Jan. 6, 1931. H. SMALLEY ET AL 1,788,340

MANUFACTURE OF RUGS, CARPETS, OR LIKE PILE FABRICS

Filed June 3, 1929 3 Sheets-Sheet 1

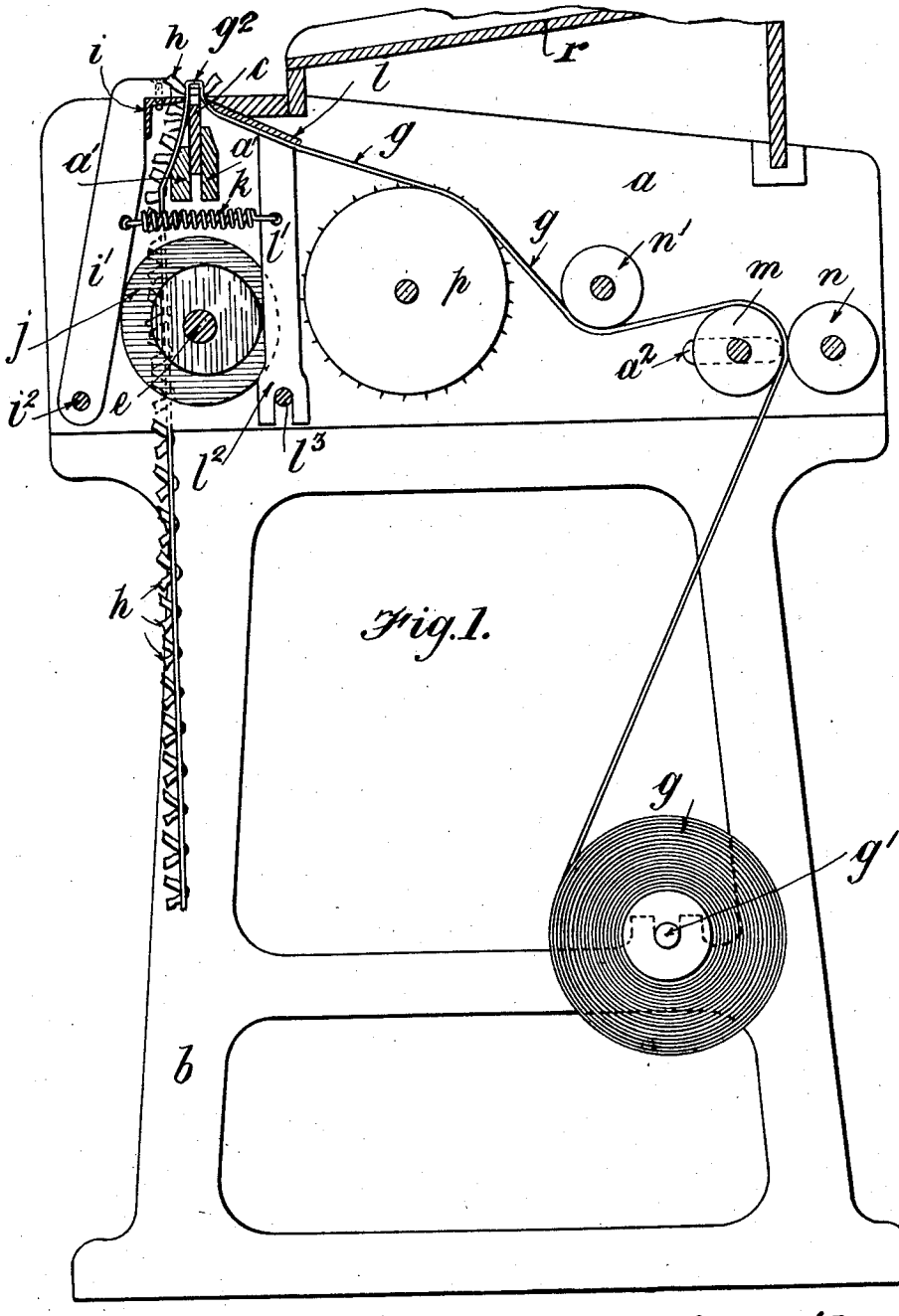


Fig. 1.

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Filed June 3, 1929 3 Sheets-Sheet 2

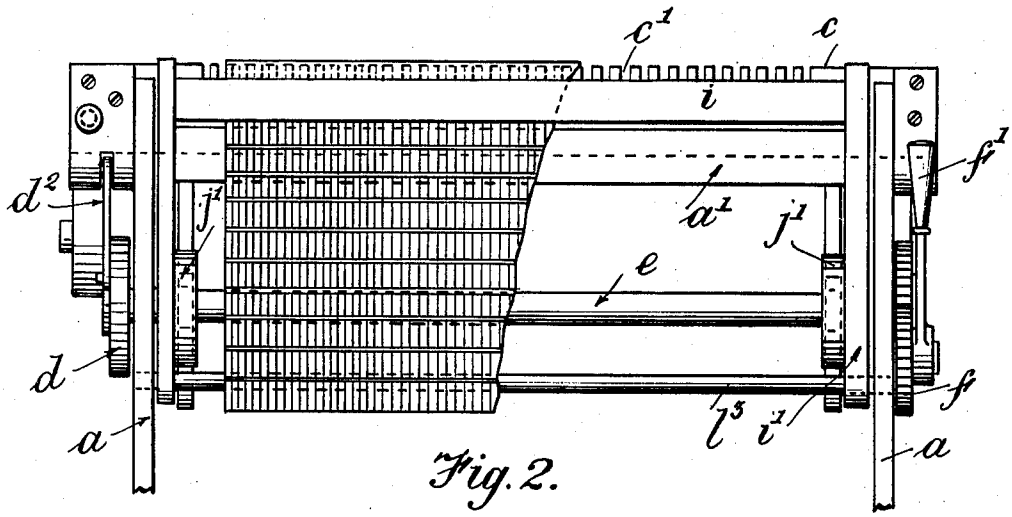


Fig. 2.

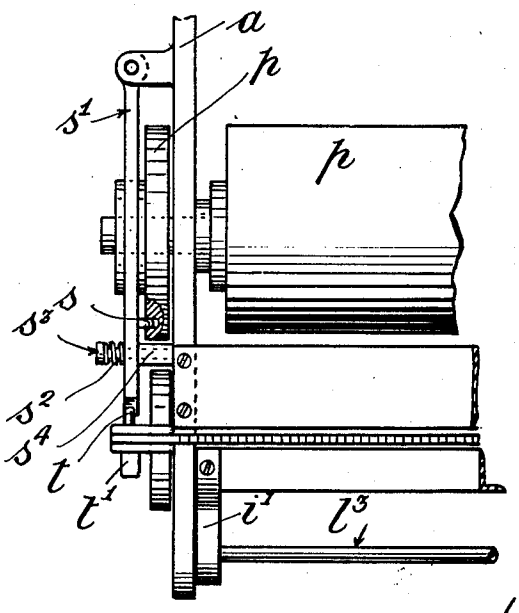


Fig. 3.

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MANUFACTURE OF RUGS, CARPETS, OR LIKE PILE FABRICS

Filed June 3, 1929 3 Sheets-Sheet 3

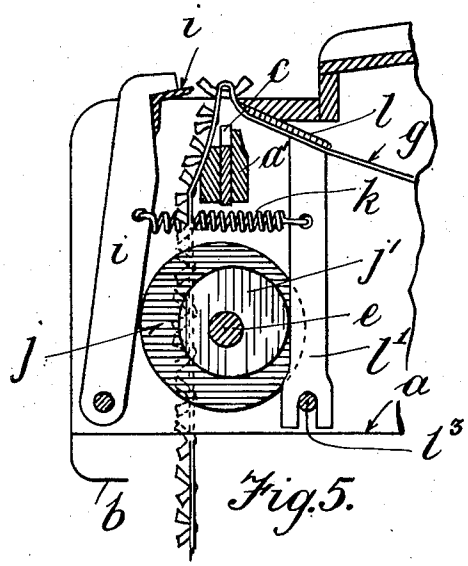


Fig.5.

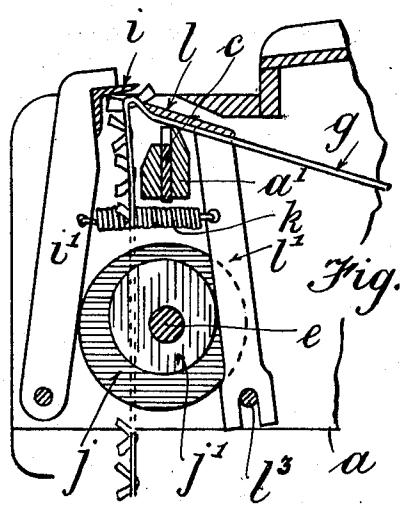


Fig.6.

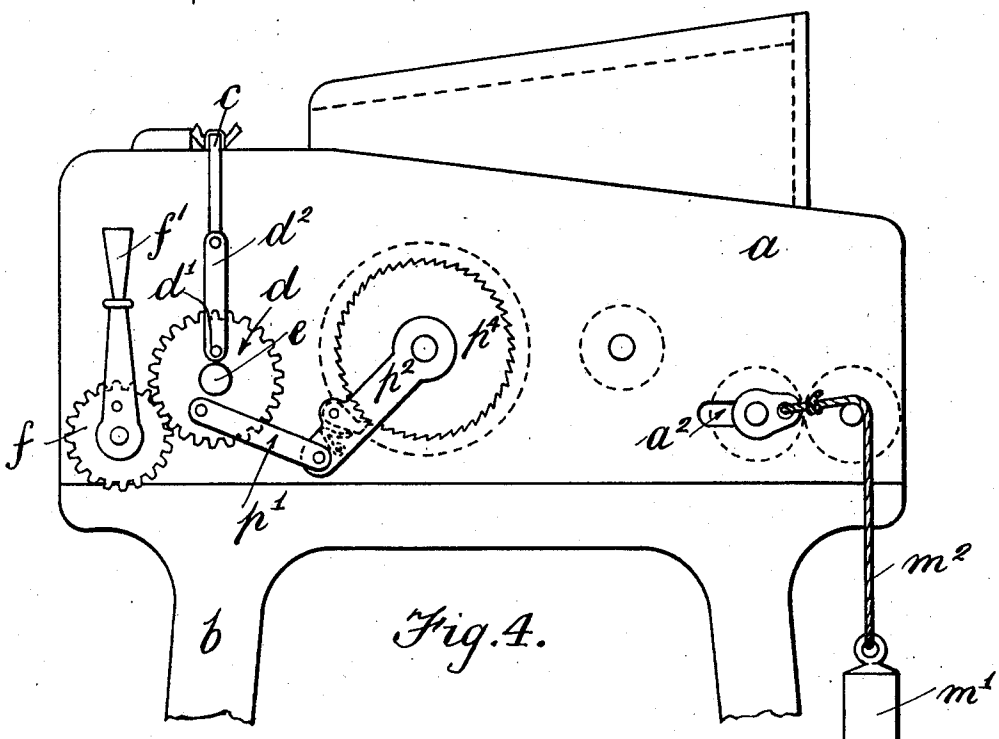


Fig.4.

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Patented Jan. 6, 1931 1,788,340

UNITED STATES PATENT OFFICE

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MANUFACTURE OF RUGS, CARPETS, OR LIKE PILE FABRICS

Application filed June 3, 1929, Serial No. 368,088, and in Great Britain June 29, 1928.

This invention relates to the manufacture of rugs, carpets or like pile fabrics in which lengths or strips of cloth or other material or yarn are attached to the foundation material or backing of fabric or warps, and has for its object to provide improved mechanism for effecting, or facilitating the attachment of the pile forming material to the foundation material.

According to the invention, means are provided for automatically forming transverse pleats or loops in the foundation material and supporting each pleat or loop so formed until the unit lengths or strips of pile forming material have been threaded through the double thickness of material along the whole or part of the length of the same, by a reaching in tool, pricker, needle, pile fixer or the like operated either manually or mechanically and so that when the respective loops are flattened out, the ends of the pile forming material lie on the top face of the foundation material, while a small portion at the centre of each strip or length is at the back of the same or fixed therein.

The invention will be more particularly described by the aid of the accompanying drawings wherein:—

Figure 1 is a transverse sectional elevation of one form of machine constructed according to the invention and with the parts in the set position for the insertion of the pile forming material.

Figure 2 is a front view of Fig. 1 with part of the rug removed to show more clearly the mechanism.

Figure 3 is a detail plan view showing one form of locking mechanism for the foundation fabric feed roll and automatic release therefor.

Figure 4 is a side elevation of the machine.

Figure 5 is a view corresponding to the left hand end of Fig. 1 with the front bar moved out of engagement with the rug after the insertion of a complete row of pile strips, while

Figure 6 is a corresponding view but showing the pusher bar in its forward position after just pushing said row of pile strips clear of loop forming mechanism.

In carrying the invention into effect according to one convenient manner as illustrated, a frame is provided comprising side members a, a supported on the base members b, b and formed with guides a^1, a^1 to receive a vertically movable plate c extending across the machine for the desired width which may be equal to, greater than, or less than the maximum width of rug or the like to be produced.

Means are provided to intermittently raise and lower the plate c, said means conveniently comprising two crank discs d keyed to a shaft e journalled in the frame a and each provided with a crank d^1 connected by means of the connecting rods d^2 to trunnions on the ends of the plate c. One disc d is formed with peripheral teeth meshing with teeth on a gear wheel f rotatably mounted on the frame a and having a handle f^1 rigidly attached thereto by means of which a part rotary movement can be imparted to the shaft to cause the plate c to rise or fall according to the direction of the turning movement imparted thereto, but it will be understood that any suitable mechanism may be used for this purpose.

A roll of foundation material or backing or warps, for instance, canvas g is carried by a spindle g^1 rotatably mounted in the frame b and said canvas is led over the tensioning roll m rotatably mounted in the slots a^2 in the frame a so as to be capable of being drawn into frictional engagement by the weight m^1 and cord m^2 with the roll n, then under the roll n^1 to the feed roll p and over the plate c. The top edge of the plate c is notched or otherwise adapted to form openings c^1 for the passage of the strips h of pile forming material through the pleat or loop g^2 of canvas formed by the plate c when in the raised position. The before mentioned plate guides a^1, a^1 extend across the machine, as shown, or alternatively a rod or rods may be mounted on one or both sides of the plate c to limit the falling movement of the canvas when said plate is retracted, and the pleat g^2 is held firmly at both sides to the plate

along lines below the notches c^1 by cross bars or the like carried by lever arms connected to a relatively fixed part of the machine. The front cross bar i is carried by lever arms i^1 pivotally connected at i^2 to the frame a and bearing on the peripheries of cam discs j, j, keyed to the shaft e, and normally retained in the operative position by spring pressure, while the rear cross bar l is carried by lever arms l^1, l^1 pivoted at l^2 on the cross rod l^3 and bearing on the peripheries of cam discs j^1, j^1 formed in one with or fixed relatively to cams j, j, springs k being attached at each end to the respective lever arms i^1, l^1 to maintain the same in contact with the respective cams j, j^1 which are formed and timed to move the respective lever arms to actuate the cross bars i, l in correct sequence as hereinbefore explained. One of the discs d is also geared to the roughened feed roll p, preferably by a link p^1 coupled to a lever p^2 carrying a pawl p^3 engaging ratchet teeth on the ratchet wheel p^4 keyed to the roll axle, so that the latter is rotated during the rising movement of the grid to let off sufficient canvas to form the next pleat or loop.

The canvas g being formed and retained in a pleat g^2 or loop on the grid, as seen in Figs. 1 and 2, the strips h of pile forming material can be readily and quickly inserted through the doubled fabric by means of a reaching in tool passed therethrough and through the notches c^1 in the plate c so that when said strip of pile is placed in the eye, hook, or jaws of the tool it may be drawn through, and the mid portion gripped by the double thickness of said fabric. The cam disc or discs may be turned by hand and the reaching in tool actuated by hand, or if desired means may be provided to actuate the latter mechanically.

Assuming the grid plate c to be raised and a row of pile forming material inserted in the pleat of canvas so formed then the shaft e is turned by means of the handle f^1 in the direction to lower said grid plate. Immediately the turning movement commences the respective cams j actuate the lever arms i^1 carrying the front rod i and moves it away from the grid c for a sufficient distance to clear the added row of pile, as illustrated in Fig. 5. Simultaneously with such movement of the front gripper rod, the grid c begins to descend and at or near the end of its downward stroke the cams j^1 permit a forward movement of the lever arms l^1 due to the tension of the springs k so that the rear pusher bar l moves forwardly to push the last inserted row of pile under the front rod i and leaves a fresh length of canvas across the grid plate c as seen in Figure 6 ready to be formed into a pleat or loop when the shaft e is turned in the reverse direction and the parts moved back to the operative position shown in Fig. 1 in reverse order. During the lowering movement of the grid c the lever p^2 is raised and the pawl p^3 rides idly over the pawl wheel p^4, but during the reverse movement said pawl engages the ratchet teeth so that motion is imparted to the roll p to feed the requisite length of canvas forward.

The reaching in tool for inserting the pile forming material through the slots or perforations in the loop forming mechanism may be of any suitable form such as a pricker, needle or pile fixer according to the nature of the material being used and may if desired be mechanically actuated. In one form of the invention the device constitutes gripping jaws which may be opened by hand or other means after the pile fixer has passed through the foundation material to allow of the insertion of the pile forming substance. The pile fixer on its return movement carries the pile material with it and draws it through the loop in the foundation canvas.

The operative stands in front of the machine and a tray r is provided to hold a supply of pile forming material in a convenient position for use, said tray usually being divided by partitions to form separate compartments to hold different coloured pile strips.

To ensure that no movement of the foundation canvas takes place during the comparatively heavy strain occurring at the moment of insertion of each strip means may be provided to positively prevent any such movement and this is conveniently effected by a locking bolt s carried by a lever arm s^1 and adapted to engage holes formed in the side of a locking plate or disc p^1 keyed to the axis of the feed roll p, and spaced apart for a distance corresponding to the length of the desired intermittent traverse of the canvas. Said lever is under the influence of a spring s^2 on a bolt s^3 secured to the frame of the machine and passing through a hole in the lever, said bolt also carrying a tubular stop s^4 to limit the inward movement of the lever, the spring s^2 normally tending to move it to force the bolt s into engagement with one of the apertures in the plate p^1 but is moved to retract said bolt by a plunger t fixed to the grid plate c engaging the end of said lever during the upward movement of the plate c, said end being inclined to the longitudinal plane of the machine to cause the requisite retracting movement. The extreme end of the lever s^1 is also inclined transversely, and the plunger t is slidably mounted in a cylindrical casing t^1, a spring being provided normally acting to force the plunger outwardly but permitting the same to slide inwardly as it contacts with the transversely inclined end of the lever s^1 during the downward movement of the grid c without imparting any movement to said lever.

It is to be understood that the improved machine may be operated manually or by power, and that where specific driving gears or actuating mechanisms have been described these are only given by way of example since there are other mechanisms or groups of mechanisms which can be employed to give the same effect.

What we claim is:—

1. Apparatus for the manufacture of rugs or like pile fabrics in which strips of pile are attached to a foundation material comprising a vertically movable plate the top edge of which is notched and across which the foundation material is fed, means to intermittently raise and lower said plate, cross bars at the front and rear of the plate, means to intermittently move said bars towards and away from the plate, substantially as described.

2. Apparatus for the manufacture of rugs or the like pile fabrics in which strips of pile are attached to a foundation material comprising a vertically movable plate the top edge of which is notched and across which the foundation material is fed, means to intermittently raise and lower said plate, cross bars at the front and rear of the plate, means to intermittently move said bars towards and away from the plate, and means to hold the foundation material clear of the vertically movable plate when the latter is lowered, substantially as described.

3. Apparatus for the manufacture of rugs or the like pile fabrics in which strips of pile are attached to a foundation material comprising a vertically movable plate the top edge of which is notched and across which the foundation material is fed, means to intermittently raise and lower said plate, cross bars at the front and rear of the plate, means to intermittently move said bars towards and away from the plate, and means to hold the foundation material clear of the vertically movable plate when the latter is lowered, a roll of foundation fabric rotatably mounted and means to positively prevent unintentional traverse of the foundation material, substantially as described.

4. Apparatus for the manufacture of rugs or the like pile fabrics in which strips of pile are attached to a foundation material comprising a vertically movable plate the top edge of which is notched and across which the foundation material is fed, means to intermittently raise and lower said plate, cross bars at the front and rear of the plate, means to intermittently move said bars towards and away from the plate, and means to hold the foundation material clear of the vertically movable plate when the latter is lowered, a roll of foundation fabric rotatably mounted and means to positively prevent unintentional traverse of the foundation material, and means for positively traversing the foundation material forward, intermittently for a predetermined length after each row of pile strips have been inserted, substantially as described.

5. Apparatus for the manufacture of rugs or the like pile fabrics in which strips of pile are attached to a foundation material comprising a vertically movable plate the top edge of which is notched and across which the foundation material is fed, means to intermittently raise and lower said plate, cross bars at the front and rear of the plate, means to intermittently move said bars towards and away from the plate, and means to hold the foundation material clear of the vertically movable plate when the latter is lowered, a roll of foundation fabric rotatably mounted and means to positively prevent unintentional traverse of the foundation material, and means for positively traversing the foundation material forward, intermittently for a predetermined length after each row of pile strips have been inserted, all the moving parts being geared together and timed to move in correct sequence.

In testimony whereof, we have signed our names to this specification at the city of Lincoln this 17th day of May 1929.

HERBERT SMALLEY.
GILBERT HAWORTH.