

May 6, 1930.

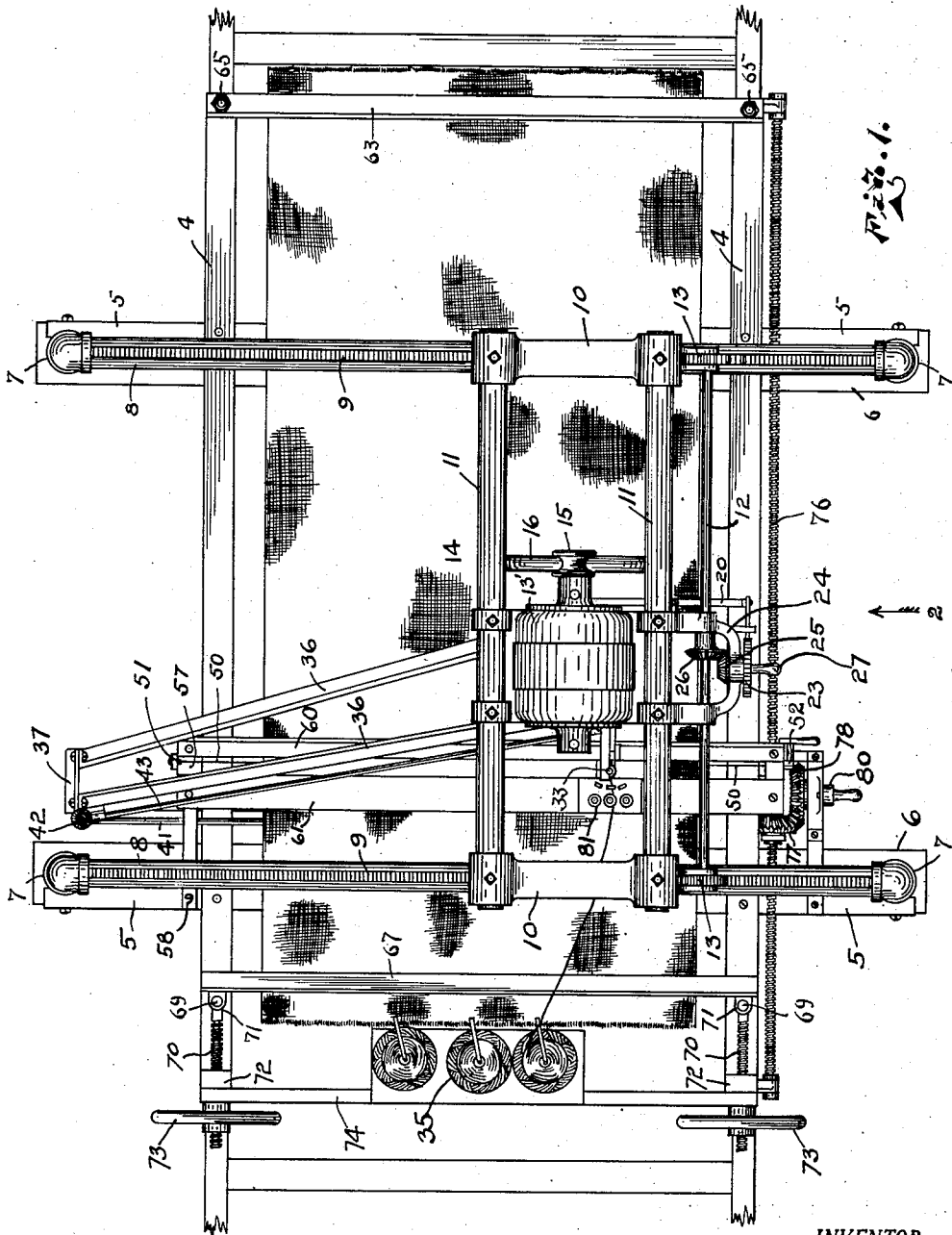
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1,757,795

TUFTING MACHINE

Filed Oct. 7, 1926

4 Sheets-Sheet 1



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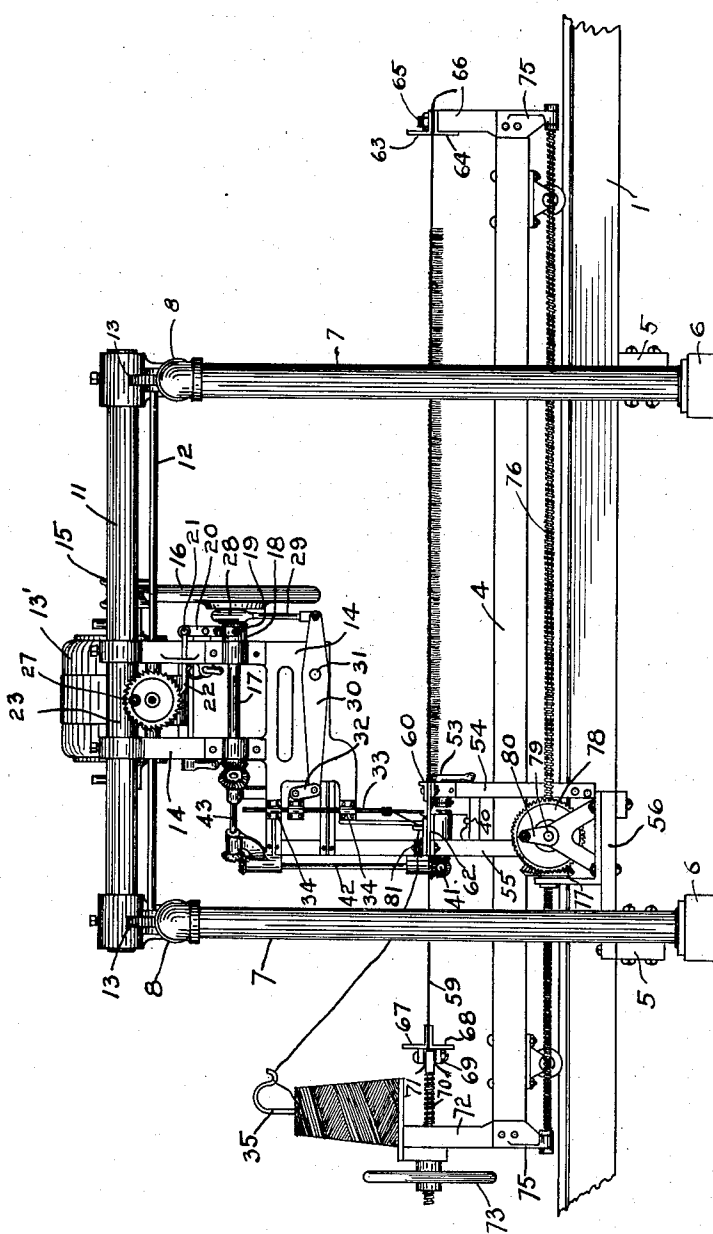


Fig. 2.

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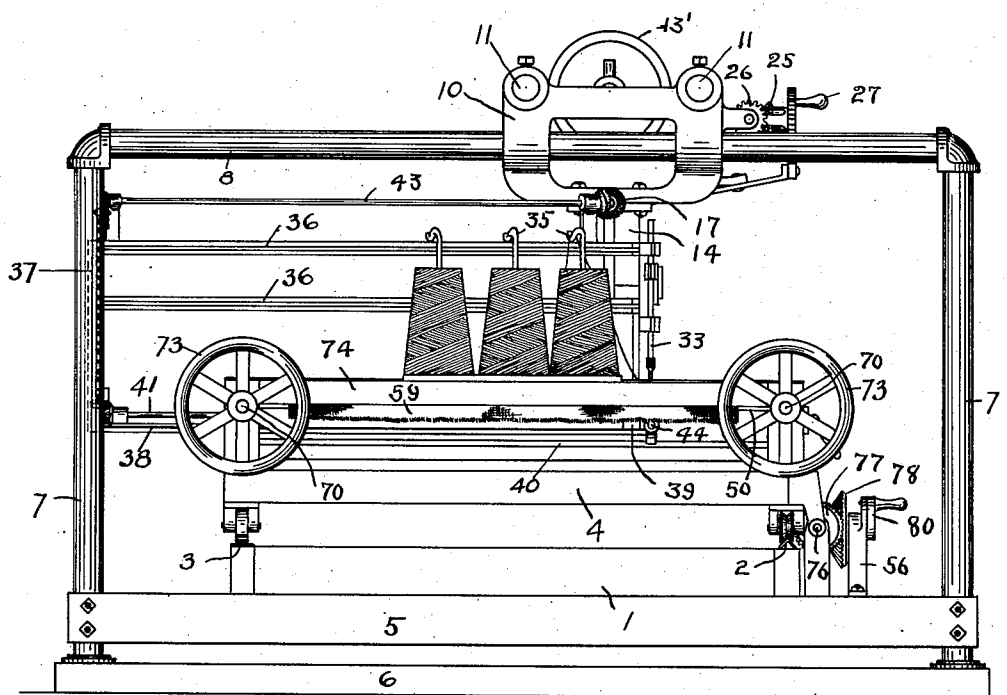


Fig. 3.

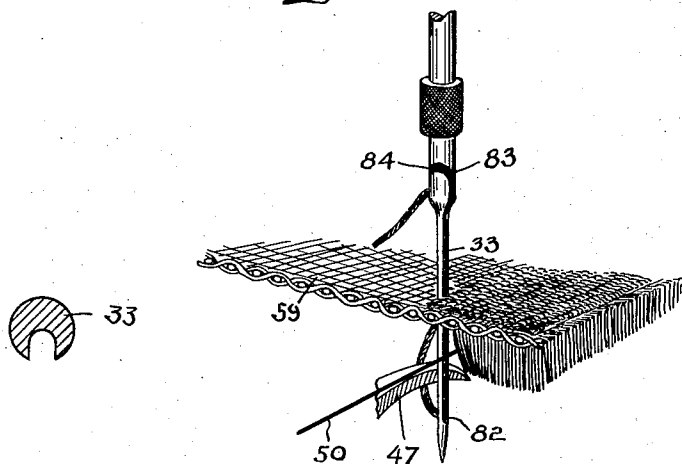


Fig. 5.

Fig. 4.

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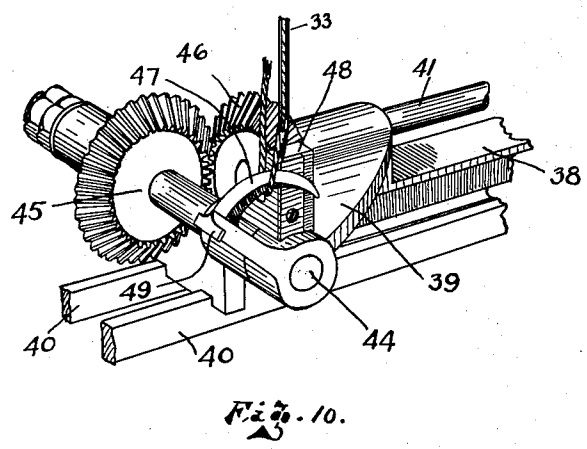
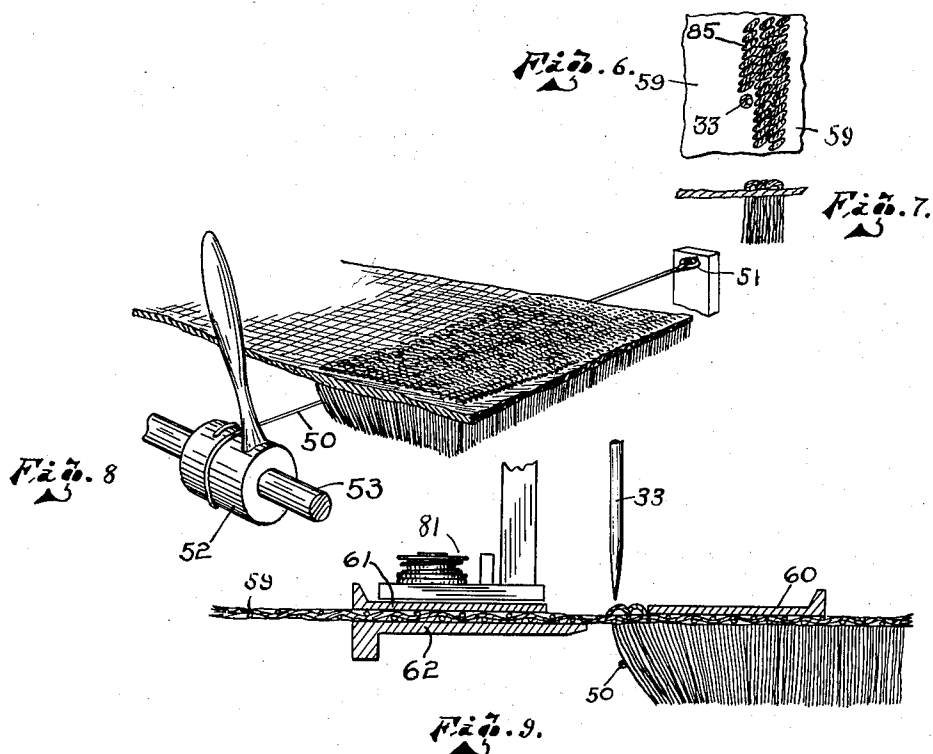
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Filed Oct. 7, 1926

4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

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TUFTING MACHINE

Application filed October 7, 1926. Serial No. 140,028.

This invention relates to rug making machines and has special reference to one particularly designed for producing a rug having a deep pile or nap, similar to the well known Chinese rugs, the principal object of which is to produce a practical, simple, and economical machine for such purpose.

Other objects and advantages of the invention will appear in the further description thereof.

Referring now to the accompanying drawing, forming part of this application, and wherein like reference characters indicate like parts:

Figure 1 is a top plan view of a complete machine as it would appear in operation;

Figure 2 is a front elevation, looking in the direction of the arrow 2 on Figure 1;

Figure 3 is a side elevation looking in the direction of the arrow 3 on Figure 1;

Figure 4 is an enlarged perspective view of a fragmental portion of a rug being made, the needle also being shown;

Figure 5 is an enlarged transverse section of the needle;

Figure 6 is an enlarged plan view of the looped back of the rug;

Figure 7 is a transverse section of Figure 6;

Figure 8 is an enlarged view of the operating end of the wire control mechanism;

Figure 9 is an enlarged transverse section of the partially made rug adjacent the needle; and

Figure 10 is a perspective view of the loop cutting mechanism.

1 represents an elevated frame structure carrying upon one side thereof a V-shaped rail indicated at 2, and on the other side a flat rail indicated at 3, upon which the carriage 4 is mounted, it having the desired number and shape of wheels to cooperatively correspond with the rails. This frame structure is supported centrally upon the transverse girders 5 and 6, the latter supporting upon their ends the upright metal tubular legs 7, while the former are spaced above the latter and bolted to the sides of the legs adjacent the bottom thereof. The upper ends of the legs 7 are provided with elbows into which are mounted horizontally, and trans-

verse the carriage 4, the racks 8, they being preferably of round rod with teeth formed in the upper surfaces thereof as indicated at 9. These racks are spaced a considerable distance above the carriage 4 for convenient manipulation of the mechanism intermediate of the carriage and the racks.

The power carriage comprises the end members 10 and connecting rods 11, and is mounted upon the racks 8 for longitudinal reciprocation thereupon by means of the shaft 12 in front of and parallel with the front rod 11 of the carriage, and carrying upon its extreme ends the spur gears 13 constantly in mesh with the teeth 9. In the embodiment here illustrated I have provided means for the return of the power carriage manually after having been advanced by the motor during a working trip across the rug, though it is quite obvious that the same may be made to operate automatically, if desired.

The power mechanism comprises the electric motor 13' carried in a suitable depending saddle illustrated at 14 upon the rods 11, and transmitting its power frictionally as by the small sheave 15, bearing against the larger drive pulley 16, mounted upon the outboard end of the shaft 17, journaled within the saddle. This shaft 17 carries the ratchet manipulating hub 18, which has a diagonally disposed circumferential groove 19 therein which reciprocates the lower end of the lever 20, pivotally carrying upon its upper end as at 21 the pawl 22 operating in the ratchet wheel 23, mounted upon a short shaft in the lateral extension 24 of the saddle. This short shaft carries the miter gear 25 which meshes with the like gear 26 on the shaft 12 of the power carriage so that when the shaft 17 rotates it will reciprocate the pawl 22 and intermittently rotate the shaft 12, thus advancing the power carriage intermittently through the meshing of the gears 13 on the shaft 12 with the rack teeth 9. As before stated, for reverse motion of the power carriage manually, I provide the crank handle 27 upon the ratchet wheel 23, so that by dropping the pawl 22 from engagement with the ratchet wheel in any desired manner, the carriage may be operated backwardly by hand.

Upon the shaft 17, and intermediate of the hub 18 and the driven friction wheel 16, is mounted an eccentric 28, carrying the depending pitman 29, which operates the rocker arm 30, pivoted as at 31 in the lowermost extension of the saddle 14. The opposite end of the rocker arm 30 has a suitable linked connection as indicated at 32 with the vertically reciprocable needle 33, so that as the shaft 17 is rotated a constant vertically reciprocable motion is imparted to said needle for hooking the rug; this needle being obviously suitably mounted as at 34 in the lower extension of the saddle. The yarn, or material used in forming the pile of the rug, is fed in the usual manner, as indicated at 35, the same being supported in any convenient manner upon one end of the rug carriage 4.

A rearwardly projecting and angular extension of the saddle 14 is illustrated at 36, the same terminating rearwardly in the upright 37, which is of sufficient height to carry the underslung extension or arm 38, the head of which, as indicated at 39, is slidably mounted upon the two transverse beams 40 beneath the rug, there being formed a suitable depending extension 39' of the head 39 for such engagement with the beams 40, the same being clearly illustrated in Figures 2 and 3 of the drawings.

The loop cutting mechanism, carried in the head 39, is operated by the shaft 41 journaled in said head and leading backwardly to the upright 37, parallel with the arm 38, they receiving power and motion from the vertical shaft 42 which is operated by the horizontal shaft 43, parallel with the extension arms 36 to the end of the power shaft 17 from which power and motion is derived through suitable beveled gears.

The loop cutting mechanism mounted within the head 39 comprises the short transverse shaft 44 journaled within the head and carrying the miter gear 45 in constant mesh with the similar gear 46 fixed to the end of the shaft 41. On the outboard end of the shaft 44 is mounted the loop cutting hook 47 which intermittently passes the fixed cutting post 48 carried by the head 39 as the shaft 44 rotates, the hook being in step with the other operable parts of the mechanism so that each time the needle 33 reaches its lowermost extremity through the back of the rug and is about to start its upward course, forming a loop in the thread, the hook will become engaged in said loop by its rotation and sever same as it passes the cutting post 48, the needle having returned to its position just above the back preceding another downward stroke, when the hook will be on hand to repeat its cutting operation. In addition to the cutting of the loop, the hook is provided with means to function as a brush so that as it passes the successive groups of cut loops the lateral extension or wiper 49 at the shoulder

of the hook will crowd the pile adjacent the path of the needle away from same thus insuring freedom of the operation of the needle. The exact shape of the hook, its cutting edge, and the cutting edge of the post, are not essential to the present invention, so the detailed description of same is omitted.

As an additional means for controlling the pile, I provide the wire 50 which is permanently fastened in any desired manner, as at 51, adjacent the rearmost extremity of the frame 57, so as to always be a trifle back of the path of the needle, and the opposite end of said wire 50 is wound about the small intermittently hand rotated drum 52 mounted upon the shaft 53 journaled in the upright 54 of the support for the beams 40, the other upright being indicated at 55. As is obvious the wire must be slackened so as to overlap each successive row of cut pile and again tightened, prior to the starting of a new row, so that the needle may have free action. The uprights or supports 54 and 55 are positioned in front of the carriage 4 and are supported in any desired manner upon the platform 56 bolted to one of the girders 5. At the rear of the carriage 4 the opposite ends of the beams 40 are supported in a similar manner on a frame structure indicated at 57, also bolted to the beam 5, as at 58, it being understood that the beams 40, and their supports at either end are permanent fixtures, as well as the tubular legs or uprights 7; the arm 38 reciprocating back and forth carrying the loop cutting head therewith as the needle and power carriage is operated back and forth on the racks 8.

The uprights 54 and 55, together with the frame 57 extend upwardly into the same plane with the back 59 of the rug when stretched taut in the carriage 4, and there support the small angle plate 60 upon one side of the path of the needle and above the rug, while upon the other side is supported a similar angle plate 61 above the back, and a slightly larger angle plate or bar 62 below the back of the rug, these being for the purpose of guiding and holding the rug uniformly while the needle is in operation to prevent undesirable flopping or vibration of the rug during the making thereof.

The back 59 of the rug is held at one end intermediate of the two clamping angle bars 63 and 64 which are held together by suitable bolts 65 in the uprights 66 of the carriage 4, while at the opposite end it is held tightly intermediate of similarly shaped clamping angle bars 67 and 68 held together by suitable bolts 69. At either end of the clamping bars 67 and 68 is provided an externally screw threaded tightening bolt 70, which is pivotally attached to the back of the clamping bars as at 71 and extending outwardly through the uprights 72 at each corner of the carriage 4, externally of which is mounted upon each

one a screw threaded hand wheel 73 for tightening or loosening the rug as desired. It is on a suitable cross bar 74 intermediate of the uprights 72 that the thread or yarn holders 35 are mounted and from whence the yarn leads to a suitable tension device as common in the art and indicated at 81, the same being supported from the needle holding frame.

The uprights 66 and 72 upon the front corners of the carriage 4 are each provided with a depending bracket 75 in which is journaled the externally screw threaded rod 76 passing through the beveled gear 77 mounted upon the platform 56, the hub of said gear being internally screw threaded to cooperatively receive said rod. Mounted adjacent this gear 77 and meshing therewith is a similar miter gear 78 mounted on a suitable shaft 79 also carried on said platform 56, and a crank 80 is mounted upon the end of the shaft 79 for turning same in accomplishing a horizontal movement of the carriage 4. While I have illustrated this part of the mechanism as being controlled or performed manually, it is obvious that the same may be done mechanically or automatically as desired.

Particular attention is directed to the arrangement and construction of needle 33 as it is formed with a channel extending from the eye 82 to the shank 83, which latter is provided with a transverse slot 84, so that the thread or yarn is payed through said slot from the opposite side of the needle to that which is fluted or grooved; and the disposition of the needle in operation is such that the fluted side is toward the previously formed pile and the loop is cut on the opposite side of the needle, as clearly shown in Figure 4. By this positioning of the needle, which is again clearly shown in Figure 6, the loops 85 formed on the back of the rug are diagonally positioned, and the height that the needle is raised at each stroke above the back of the rug determines the size of the loop, so that in the preferred construction these loops are conveniently made of sufficient size to completely cover the back of the rug.

From the foregoing it is evident that I have devised a simple and practical means for making a rug of the type described, and having the back completely covered with the same material of which the pile is formed.

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

1. A machine of the type described comprising in combination an upright power and loop forming mechanism support, a horizontally reciprocable carriage beneath said mechanism, rug holding mechanism upon the carriage, means for operating the power and loop forming mechanism transverse the carriage, said loop forming mechanism comprising a needle supported from above the rug, and a loop cutting means also operated from

above the rug and cooperating with the needle beneath the rug.

2. The combination with a machine of the type described having rug holding means, and a reciprocable needle for forming the loops of said rug, of steadying plates spaced apart and adjacent the path of the needle, one above and one below the rug, the needle operating therebetween.

3. In a rug making machine of the type described having rug holding means and a reciprocable needle for forming the loops of a rug, spaced steadying plates extending wholly across the rug adjacent the path of the needle, one plate being above and another below the rug, and the needle operating therebetween.

4. A machine of the type described comprising a rug support, means carried by the support for feeding the rug, needle operating mechanism above the rug, loop forming mechanism below the rug cooperating with the needle, and means for supporting the needle and loop forming mechanism, said means being reciprocable parallel with the line of stitching of the rug.

5. In a rug making machine of the type described having rug holding means, a reciprocating needle provided with a strand of material for forming the loops of a rug, rotating loop cutting means operable in step with the needle, and means for crowding the cut loops away from the path of the needle.

6. In a rug making machine of the type described having rug holding means, a reciprocating needle provided with a strand of material for forming the loops of a rug, rotating loop cutting means operable in step with the needle, means for crowding the cut loops away from the path of the needle, and means for holding the cut loops or pile of the rug away from the path of the needle.

In testimony whereof I affix my signature.

CHARLES ALFRED DAHLEN.