

June 14, 1932.

E. E. RICE

1,862,768

MACHINE FOR HOOKING RUGS AND THE LIKE

Filed July 1, 1930

2 Sheets-Sheet 1

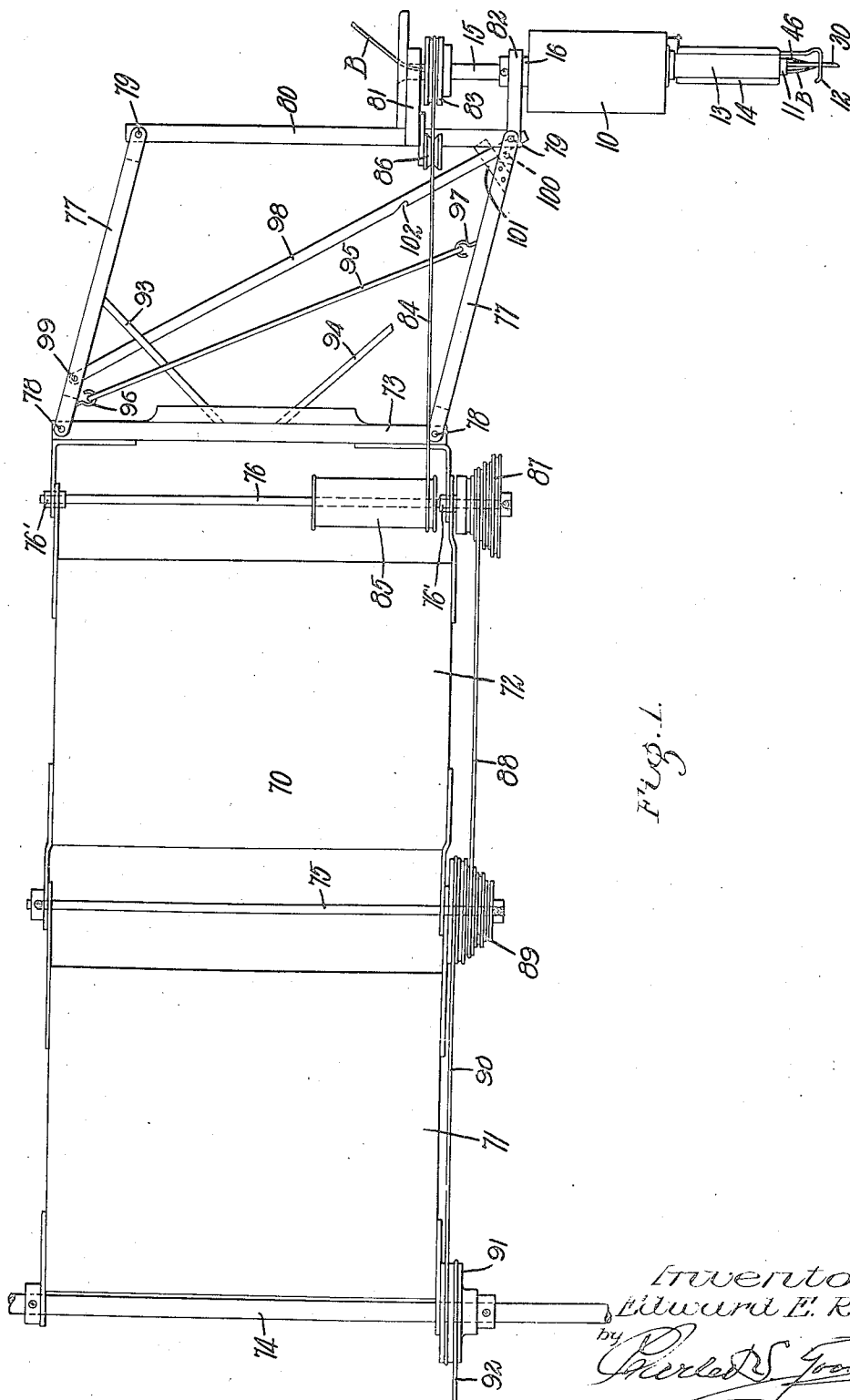


Fig. 1.

Inventor:  
Edward E. Rice.  
by *Charles S. Goodings*  
Att'y.

June 14, 1932.

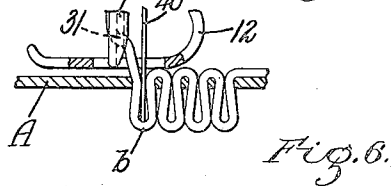
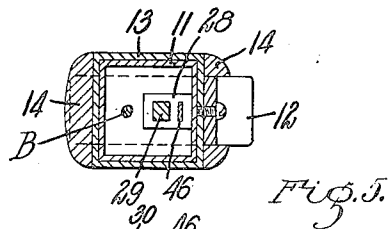
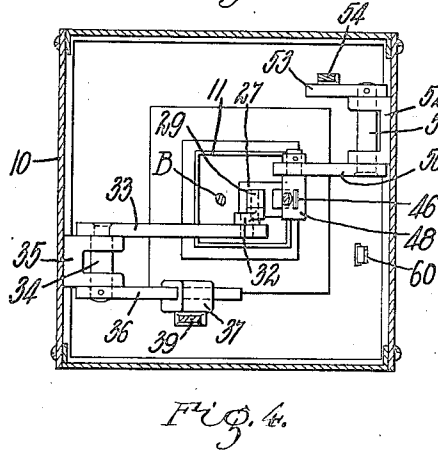
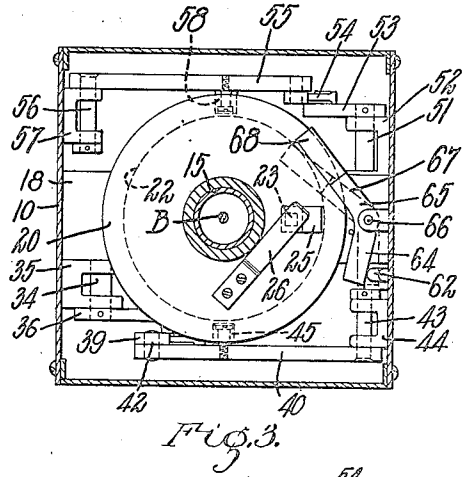
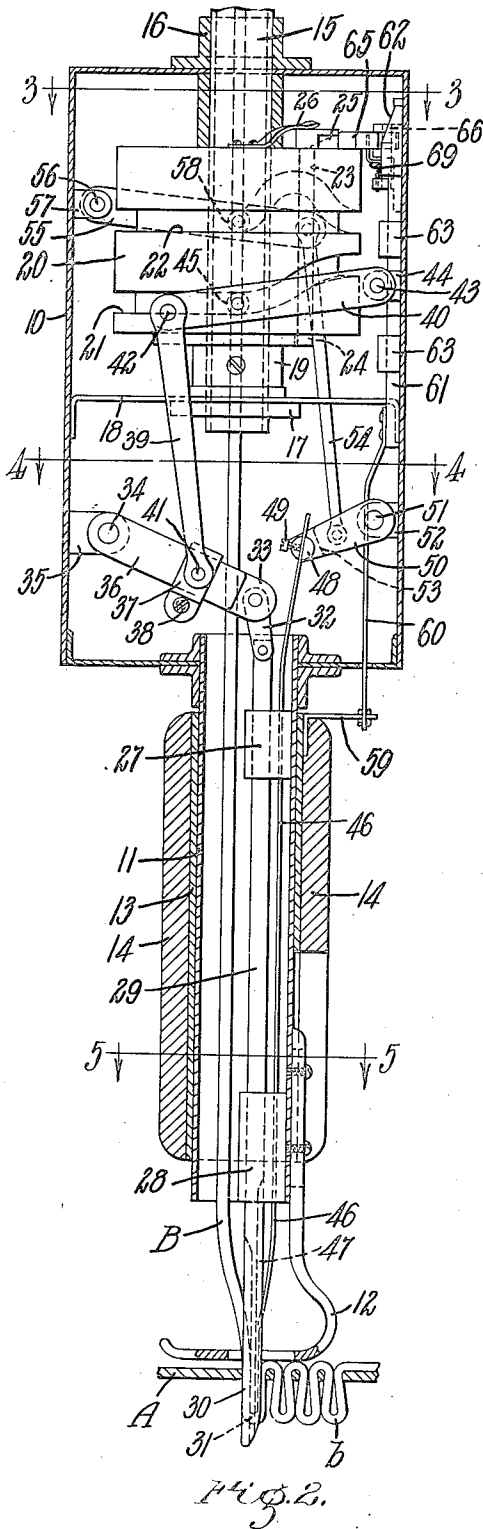
E. E. RICE

1,862,768

MACHINE FOR HOOKING RUGS AND THE LIKE

Filed July 1, 1930

2 Sheets-Sheet 2



INVENTOR:  
 Edward F. Rice.  
 by *Charles S. Gooding,*  
 Atty.

# UNITED STATES PATENT OFFICE

EDWARD E. RICE, OF NORTH QUINCY, MASSACHUSETTS

MACHINE FOR HOOKING RUGS AND THE LIKE

Application filed July 1, 1930. Serial No. 465,133.

This invention relates to improvements in machines for hooking rugs and the like.

The object of the invention is to provide an efficient power operated machine for hooking rugs and similar articles, said machine embodying therein a hooking needle adapted to force loops of hooking material such as yarn or rags through sheet material such as burlap, and a follower adapted to engage said loops and prevent the same from being withdrawn from the burlap during the withdrawing movement of the needle, the mechanism for actuating both the needle and follower being so constructed and arranged that either the needle or the follower will always be located at the bottom of its stroke and positively hold the loops of hooking material in a manner to prevent even a partial withdrawal of said loops from the sheet material, and preventing loops of uneven length from being formed.

Another object of the invention is to provide a cam or cams for operating the needle and follower, the actuating mechanisms of which also embody therein levers which are so connected to the cams that the movement of the levers may be adjusted and the consequent length of the loops varied as desired.

Another object of the invention is to provide a clutch which is positively connected to the cam member which actuates the needle and follower, the clutch mechanism being operatively connected to an operating and guiding handle for the device which is mounted to slide vertically upon an extension of the casing, the handle being located in a raised position during the operation of the device and being adapted to drop by gravity and automatically disconnect the driving mechanism from the source of power when it is released.

The invention further contemplates the employment of a hollow driving shaft and guiding handle through which the hooking material is fed to the hooking instrumentalities.

Another object of the invention is to provide an improved swinging support and flexible variable speed driving means for the hooking device, said support embodying

therein a plurality of sections pivoted one to another to swing through a horizontal plane, an outer section thereof being constructed of parallel links pivoted one to another to permit the hooking device to be raised and lowered and always held in a vertical position, it being evident that by always holding said device vertical that there will be a greater tendency for the loops to be of the same length.

Still other objects of the invention are to provide means for counterbalancing the hooking device, means for holding the device in a raised position above the work, and means for limiting the extent to which the device may be raised and lowered upon its swinging support.

The invention consists in an improved machine for hooking rugs and the like as set forth in the following specification and particularly as pointed out in the claims thereof.

Referring to the drawings:—

Fig. 1 represents a side elevation of a hooking device embodying my invention, including a swinging support upon which the hooking device is mounted and flexible driving means therefor.

Fig. 2 represents an enlarged central vertical section through the hooking device.

Fig. 3 is a horizontal section taken on the line 3—3 of Fig. 2.

Fig. 4 is a horizontal section taken on the line 4—4 of Fig. 2.

Fig. 5 is a horizontal section taken on the line 5—5 of Fig. 2.

Fig. 6 is a detail view illustrating the needle in its raised position and the follower in its lowermost position holding a loop in the sheet material of the rug.

Like numerals refer to like parts in the several views of the drawings.

In the drawings, 10 represents a casing preferably rectangular in cross section and constructed of any suitable material. 11 is a tubular extension which projects downwardly from the lower side of the casing 10 and in effect forms a part thereof. A foot 12 is adjustably secured to the extension 11 and is adapted to rest upon the rug and slide thereover while the rug is being constructed. Slidably mounted upon the extension 11 is a tubu-

lar handle portion 13 upon opposite sides of which are gripping portions 14.

A tubular driving shaft 15 is mounted to rotate in bearings 16 and 17, the former being mounted upon the top of the casing 10 and the latter upon a cross member 18 which is located within the interior of the casing 10. Rigidly fastened to the driving shaft 15 is a clutch member 19 and loosely mounted upon the driving shaft, with the lower extremity thereof contacting with the clutch member 19, is a cam member 20 upon the periphery of which are cam grooves 21 and 22.

Extending through the cam member 20 is a locking pin 23 which is non-rotatably mounted in said cam member. At its lower end the locking pin 23 is adapted to project into a hole 24 which is provided in the clutch member 19. Rigidly fastened to the upper extremity of the locking pin 23 is a wedge 25, the upper surface of which is engaged by a flat spring 26 which is secured to the top surface of the cam member 20 and said spring normally acts to always press downwardly upon the locking pin 23. When the pin 23 projects into the hole 24 the cam member 20 will be interlocked with the clutch member 19 and will rotate in unison therewith.

Extending through the extension 11 and slidably mounted in bearings 27 and 28 that are mounted therein is a shank 29 of a hooking needle 30 which is provided with an eye 31 adjacent to its lower extremity. A reciprocatory movement is imparted to the needle 30 to force the same through sheet material A which forms the base of a rug and thereby force a strip of hooking material B through said material A by mechanism as follows:—

The shank 29 of the needle 30 is connected by means of a link 32 with a lever 33 which is rigidly fastened to a shaft 34 mounted in a bearing 35 which is fastened to the casing 10. Another lever 36 is also rigidly fastened to the shaft 34 and has a split sleeve 37 slidably mounted thereon and secured thereto by means of a clamping screw 38. The lever 36 is operatively connected by means of a connecting rod 39 with another lever 40, the lower portion of said connecting rod being pivotally attached at 41 to the sleeve 37 and pivotally attached at its upper end at 42 to the arm 40. The levers 33 and 36 in effect constitute a single lever and could be so constructed if so desired, in which event it would be necessary to bend the connecting rod 39. The lever 40 is rigidly fastened to a shaft 43 which is mounted in a bearing 44 fastened to the casing 10. A cam roll 45 is rotatably mounted upon the lever 40 and projects into the groove 21 of the cam member 20. By varying the position of the adjustable sleeve 37 upon the lever 36, the movement that is imparted to the needle 30 by the cam member 20 may be increased or decreased as desired.

Also projecting through the extension 11 and for a greater part of its length being parallel to the shank 29 of the hooking needle 30 is a follower 46 which is constructed of spring steel. The lower end portion of the follower 46 is bent toward the needle 30 and is located within a groove 47 which is provided therefor in the side of the needle. The follower 46 is slidably mounted in the bearings 27 and 28 within the extension 11 and at its upper end is attached to a clamping member 48 in which it is adjustably secured by means of a screw 49.

The clamp member 48 is mounted to swivel in a lever 50 which in turn is rigidly secured to a shaft 51 mounted in a bearing 52 fastened to the casing 10. Another lever 53 is rigidly secured to the shaft 51 and this lever is operatively connected by means of a connecting rod 54 with a lever 55 which is rigidly fastened to a shaft 56 mounted to rock in a bearing 57 fastened to the casing 10. The levers 50 and 53 in effect constitute a single lever and could be so constructed if desired, in which event it would be necessary to bend the connecting rod 54. The lever 55 has a cam roll 58 rotatably mounted thereon which projects into the cam groove 22 of the cam member 20. The cam groove 22 is cut to provide the maximum throw that is required for the follower 46 and the latter is adjustably positioned in the clamping member 48 when it is desired to vary the lengths of loops *b* of the hooking material B that are formed by the needle in the sheet material of the rug.

The cam grooves 21 and 22 are so timed that after the hooking needle 30 has formed a loop *b* of the hooking material B in the sheet material A of the rug, and while said needle is still located in its lowermost position that the follower 46 will be forced downwardly through the opening in the sheet material that has been formed by the needle and will engage the loop *b* and hold the latter taut while the needle is being withdrawn from the sheet material and also during the time that the needle is being again moved downwardly to form another loop in the sheet material, and the cam grooves, furthermore, are so formed that either the needle or the follower will always be located at the bottom of its stroke and positively hold the loops *b* extended in a manner to prevent even a partial withdrawal of the loops from the sheet material while the needle is being withdrawn therefrom and also while the needle is being advanced along the surface of the sheet material and completing the formation of another loop at a new location.

In Fig. 6 the follower is shown at its lowermost position holding a loop *b* in position and the needle is shown in an advanced position ready to be again driven downwardly to form a new loop, and it will be understood

that the follower will remain in the position illustrated in Fig. 6 until the needle 30 has completely formed a new loop.

During the operation of the machine the operator grasps the handle 13 and holds the latter in its uppermost position as shown in Fig. 2, at which time the cam member 20 is interlocked with the clutch member 19. The mechanism for actuating the clutch mechanism is as follows:—Projecting laterally from the top of the handle 13 is a finger 59 which is connected by means of a connecting member 60 with a slide 61 at the upper extremity of which is a wedge portion 62. The slide 61 slides against the inner surface of the casing 10 and is guided by means of bearings 63 which are in turn fastened to the inner surface of the casing. The wedge 62 contacts with an arm 64 of a bell-crank lever 65 which is pivotally attached at 66 to the casing 10, and another arm 67 of said bell-crank lever has a wedge portion 68 provided thereon. A spring 69 surrounds the pivot 66 and engages the bell-crank lever in a manner to normally tend to force said lever from the position illustrated in full lines in Fig. 3 to the dotted line position in said figure, at which time the wedge portion 68 will be located in the path of the wedge portion 25 of the locking pin 23 and the action of the wedge 68 will be to force the wedge 25 and pin 23 upwardly and disengage the lower extremity of said pin from the clutch member 19, thereby disconnecting the cam member 20 from said clutch member and causing the operation of the device to cease. When the handle 13 is raised the wedge 62 engages the arm 64 of the bell-crank lever 65 and holds the latter against the tension of the spring 69 in a position where it is out of the path of the wedge 25 during the rotation of the cam member 20, but when the handle 13 is released and drops by gravity to its lowermost position, the wedge 62 will slip from behind the arm 64 and the spring 69 will actuate the bell-crank lever 65 to stop the device as previously mentioned.

The hooking device is supported in a vertical position at the outer end of a flexible arm 70 upon which the device may be raised and lowered and by means of which it may be swung through a horizontal lane to any position that may be desired above the rug which is being hooked.

The arm 70 embodies therein a plurality of sections 71, 72 and 73, the section 71 being pivotally attached to a vertical shaft 74 which, in turn, may be supported at its lower end upon a bench or may project downwardly from the ceiling. The section 72 is pivotally attached to the section 71 by means of a vertical shaft 75, while the section 73 is pivotally mounted upon sleeves 76' which are in turn mounted upon a vertical shaft 76. The sections 71 and 72, as illustrated, are formed of

blocks of wood to which any suitable form of pivot members may be secured, but it is evident that these sections may be constructed entirely of metal if it is so desired.

A pair of parallel arms 77 are pivoted at one end thereof at 78 to the section 73 and at their opposite ends at 79 to a vertical member 80 which has bearing portions 81 and 82 formed integral therewith and the shaft 15 of the hooking device is rotatably mounted in these bearings. A driving pulley 83 is fast to the shaft 15 and is driven by means of a belt 84 from a pulley 85 which is rigidly fastened to the shaft 76. A pulley 86 is provided for the purpose of holding the belt 84 tight at all times. As the hooking device is raised and lowered, the belt 84 will move upwardly and downwardly upon the pulley 85 always being driven thereby.

A cone pulley 87 also fast to the shaft 76 is driven by a belt 88 from a cone pulley 89 which is loose upon the shaft 75 and the pulley 89 is driven by a belt 90 from a pulley 91 which is loose upon the shaft 74. The pulley 91 is driven by a belt 92 from any suitable source of power. The flexible driving means illustrated permits the hooking device to be driven effectively in all of the various positions to which the sections of the arm 70 may be swung.

Stop rods 93 and 94 fast to the section 73 engage the upper and lower arms 77 respectively and limit the extent to which said arms may be raised and lowered in raising and lowering the hooking device. The hooking device, furthermore, is held in counter-balanced relation upon the arms 77 by means of an elastic band 95 which is connected at 96 to the upper arm 77 adjacent to the pivot 78 thereof and to the lower arm 77 at a point adjacent to its outer extremity. It is evident that a helical spring may be substituted for the elastic band 95, if it is so desired.

A bar 98, constituting a latch, is pivoted at its outer end at 99 to the upper arm 77 and at its lower end rests upon a pin 100 which projects laterally from the lower arm 77 adjacent to the outer end thereof, and the lower portion of said latch is held upon the pin 100 by means of a guide 101 which is fastened to the lower arm 77. The latch 98 has a notch 102 formed therein and when it is desired to support the hooking device in a raised position out of engagement with the rug, the device is lifted until the pin 100 slides into the notch 102 after which the latch 98 will support the hooking device and swinging frame to which it is attached in a raised position. In this position, furthermore, the lower portion of bar 98 will frictionally engage the periphery of the casing 10 and prevent the latter from spinning when the power is not shut off.

The general operation of the device here-

inbefore specifically described is as follows:—

Assuming that the hooking device is located in the position illustrated in Fig. 1 and is positioned upon the upper surface of the material A which forms the base for the rug, the operator grasps the gripping members 14 of the handle 13 and forces the latter upwardly thereby rocking the bell-crank lever 65 into a position where the wedge portion thereof will be out of the path of the wedge portion 25 of the locking pin 23. The cam member 20 will now be locked to the clutch member 19, and the driving instrumentalities for the hooking needle 30 and follower 46 will cause the hooking needle to force the strip of hooking material B through the sheet material A of the rug causing loops *b* to be formed, and the follower 46 will engage these loops and hold the same taut while the needle is being withdrawn and during the interval when the device is being moved ahead and while the needle is being again forced through the sheet material to form another loop, and it will be noted that the cam grooves 21 and 22 are so formed that either the needle or the follower is always located in its lowermost position so that there will be no tendency for the loops *b* to be partially withdrawn from the sheet material of the rug.

During its operation the hooking device is positively held in a vertical position by the swinging support, while the operator guides the device across the surface of the sheet material A holding the handle 13 in a raised position while so doing.

When it is desired to stop the operation of the hooking device all that is necessary is to release the handle 13 which will immediately fall by gravity to its lowermost position causing the wedge 62 to be withdrawn from behind the arm 64 of the bell-crank lever 65 and the spring 69 will then cause the bell-crank lever to be rocked into a position where the wedge 68 will engage the wedge 25 of the locking pin 23 which will be actuated to disengage the clutch member 19 from the cam member 20 causing the hooking instrumentalities to stop. The hooking device is so evenly counterbalanced upon the arm 70 that it will remain practically stationary when it is released, but if it is desired to lift the same out of engagement with the rug a lifting movement will cause the pin 100 to enter the notch 102 of the latch 98 and the latter will thereafter hold the device in a raised position upon the arm 70.

I claim:

1. A machine for hooking rugs and the like comprising, in combination, a casing embodying therein a tubular extension, a drive shaft mounted therein, a clutch member fast to said shaft, a foot attached to the extension, a hooking needle slidably mounted in

the extension and adapted to penetrate the sheet material of the rug and force loops of hooking material therethrough, a follower positioned adjacent to the needle and adapted to engage said loops and hold the same during the withdrawing movement of the needle, a cam member loosely mounted upon the shaft and operatively connected to the needle and follower, a handle slidably mounted upon the extension of the casing, and means operatively connecting the clutch and handle and actuated by a vertical movement of the latter, whereby the cam member is interlocked with the clutch member and driven thereby.

2. A machine for hooking rugs and the like comprising, in combination, a casing, a foot attached thereto slidable over the sheet material of the rug, a hooking needle slidably mounted in said casing, means to actuate said needle to force a loop of hooking material through said sheet material, a follower slidably mounted adjacent to the needle, means to actuate said follower to move the latter into contact with said loop and to hold the latter during the entire movement of the needle, and means to at all times maintain the hooking machine in a vertical position above the rug.

3. A machine for hooking rugs and the like comprising, in combination, a casing, a foot attached thereto slidable over the sheet material of the rug, a hooking needle slidably mounted in said casing, means to actuate said needle to force a loop of hooking material through said sheet material, a follower slidably mounted adjacent to the needle, means to actuate said follower to move the latter into contact with said loop and to hold the latter during the entire movement of the needle, means to at all times maintain the hooking machine in a vertical position above the rug, and resilient means to counterbalance the hooking machine.

4. A machine for hooking rugs and the like comprising, in combination, a casing, a handle slidably mounted thereon, a foot attached thereto slidable over the sheet material of the rug, a hooking needle slidably mounted in said casing, means to actuate said needle to force a loop of hooking material through said sheet material, a follower slidably mounted adjacent to the handle, means to actuate said follower to move the latter into contact with said loop and to hold the latter during the entire movement of the needle, means to at all times maintain the hooking machine in a vertical position above the rug, means to swing the hooking machine through a horizontal plane above the rug, and means to operatively connect said handle with the actuating means for the needle and follower.

5. A machine for hooking rugs and the like comprising, in combination, a casing, a foot attached thereto slidable over the sheet material of the rug, a hooking needle slidably

mounted in said casing, means to actuate said needle to force a loop of hooking material through said sheet material, a follower slidably mounted adjacent to the needle, means to actuate said follower to move the latter into contact with said loop and to hold the latter during the entire movement of the needle, parallel arms adapted to at all times maintain the hooking machine in a vertical position above the rug, means to swing the hooking machine through a horizontal plane above the rug, and means to swing the machine through a vertical plane above the rug.

6. A machine for hooking rugs and the like comprising, in combination, a casing, a foot attached thereto slidable over the sheet material of the rug, a hooking needle slidably mounted in said casing, means to actuate said needle to force a loop of hooking material through said sheet material, a follower slidably mounted adjacent to the needle, means to actuate said follower to move the latter into contact with said loop and to hold the latter during the entire movement of the needle, means to at all times maintain the hooking machine in a vertical position above the rug, means to swing the hooking machine through a vertical plane above the rug, and resilient means to counterbalance the weight of the machine.

7. A machine for hooking rugs and the like comprising, in combination, a casing, a foot attached thereto slidable over the sheet material of the rug, a hooking needle slidably mounted in said casing, means to actuate said needle to force a loop of hooking material through said sheet material, a follower slidably mounted adjacent to the needle, means to actuate said follower to move the latter into contact with said loop and to hold the latter during the entire movement of the needle, means to at all times maintain the hooking machine in a vertical position above the rug, means to swing the hooking machine through a horizontal plane above the rug, means to swing the machine through a vertical plane above the rug, means to counterbalance the weight of the machine, and means to hold the machine in a raised position out of contact with the rug.

8. A machine for hooking rugs and the like comprising, in combination, a casing, a foot attached thereto, a hooking needle slidably mounted in said casing and adapted to penetrate the sheet material of the rug, a lever to which said needle is operatively connected, another lever operatively connected to the first-mentioned lever, a cam for actuating the last-named lever, whereby a reciprocatory motion is imparted to the needle and loops of hooking material are forced through the sheet material, a follower positioned adjacent to the needle and adapted to engage the loops and hold the same during the with-

drawing movement of the needle, and a cam for actuating the follower.

9. A machine for hooking rugs and the like comprising, in combination, a casing, a foot attached thereto, a hooking needle slidably mounted in said casing and adapted to penetrate the sheet material of the rug, a lever to which said needle is operatively connected, a sleeve adjustably secured to said lever whereby the movement of the latter may be varied, another lever operatively connected to said sleeve, a cam for actuating the last-named lever, whereby a reciprocatory motion is imparted to the needle and loops of hooking material are forced through the sheet material, a follower positioned adjacent to the needle and adapted to engage the loops and hold the same during the withdrawing movement of the needle, and a cam for actuating the follower.

10. A machine for hooking rugs and the like comprising, in combination, a casing, a foot attached thereto, a hooking needle slidably mounted in said casing and adapted to penetrate the sheet material of the rug, a lever to which said needle is operatively connected, another lever operatively connected to the first-mentioned lever, a cam for actuating the last-named lever, whereby a reciprocatory motion is imparted to the needle and loops of hooking material are forced through the sheet material, a follower positioned adjacent to the needle and adapted to engage the loops and hold the same during the withdrawing movement of the needle, a lever to which said follower is operatively connected, another lever operatively connected to said last-mentioned lever, and a cam for actuating the last-named lever whereby the follower is actuated to hold the loop from being withdrawn from the sheet material.

In testimony whereof I have hereunto set my hand.

EDWARD E. RICE.

110

115

120

125