April 5, 1938. J. S. KENNARY 2,112,912

LOOPING ATTACHMENT FOR LOOMS

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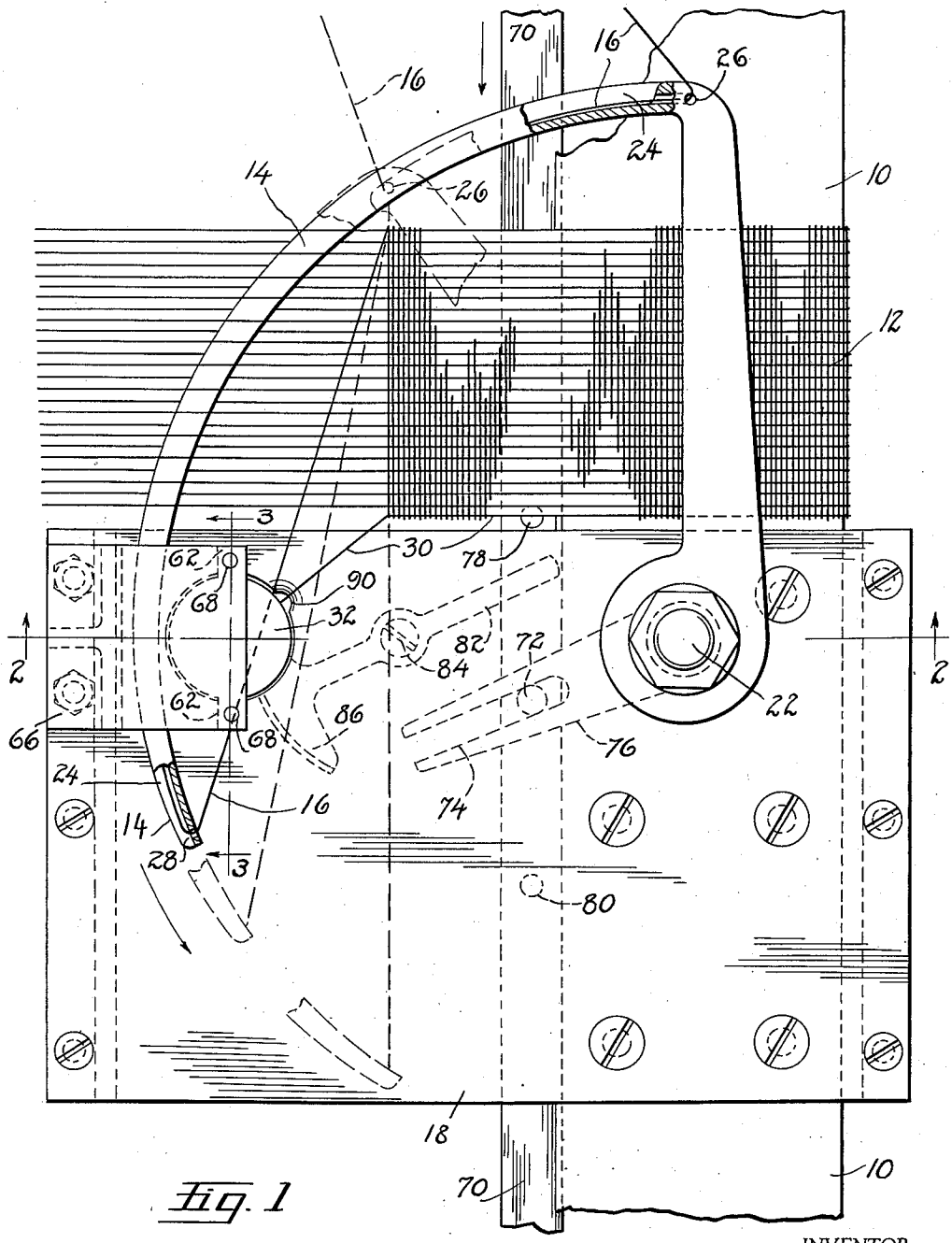


Fig. 1

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Fig. 3

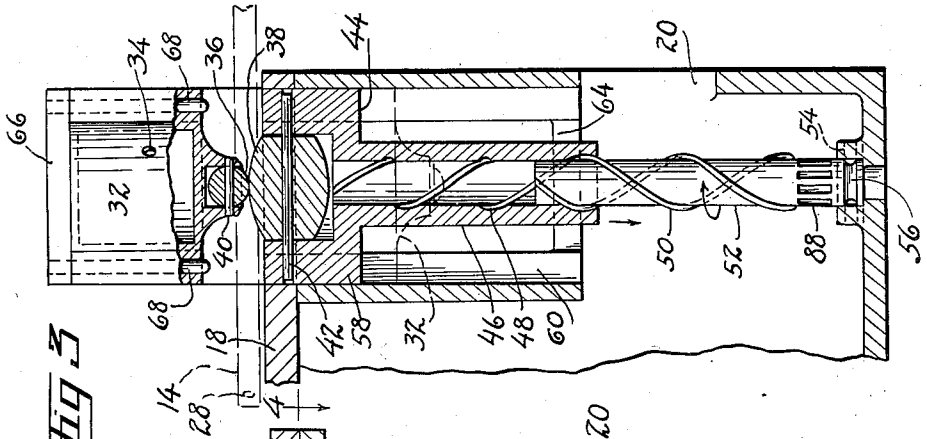
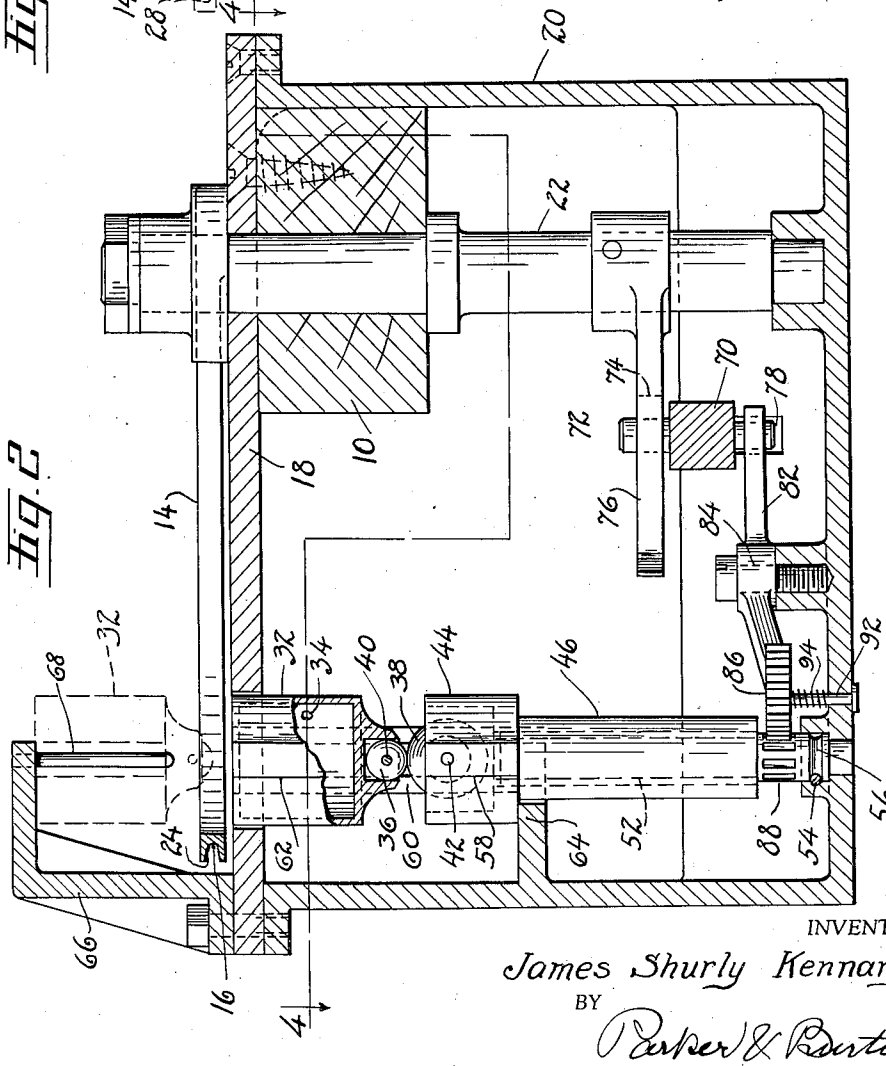


Fig. 2



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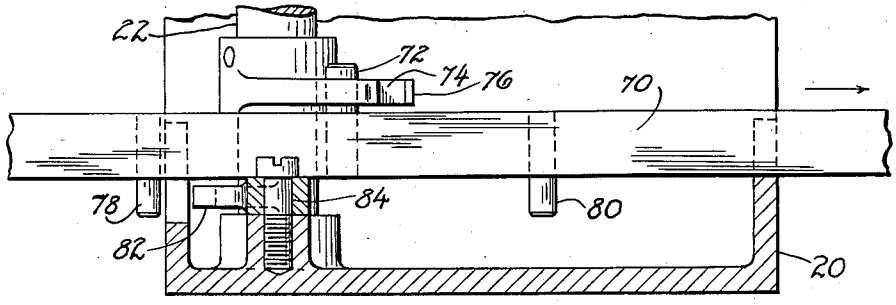


Fig. 5

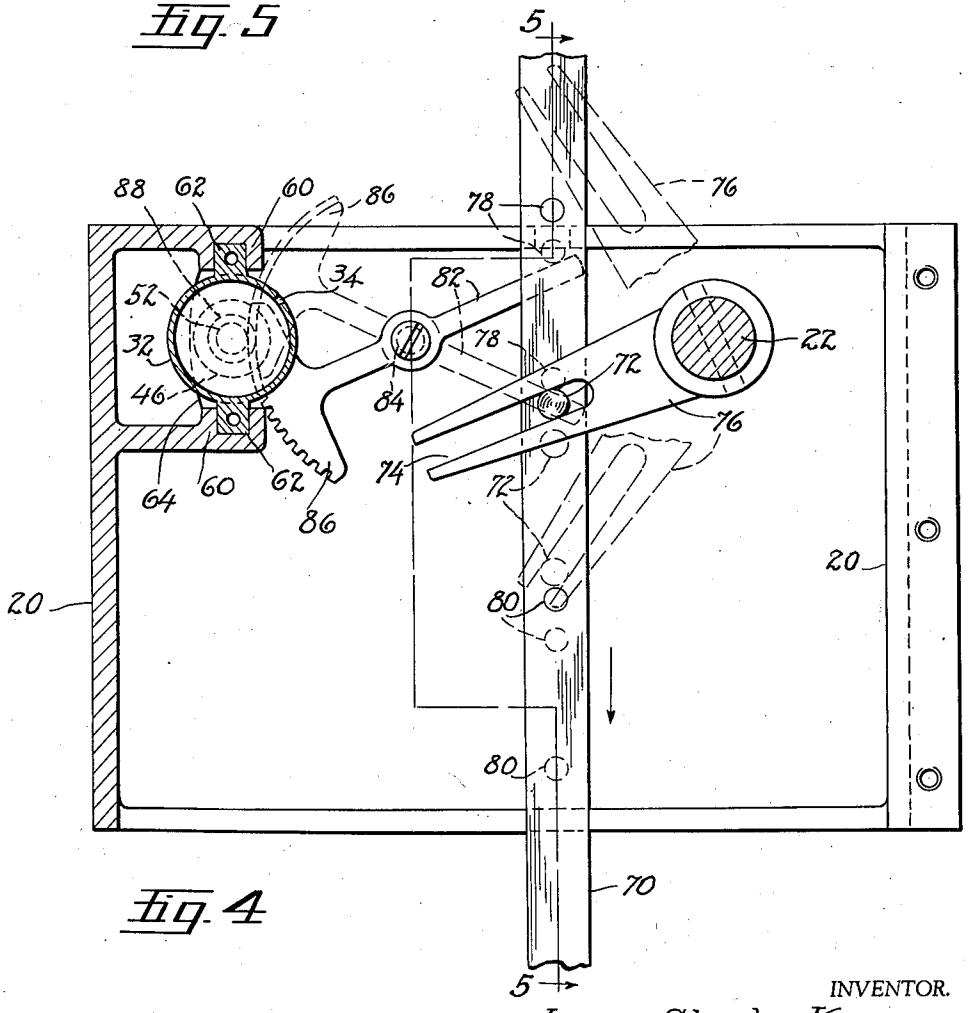


Fig. 4

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UNITED STATES PATENT OFFICE

2,112,912

LOOPING ATTACHMENT FOR LOOMS

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Application April 8, 1936, Serial No. 73,251

5 Claims. (Cl. 139—124)

This invention relates to improvements in looms and more particularly to a novel method of and apparatus for looping a weft thread about a warp thread in the manufacture of cloth.

A primary object of this invention is to provide a new and improved method of and apparatus for looping a weft thread about a selvedge warp thread. The invention is adapted to loop the threads with a minimum amount of strain upon the threads and without causing the weft thread to move substantially from the plane of the warp threads of the cloth being formed. The device is easily and economically constructed and the parts are easily replaced when desired. The embodiment of the invention described herein is particularly adapted for the weaving of narrow fabrics but it is to be understood that the principles of this invention are applicable to the formation of wider fabrics.

More particularly, the invention is especially adapted for those weaving devices in which an oscillating needle or arm feeds the weft thread through the shed of warp threads and operates in conjunction with a bobbin which feeds a selvedge thread to the cloth being formed. The invention comprises novel mechanism for bodily shifting the bobbin from a position on one side of the plane of the needle to a position on the other side of the plane of the needle. This operation is so synchronized by novel operating devices that the weft thread is advanced by the needle past one side of the bobbin and is returned on the other side thereof thus looping the weft thread about the selvedge thread.

More specifically, the novel mechanism comprises a pair of arcuate surfaces or rollers contactingly engaging one another on their peripheries and arranged to bodily shift the bobbin in timed relation to the movement of the weft feeding needle. The weft thread is caused by the needle to pass between these contacting surfaces and in this manner pass the weft thread from one side of the bobbin to the other. The bobbin is bodily shifted before return movement of the weft feeding needle so that the weft is carried past the bobbin on the opposite side of the selvedge thread which is fed therefrom. By this novel mechanism the weft thread is looped around the warp thread.

A meritorious feature of this invention is the fact that a plurality of these looping attachments may be secured upon the framework of a loom and all be operated from a single movable easily controlled element. These looping attachments are readily secured to the framework of any standard type of loom. They are designed for attachment to a loom without altering the structure of the loom to any great extent. The looping device itself is supported upon a flat plate which is readily secured to the breast beam of a loom. When a plurality of such devices is desired upon a loom, they may be mounted in a row upon the breast loom and all be operated by a reciprocating member or other suitable mechanism extending below and parallel with the breast beam.

Other objects, advantages and meritorious features will further appear from the following specification, appended claims and accompanying drawings, wherein:

Figure 1 is a top plan view of the looping device showing its position upon the framework of a loom,

Fig. 2 is a cross-sectional view of the looping device along line 2—2 of Fig. 1,

Fig. 3 is a cross-sectional view along line 3—3 of Fig. 1,

Fig. 4 is a cross-sectional view along line 4—4 of Fig. 2,

Fig. 5 is a cross-sectional view along line 5—5 of Fig. 4.

Referring in detail to the drawings, the breast beam of a standard loom is indicated at 10. Across the upper surface of the breast beam is led the woven material or cloth 12 as it is formed. As is the usual practice, the warp threads of the cloth are controlled by heddles to form a shed. The filler or weft thread is carried through the shed between operations of the heddles. In the embodiment illustrated herein, a curved needle 14 passes the filler or weft thread 16 back and forth through the shed. The weft thread is looped around the selvedge warp thread along the right hand margin of the cloth material 12 by the action of the heddles transferring the alternate leaves of warp threads to reverse position. The weft thread 16 is looped around the selvedge warp thread along the left margin of the cloth material by the novel looping device to be hereinafter described.

Fixed upon the breast beam is a flat plate 18. Secured to this plate by suitable means is a support or bracket 20 which extends below and from one side of the breast beam to the other as shown in Fig. 2. Rotatably journalled in the breast beam and upon the bottom of the bracket is a vertical shaft 22. The needle 14 is fixed to this shaft above the plate 18 as indicated in Fig. 2. Rotation of the shaft swings the needle in an arcuate path through the shed and across

the top of the plate as the various dotted positions in Fig. 1 indicate.

The needle is provided with a peripheral groove **24** through which the weft thread **16** is fed. One end of the groove opens through an aperture **26** for receiving the weft thread from a suitable source of supply. The other end of the needle is apertured on its under side at **28** for feeding the weft thread to the cloth material.

The selvedge warp thread **30** is fed from a bobbin located within a cylindrical holder or housing **32** arranged in a novel manner for bodily movement through a hole in the plate **18**. The bobbin is not shown but it is understood that the cylinder contains any suitable type of bobbin. The selvedge thread **30** is delivered from an aperture **34** in the side of the bobbin holder **32**. When the top of the bobbin holder is in lowered position its top surface is flush with the upper surface of the plate **18** and forms a part thereof as indicated in Fig. 2. In its fully raised position the bobbin holder is lifted completely out of the hole in the plate as indicated in Fig. 3. The top of the bobbin holder may be arranged for removal so that access may be had to the interior thereof.

Mechanism for reciprocating the bobbin holder comprises a novel device employing a point contact as the means for raising and lowering the bobbin. More specifically the device comprises a pair of arcuate surfaces or rollers **36** and **38** whose peripheries contact one another and form by this means the sole support of the weight of the bobbin holder. The smaller roller **36** is suitably contained or housed within the tapered bottom portion of the bobbin holder as appears in the drawings and is rotatably supported about a pin **40**. The pin **40** supports the roller so that its periphery extends below the tapered housing within which it is contained. The roller **38** has a barrel formation, the curved side portions of which are the only part of the roller which extend above the level of the plate **18** as shown in Fig. 3. Roller **38** is rotatably supported about a pin **42** which is rotatably journaled in the side walls of a cup-shaped member **44**.

The member **44** is provided with a tube or sleeve **46** having spiral grooves **48** on its inner surface which cooperatively engage with the spiral teeth **50** on the rotatable vertical shaft **52**. Shaft **52** is fixed against longitudinal movement but is free to rotate by a journal support on the bottom of the supporting bracket **20**. The journal comprises a pin **54** extending tangentially through the peripheral groove **56**. The sleeve **46** is free to move vertically up and down within certain limits but is restrained against rotation. The sleeve and member **44** is held against rotation by the provision of squared shoulders **58** arranged diametrically on opposite sides of the member **44**. These shoulders slidably fit within correspondingly shaped guideways **60**. These guideways are supported in any desired manner from the side and end wall portions of the bracket **20**. The bobbin holder **32** is likewise provided with squared shoulders **62** which are adapted to fit into the guideways **60** when the bobbin is in lowered position. This is shown in Fig. 4.

The guideways **60** restrain the sleeve **46** from rotation but allow it to slide vertically. Accordingly, when the shaft **52** is rotated, the spiral teeth **50** drive the sleeve either up or down depending upon the direction of its rotation. The sleeve **46** is limited in its downward movement by the laterally extending member or ledge **64** which engages with the underside of the member **44** as indicated in Fig. 2. This ledge forms part of the support for the guideways **60**.

In order to retain the bobbin holder **32** in position, superimposing the roller **38** and in proper alignment with the guideways **60**, a bracket **66** is secured to the plate **18** and arranged to partly overhang the hole through which the bobbin holder reciprocates. The bracket is provided with a pair of vertical pins **68** each of which is adapted to enter a hole bored through one of the squared shoulders **58** on the bobbin holder as is shown in Figs. 3 and 4. The pins **68** are of such a length that when the bobbin holder is raised above the plate **18** the pins **68** enter their respective holes in the shoulders of the holder prior to the time the shoulders leave the guideways **60**. The holder is therefore kept at all times in proper alignment. The overhanging part of the bracket **66** performs the additional function of limiting the upward movement of the sleeve and bobbin holder assembly.

The bobbin holder is reciprocated in timed relation to the needle operation by mechanism which will now be described. Extending transversely to the supporting bracket **20** and below and parallel with the breast beam **10** is a reciprocating member or bar **70**. This bar is provided with an upstanding pin **72** which is engaged in a slot **74** provided in an arm **76** which is fixed to the shaft **22** as indicated in Fig. 4. It is obvious that reciprocation of the bar **70** will swing the arm back and forth and oscillate the needle a corresponding amount. The extreme limits of this movement are shown by the dotted positions of the arm **76** in Fig. 4.

Extending downward from the member **70** are two pins **78** and **80** which are positioned equal distances on opposite sides of the pin **72** as indicated in Fig. 5. Each of these pins **78** and **80** are adapted to engage with an arm **82** and oscillate the same. These pins engage the arm **82** alternately and only for a part of their total distance of movement. Arm **82** is pivoted at **84** to the bracket **20**. The opposite end of the arm is shaped with an arcuate gear segment **86** having engagement with a geared section **88** on the base of the shaft **52**. It is obvious that rocking movement of the arm **82** will rotate the shaft either in one direction or the other and correspondingly raise or lower the bobbin holder.

The pins **78** and **80** are positioned in such a manner along bar **70** that they cause the bobbin to rise above the plane of the needle when the latter swings in one direction across the plate and to lower the bobbin below the plane of the needle when the same returns so that the weft or filler thread **16** is caused to be passed between the contacting rollers **36** and **38** when the bobbin is in raised position and to be returned across the top of the bobbin when the latter is in lowered position. This acts to loop the weft thread **16** about the selvedge warp thread **30**.

In the embodiment illustrated therein, and as best described in Fig. 1, the bobbin is raised to upper position by the pin **80** striking the arm **82** when the needle is completing its withdrawal movement from the shed. The bar **70** reciprocates to the right to accomplish this movement and the spiral shaft **52** rotates in a direction contrary to the arrow in Fig. 3. When the bar **70** moves toward the left or in the direction of the arrow in Fig. 1, the pin **80** disengages from contact with the arm **82** and the latter is left free

or stationary until pin 78 catches up and thrusts the arm in the direction of movement of the bar 70.

In the meantime the needle, being in constant engagement with the member 70 through the medium of the pin 72 and arm 76, is swung through the shed and partially across the plate. As shown in full lines in Fig. 1, the needle has just passed the weft thread 16 under the bobbin holder and between the rollers 36 and 38. This passes the weft under the selvedge thread 30. As the needle continues to move in counter-clockwise direction, pin 78 engages arm 82 and swings the arm to the dotted position in Fig. 1, the movement causing the shaft 52 to rotate in the direction indicated by the arrow in Fig. 3 and lowering the bobbin holder assembly. The respective positions of the pins 72, 78 and 80, as this swinging movement of the arm 82 is accomplished, is shown in their dotted positions to the left of their full line positions in Fig. 4. When the needle reaches the end of its swing to the left in Fig. 1 the bobbin is in its lowest position below the surface of the plate 18. Return movement of the needle carries the weft thread 16 over the bobbin and the selvedge thread thus looping the former about the latter.

To assist in the delivery of the selvedge thread to the cloth being formed, the hole in which the bobbin holder reciprocates is slightly widened at 90 and beveled to permit the free run of the thread. If desired, the selvedge thread may be first run through a thread tightener of any well known type which may be fixed to the holder either in the interior or upon the exterior of the bobbin holder. In the latter case, the hole in the plate through which the bobbin holder reciprocates may be widened for this purpose if necessary.

The bobbin holder assembly is preferably constructed of light weight metal. This will relieve the weight of the assembly upon the weft thread and permit an easy passage between the rollers 36 and 38. In the embodiment of the invention illustrated the rollers are mounted about axes extending parallel to the breast beam. The weft thread is carried to the rollers in a line at a slight angle to the axes of the rollers. This will not affect the passage of the thread between the rollers but it is obvious that if thought desirable, the axes of the rollers could be turned so that the weft thread passed between the contacting rollers on a line parallel with their axes.

In the raised position of the bobbin assembly it is desirable to have the point of contact of the rollers on substantially the same plane as the weft thread carried thereto by the needle. This minimizes the danger of the weft thread catching on any object other than the curved contours of the rollers. The large curvature of the barrel roller 38 assists in directing the weft thread between the contact points of the rollers. The tapered construction of the bottom of the bobbin holder also insures that the weft thread is directed to the peripheral contact of the rollers.

To insure that the bobbin holder assembly will be retained in raised position until returned by the action of the pin 78, means is provided for yieldingly bearing upon the connection between the bar 70 and spiral drive for the assembly. Any suitable means may be provided. As illustrated in the drawings, this means comprises a coil spring 92 bearing upon the under surface of the segment gear 86 in such a position that it always bears on this surface regardless of the position it may take in its path of movement. The coil spring is supported in vertical position by a pin 94 which terminates a little short of the segment gear. The spring 92, however, continues beyond the end of the pin and frictionally bears upon the segment gear.

A series of looping devices of the character described herein can be attached in a row upon the breast beam of any standard loom. They may be operated from a single reciprocating bar or other suitable mechanism extending parallel with the breast beam. This mechanism or bar may be in turn operatively coupled with the lathe which swings the reed or comb and operates in timed relation thereto.

What I claim:

1. In combination with a loom having a breast beam and heddles for forming sheds in the warp threads of the cloth being formed, a thread looping attachment comprising a flat plate secured to said beam, a needle pivotally secured to said plate for oscillation and arranged to pass a filler thread back and forth through the shed, and to partially overlie the surface of said plate for a part of its movement, a bobbin for supplying selvedge thread to the cloth being formed, said bobbin being mounted for bodily movement from a position below the surface of said plate to a position spaced above the surface of the plate, means for bodily moving said bobbin including a pair of rollers contactingly engaging one another by their peripheries and forming the sole support of the weight of said bobbin when the same is moved, said needle arranged to pass said filler thread between said rollers when the bobbin is in position spaced from the surface of said plate and to return the filler thread past the bobbin when the same has moved to position below the surface of said plate whereby said filler thread is looped about said selvedge thread.

2. In a loom, the combination with a frame and a shed forming mechanism for the warp threads of the cloth being produced, of means for carrying a filler thread back and forth through the shed, a flat plate secured to said frame adjacent said shed and arranged so that said means sweeps across its surface for a portion of its movement, means for supplying a selvedge warp thread to the cloth being formed, said plate having a hole therethrough, means mounting said selvedge thread supplying means for bodily reciprocal movement in said hole and from a position below the surface of the plate to a position spaced above the surface of said plate, means for reciprocating said selvedge thread supplying means including a pair of contacting elements adapted in one position of their reciprocal movement to have their point of contact above the surface of said plate, said filler thread supplying means adapted when sweeping across said plate to carry the filler thread between the contact surfaces of said elements when the latter are above the surface of the plate and to return the filler thread past said bobbin when the latter is below the surface of said plate whereby the filler thread is looped about said selvedge thread.

3. In combination with a loom having a breast beam and heddles for forming sheds in the warp threads of the fabric goods being formed, a thread looping attachment therefor comprising a flat plate secured to said breast beam, a curved needle secured to said plate for oscillation and adapted in its movement to pass a filler thread back and forth through said shed and to partial-

ly overlie the surface of said plate for a part of its movement, said plate having a hole therethrough adjacent the path of movement of said needle and across which the filler thread fed thereby is adapted to be passed, a bobbin for supplying selvedge thread to the fabric goods being formed, means for reciprocating said bobbin through the hole provided in said plate in timed relationship to the movement of said needle and from a position below the surface of said plate to a position spaced above the surface of said plate, said needle adapted in one direction of its movement to pass the filler thread across said hole in the plate when the bobbin is raised above the surface of the plate and adapted upon return movement to pass the filler thread across the hole when the bobbin is below the plate.

4. In combination with a loom having a breast beam and heddles for forming sheds in the warp threads of the cloth being formed, a thread looping attachment therefor comprising a flat plate secured to said breast beam, a needle adapted to pass a filler thread back and forth through said shed and to swing over the surface of said plate in close juxtaposition thereto, said plate having a hole therethrough adjacent the path of movement of said needle and across which the filler thread fed therefrom is passed, a bobbin for supplying selvedge thread to the cloth being formed, means for reciprocating said bobbin through the hole provided in said plate in timed relationship to the swinging movement of said needle across the surface of the plate and from a position below the surface of said plate to a position spaced above the surface of said plate, said needle adapted in one direction of its movement to pass the filler thread across the hole in the plate when the bobbin is below the surface thereof and adapted upon return movement to pass the filler thread across the hole in the plate when the bobbin is in spaced relationship thereabove.

5. In combination with a loom having a breast beam and heddles for forming sheds in the warp threads of the cloth being formed, a thread looping attachment therefor comprising a flat plate secured to the top of said breast beam and provided with a hole therethrough, a needle adapted to feed a filler thread back and forth through said shed and to swing closely over the top surface of said plate for a portion of its movement, the filler thread fed by said needle sweeping across a portion of the top surface of said plate and back and forth across the hole extending therethrough, a bobbin for supplying selvedge thread to the cloth being formed, means mounting said bobbin for vertical reciprocating movement through the hole in said plate from a position wholly below the top surface thereof to a position spaced above the top surface, and means underneath said plate for reciprocating said bobbin in timed relationship to the swinging movement of said needle, said needle adapted in one direction of its movement to pass the filler thread across the hole in said plate when the bobbin is in lowered position beneath the top surface thereof and in its other direction of movement to pass the filler thread back across the hole when the bobbin is in spaced relationship above the surface of said plate.

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