No. 650,990. Patented June 5, 1900.

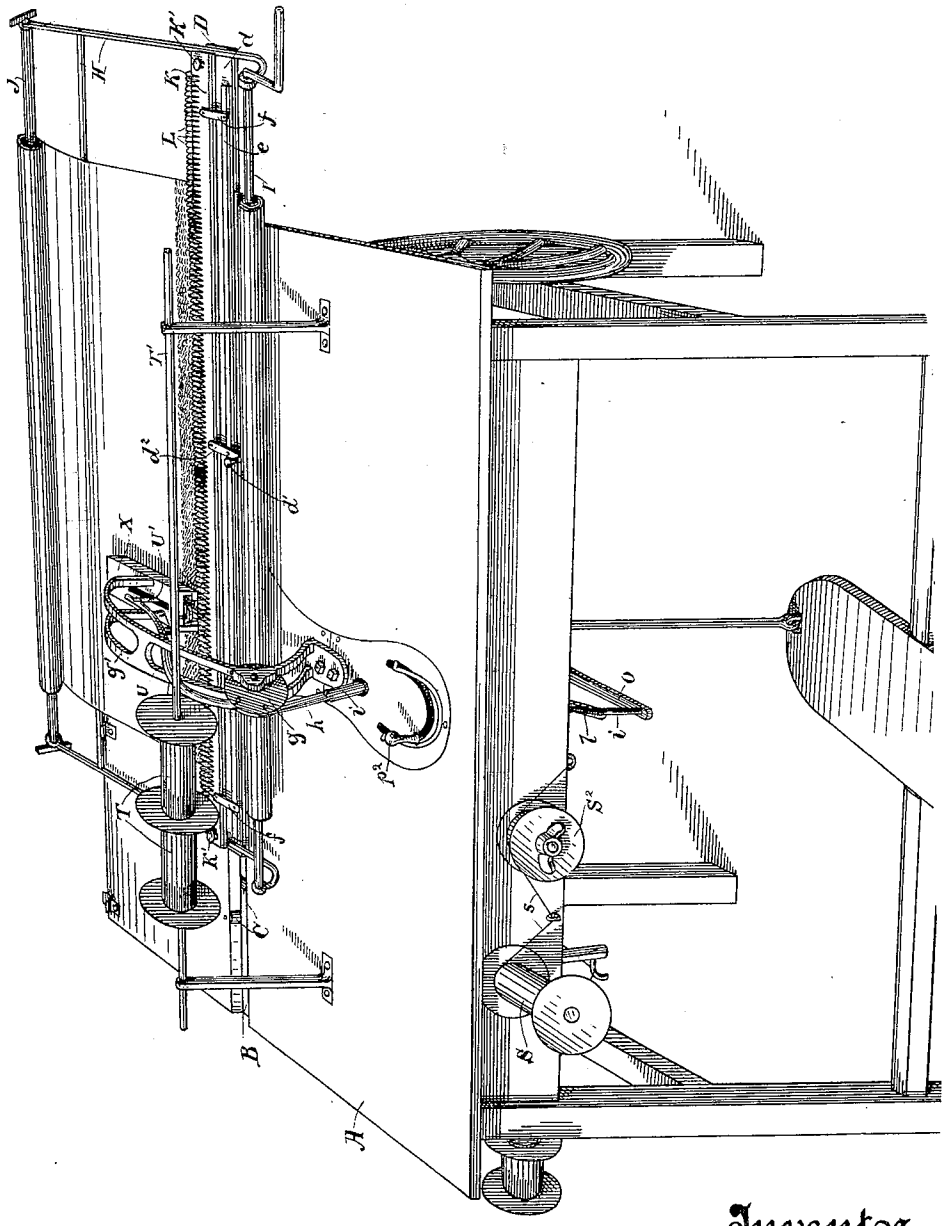
O. RICE.

RUG SEWING MACHINE.

(Application filed Dec. 7, 1898.)

(No Model.) 4 Sheets—Sheet 1.

Fig. 1.



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Fig. 2.

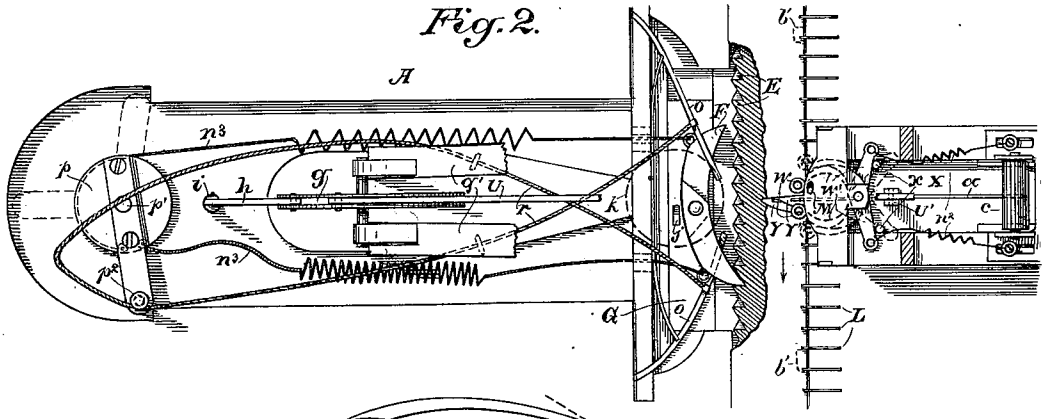
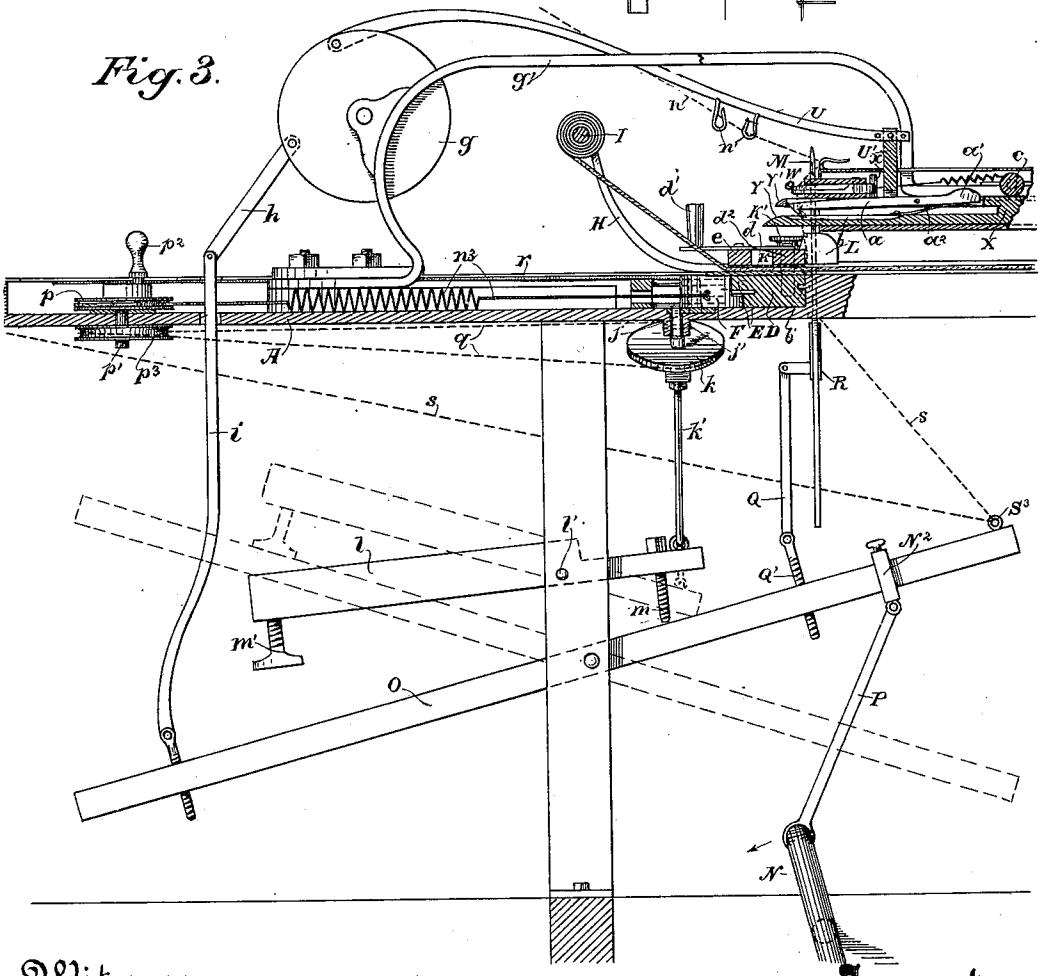


Fig. 3.



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Fig. 4.

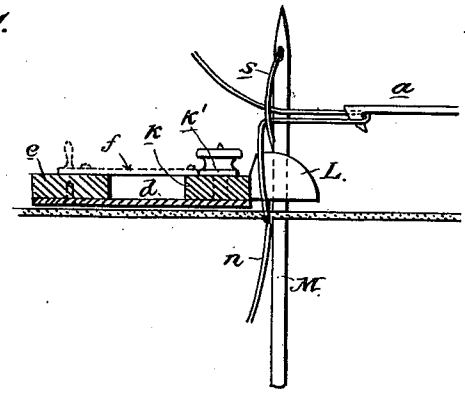


Fig. 5.

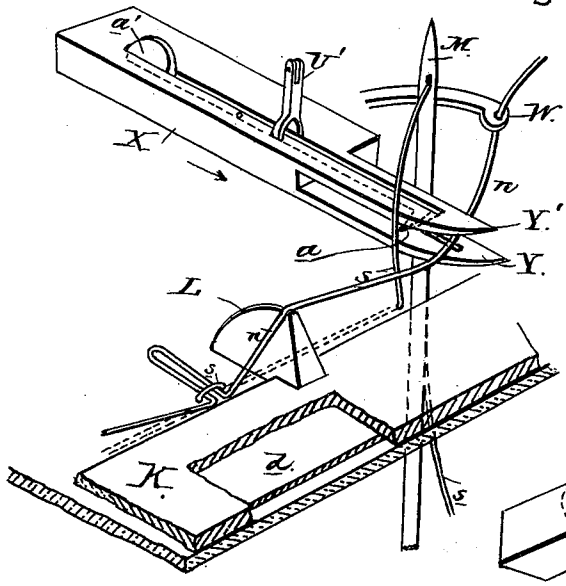


Fig. 6.

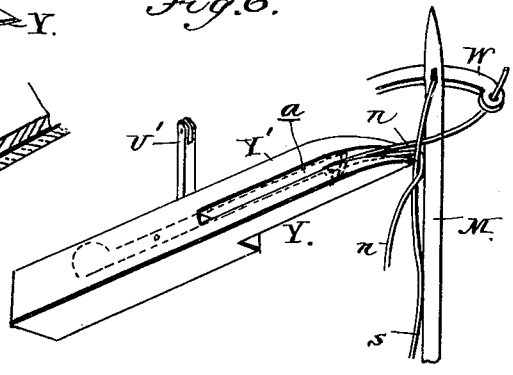
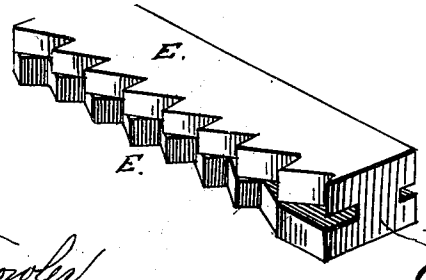


Fig. 7.



WITNESSES

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(No Model.) 4 Sheets—Sheet 4.

Fig. 8.

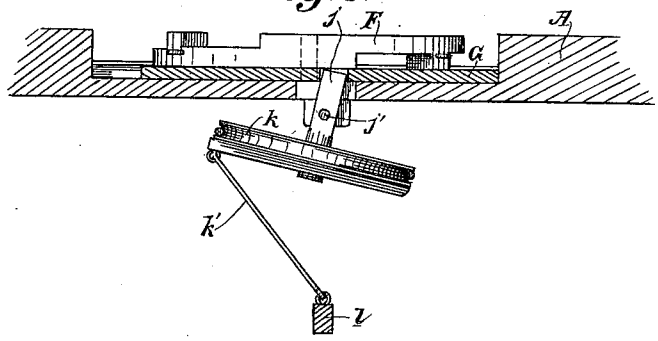
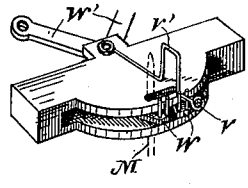


Fig. 9.



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UNITED STATES PATENT OFFICE

OLIVER RICE, OF OAKLAND, CALIFORNIA.

RUG-SEWING MACHINE.

SPECIFICATION forming part of Letters Patent No. 650,990, dated June 5, 1900.

Application filed December 7, 1898. Serial No. 698,496. (No model.)

To all whom it may concern:

Be it known that I, OLIVER RICE, a citizen of the United States, residing in East Oakland, county of Alameda, State of California, have invented an Improvement in Rug-Making Machines; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to a machine which is especially designed for the manufacture of rugs in which the yarns are formed in loops and secured upon a canvas or flexible foundation.

It consists in a novel mechanism by which the loops of the yarn are formed and engaged by a thread carried by a reciprocating needle, so that each loop is given the proper height and is tied or fastened by the thread of the needle.

It also comprises details of construction, which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a perspective view showing that part of the machine above the table. Fig. 2 is a plan and partial section of a portion of the mechanism. Fig. 3 is a vertical section taken from front to rear of the table. Fig. 4 is a detailed sectional view of the comb-plate and adjunctive parts and showing the looper in the act of pulling the yarn-loop through the loop of the needle-thread. Fig. 5 is a perspective view, partially in section, of the looper and a portion of the comb-plate, showing the looper passing through the loop of the needle-thread and about to grasp the yarn. Fig. 6 is a detailed perspective view of the looper looking upward and showing the yarn-loop drawn through the loop of the needle-thread. Fig. 7 is a perspective of a portion of the double racks E. Fig. 8 is a sectional view showing the mechanism for advancing the rug-carrier. Fig. 9 is a perspective view of the yarn-guide.

A is a table having a groove or channel B, provided from end to end with antifrictional rollers C, journaled both vertically and horizontally in the channel for the purpose of relieving the friction of the rug-carrier. This carrier consists of a slide D, which fits and travels in the channel B and which is provided with racks E, superposed upon each other, with the teeth pointed in opposite directions, as shown in Fig. 7, so that one of these racks may be engaged by one point of a pawl F, and when the pawl and its slidable carrier G are reciprocated the pawl will move the rack and the rug-carrier until the whole width of the rug-surface has been moved beneath the needle and loops formed thereon. When this has been completed, the movement of the frame is reversed by tilting the pawl F, so that the opposite point engages the rack which faces in the other direction, and the reciprocations of the pawl-carrier will then reverse the movement of the rug-carrier and transfer the rug across to the opposite side, these movements taking place as the stitches are being made, and at the same time the finished work is moved along as fast as completed.

The rear edge of the bar or slide D is channeled and fits and is movable upon lugs or spurs b', which project from the side of the channel B, so as to prevent the slide from lifting out of place.

The slide D carries a light metal framework H, and at one side of this framework is journaled a roller I, upon which the canvas is rolled, and upon the other side of the framework is another roller J, upon which the finished product is rolled up. The canvas passes between a plate d, which is fixed upon the slide-bar D, and a bar K, which is secured to the bar D by screws K′ at each end, and by means of these screws the compression of the bars upon the canvas passing between them may be regulated so as to produce a sufficient tension to allow the canvas to be drawn between these plates and kept smooth while the work is proceeding. Upon the plate K and projecting upward and rearwardly from it are short vertical plates L, which I shall hereinafter call the "combs." These combs serve to support the loops of the yarn, as is well shown in Fig. 4, so that when the loops are drawn down and tied they will all have the same length and produce an even surface of the finished rug. The distance between the comb-plates L is equal to the length of the rack-teeth E, by which the rug is advanced after each loop has been formed, and the needle M, which is reciprocated with the point upwardly from beneath the table, passes between two

of these comb-plates at each upward reciprocation, carrying the needle-thread *s* with it and interlooping it at each reciprocation with the yarn *n*, with which the rug is formed, as plainly shown in Figs. 4, 5, and 6.

The mechanism beneath the table consists of a crank-shaft having upon it the crank N and a fulcrumed oscillating lever-arm O, one end of which is connected with the crank-shaft by an adjustable pitman P, so that as the crank revolves this lever will be oscillated. The length of the stroke is regulated by a slidable clamp N^2, movable upon the bar O and retained at any point by a set-screw. The pitman P connects with this slide. The lever O is connected by an adjustable arm Q with a guided slide R, which carries the needle M, and it will thus be seen that the oscillations of the bar O will cause the reciprocation of the needle, the point of which, as before stated, is upwardly. The adjustment of the needle is effected by a screw Q', connecting the rod Q with the pitman O, as shown. The needle-thread is shown in dotted lines *s* and is supplied from a bobbin or reel S, suitably attached to the table, the thread passing thence around a tension device S^2, as shown in Fig. 1, and thence beneath the table and through an eye S^3 upon the end of the oscillating lever O, passing thence up to the needle M and being carried by the latter in its reciprocations. After the first stitches are made the fastening of the thread and the yarn at one side holds that end, while allowing the thread to be drawn through the needle by each upward reciprocation thereof, thus bringing the new portion of the thread after each stitch is tied. The yarn of which the loops are formed is contained upon a reel or reels T, which are loosely turnable upon a rod T', extending across above the table and supported by suitable standards, as shown. As many of these yarn-reels may be employed as it may be desired to have colors worked into the rug, and from the reels the yarn *n* passes through hooks or guides *n'* upon the reciprocating arm U, which will be hereinafter described. From this guide the yarn passes down through a guide-loop V, formed in the end of an elastic bent wire V'. (Shown plainly in Fig. 9.) The loop V is adjustable to one side or the other of the line of travel of the needle M by means of guide-pins, (shown at W.) The wire in which the loop is formed is sufficiently elastic to be raised and is dropped between one pair of these guide-pins when the rug is moving to one side of the table and is lifted out and dropped between the other pair of pins when the rug is moving in the opposite direction, thus holding the yarn at one side or the other of the line of movement of the needle, so as to properly lay the yarn between the spurs and engage the hook *a* and also engage the needle-thread with the loops.

In place of the single transferable guide V, as shown in Fig. 9, a guide may be fixed to the ends of each of the levers W', as in Figs. 2 and 6, in which case the yarn would be transferred from one to the other as the travel of the rug-carrier is reversed. In either case the guides are carried by the front ends of crossed pivoted levers W', the rear ends of which are separated at each forward movement of the carriage X by means of pins *x*, fixed to the carriage in such a position as to strike the rear ends of the levers. This moves the guide through which the yarn passes, so that the yarn is laid in an oblique position from the last stitch to the guide, and the spurs Y Y' will thus pass above and below it when they are advanced.

The slidable plate or carriage X is movable in guides, so that it may be reciprocated to and from the line of travel of the needle and at right angles to the movement of the rug-carrier. This plate carries the two spurs Y and Y' one above the other, and also carries the hook *a*, by which the loops in the yarn are formed. When the carriage X is moved forward, the spurs Y and Y' are advanced at one side of the line of travel of the needle, and the yarn *n* is directed between them by the position of the guide-loop V and the fastening of the end which has already been formed into a loop, and this holds the yarn so that the hook *a*, which has a beveled front end, passes over and engages the yarn. The lower spur Y has a shallow groove or channel *b* made in its upper surface, and the point or barb of the hook *a* normally lies in this channel. When the spurs Y and the hook are advanced, as previously described, the pressure of the yarn upon the beveled front of the hook will lift it and allow the yarn to pass behind, the hook dropping into the groove *b*, and thus engaging the yarn, so that when the parts are again retracted the hook will draw the loop of the yarn back. The rear end of the hook-shank has a raised cam *a'* formed upon it, and as the carriage is retracted this cam passes beneath a roller *c*, which depresses this end of the hook-lever and raises the hook so as to disengage it from the yarn-loop which has now been made. When a stitch is finished and the needle has descended far enough to clear the slide D, the latter is moved along one tooth of the rack-bar, and immediately afterward the needle commences to rise, and as it continues to rise the carriage X commences to move forward, and the spurs Y Y' enter between the needle and its thread, and as the carriage continues to advance the spurs pass above and below the obliquely-placed yarn, Fig. 5, and the latter is forced beneath the hook *a*. When the carriage returns, the hook *a* pulls the yarn through the needle thread-loop, as shown in Figs. 4 and 6, and the needle commences to descend. Meanwhile the roller *c* will act to raise the hook *a* and release the yarn-loop. Therefore as the needle descends its thread-loop engages the portion of the yarn between the loop of the latter and the portion of said

yarn which lies over the underlying comb-plate, as shown in Fig. 4, so that a further downward movement of the needle through the canvas pulls the thread-loop tight. The needle works in the space between adjacent comb-plate, and when the stitch is finished and the needle has descended far enough to clear the slide D this slide is moved along one tooth of the rack-bar, which lays the yarn over the next comb-plate and in a position which when the needle again descends causes a second loop to be formed in that portion of the yarn lying upon the comb-plate and between the stitch being formed and the next preceding stitch.

The loops are substantially in pairs, with one loop of one row about midway between its companion and another loop of another row. The loops which are formed on the comb-plates remain upon said plate until the row has been completed from one side to the other, when they are pushed off said plates by means of the sliding plate d, Figs. 3 and 4, having a handle d', by which it is operated. This plate d is fixed upon a bar e, and this bar is connected with the bar K, which carries the comb-plates, by links f, so that when the handle d' is moved it turns about its pivot-point d^2 upon the bar K, and being pivoted to the bar e it moves the latter, turning about the links f in the manner of a parallel ruler. This pushes the plate d forward beneath the comb-plates, and thus forces the series of loops which have been left on the comb-plates off of these plates. The canvas can be then wound a little further upon the roller J, thus leaving another surface ready for another row of stitches. The reciprocation of the slide X, which carries the hook or looper a and the spurs Y and Y', is effected by means of the arm U, the rear end of which is connected with a standard U', extending up from the slide or carriage X. The front end of the arm U is connected with the periphery of a revoluble disk or wheel g, pivoted to a supporting frame or yoke g', as shown. A link h connects the periphery of this disk with a pitman-rod i, which passes down through the table and connects with the end of the oscillating lever O, as shown in Fig. 3. The upward movement of the front end of this lever pushes the connecting-rod i up and through the link h rotates the disk g, thus pushing the arm U and the slide or carriage X backwardly after the hook a has engaged the yarn, and the loop is thus formed. A spring a^2 presses upon the lower rear part of the hook-arm a and normally raises the rear cam-shaped portion a', pressing the hook at the front end down into the slot or channel b while the loop is being pulled backwardly. The pressure of this spring a^2 is easily overcome when the yarn presses against the front of the hook, so as to lift the hook at the front end of the arm a and allow the yarn to pass. The depression of the front end of the lever-arm O, acting through the connecting-rod i and the link h, again rotates the disk g, so as to draw the arm U, and with it the slide or carriage X, toward the front, and this moves the spurs Y Y' and the hook forward to engage another loop in the yarn, as previously described.

In order to move the canvas-carriage to the right or left, the slide G carrying the pawl F, which engages the teeth E of the rack-bars, is engaged by an oscillating arm j, Fig. 8, which is fulcrumed, as shown at j', and carries upon the lower end a grooved wheel or roller k. (Shown also in Fig. 8.) The periphery of this wheel or roller is connected by a link k' with a tilting bar l, which is fulcrumed, as shown at l', and has adjustable screws or lugs m m' passing through its ends. This lever l is fulcrumed above the lever O and at such a distance therefrom that when the lever O is tilted it alternately strikes the adjustable lugs m m', so that the lever L will be tilted about its fulcrum-point, and when the rear end is thus pushed up it acts through the rod k' to tilt the pulley k, and acting upon the arm j thus projecting through the slide G causes the latter to reciprocate transversely of the table and parallel with the line of movement of the canvas-carrier. This slide G carries the double-pointed pawl F, and the point which is advanced will engage a tooth of the rack E, and thus move the rack and the canvas-carrier forward a single tooth at each reciprocation. When the canvas-carriage has moved to its full extent in one direction, the position of the pawl F is reversed by turning it upon its pivot, so that the point which has hitherto been engaged will be retracted and the other one advanced. This change of position is effected by means of elastic or other equivalent connections n^2 n^2, the rear ends of which are connected with the opposite ends of the pawl F. The front ends of these attachments n^2 are here shown connected with a pulley p, passing around it from opposite sides, so that when it is turned to one side or the other it alternately acts to pull one point of the pawl F out of engagement with its rack E, while the other is allowed to advance and engage with the other rack. The pulley p is turned by a crank p^2, so that when this crank is turned in one direction it pulls upon one of the cords n^2, so as to disengage one point from its rack E and throw the other point forward to engage with the other rack. Whenever the pulley p is turned a half-revolution to thus change the pawls, the position of the arm j is also changed by tilting the pulley k so that its angle of operation will be opposite to that shown in Fig. 8. This change is effected by the turning of the crank p^2, which is pivoted to a shaft, as shown at p', and this shaft extends down through the table and has a pulley p^3 fixed to its lower end, as shown in Fig. 3. When the crank-arm p^2 is turned, as shown in Fig. 2, it will have turned the pawl F so that one of its points engages its rack, as shown. When the crank

p^2 is turned a half-revolution in the opposite direction, it will have disengaged this point of the pawl and will have advanced the other point to engage with its rack. At the same time it turns the pulley p^3 below the table, and by means of a cord q, which passes from this pulley around the tilting pulley k, the latter will be also turned a half-revolution. This transfers the connecting rod or link k' to the opposite side of the lever-arm l, and this transfer acts to tilt the pulley k in the opposite direction from that shown in Fig. 8, and when in this position it acts to move the slide G, which carries the double pawl F, so that the latter will advance the rack E in the opposite direction. The cords r connect with opposite ends of the pawl F by means of spring-pressed arms o, which have one end fixed, as shown, and the inner adjacent ends pressing upon the pawl. The ends of the cord connect with these arms o, and the bight of the cord passes around the crank-handle p^2, so that when it is turned to its farthest forward position, as shown in dotted lines, Fig. 2, it will pull equally upon the arms o.

If it is desired to entirely remove the sliding carrier, upon which the canvas is mounted, by setting the crank p at its farthest forward position, or half-way of its complete turn, it pulls upon the cords r, and thus pulling upon the spring-pressed arms o both of these press simultaneously upon the ends of the pawl F and bring it into a position where neither of the points F engage with the racks E, thus leaving the slidable canvas-carrier free to be drawn out of the groove or channel B, in which it travels.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A rug-making machine comprising a transversely-channeled table, a frame with rollers adapted to carry and transfer the rug-base, a bar movable and guided in the table-channel, oppositely-toothed racks with mechanism whereby the rug-carrier may be transferred alternately from one side to the other, a bar secured on top of the first-named bar and separated from the latter to provide a space for the passage of the rug-base and having vertically-disposed comb-teeth projecting from its front, and a plate adapted to strip the loops off the comb-plates after a row of loops has been formed.

2. In a rug-making machine, a transversely-channeled table, a frame having rollers journaled upon it for the reception of the rug-base and the completed rug, and means for transferring the same from one roller to the other, a rack-bar fitting and movable within the table-channel and having the rug-carrying frame secured thereto, a second bar adjustably secured upon the top of the rack-bar and having a space formed between the two through which the canvas rug-base passes from one roller to the other, a loop-forming mechanism, vertical comb-plates fixed and projecting from the upper bar and adapted to receive and gage the loops of the yarn as they are formed, and a stripper plate and bar movable in the space through which the rug-base passes, so as to strip the loops off the comb-plates after said loops have been completed.

3. In a rug-making machine, a transversely guided and movable carrier for the rug-base with vertically-disposed comb-plates fixed thereto at intervals equal to the steps by which the rug-carrying frame is transferred from one side to the other, a guided carriage or slide movable at right angles with the line of movement of the rug-carrier, spurs situated one above the other projecting from the front of said carrier and adapted to receive the yarn, a vertically-tilting hook-bar pivoted with its hook projecting between the spurs and beveled so as to engage the yarn when the device is projected to the front, mechanism by which the carriage and hook are retracted after said engagement to form a loop of the yarn, a cam formed upon the rear of the hook-arm and a roller or contact-piece with which it engages when it reaches its rearmost position, whereby the hook is disengaged from the loop.

4. In a rug-making machine, a transversely-movable carrier to which the rug and its base are secured, a guide movable in the transversely-channeled table, and oppositely-toothed rack-bars and mechanism by which the carrier is transferred by intermittent steps to one side or the other, vertically-disposed comb-plates having spaces equal to the distance between the teeth of the rack-bars, a guided carriage movable transversely to the line of movement of the rug-carrier having spurs projecting from the front, guides through which yarn is brought and delivered between said spurs, a vertically-pivoted hook lying between the spurs and adapted to engage the yarn when the parts are projected to the front, and to withdraw the yarn to form a loop when retracted, a vertically-movable thread-carrying needle and mechanism by which it is reciprocated in unison with the movements of the looper whereby its thread is engaged with the yarn-loop, and said yarn is drawn down upon one of the comb-plates.

5. In a rug-making machine, a transversely-traveling carrier upon which the rug-base is supported, a carriage movable at right angles with the movements of the rug and its carrier having spurs, one above the other, guides through which the yarn is brought and delivered between said spurs, a vertically-tilting hook pivoted between the spurs so as to engage the yarn and draw it back to form a loop when the device is retracted, separable arms to which the yarn-guide is attached, and pins mounted upon the carriage so as to act upon said arms and move the yarn-guides.

6. In a rug-making machine, a transversely-movable rug-carrier and the looper adapted to reciprocate at right angles with the move-

ments of the rug-carrier, a vertically-reciprocating thread-carrying needle, a mechanism by which it is reciprocated through the rug-base, oppositely-toothed rack-bars and mechanism by which the rug is moved alternately to one side and the other, a yarn-guide and means for supporting it at a point in advance of the needle in the direction of the travel of the rug, and arms engaging and operating the yarn-guide.

7. In a rug-making machine, a transversely guided and movable rug-carrier, oppositely-toothed racks connected therewith, a double-pointed, fulcrumed pawl, a mechanism whereby it may be tilted to engage either one point or the other with its respective rack, a slide upon which said pawl is fulcrumed, a tilting lever engaging said slide, a pulley journaled upon the lower end of said lever and turnable thereon, a link connection between the periphery of the pulley and a vertically-oscillating lever-arm whereby the pulley and its lever are oscillated, and a means for turning the pulley to transfer the link connection and change the angular position of the pulley.

8. In a rug-making machine, a transversely-guided rug-carrier, oppositely-toothed racks connected therewith, a double-pointed fulcrumed pawl, and mechanism by which it may be tilted to engage one point or the other with its respective rack, a slide upon which the pawl is fulcrumed, mechanism by which the slide is reciprocated, consisting of a pivoted arm and a pulley carried thereby, a fulcrumed lever, a rod by which the edge of the pulley is connected with the lever, a second lever fulcrumed beneath and adapted to contact with the first-named lever, and means for operating the second lever.

9. In a rug-making machine of the character described, a transversely-movable rug-carrier, a carriage and yarn-looper movable at right angles therewith, and a vertically-reciprocating needle, the thread of which engages the yarn-loops, means for operating the looper and needle, levers fulcrumed beneath the table and adapted to contact when oscillated, adjustable contact screws or points by which the time and duration of the contacts are regulated, the rack-bars and a pawl connection between the same and the carriage, and an oscillating arm and connection between the same and one of said levers.

10. In a rug-making machine of the character described, a transversely-movable rug-carrier, a carriage and yarn-looper movable at right angles therewith and a vertically-reciprocating needle, the thread of which engages the yarn-loops, means for operating the looper and needle, levers fulcrumed beneath the table so as to contact when oscillated, rack-bars and a pawl connection between the same and the carriage, an oscillating arm and connections between the same and the uppermost lever, a crank and pitman by which motion is transmitted to the lowermost lever, and a clanp with which the pitman connects, said clamp being adjustable upon the lever to vary the stroke.

11. In a rug-making machine of the character described, the rug-carrier, carriage and yarn-looper and mechanism by which they are moved with relation to each other as shown, a vertically-reciprocating thread-carrying needle which engages a yarn-loop at each stroke, a fulcrumed lever beneath the table, and a crank and connections through which motion is transmitted, a needle-holding clamp, a rod connecting it with the oscillating lever, and an interposed adjusting device by which the position of the needle is regulated.

In witness whereof I have hereunto set my hand.

OLIVER RICE.

Witnesses:
S. H. NOURSE,
JESSIE C. BRODIE.