabric.

With these and other objects in view this invention consists in certain novel features of construction, combination and arrangement of parts to be hereinafter more fully described and claimed.

For a complete understanding of my invention, reference is to be had to the following description and accompanying drawings, in which

Figure 1 is a fragmentary top plan view illustrating a needle weaving attachment for looms constructed in accordance with my invention.

Figure 2 is a fragmentary side elevation illustrating the looping arm and its finger in the act of engaging the filler thread.

Figure 3 is a view similar to Figure 2 showing the looping arm positioned just prior to the closing of the finger.

Figure 4 is a view similar to Figures 2 and 3 showing the looping arm with the finger in a closed position.

Figure 5 is a view similar to Figure 4 showing the looping arm positioned with the finger in a closed position just prior to opening for the purpose of releasing the filler thread.

Figure 6 is a fragmentary side elevation illustrating the opposite side of the attachment from that shown in Figures 2 to 5, inclusive, and illustrating the drive and the selvage thread leaving the bobbin.

Figure 7 is a plan view illustrating the bobbin and its holder.

Figure 8 is an end view illustrating the same.

Figure 9 is a sectional view taken on the line 9—9 of Figure 8.

Figure 10 is an end view illustrating the opposite end of the holder and the bobbin.

Referring in detail to the drawings, the numeral 1 indicates a fragmentary portion of a loom frame with the shed 2 thereon and including the usual warp threads 3 between which operates the needle 4 for the purpose of feeding the filler thread 5 back and forth through the warp threads. The operation of the needle 4 is in accordance with that set forth in my Letters Patent above referred to. The selvage, or holding thread 6 is woven within the edge of the fabric along with the filling thread by action of the needle 4. To render the selvage uniform it is necessary that the filler and selvage thread be always maintained under an even tension which is accomplished by a suitable tension applied to the filler thread before it reaches the needle. A bobbin 7 and its holder 8 provided with a tension device 9 will be hereinafter more fully described.

The filler thread is looped around a holding thread on every pick of the needle.

A casting 10 is suitably mounted on the loom frame 1 adjacent the shed 2 and needle 4 and has formed therein a journal or bearing 11 for supporting the holder of the bobbin 7 and is provided with a cut-away portion to form a mouth 12 located adjacent the path of movement of the needle 4. The holder 8 is of cylindrical formation having one end fully open and provided at that end with a marginal flange 13 spaced slightly from one end of the bearing or journal 11. The other end of the holder 8 is closed by an end wall 14 apertured to receive a bobbin shaft 15 which is provided with a screw threaded portion 16 arranged outwardly of the holder and has threaded thereto a cone-shaped guard 17 carrying an eye 18 at its apex. The bobbin 7 is removably mounted on the shaft 15 and held in operative position by a pivoted latch 19 located at one end of the shaft 15 and engaged by a tension means 20 located in a socket formed in the shaft 15. The pivoted end of the latch is of cam shape which rides against a follower 21 engaged by the tension means 20 for the purpose of retaining the latch at right angles to the shaft 15 to prevent the bobbin from moving off of the shaft during the operation of the device.

A tension member 22 is secured to the end wall 14 upon the exterior thereof and carries a brake pin 23 extending through an opening in the end wall 14 for engagement with one end of the bobbin 7. The pin 23 carries a hook 24. As shown in Figures 8 and 9, the tension member 22 is a resilient strip in the form of a ring whereby it may pass around the shaft and the tension discs. This member is fixed at one point to the end of the bobbin holder and the pin 23 and hook 24 are secured at a diametrically opposite point of the ring. The ring tends constantly to hold the brake pin 23 against the

bobbin but when the thread is being drawn through the hook 24, the pull on the thread overcomes the tension member and withdraws the pin 23 from the bobbin. Friction discs 25 and 26 are mounted on the screw threaded portion 16 of the shaft 15 and fitting within an opening provided in the tension member 22 with the friction disc 25 bearing against the end wall 14. The friction disc 26 is engaged by a coil spring 27 to maintain the discs 25 and 26 in proper frictional contact with each other. The spring 27 engages adjusting nuts 28 on the screw threaded portion 16 of the shaft 15 within the cone-shaped guard 17 whereby the tension of the spring 27 may be increased and decreased as desired. The friction discs 25 and 26 have their peripheries beveled to form a thread groove.

The object of tension member 22 and brake pin 23 is to lock the bobbin 7 so it will not turn and allow slack in the selvage thread while the filler thread is being looped around the bobbin holder 8. The filler thread rubs over the selvage thread where same comes out of holder 8 and would cause a slight pull on bobbin 7 if the bobbin was free to turn when the filler thread was looped around it. Tension discs 25 and 26 furnish the necessary tension for the selvage thread.

The selvage thread 6 is carried by the bobbin 7 and feeds off the bobbin through an opening 30 in the holder 8 and then through guide openings 31 of the holder, being then passed about a friction disc without the thread groove and over the hook 24 and through the eye 18 of the guard 17. A pull made on the selvage thread by the filler thread will disengage the brake pin 23 from the bobbin, allowing the latter to rotate. However, on the decrease or stopping of the pull on the thread 6 the brake 23 automatically retards the rotation of the bobbin and prevents slack from occurring in the selvage thread between the bobbin 7 and the tension discs 25 and 26.

A counter balanced crank shaft 32 is journaled through the casting and is driven from the power shaft of the loom through gearing and sprocket chain drive, as shown at 33, to cause smooth operation of the crank shaft, and due to its counter balance vibration is reduced to a minimum. The wrist pin 34 of the crank shaft has journaled thereon a looping arm 35, one end of which is pivoted to the lower end of a hanger 36 while the opposite end of the looping arm is enlarged to form a hook-shaped head 37. The hanger 36 is pivoted to a standard 38 on the casting 10, as shown at 39. The head 37 is adapted to travel in an elliptical path at one end of the bearing or journal 11 and to move about the flanged end 13 of the bobbin holder 8. The head 37 is provided with a notch 40 and a groove 41 to cooperate with a hooking finger 42 in receiving and holding the filler thread during the operation of the device. The hooking finger 42 is pivoted to the head 37 and to an operating rod 43 which is in turn pivoted to the hanger 36 above the pivotal connection between the hanger and the looping arm 35. The purpose of the operating rod 43 is to cause an opening and closing of the finger 42 with respect to the head 37 during the movement of the latter about the end of the bobbin holder.

The best results are found to be obtained by a gear ratio which causes the counter balanced crank arm to rotate five times to one revolution of the power shaft of the loom, or one complete in and out movement of needle 4, the looper arm running free during four revolutions while awaiting return movement of the needle. The hooking finger 42 when in open position forms a hook to engage the filler thread and when in a closed position cooperates with the head 37 in forming a closed eye to prevent the escape of the filler thread therefrom. As shown in Figure 2, the needle 4 has assumed an inward position and the finger is in an open position in the act of engaging the filler thread. Obviously, the crank 34 travels in a circular path and the arm 35 must follow the same path at the point where it is pivoted to the crank. The hanger 36, however, oscillates and the end of the arm pivoted to the hanger cannot, therefore, move in a circle, the result being that the free end of the arm will move over an elliptical path. The rod 43 has the same movement as the looper arm but as its ends swing on a shorter radius than the arm, there follows a rocking movement of the finger relative to the head. The head 37 and the finger move downwardly from the position shown in Fig. 2 following the curvature of the bobbin holder and carrying the filler thread between the holder and the bearing 11, as shown in Figure 3. As the finger 42 and the head 37 start upwardly still following the curved path and in alinement with the periphery of the flange 13 on the holder 8, the finger moves into a closed position as shown in Figure 4 owing to the different angular positions assumed by them and maintains this position during the further upward movement of the head 37, as shown in Figure 5, drawing the filler thread around the holder 8 and tensioning the same against the upper portion of the journal 11, entwining said filler thread about the selvage thread. When the parts reach the positions shown in Figure 5, the head and the finger are above the bobbin holder and the pull of the filler thread is downwardly, so that as the travel continues toward the position shown in Figure 2, the finger opens and the thread snaps or jerks free thereof when drawn by the receding needle.

From the foregoing description taken in connection with the accompanying drawings it will be seen that a very efficient means has been provided for entwining the filler thread about the selvage thread with a complete smoothness of operation, the various parts being so designed that vibration is practically eliminated, assuring longer life thereto and permitting said means to efficiently operate at all speeds of the loom. It is further to be noted that the selvage thread is always kept to an even tension free of any slack and any knot or lump in the thread would ordinarily cause a hard pull on said thread as it tries to pass under the tension washers, but by arranging the thread coming from the tension washers so that it will pull against the pressure of the tension spring allowing the knot or lump to pass much freer since the thread leaving the tension will pull against the spring to relieve the pressure.

While I have shown and described the preferred embodiment of my invention, it will be understood that minor changes in construction, combination and arrangement of parts may be made without departing from the spirit and scope of my invention, as claimed.

Having described the invention, I claim:

1. In a weft supply loom having a needle for passing a filler thread through warp threads of a shed, a horizontally arranged bobbin holder, a bobbin carried by the holder for supplying a sel-

vage thread to the shed, tension means for a selvage thread, a counter balanced crank shaft journaled adjacent the bobbin holder, a looping arm journaled to the crank shaft, a rocking support for one end of the arm, and automatic means carried by the other end of said arm to engage the filler thread and move the latter in a circular path about the bobbin holder whereby said filler thread will entwine about the selvage thread as it is drawn through the shed by the needle.

2. In a weft supply loom having a needle for passing a filler thread through warp threads of a shed, a horizontally arranged bobbin holder, a bobbin carried by the holder for supplying a selvage thread to the shed, a tension means for the selvage thread, a counter balanced crank shaft journaled adjacent the bobbin holder, a looping arm journaled to the crank shaft, an oscillatory hanger suspending one end of the arm, a head on the other end of the arm, a hook shaped finger pivoted to said head, and means between said finger and said hanger to cause an opening and closing of the finger relative to the head during the movement of the said head in a circular path with respect to the bobbin holder, whereby to engage the filler thread and entwine the latter about the selvage thread and automatically release said filler thread.

3. In a weft supply loom having a needle for passing a filler thread through warp threads of a shed, a bearing having an open side to form a mouth, a bobbin holder mounted in the bearing, a bobbin carried by said holder and containing a selvage thread to be fed to the shed, tension means for the selvage thread, a crank shaft, counter balance means for said shaft, means for rotating the shaft, a looping arm journaled to the crank shaft, an oscillatory hanger suspending one end of the arm, a head at the other end of the arm, a hook-shaped finger pivoted to the head, and means between the finger and said hanger to cause automatic movement of the finger relative to the head for opening and closing the finger with respect to the head, said head traveling in an elliptical path with respect to the bobbin holder and said finger engaging the filler thread to move the latter about the bobbin holder between the latter and the bearing to entwine said filler thread about the selvage thread and to automatically release the filler thread at the mouth of the bearing.

4. In a loom of the type set forth, a bobbin holder having an open end, a bobbin in said holder carrying a selvage thread, a rotating crank adjacent the bobbin holder, a looping arm pivotally mounted between its ends upon said crank, an oscillatory hanger suspending one end of said arm, the opposite end of said arm being free and disposed adjacent the open end of the bobbin holder, a head on the free end of the said arm, a finger pivoted on the head and projecting above the same, and a rod disposed above and parallel with the looping arm and having one end pivoted to the hanger and its opposite end pivoted to the upper end of the finger, whereby as the arm rocks the finger will be caused to engage the head with a filler thread between the same and the head, wrap said thread around the bobbin holder, and release said thread at a point above the holder.

5. In a weft supply loom having a needle for passing a filler thread through warp threads of a shed, a horizontally arranged bobbin holder, a bobbin containing a selvage thread carried by the holder for feeding the selvage thread through the shed by the movement of the needle, a rocking arm mounted to operate at the end of the bobbin holder, and a finger pivotally mounted on said arm to engage the filler thread and wrap said thread about the bobbin to pass therefrom and loop around the selvage thread upon receding movement of the needle.

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