

March 23, 1937.

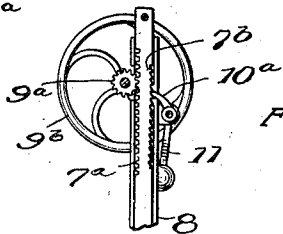
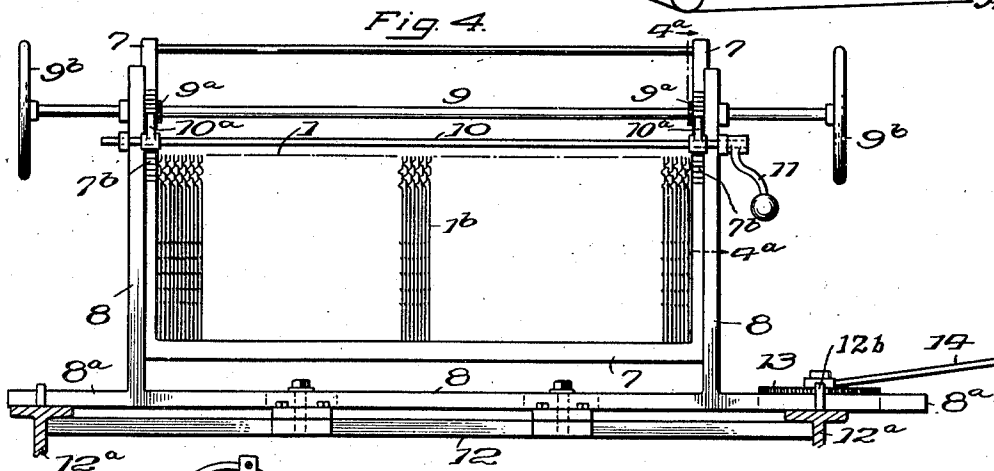
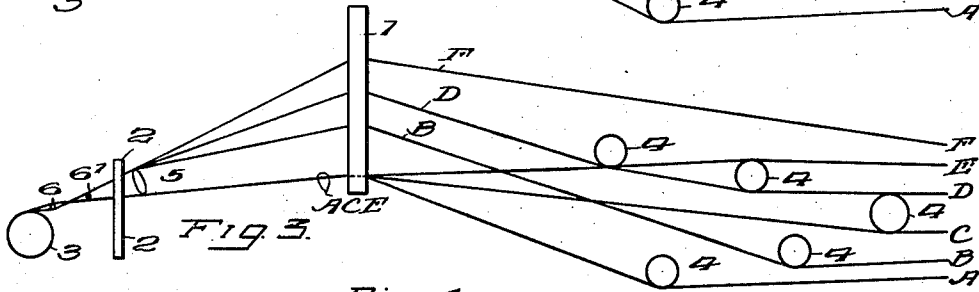
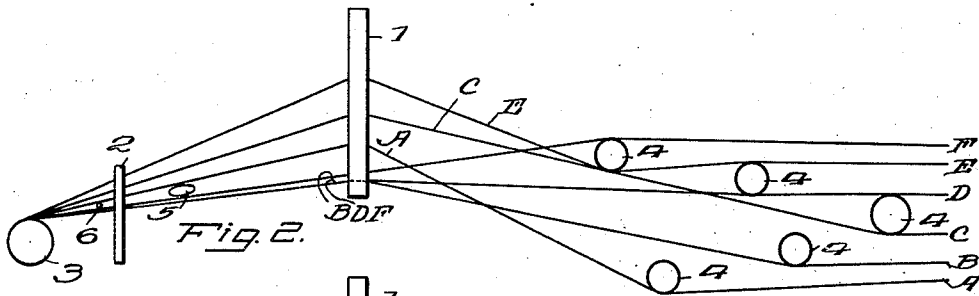
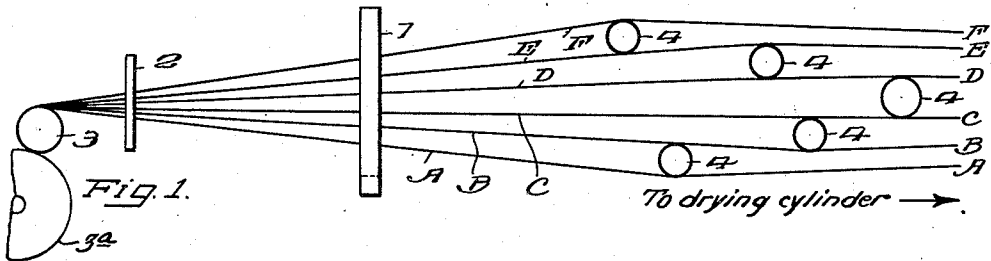
S. J. ADAMS

2,074,635

LEASE FORMING REED

Filed April 13, 1935

2 Sheets-Sheet 1



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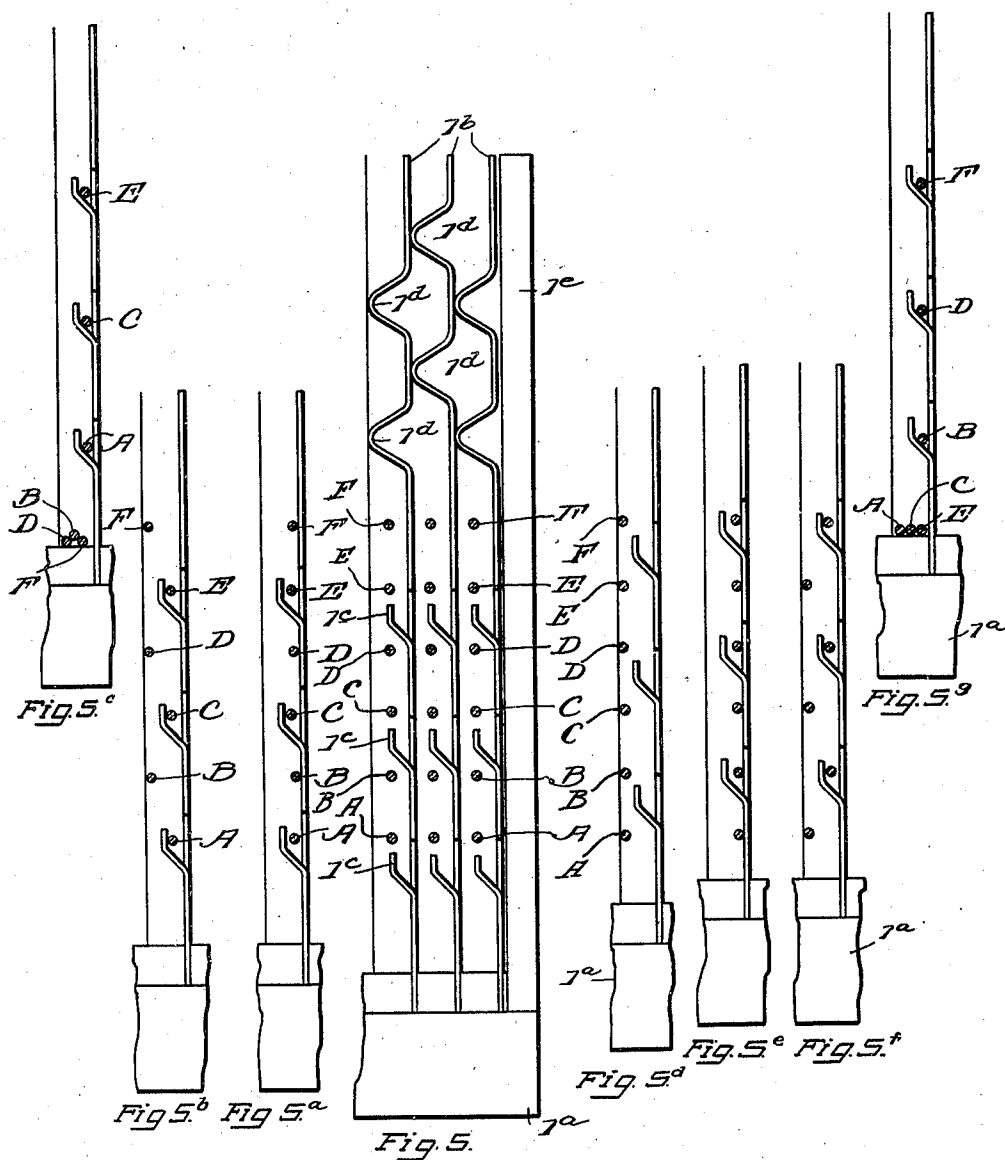
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LEASE FORMING REED

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,074,635

LEASE FORMING REED

Simpson James Adams, Greenville, S. C.

Application April 13, 1935, Serial No. 16,250

14 Claims. (Cl. 28—40)

My invention relates to a reed for forming a lease in a warp, and in particular to a reed for forming a lease in a warp having a large number of ends per inch. My lease forming reed is particularly useful in forming a lease in the warp on a slasher. My invention also involves a novel method of forming an end-and-end lease in warp.

In the manufacture of fancy goods involving special patterns, it is common practice in placing a new warp beam into a loom to take the warp beam from the slasher and send it to the drawing-in room where the warp ends are manually combed out and drawing-in operators manually draw the ends through the drop wires, through the harness, and through the loom reed, according to the pattern desired, and then the beam, drop wires, harness and reed are sent to the loom and installed. The manual drawing-in operations involved in this practice are tedious, require considerable time, and are subject to variations due to human error.

According to my invention, I provide a reed for operation in connection with a slasher to form a lease in the warp as it is delivered from the slasher onto the warp beam, and by means of this lease, it is possible to use a tying-in machine to join the ends of the new warp beam onto the ends of the warp which is running out in the loom, thereby avoiding the expensive and time consuming manual drawing-in operation referred to above. My invention reduces the manual drawing-in operations to only one operation for each new pattern.

It has heretofore been proposed to form a lease in the slasher warp at a point where the warp is fed from the warp creel to the sizing vat, but in forming a lease in this manner, the lease must be carried through the slasher over to the warp beam at the end of the slasher, and these operations make it necessary to shut down the slasher for one-third of the working time. This method requires three operators to form and carry over the lease every time a beam is to be doffed. Furthermore, in case of rayon warp, a considerable quantity of the rayon yarn is damaged and lost by burning on the slasher cylinder during the time required to form the lease and carry it over to the warp beam. There is a further disadvantage that the warp on the cylinder dries out and sticks together. This method also makes it necessary to remove all parting bars in carrying the lease over the slasher and then replace the bars after the lease has been carried over.

A further object of my invention is to devise a reed which will form an end and end lease in

the warp at the slasher comb without having to remove the parting rods from the slasher.

Another object of my invention is to devise a reed for forming a lease in the warp of the slasher which can be operated by one operator, and by which a complete lease may be formed quickly and without having to stop the slasher long enough to burn the yarn.

Still another object of my invention is to devise a lease forming reed in which the dents or splits are open at one end to facilitate threading and to provide for the lateral support of the free ends of the splits.

Lease forming reeds heretofore commonly used will accommodate only one thread per reed space, but the reed of my invention will accommodate more than one thread per space. For example, it is possible according to my invention, to operate the reed with 12 ends per dent, and, in case there are 16 dents per inch, a 60-inch reed will accommodate 11,520 ends.

My invention is illustrated in the accompanying drawings in which Figure 1 is a schematic diagram showing a portion of a slasher in side elevation with my lease forming reed in normal operating position;

Figure 2 is a schematic diagram like Figure 1 showing my lease forming reed operated to a position to form the first shed of the lease;

Figure 3 is a schematic diagram like Figures 1 and 2 showing the reed in a position for forming the second shed of the lease;

Figures 4 and 4a illustrate one arrangement for moving the reed in horizontal and vertical directions; Figure 4a being a sectional view of Fig. 4 along line 4a—4a;

Figure 5 is a fragmentary front elevational view showing the details of construction of my lease forming reed, and also illustrating the normal running position of the warp ends with respect to the reed.

Figures 5a, 5b and 5c illustrate various positions of the reed in forming one shed of the lease; and

Figures 5d, 5e, 5f and 5g illustrate various positions of the reed in forming the second shed of the lease.

It will be understood that the drawings are not to scale, and many dimensions have been exaggerated for the sake of clearness of illustration.

For the purpose of illustrating my invention, it will be described in connection with a slasher machine of well known construction, the details of which need not be described here. It is sufficient to state that a slasher includes a creel on

which a number of beams of warp are placed, a sizing vat through which the warp sheets from the beams are passed for sizing the warp, a drying cylinder over which the warp sheets pass in superposed relation from the sizing vat, a comb through which the warp ends are guided onto a presser roll operating in connection with a power driven delivery roll, and a power driven beam for receiving the warp. Usually, parting bars are provided between the creel and the sizing vat, and also between the drying cylinder and the comb, for keeping the sheets of the various beams of warp separated as they pass through the slasher. Examples of slasher machines will be found in U. S. patents to Cook 1,944,221 and Johnson 1,966,097.

In Figure 1, I have shown six sheets of warp ends A, B, C, D, E and F as they are fed from the slasher cylinder (not shown) through my lease forming reed 1, through the slasher comb 2 and onto the presser roll 3, from which point the warp passes around the delivery roll 3a, over another presser roll and onto the receiving beam (not shown). The various warp sheets pass through the reed 1 in vertically spaced planes. While I prefer a uniform vertical spacing of the warp sheets in passing through the reed 1, it will be obvious that a uniform spacing is not essential. The arrangement is such that one warp end from each sheet passes through the groove or space between adjacent splits on the reed, so that six ends lie in each space between adjacent splits.

The details of construction of the reed are illustrated in Figure 5 which is a fragmentary view showing one end of the reed and illustrating only three splits. The reed is of a comb-like construction comprising a back bar 1a from which is supported a plurality of splits or dents 1b formed of thin metallic strips. Each split is provided with a plurality of hook elements 1c preferably uniformly spaced along the length of the split as shown. The hook elements are preferably formed by stamping hook portions from the body of the split, but they may be formed and supported upon the splits in any desired manner. The hooks extend into the space between adjacent splits, but sufficient clearance is provided between each hook and the adjacent split to permit the warp end to pass around the hook freely in either direction. The opening of the hook is sufficiently wide to freely receive a warp end. The upper ends of the splits are free and unsupported except for the lateral support provided by transverse crimps 1d formed near the upper ends of the splits, the crimps in one split being vertically displaced with respect to the crimps in the adjacent splits as shown in Figure 5. It will be clear that the crimps 1d provide lateral support for the free ends of the splits, but due to the staggered relation of the crimps in adjacent splits, and to the spring-like character of the splits, the reed may be threaded by introducing the warp ends between the free ends of the splits and forcing the warp ends down between the crimps and the adjacent splits with which they are in contact. This arrangement permits quick threading of the reed and at the same time prevents accidental removal of the warp ends from the reed. Rigid end bars 1e are supported at each end of the back bar 1a and provide end support for the splits 1b. It will be seen that the crimps 1d constitute lateral projections on the free ends of the splits for giving lateral support, and these lateral projections

may assume other forms than crimps in the splits.

Figure 5 shows the relation between the ends in the various warp sheets as they pass through the reed in the normal running position. It will be seen that the ends in the warp sheets A, B, C, D, E and F pass through the reed in horizontal sheets uniformly spaced vertically. Also the arrangement is such that in the normal running position of the reed, two warp ends are located above each hook element. The reed 1 is mounted upon the slasher frame by an arrangement illustrated in Figure 4 so that the reed may be moved to the left or to the right from the normal position shown in Figure 5 and may also be moved vertically upward from the position shown in Figure 5.

In forming a lease in the warp, it is necessary to select alternate ends in each space of the reed and separate these ends from the remaining ends and then insert a lease rod between the two groups. After this, the ends of the two groups are moved so that they exchange positions and thereby form a lease of crossed-shed arrangement in which adjacent threads in the lease lie in different sheds and cross each other at an angle, so that a tying-in machine can pick up only one end of the warp at a time. Assume that the loom beam on the slasher is ready to doff and it is necessary to form a lease in the warp; the slasher is stopped and the reed is moved to the left of the normal position shown in Figure 5, so that all of the warp ends bear against the splits above their respective hook elements; the reed is then moved upwardly so the hook elements engage the ends of warp sheets A, C and E as shown in Figure 5a. The reed is then moved to the right until the warp ends of sheets B, D and F lie against the adjacent splits as shown in Figure 5b, and then the reed is moved vertically upward to a position shown in Figure 5c where it will be seen that the ends of sheets A, C and E have been carried up with the reed, and the ends of sheets B, D and F have passed around the hooks and occupy a position at the bottom of the reed spaces, thereby separating alternate ends into an upper group and a lower group, as illustrated in Figure 2 of the drawings. A lease rod 5 is now inserted between the two groups of ends as shown in Figure 2, and by moving the lease rod up near the comb 2, a lease string 6 may be inserted between the two groups of ends on the other side of the comb, see Figure 2. The lease rod 5 is now withdrawn and the reed 1 is returned to its normal running position so that the warp ends again assume the position shown in Figure 1.

In forming the second shed of the lease, the reed is moved to the right from the position shown in Figure 5 so that all the warp ends bear against the back of the reed splits, and the reed is then moved upwardly so the hooks 1c lie opposite the spaces between the ends in sheets A-B, C-D and E-F, as shown in Figure 5d. The reed is then moved to the left, and then upwardly, until hooks 1c engage the ends of sheets B, D and F as shown in Figure 5e. The reed is next moved to the right so that the ends in sheets A, C and E bear against the back of adjacent splits, as shown in Figure 5f, and then upwardly to a position illustrated in Figure 5g so that the ends of sheets B, D and F are carried upwardly and are separated into a group from the ends of sheets A, C and E which lie at the bottom of the spaces in the reed, as shown also in

Figure 3 of the drawings. In this position of the reed, the lease rod 5 is again inserted in the shed and the lease string 6 is returned through the shed on the other side of the comb as shown at 6' in Fig. 3. Upon tying the ends of the lease string the lease is complete, and the lease rod 5 may be removed and the reed 1 returned to its normal position. After forming the lease, the warp is advanced until the lease reaches the loom beam, and the beam is then doffed in the usual manner.

After doffing the beam, it may be taken directly to the loom and, by means of a portable tying-in machine, the ends of the new beam may be joined to the ends of the warp which is running out on the loom. If desired, instead of performing the tying-in operations at the loom, the new beam may be sent from the slasher to the drawing-in room where the tying-in operations are performed on a regular tying-in machine. With this procedure, it will be understood that the ends of the warp which is running out in the loom are knotted to prevent withdrawal from the loom drop wires, harness and reed, and the warp is severed from the cloth by cutting the cloth at a point to leave a short length of cloth on the front side of the reed to prevent withdrawal of the warp ends, and then the drop wires, harness and reed are removed from the loom and sent to the drawing-in room where the tying-in operations are performed by machine. The machine tying-in operation is made possible by reason of the lease in the warp on the new beam and also by reason of the fact that a lease can be readily formed in the old warp to which the new warp is to be joined.

The arrangement for mounting and moving the reed on the slasher may assume different forms, but in Figures 4 and 4a I have illustrated one possible arrangement. The assembled reed as described above in connection with Figure 5 is mounted in a rectangular frame 7 which in turn is supported in vertical grooves or ways formed in another frame 8 so as to be movable in a vertical direction. A shaft 9 is journaled to frame 8 near the top and carries two pinion gears 9a-9a engaging racks 7a-7a on the two ends of frame 7, see Fig. 4a, and by which the frame 7, with the reed, may be moved vertically by hand wheels 9b-9b secured at each end of the shaft 9. On the opposite side of frame 7 from racks 7a are arranged racks 7b-7b, and a pair of cooperating pawls 10a-10a are carried by a shaft 10 journaled to the frame 8. The pawls are normally held in engagement with racks 7b by a weighted lever 11 and serve to hold frame 7 in any desired adjusted elevation. The pawls are released by lever 11 when the reed is to be lowered. By making the notches in racks 7b of the proper pitch with respect to the vertical separation between warp sheets, the racks will serve as a standard by which the proper operation of the reed may be determined, in other words, the required movement in any operation may be stated in terms of rack notches.

The frame 8 which supports the reed frame 7 is arranged transversely of the slasher frame and is slidably supported in a vertical position on a cross-beam 12 secured between the side-beams 12a-12a of the slasher frame. The lower side of frame 8 extends out over the side-beams 12a-12a as shown at 8a-8a, and one or both of these extensions is provided with a rack engaged by a gear 13 journaled on the slasher

frame. A pin 12b secured to side beam 12a maintains the rack on 8a in contact with gear 13. An operating lever 14 is secured to the gear 13 by which the frame 8, and with it the frame 7 and also the reed, may be moved transversely of the slasher frame.

It will be clear from the above that by operating lever 14, the reed may be moved either to the right or to the left of the normal operating position shown in Fig. 5, and by operating hand wheels 9b the reed may be moved vertically upward from the normal position. Other arrangements for mounting and moving the reed in horizontal and vertical directions will be obvious to those skilled in the art.

While I have shown one form of reed in which the hooks face towards the open ends of the splits and the reed is raised above the normal position in forming a lease, the reed may be constructed so the hooks are reversed from the position shown, so they face the back bar, and the reed mounted so that it would be moved downwardly from normal position to form the lease. In this arrangement, a stop-bar would be clamped across the reed just below the upper ends of the splits to prevent the warp ends from pulling out of the reed while a lease is being formed.

While I have shown and described my lease forming reed in connection with a slasher where it is particularly useful, it will be obvious that it may be used in any situation where it is desired to form a lease in a warp having a large number of ends per inch.

I have herein described the principle of my invention and illustrated a preferred embodiment thereof. Various modifications will occur to those skilled in the art, and I desire it to be understood that all modifications which fall within the terms of the appended claims are to be considered as falling within the scope of my invention.

What I claim is:

1. A leasing reed comprising a plurality of splits supported in parallel spaced relation, and a plurality of hook elements supported on each split in spaced relation along the length thereof, said hook elements being positioned to engage warp ends lying to one side of the center of the reed space but to allow warp ends to freely pass around the hooks on the other side of the center of the reed space.

2. A leasing reed comprising a plurality of splits supported in parallel spaced relation, and a plurality of hook elements supported on each split in spaced relation along the length thereof, said hook elements being so positioned that upon relative movement between the reed and warp ends in a direction parallel to the splits the hooks engage all warp ends bearing against the supporting split, but freely pass all warp ends bearing against the adjacent split.

3. A leasing reed comprising a back bar supporting a plurality of equally spaced splits, and a plurality of hook elements supported on each split in spaced relation along the length thereof, said hook elements being arranged to extend into the space between the supporting split and an adjacent split but sufficiently spaced from the adjacent split to allow warp ends to freely pass around said hooks in either direction.

4. In combination, a leasing reed comprising a plurality of spaced splits each provided with a plurality of hooks spaced along the length thereof, means for guiding a plurality of warp sheets through said reed in vertically spaced relation with each reed space receiving one warp end

from each sheet and two warp ends above each hook element, and means for moving the reed transversely of the sheets both horizontally and vertically.

5 5. In combination, a leasing reed comprising a plurality of spaced splits each provided with a plurality of hooks spaced along the length thereof, means for guiding warp ends through each space of said reed with two ends located between
10 each pair of adjacent hooks, and means for moving said reed transversely of the warp in two directions to selectively engage said hooks with one or the other of the ends in each pair of ends.

6. In combination, a warp beam receiving at
15 least four sheets of warp arranged in superposed relation, a leasing reed through which said warp sheets pass to said beam, parting bars for guiding said sheets through said reed in vertically spaced relation with each space in the reed receiving one warp end from each sheet, a hook element supported on each split below each pair of
20 ends, each hook being positioned to engage warp ends bearing against the supporting split but to pass warp ends bearing against the adjacent split, and means for moving said reed transversely of
25 said sheets both horizontally and vertically.

7. The method of forming a lease in warp having a large number of ends per inch which consists in arranging the ends of the warp in four
30 or more sheets arranged in superposed spaced vertical relation, simultaneously engaging the ends of the even numbered sheets and moving the same vertically beyond the odd numbered sheets to form a shed between the even numbered
35 sheets and the odd numbered sheets, inserting a leasing element in the shed, releasing said ends, simultaneously engaging the ends of the odd numbered sheets and moving the same vertically beyond the even numbered sheets to
40 form a second shed between the odd numbered and even numbered sheets but in reverse position, and inserting a leasing element in the second shed.

8. The method of forming a lease in warp on
45 a warp dressing machine provided with a leasing reed comprising a plurality of spaced vertical splits, each provided with a hook element intermediate the ends thereof, said hook element being positioned to engage warp ends bearing
50 against the supporting split but to pass warp ends bearing against the adjacent split, which method consists in arranging the warp ends to pass through said reed in four or more sheets arranged in superposed spaced vertical relation,
55 with one end from each sheet passing through each space of the reed, shifting said reed transversely of said warp sheets both horizontally and vertically to engage alternate ends by said hooks and to shift said engaged ends vertically beyond
60 the unhooked ends, thereby forming a shed between the even numbered sheets and the odd numbered sheets, inserting a leasing element through the shed so formed, returning said reed to its original position to release said warp ends,
65 shifting said reed transversely of said warp sheets both horizontally and vertically to engage the alternate ends which previously were not engaged, and moving said reed to carry said engaged ends vertically beyond said unhooked ends to form a second shed between the even numbered
70 sheets and the odd numbered sheets in reverse position, passing a leasing element through the second shed, and returning said reed to its original position.

75 9. The method of forming a lease in warp on

a warp dressing machine provided with a leasing reed comprising a plurality of spaced vertical splits each provided with a plurality of hooks spaced along the length thereof, each hook being
5 positioned to engage warp ends bearing against the supporting split but to pass warp ends bearing against the adjacent split, which method consists in arranging the warp ends in four or more sheets in superposed spaced vertical relation, with one end from each sheet passing
10 through each space of the reed and two spaced ends arranged above each hook element, shifting said reed transversely of said warp sheets both horizontally and vertically to engage one end of each pair by said hooks, shifting said reed horizontally to allow the other end of each pair to
15 bear against the adjacent split, shifting said reed vertically so that the hooked ends pass the unhooked ends and the lower-most hooked sheet of ends is moved vertically beyond the uppermost sheet of unhooked ends, inserting a leasing thread through the shed of warp sheets so formed, returning said reed to its original position to release said warp ends, shifting said reed transversely of the warp sheets vertically and horizontally to engage the other warp end of each
20 pair, shifting said reed horizontally and vertically to carry said engaged warp sheets vertically beyond the unhooked warp sheets, inserting a second leasing string between the shed so formed, and returning said leasing reed to its original position.

10. The method of manipulating the apparatus of claim 6 to form an end-and-end lease in the warp which consists in moving the reed transversely of said sheets both horizontally and vertically to engage the ends of the odd numbered
35 sheets and to move the same vertically beyond the ends of the even numbered sheets and to thereby form a shed between the odd-numbered and even-numbered sheets, passing a leasing element through the shed, returning the reed to its original position to release said ends, moving the reed transversely of the sheets both horizontally and vertically to engage the ends of the
40 even-numbered sheets and to carry the same vertically beyond the ends of the odd-numbered sheets and thereby form a shed between the even-numbered and odd-numbered sheets in reverse position, passing a leasing element through the
50 second shed, and returning the reed to its original position.

11. A leasing reed comprising a back bar, a plurality of sheet metal splits supported at one end from said back bar, the spaces between said
55 splits being open at the other end, each split being provided with a lateral projection formed near the free end thereof and extending into contact with an adjacent split, the projections on adjacent splits being staggered in position along the splits, a plurality of hook elements supported on each split in spaced relation along the length thereof, said hook elements being positioned to engage warp ends lying to one side of the center of the reed space but to allow warp ends to freely
60 pass around the hooks on the other side of the center of the reed space, and rigid end members secured to the ends of said back bar and embracing said splits, said end members cooperating with the lateral projections on said splits to provide lateral support for the free ends of said splits.

12. The method of forming a lease in warp on a warp dressing machine provided with a leasing reed comprising a plurality of spaced vertical
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splits each provided with a hook element, the hooks on adjacent splits being spaced apart to permit warp ends to pass between said hooks, which method consists in arranging the warp ends in four or more horizontal sheets in superposed spaced vertical relation, the ends of said horizontal sheets being arranged in a plurality of vertical rows, one vertical row to each split and each row containing an end from each horizontal sheet, shifting said reed vertically and causing relative horizontal transverse movement between said warp ends and said hook elements to engage alternate ends in said vertical rows, shifting said reed to carry said engaged ends vertically beyond the unhooked ends thereby forming a shed between the even numbered sheets and the odd numbered sheets, inserting a leasing element through the shed so formed, returning said reed to its original position to release said warp ends, again shifting said reed vertically and causing relative horizontal transverse movement between said ends and said reed to engage the alternate ends which previously were not engaged,

and moving said reed to carry said engaged ends vertically beyond said unhooked ends to form a second shed between the even numbered sheets and the odd numbered sheets in reverse position, passing a leasing element through the second shed and returning said reed to its original position.

13. A reed comprising a back bar supporting a plurality of equally spaced splits, and a plurality of hook elements supported on each split in spaced relation along the length thereof, said hook elements being arranged in a plurality of parallel rows substantially parallel with said back bar.

14. A reed comprising a back bar supporting a plurality of equally spaced splits, and a plurality of hook elements supported on each split in spaced relation along the length thereof, said hook elements being arranged in a plurality of parallel rows substantially parallel with said back bar, each split being provided with a hook element located in each parallel row of hooks.

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