

June 19, 1934.

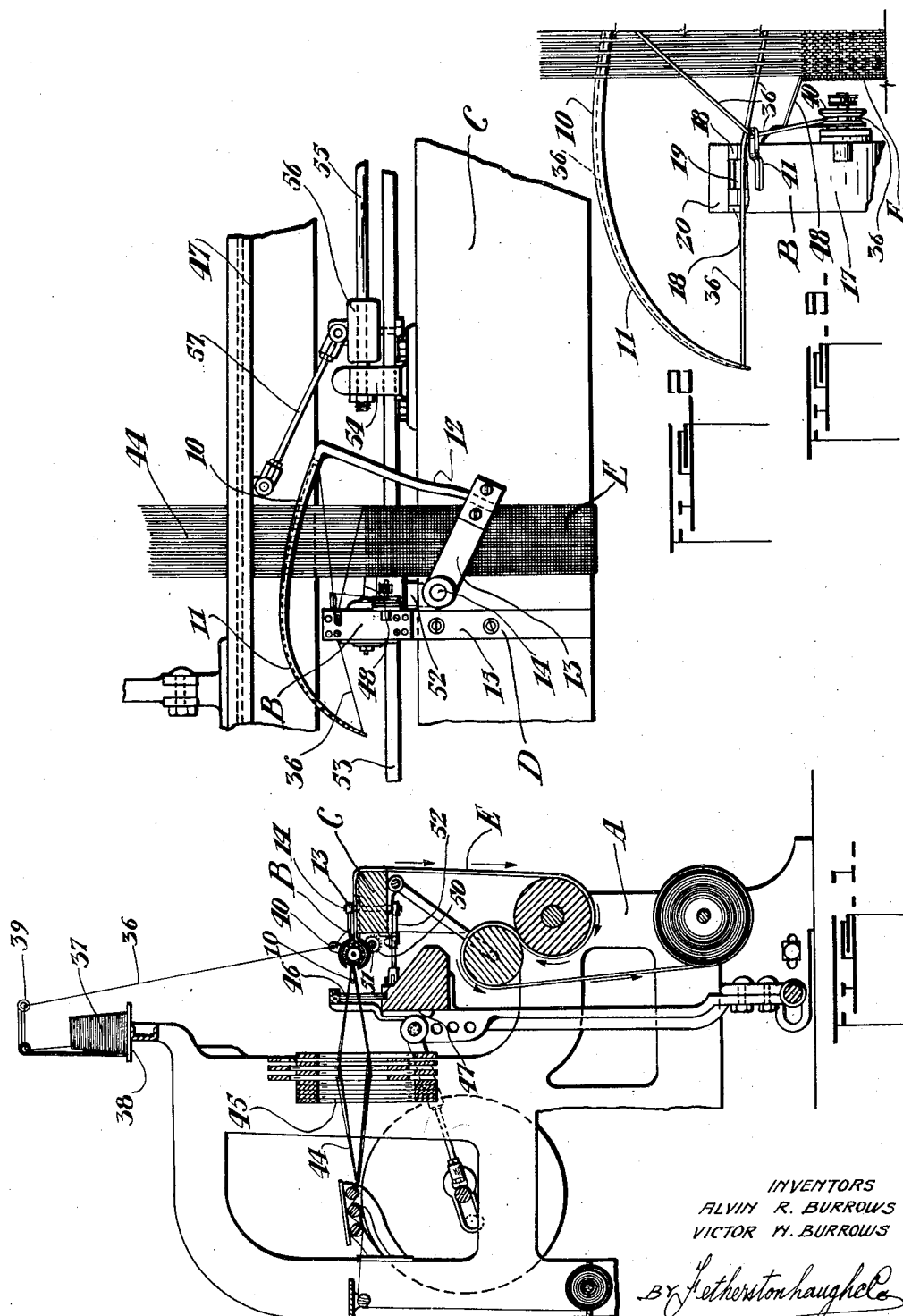
A. R. BURROWS ET AL

1,963,885

ATTACHMENT FOR LOOMS

Filed Oct. 10, 1932

3 Sheets-Sheet 1



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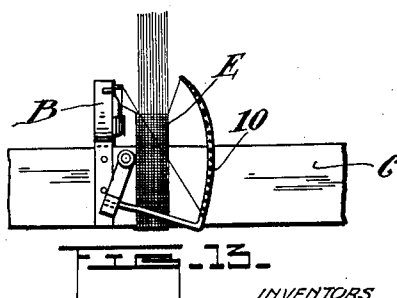
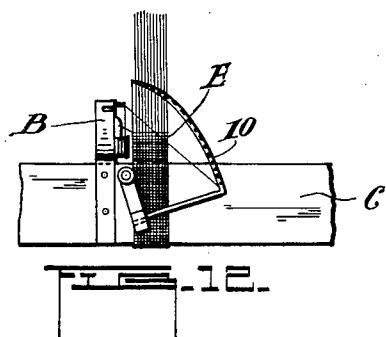
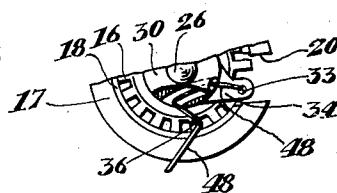
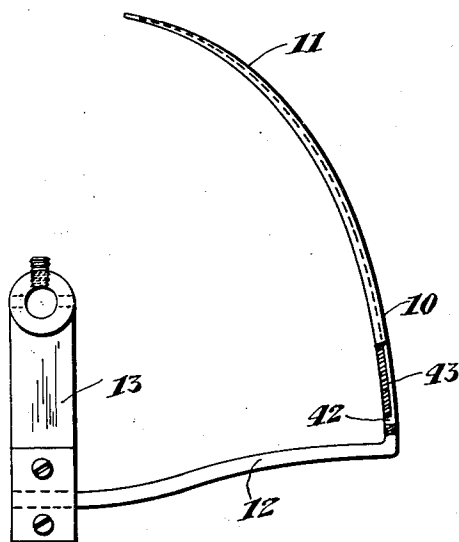
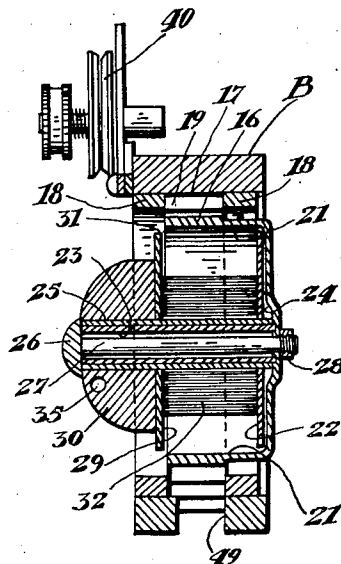
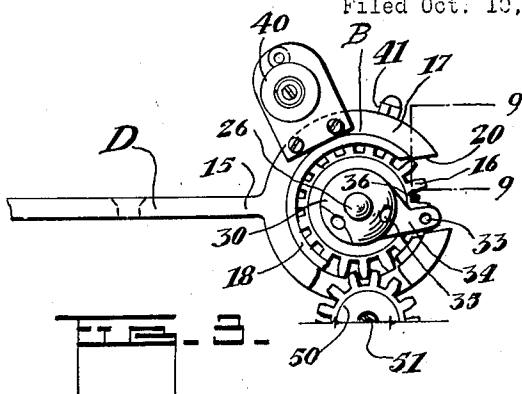
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ATTACHMENT FOR LOOMS

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3 Sheets-Sheet 2



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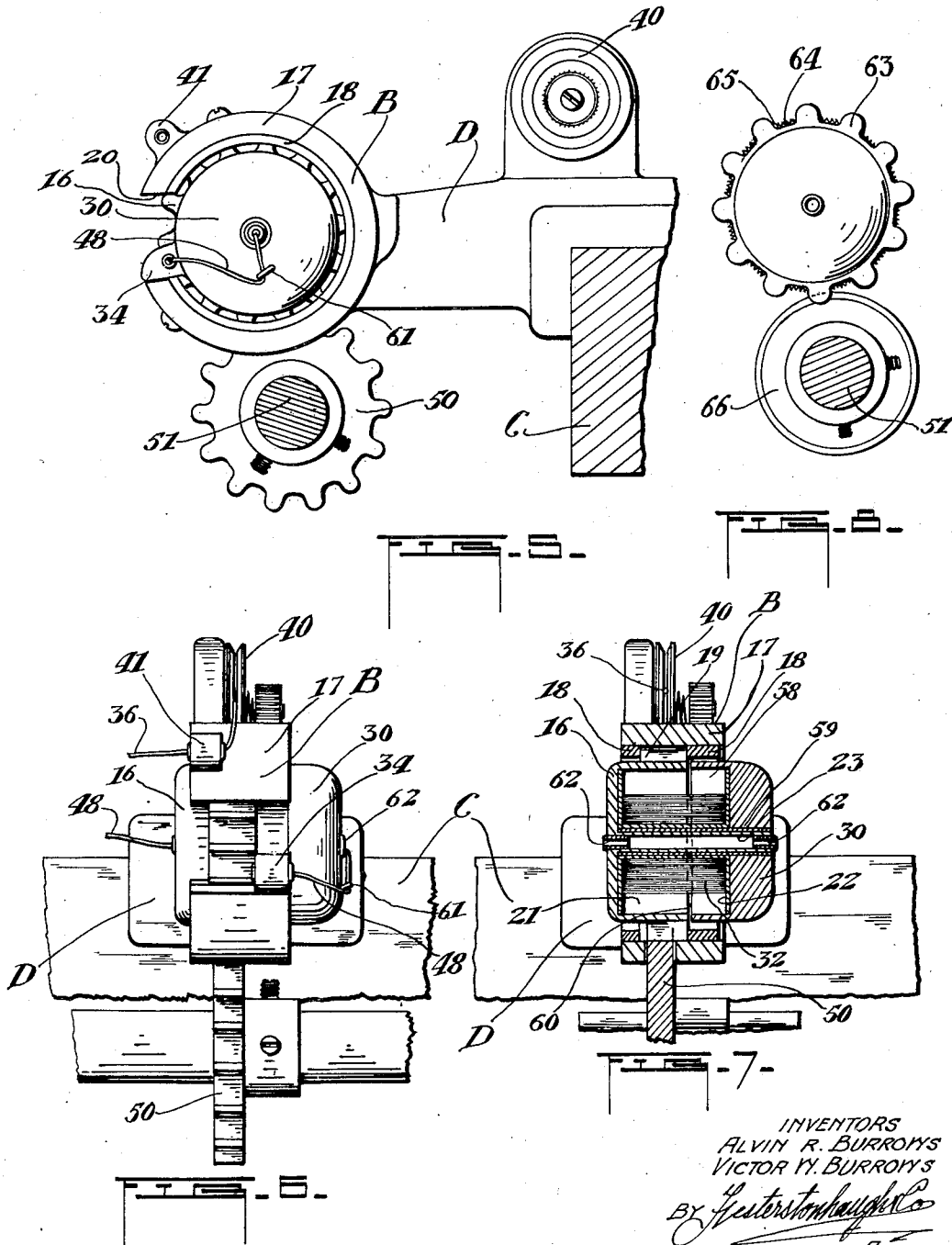
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ATTACHMENT FOR LOOMS

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3 Sheets-Sheet 3



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1,963,885

ATTACHMENT FOR LOOMS

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Application October 10, 1932, Serial No. 637,048

12 Claims. (Cl. 139—124)

This invention relates to attachments for looms and, more particularly, to a device for looping weft yarn around the warp selvage of a piece of cloth.

In the past, various attempts have been made to provide a yarn looping device which will function to loop weft or filling yarn around the warp selvage yarn of cloth with a view to simplifying the weaving operation and eliminating the use of reciprocating shuttles. These various attempts, however, have not been successful in that they have been complicated and cumbersome and not delicate enough to avoid the straining of the yarn being looped and consequent breaking of the yarn. To provide a yarn looping device of this character, the structure must be very simple, readily operable and of a comparatively delicate nature and we have found that to fulfil all requirements it is necessary to provide a device operable without the use of a complication of gears and parts specially formed to catch the yarn at one predetermined time.

It is, therefore, an object of the present invention to provide a yarn looping attachment which is simple in construction and which will function to loop the yarn in a rotary motion any time that the weft or filling yarn is carried into contact with the looping device.

A further object of the invention is to provide a looping device which is designed to operatively engage with the weft yarn at a plurality of points in its surface and which will carry a large supply of selvage warp yarn.

A further object of the invention is to provide a device which will function continuously for a long period without necessitating periodic stopping of operations to replenish the warp selvage yarn supply.

A further object of the invention is to provide a device which will loop the weft yarn around the warp selvage yarn in a very natural looping operation, avoiding strain on the weft or filling yarn.

A further object of the invention is to provide a device which may be fitted upon any standard loom.

A further object of the invention is to provide an attachment which may be operated with very little power.

With these and other objects in view, the invention consists essentially in a housing adapted to carry a rotary member having a plurality of spaced teeth or projections designed to move in light bearing engagement with the housing, the housing being recessed or cut away to expose the

teeth or projections which are designed to receive therebetween the weft or filling yarn carried thereto by the weaving needle.

The rotary member, according to the invention, is recessed and provided with a spindle to receive a bobbin carrying the selvage warp yarn with the provision of a thread guide mounted on the spindle through which the warp yarn is fed to the selvage of the cloth being woven, as more fully described in the following specification and illustrated in the accompanying drawings which form part of the same.

In the drawings:—

Figure 1 is a fragmentary sectional elevation of a loom showing the attachment in mounted position.

Figure 2 is an enlarged fragmentary plan of that part of the loom to which the attachment is applied.

Figure 3 is a side elevation of the rotary member, part of the mounting therefor being broken away to show the gear draft.

Figure 4 is a transverse section taken through the centre of the rotary member and illustrating the bobbin carrying the yarn for the selvage.

Figure 5 is a side elevation of an alternative form of yarn looping device.

Figure 6 is an end elevation of Figure 5.

Figure 7 is a section taken on the line 7—7 of Figure 5.

Figure 8 is an alternative form of rotary member for the yarn looping device.

Figure 9 is an enlarged fragmentary plan view of the needle, the yarn looping device and cloth as shown in Figure 2, illustrating the relative position of the selvage warp yarn and weft yarn passing to the cloth, the forward upper part of the looping device being broken away as on line 9—9 Figure 3 to show the weft yarn passing between the teeth of the rotary member.

Figure 10 is a fragmentary detail of the manner in which the rotary member shown in Figure 3 loops the weft yarn around the warp selvage yarn.

Figure 11 is a plan view of the needle, part of which is broken away to show the guideway for the thread.

Figure 12 is a detail pictorial illustration of the attachment with the needle in one position just after looping the weft yarn around the warp yarn forming the selvage on one side of the cloth.

Figure 13 is a detail view similar to Figure 12 but illustrating the needle after it has looped the weft yarn around the warp yarn forming the selvage on one side, and drawn the weft yarn

across between the warp threads, the weft yarn having been pressed into proper position by the lathe.

Referring more particularly to the drawings, A indicates a loom and B indicates the yarn looping attachment according to the present invention, which is designed to be mounted upon the breast beam C of the loom.

On referring particularly to Figure 2, it will be seen that the yarn looping attachment B operates in conjunction with a needle 10 which is curved as at 11 and provided with a shank 12 substantially at right angles to the main portion of the needle, the shank fitting in the operating arm 13 which is pivotally mounted on the breast beam C on the vertical pin 14.

The yarn looping attachment B, which operates in conjunction with the needle 10, as illustrated particularly in Figures 3 and 4, consists in a cylindrical casing 15 which is mounted from the breast beam C of the loom preferably by means of a shank D or the like.

The housing 15 is designed to house the rotary member 16 which is preferably in the form of a rotatable gear wheel, the teeth of which are designed to rotate in light bearing engagement with the inner wall 17 of the housing 15, being held within the housing by means of the ring like guide members 18 which, in combination with the inner wall 17, form a guideway 19 for the rotary member 16. The housing, according to the invention, is cut away as at 20 to provide an opening which will fully expose the outer periphery or teeth of the rotary member 16 as the periphery or teeth pass the opening during rotation.

The rotary member 16 is recessed at 21 to provide a housing for the bobbin 22 which is mounted rotatably upon the hollow sleeve 23 rigidly mounted on the rear wall 24 of the rotary member 16, the sleeve 25 of the bobbin sliding over the sleeve 23. The bobbin is held within the recess 21 and upon the sleeve 23 by means of the head 26 of the pin 27 which passes through the sleeve 23 and is fastened by a nut or the like 28. The sleeve 25 of the bobbin projects beyond the outer guide disc 29 thereof and upon this projecting end is mounted a movable thread guide 30.

The bobbin is of a depth a little greater than the depth of the recess 21 so that between a defining wall of the recess 21 and the outer guide disc 29 of the bobbin 22 there exists a space 31 through which the thread or yarn 32 on the bobbin may pass to be inserted through an orifice 33 (see Figure 3) in the nose 34 of the thread guide 30 from which it passes through the channel 35 to then extend and form the warp thread of the selvage of one side of the cloth.

The body of the thread guide 30 is balanced upon the sleeve 25 so that the nose 34 lightly rests upon an edge of the casing formed by the opening 30 so that upon a very slight pressure applied to the lower surface of the nose the thread guide will partially rotate on sleeve 25 as referred to hereinafter.

On referring to Figures 1, 2 and 9, it will be seen that the cloth E is made up of the filling formed by the weft yarn 36 which is fed from the cone 37 mounted on any suitable bracket 38 positioned adjacent the top of the loom, the yarn passing through the guide 39 down to the attachment B, passing through the thread tightener 40 which is preferably positioned on the side of the casing 17 (see Figure 4) and it then passes through the thread guide 41 (Figure 3) to be threaded through an orifice 42 in needle 10, to

pass through the groove 43 in the outer face of the needle and thence through the needle eye to the cloth as shown in Figure 2. As is usual the warp yarn 44 passes through the loom over suitable guides, to be threaded through the heddles 45 and to pass through the reed 46 of lathe 47, the finished cloth passing over the breast beam C and over suitable rollers to be wound in rolls after it is finished, the loom not forming part of the present invention.

The selvage warp yarn 48 from the bobbin 22 (see Figures 2 and 9) passes to the cloth D forming the warp thread of the selvage of one side of the cloth, around which the weft yarn is designed to be looped to form the complete selvage on that side of the cloth as will be explained.

The needle 10 is mounted on the breast beam so that it lies in a plane which intersects the opening 20 in the casing 17 of the yarn looping device 15 and, as the heddles 45 of the loom move relatively to each other to form the shed or space alternate warp threads vertically from each other, as shown in Figure 1, the needle 10 passes through the shed or between the spaced warp threads carrying the weft yarn 36 which is held at one end by the cloth D as shown in Figure 2 and, at the opposite end by the point of the needle through which it is threaded, so that the weft yarn is drawn across the front of the looping device 15, passes through the opening 20 formed in its casing and, enters between a pair of the teeth 19 of the rotary member 16 as shown in Figure 3. The rotary member which is constantly rotated in synchronism with other loom parts causes the weft yarn 36 when passed between the teeth 19, to travel around with it until the yarn contacts with the selvage warp yarn 48 which is fastened in cloth D at one end being fed from the bobbin 22. As the rotary member continues in its travel the weft yarn 36 loops around the selvage yarn 48 (see Figure 10) and as the rotary member continues through its revolution, bringing the weft yarn 36 to a point adjacent to the lower surface of the nose 34 of the rotary thread guide 30 which, owing to its balance, raises upon slight pressure, and the weft yarn 36 will slip away from the teeth of rotary member 16 through the opening 20, at which point the weft yarn 36 is completely looped around the selvage warp yarn 48.

At this point the needle 10 starts to return to its original position carrying the weft yarn 36 free of the teeth 19 of rotary member 16, the yarn readily slipping from under the nose 34 of the balanced rotary thread guide (see Figure 13), and, when the weft yarn has been carried completely back through the shade or spaced warp threads, the heddles reverse and the needle travels back through the further shade between the warp threads formed by such reversal. Owing to the reversal of the warp threads, the weft thread 36 passes around the warp thread of the selvage similarly to selvage formation when shuttles are used on that side of the cloth adjacent to the needle and, upon passing back to the yarn looping device, it is again rotated by the rotary member 16 to form, with the lead warp thread 48, a natural selvage of the cloth on the one side. In other words, the thread of the bobbin 22 as it is fed from the bobbin forms with the lead weft thread 36 the selvage of one side of the cloth.

Upon each movement of the needle 10 back through the shade formed with each reversal of the heddles, and, after the weft thread 36 has

been looped around the selvage warp thread 48, the lathe operates so that the reed presses the weft thread into its normal position in the cloth, the illustration in Figure 12 showing the position of the threads just after the reed has pressed the weft thread into proper position and prior to the return of the needle through the shade or spaced warp threads.

In the preferred form of the invention the casing 17 of the yarn looping device 15 is slotted as at 49 so that the driving gear 50 (Figures 1 and 3) may project therethrough to engage its teeth with the teeth 19 of the rotary member or gear 16, (see Figure 3). It will be noted that the teeth of the gear 50 are shorter than the teeth 19 of the rotary member or gear 16 so that a clear channel is formed between the teeth 19 and the end of the teeth of gear 50, whereby the weft yarn 36 may pass therethrough, so that ordinarily no contact would take place between the weft yarn and the teeth of the gear 50, while the rings 18 definitely keep the weft yarn from any possibility of such contact. The gear 50 is mounted on a horizontal shaft 51 (see Figure 1) parallel with and supported from the breast beam C and is driven through any suitable connection with the drive of the loom so that the rotary member or gear 16 is constantly rotated in timed relation with the needle. This permits the weft yarn to be looped around the warp selvage yarn at a proper speed and without strain, bringing about a condition conducive to smooth and efficient operation. The rotary member or gear, however, does not have to be timed having regard to the movement of the filling yarn with the needle, for the purpose of looping at one predetermined point, in view of the fact that the rotary member is provided with teeth, projections or the like spaced around its periphery so that as soon as the weft filling yarn is brought into engagement with any point in the periphery of the rotary member the yarn is engaged by this member and positively rotated at a proper speed.

The needle 10 may be reciprocated in any suitable manner in synchronism with the other mechanism so that it will pass backwardly and forwardly through the shade or spaced warp threads at the appropriate moment. One manner of synchronously operating the needle is shown particularly in Figure 2 wherein the pin 14 is operated by the connecting lever 52 pivotally connected to the sliding bar 53. The sliding bar is adapted to extend parallel with the breast beam C and may pass through the bracket 54 mounted on the breast beam which also carries the guide rod 55. The sliding bar 53 is connected to the fitting 56 which may be in the form of a collar, slidably mounted on the guide 55, the fitting 56 being pivotally connected to connecting rod 57 which in turn is pivotally connected to the lathe 47. Consequently on forward movement of the lathe to press the weft thread into position the fitting 56 will slide along the guide 55 and so cause the sliding bar 53 to move in the same direction, thus rotating the needle to carry thread back from between the spaced warped threads at which point the reed 46 of the lathe presses the carried weft yarn into place, the needle and section of weft yarn just carried through being in the position indicated in Figure 8.

As the lathe moves away from the cloth the sliding bar 53 will be moved in the opposite direction, thus operating the needle to pass back through the shade or between the spaced warp threads so that the weft yarn 36 may be again

looped around the selvage warp thread 48 and returned to draw the weft yarn back through the shade. It is apparent, therefore, that the needle 10 passes through the shade or between the spaced warp threads and, after the looping of the weft yarn 36 around the selvage warp yarn 48, it passes back to its normal position carrying the weft yarn 36 at which point the lathe moves to cause the reed to press the weft yarn into normal position in the cloth, or in other words the needle makes two movements, one backwards and one forwards in and out of the shade for each reciprocal movement of the lathe.

Each time that the weft yarn 36 is carried across through the shade by the needle 10 to project through the opening 20 of the arm looping device to engage the arm with the teeth or yarn engaging device, of the rotary member 16, it will be noted particularly on reference to Figure 1, that the needle carries the yarn on a level with the centre of the rotary member, and in a plane substantially corresponding to the outlet of the warp selvage yarn 48 from the arm looping device, so that this results in a rather natural rotary looping operation, the selvage weft yarn after being looped slipping away from the looping device on the weft selvage yarn without any strain on the yarn.

In Figures 5 to 7, an even more practical form of yarn looping device is illustrated, which corresponds to the principle of the looping device illustrated in Figures 3 and 4, with the difference that the thread guide 30 is positioned on the opposite side of the looping device B, so that it can project therefrom a considerable distance, without in any way conflicting with the needle structure or the cloth being formed, and thus the cloth can be positioned quite close to the looping device without possibility of complication in the weaving operation. In this respect therefore a great many units can be mounted on a machine without taking up a great deal of space.

The thread guide 30 as illustrated in Fig. 7 is recessed as at 58 to receive one end of the bobbin, which in view of the fact that the thread guide may project to any practical extent from the looping device in this form of the invention, may be of considerable size and thus carry a large quantity of warp selvage yarn. The thread guide 30 as illustrated in Figure 7 is rotatably mounted upon a hollow sleeve 23, which is integral with or fastened to the rear wall of the rotary member 16, similarly to the showing in Figure 4, the thread guide being merely slid on to the projecting end of the sleeve 23, or the thread guide may carry a sleeve-like member 59 which fits over the sleeve 23 more firmly to mount it.

The thread from the bobbin 22 is designed to pass through the space 60 between the end of the thread guide and the rotary member 16, and as illustrated in Figure 5, passes through an opening formed in the projecting nose 34 of the thread guide through a guide 61 on the outer surface of thread guide 30, and it then passes through the hollow sleeve 23 to extend from the other side of the rotary member to the cloth being woven, as illustrated in Figure 6, suitable bushings 62 being positioned at each end of the sleeve 23 through which the yarn passes. The manner in which the yarn passes to the cloth also serves to hold the thread guide in its mounted position upon the sleeve 23.

In this form of construction, it will be particularly noted that the warp selvage yarn 48 passes

to the cloth from the centre of the rotary member 16 and, as previously explained the needle carrying the weft or filling yarn moves in a horizontal plane corresponding to the centre of the rotary device 16.

As the needle passes the weft thread to extend through opening 20 to engage the surface of the rotary member 16, the point of the needle moves to a position just opposite the centre of the bobbin and the passageway through which the warp selvage thread extends at the extremity of its feeding movement (see Fig. 2), so that as the rotary member 16 moves, carrying with it the weft thread engaged thereby, a very natural looping operation results, the weft yarn, finally slipping out through the opening 20 and from underneath the nose 34 of the thread guide 30, looped around the warp selvage yarn, and in consequence there can be no strain on the filling yarn. In this connection it will be noted that the point of the needle at the extremity of its feeding movement, the axis of the rotary member and the last strand of weft yarn woven, are in alignment and the weft yarn extending between the needle and woven cloth is substantially fixed at two points, namely, at the point of the needle where it leaves the eye and at the point where it leaves the woven cloth, so that the distance between these fixed points and the contact of the weft yarn with the rotary member is constant during the rotation of the latter.

As illustrated in Figures 5, 6 and 7, the rotary member 16 is operated in exactly the same manner as illustrated in Figures 3 and 4 by means of a gear 50. It is not necessary however that the rotary member take the form of a gear, since it could take other forms, such for instance, as illustrated in Figure 8, comprising a rotary member 16 having the peripheral projections 63 which project on each side of the rotary member to form a guide to fit within the guideway 19 in the housing of the looping device B. Between the projections 63 and extending completely around the circumference of the rotary member 16, is a band of rubber or other suitable material 64, which is serrated or grooved to provide the projections 65, so that the weft yarn when passed through the opening 20 of the looping device will be carried across the rotary member 16 between the pairs of projections 63 to lie between the projections 65 or lie in the grooves formed by the projections 65, and as the device rotates, this yarn is carried around within the housing of the looping device B, to be looped over the warp selvage yarn in a similar manner to the operations effected in the constructions illustrated in the other views. The drive for the device illustrated in Figure 8 would then take the form of the friction roller 66 adapted to contact with the surface of the rubber band 64. In other respects this embodiment of the invention is just the same as the construction illustrated in Figures 5 to 7, or can be laid the same as the construction illustrated in Figures 3 and 4.

From the foregoing, it should be apparent that we have provided a very simple form of yarn looping device, including a rotary member compactly housed and provided with means for engaging with weft yarn throughout its periphery. Furthermore it will be noted that in this construction the bobbin for the warp selvage yarn is held in a unique manner within the rotary member with the advantage that a practically unlimited supply of selvage warp yarn may be carried so as to eliminate the shutting down of

the machine at short intervals of time to replenish the limited supply carried by a shuttle or even a bobbin, wherein the structure is such that the bobbin must be confined to a given size. Finally the placement of parts in this compact structure yields the most desirable advantage of providing for looping of the weft yarn as described, in a natural looping operation with the avoidance of strain being placed upon the weft yarn, which would bring about the breaking of the yarn during operation.

It is apparent that the attachment can be made in various sizes according to the nature of the cloth being woven, and it will be equally apparent that the attachment might be modified in other ways rather than being confined to the practical form illustrated.

Various modifications may be made in this invention without departing from the spirit thereof or the scope of the claims, and therefore the exact forms shown are to be taken as illustrative only and not in a limiting sense, and it is desired that only such limitations shall be placed thereon as are disclosed in the prior art or are set forth in the accompanying claims.

What we claim as our invention is:

1. Yarn looping attachments for looms comprising a housing, a guideway within the housing, a rotary looping member mounted in the housing and rotating within said guideway, means spaced about the periphery of said rotary member for engaging weft yarn carried thereto, means for feeding warp selvage yarn from said attachment, and means for rotating said rotary member to loop the weft yarn around said warp yarn.

2. Yarn looping attachments for looms comprising a housing, a rotary looping member rotatably mounted within said housing, means formed on and spaced around the periphery of said rotary member for engaging weft yarn carried thereto, means for feeding warp selvage yarn from said attachment, and means for rotating said rotary member to loop the weft yarn around said warp yarn.

3. Yarn looping attachments for looms comprising a housing in the form of a cylindrical member having an opening in its periphery, a rotary looping member rotatably mounted in said housing having a part of its periphery projecting in said opening, means formed on and spaced about the periphery of said rotary member for engaging weft yarn carried thereto through said opening, means for feeding warp selvage yarn from said attachment, and means for rotating said rotary member to loop the weft yarn around said warp yarn.

4. Yarn looping attachments for looms comprising a housing, formed with an opening in its periphery, a rotary yarn looping member mounted in the housing, and having a part of its periphery projecting in said opening, ring-like members rigidly carried by the housing on each side of said rotating member, means formed throughout the periphery of said rotary member for engaging weft yarn carried thereto through said opening, means for mounting the bobbin carrying warp selvage yarn on said rotary member, and means for rotating said rotary member to loop the weft yarn around said warp yarn.

5. A device as claimed in claim 4, in which the rotary member is recessed and provided with a spindle to house and carry said bobbin.

6. Yarn looping attachments for looms comprising a housing, a rotary yarn looping member mounted in the housing, means formed through-

out the periphery of said rotary member for engaging weft yarn carried thereto, means on said rotary member for mounting a bobbin carrying warp selvage yarn, a balanced thread guide 5 swingingly mounted upon said rotary member having a projecting nose formed with thread guiding means designed to guide the warp yarn from said bobbin to the cloth being woven, and means for rotating said rotary member to loop 10 the weft yarn around said warp yarn.

7. Yarn looping attachments for looms comprising a rotary looping member having a plurality of projections spaced about its periphery for engaging weft yarn carried thereto, means 15 for feeding warp selvage yarn from said attachment, and means engageable with the looping member for rotating said member to loop weft yarn around said warp yarn.

8. Yarn looping attachments for looms comprising a rotary looping member having means spaced about its periphery for engaging weft yarn carried thereto, means for feeding warp selvage 20 yarn from said attachment, and means directly contacting with the engaging means spaced about the periphery of the rotary looping member for 25 rotating said member to loop weft yarn around said warp yarn.

9. Yarn looping attachments for looms comprising a gear forming a yarn looping member 30 having a plurality of teeth spaced about its periphery for engaging weft yarn carried thereto, said gear being centrally recessed to form a bobbin housing, a bobbin carrying warp selvage yarn rotatably mounted within said housing, means in 35 connection with said bobbin for guiding warp yarn from the bobbin designed to pass to the cloth being woven, a driving gear having a plurality of teeth engageable with the teeth of the looping member, the teeth of the driving gear being 40 shorter than those of the looping member, providing when in mesh a clear channel between the teeth of the driving gear and the looping member for the passage of the weft yarn, said yarn looping member being designed upon rotation 45 to loop weft yarn about said warp yarn.

10. Yarn looping attachments for looms comprising a casing, a gear forming a yarn looping member mounted within a guideway in the casing and having its teeth in light bearing engage-

ment therewith, said teeth forming means spaced about the periphery of the looping member for engaging weft yarn carried thereto, means for feeding warp selvage yarn from said attachment 80 said casing being formed with an opening, and a driving gear projected through said opening into mesh with the teeth of the looping member but spaced from the weft yarn carried by the said teeth for rotating said member to loop weft 85 yarn around said warp selvage yarn.

11. Yarn looping attachments for looms comprising in combination a rotary yarn looping member and a curved oscillating needle designed to feed waft filling yarn to the looping member, said looping member being formed with means 90 spaced about its periphery for engaging the weft yarn carried thereto, means for moving the needle back and forth through the shade of the cloth being formed, the weft yarn when fed to the rotary member being held substantially fixed at two 95 points, the end of the needle at the extremity of its feeding movement, the axis of the rotary member and the weft yarn at one of said points being aligned whereby the distance between said fixed points of the weft yarn and its contact with 100 the rotary member is constant during rotation of the latter, means for feeding warp selvage yarn from said attachment, and means for rotating said rotary looping member to loop the weft yarn 105 around said warp yarn.

12. Yarn looping attachments for looms comprising in combination a rotary yarn looping member and a curved oscillatable needle designed to feed weft filling yarn to the looping member, said looping member being formed with means 110 spaced about its periphery for engaging the weft yarn carried thereto, said looping member being centrally recessed in its side remote from the needle to form a bobbin housing, a bobbin of desired depth carrying warp selvage yarn rotatably 115 mounted within said housing and projecting beyond the side of the rotary member, means for guiding warp selvage yarn from the bobbin through said bobbin and looping member designed to pass to the cloth being woven and means 120 engageable with the looping member for rotating the latter.

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