Dec. 6, 1927. 1,651,676

D. CRABTREE ET AL

LOOM FOR WEAVING PILE OR PLUSH FABRICS

Filed May 4, 1926 3 Sheets-Sheet 1

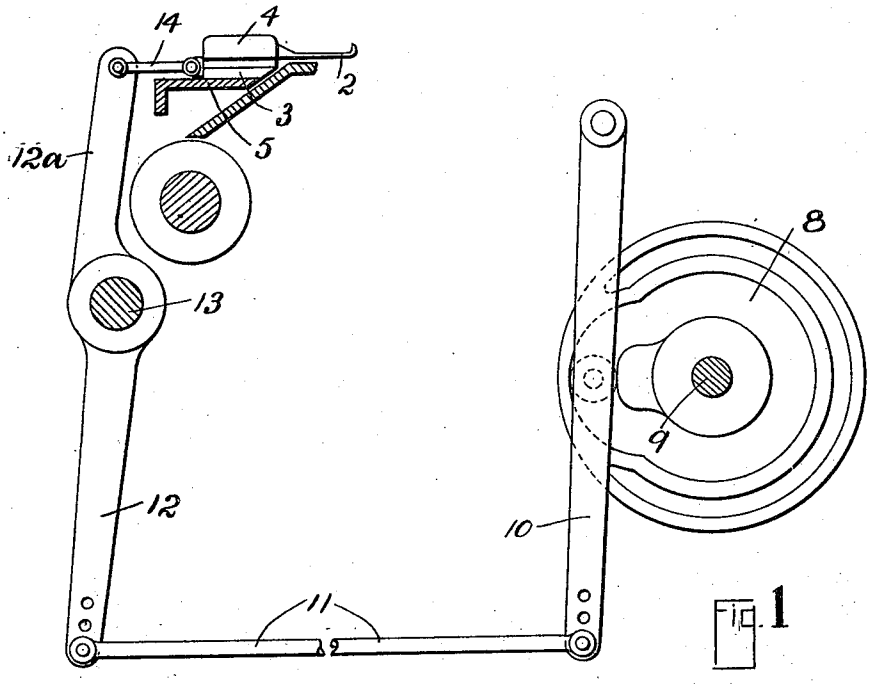


Fig. 1

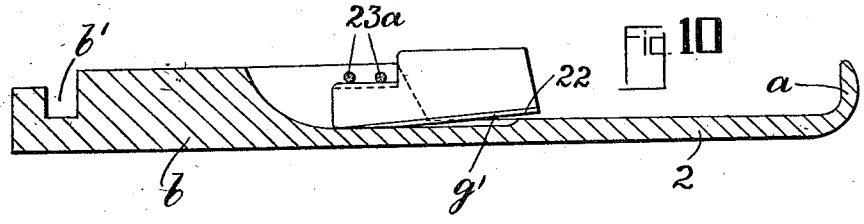


Fig. 10

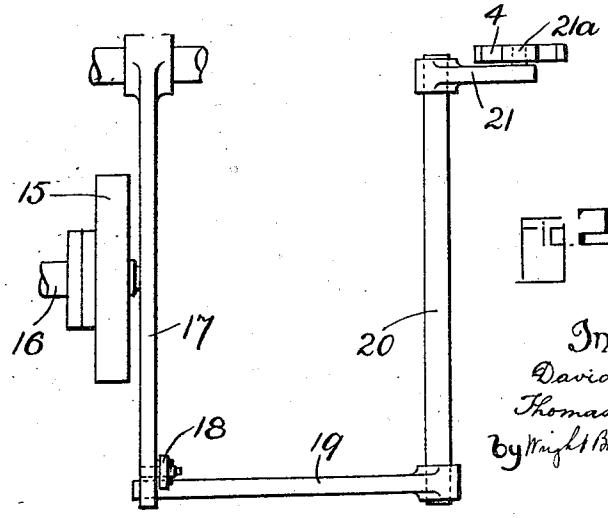


Fig. 2

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Dec. 6, 1927. 1,651,676

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LOOM FOR WEAVING PILE OR PLUSH FABRICS

Filed May 4, 1926 3 Sheets-Sheet 2

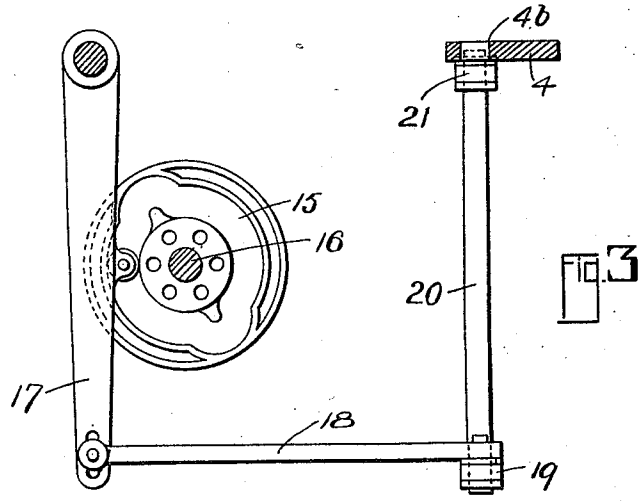


Fig. 3

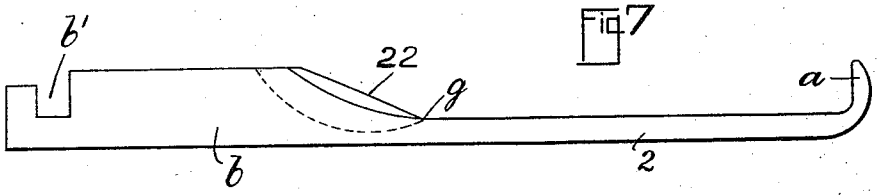


Fig. 7

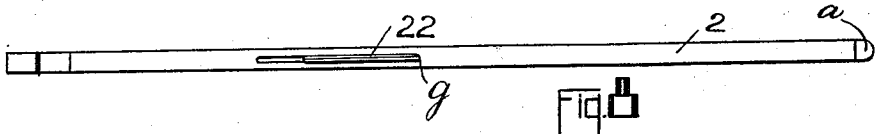


Fig. 8

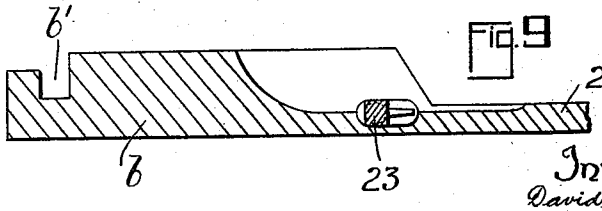


Fig. 9

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Dec. 6, 1927. 1,651,676

D. CRABTREE ET AL

LOOM FOR WEAVING PILE OR PLUSH FABRICS

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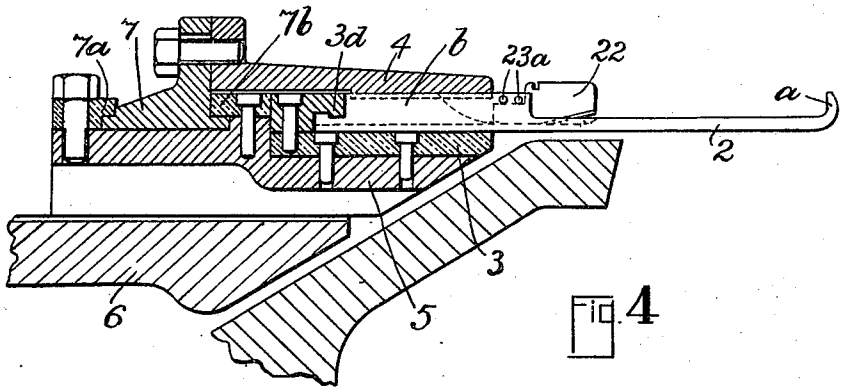


Fig. 4

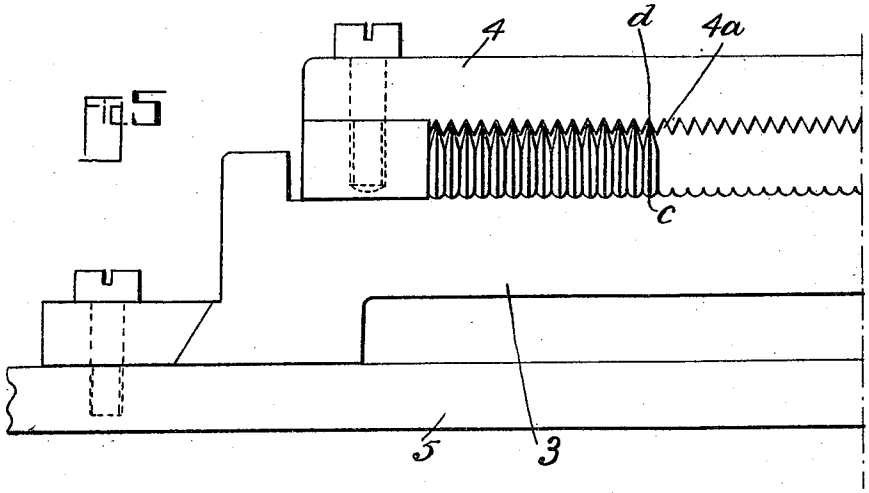


Fig. 5

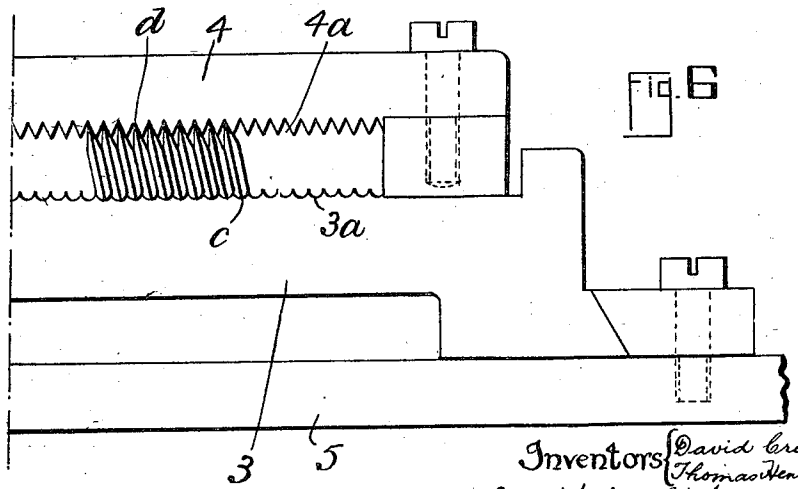


Fig. 6

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Patented Dec. 6, 1927. 1,651,676

UNITED STATES PATENT OFFICE.

DAVID CRABTREE AND THOMAS HENRY CRABTREE, OF BRADFORD, ENGLAND.

LOOM FOR WEAVING PILE OR PLUSH FABRICS.

Application filed May 4, 1926, Serial No. 106,679, and in Great Britain June 5, 1925.

Our invention relates to the type or class of loom for weaving pile or plush fabrics in which a series of hooks is made use of for engaging the warp threads that have to form the pile and which are actuated so that said warp threads are brought into position and are held in position during the operations in manner well known and our present invention consists in so constructing the series of hooks and the method of mounting and operating same that we are enabled to make use of hooks that will occupy comparatively narrow spaces laterally so that the whole series may produce pile fabrics of comparative fineness and will further enable the cutting of the loops of warp threads to form the plush with greater precision and efficiency than heretofore and that without putting stress or strain upon any of the operating parts which will cause deterioration of such parts and breakages as is often experienced.

In the accompanying sheet of drawings which are illustrative of our invention:—

Fig. 1 is a sectional end elevation showing certain shafts of the loom and the front or breast rail of said loom with parts in connection therewith to show the application of our improved devices.

Fig. 2 is also a sectional end elevation illustrating certain operating mechanism hereinafter described.

Fig. 3 is a front elevation showing the parts illustrated by Fig. 2 as seen looking from right to left of said figure.

Fig. 4 is a sectional elevation drawn to an enlarged scale showing the mounting of our devices hereinafter explained.

Fig. 5 is a front elevation of certain parts shown by Fig. 4 and at the left hand side of the loom with the hooked devices in their vertical positions.

Fig. 6 is a similar view to Fig. 5 but shows the parts at the right hand side of the loom and with the hooked devices tilted.

Fig. 7 shows the full size elevation of one of our improved forms of hooks with the knife attachment secured thereto.

Fig. 8 is a plan of the hook shown by Fig. 8.

Fig. 9 is a sectional elevation showing a modification in the formation of a certain part of the hook produced in accordance with our said invention.

Fig. 10 is an elevation of a hook of a modified form hereinafter explained.

In carrying our invention into effect we make use of the hooks or hooked rods or bars 2 which are of the usual formation towards their hooked ends *a* while their rear ends are formed to engage with operating mechanism hereinafter described, so that instead of requiring any additional devices in connection with said hooked ends of the bars 2 the tilting and operating of same is effected to carry out the looping of the warp threads over the body parts 2 of the hooks as desired. The rear ends *b* of the hooks are mounted with their lower edges *c* (Figs. 5 and 6) taking into an appropriately formed rack bar 3, the grooves or furrows 3^a of said bars 3, which receive the lower edges of the hooks *c*, are preferably curved in order to permit same to be oscillated from the position shown in Fig. 5 to the position shown in Fig. 6. The curved formation is an appropriate shape to allow this to be performed although we are aware that other formations may be followed.

The upper edges *d* of the end parts *b* of said hooks 2, are also of the shape shown by Figs. 5 and 6 and are made to enter grooves 4^a formed in an upper bar 4. In this case the grooves 4^a are somewhat angular in shape to meet the formation of the angular edges *d* of the hooks 2.

The bar 3 upon which the ends *b* of the hooks 2 are mounted, is fixed to a sliding bar 5 which extends across the loom and reaches to overhang the breast rail 6 of the loom so that said bar 5 may slide thereon from left to right, its advanced position being shown by Fig. 4. In this advanced position the hooks 2 are where they may lay hold of the threads of warp in known manner.

The bar 4 which engages the upper edges of the hooks 2, is made to slide longitudinally upon the bars 3 and 5 the space of movement being sufficient to enable said bar 4 to bring the bodies *b* of the hooks 2 from the vertical position shown by Fig. 5 to the slanting position shown by Fig. 6.

The bar 4 is fixed to and carried by a rail 7 which may extend lengthwise the bar 5 as well as said bar 4 or which may be in the form of a series of brackets. This bar 7 is arranged to slide upon the bar 5 to which the bar 3 is fixed and is guided in its path by the guiding strips 7^a and 7^b (see Fig. 4).

The fixing ends *b* of the hooks 2 are ar-

ranged to have a notch b^1 formed in them and this notch receives a flange from an extending rib 3^d which is fixed to the bar 3 and this rib 3^d may be the full length of the bar 3 or it may be in sections, preferably it is in sections so that by the removal of any section 3^d any of its respective hooks 2 may be removed from positions as and when desired while the formation of the flange b^1 and the rear end b of the hook 2 are such as to permit lateral play or movement of the hook 2 as is hereinbefore described.

To transmit the advancing movements to the series of hooks 2, a cam 8 is fixed upon a motor shaft 9 of the loom so that it may operate a lever 10 which by a rod 11 operates another lever which is fixed upon a supporting shaft 13. The lever 12 may cause said shaft 13 to oscillate while its extending arm 12^a will reach forward to be connected by the rod 14 to the sliding bar 5. One lever arm 12^a is at the end of the loom while a similar arm to the arm 12^a is at the opposite end of the shaft 13 and near the other end of the loom as is well known.

To operate the bar 4 so as to give the tilting action to the hooks 2, we have a cam 15 mounted upon a shaft 16 of the loom the same being arranged to operate a lever 17 which by a rod 18 and a lever 19 will cause a vertical shaft 20 to oscillate. At the upper end of this shaft 20 is fixed a lever 21 which has fixed upon it an operating bowl or projection 21^a that takes into a slot 4^b formed crosswise the sliding bar 4, thus the cam 15 will cause the hooks to tilt or oscillate at the desired time according to the treading of the warp and in accordance with the actions of the cam 8 which moves all the series of hooks 2 backward and forward in manner well known.

As is hereinbefore stated the hooks 2 are caused to advance towards the reed in the loom and are then tilted so that each one will lay hold of its respective thread of warp on which the bar 5 is caused to recede so that the hooked ends a of the hooked bars 2 will bring with them the threads of warp that have been laid hold of by them in order that when receded to the desired position, away from the reed, on the next treading or operating of said warp threads each warp thread is brought down on the opposite side of the hook to form a loop over the top of the body part 2 thereof where it remains or over which it slides during the beating up of the weft. As the number of loops upon the hooks 2 are increased they advance over the body parts 2 until they reach a position that eventually said hooks are caused to pass or slide through the series of loops until the cutter knife 22 of each hook 2 is brought into contact with the leading loops which it will cut or sever in known manner. This severing of the looped threads of warp which take over the hoops is effected during the advancing movements carried out by the cam 8 so that at this advancing movement the hooks 2 will be in their vertical positions (shown by Fig. 5) consequently the loops are cut in their middle or central positions to form the plush desired.

The hooks we make use of (as shown by the drawings) have according to one arrangement embedded in them the cutting blades 22 so that each blade has its upper edge as the cutting edge thus as the hooks are made to advance so will the lower edge g of the blade 22 pass beneath the first loop and cut same as desired.

Instead of having the blades 22 fixed with their cutting edges in the upper position shown by Fig. 7, we may form said blades 22 so as to be easily slipped or mounted in position in the grooves of the hooks 2 as shown by Fig. 10 in which case holding cross pins 23^a are employed to secure the blades in position in their grooves, while the cutting edge g^1 in this case is at the lower edge of the blade so that the warp threads are cut at the part g^1 as said hooks are made to advance as is hereinbefore described.

To prevent accumulation of fluffy or fibrous matter in the grooves of the hooks 2 within which the blades 22 are mounted as shown by Fig. 10 we may form an opening through the body part of the hook as is shown by Fig. 9 and place therein a bar 23 which may be reciprocated so that projections thereon will remove the fluffy or fibrous substances as these pass below the cutting edge g^1 of the blade.

Such being the nature and object of our said invention, what we claim is: —

1. In looms for weaving pile or plush fabrics, the combination of a series of pile warp engaging hooks, means for reciprocating said hooks, a rack bar extending transversely of and engaging with the stems of the hooks, means for moving the rack bar to tilt the hooks about axes extending longitudinally of the length thereof, and blades mounted upon the bodies of said hooks.

2. In looms for weaving pile or plush fabrics, the combination of a series of hooks having elongated stems and adapted to engage the pile or plush warp threads, means for supporting the extending stem parts of the hooks, mechanism for effecting lengthwise reciprocation of said hooks, a rack bar extending transversely of and supporting the rear ends of the stems of the hooks, a second movable rack engaging said stems, means for operating the last named rack to tilt the hooks, and blades fixed to said hooks for cutting the pile threads.

3. In looms for weaving pile or plush fabrics, the combination of a series of hooks

having elongated stems adapted to engage the threads of pile warp, means for supporting said hooks, devices for reciprocating the hooks in the direction of their length, a rack bar cooperating with the hooks for tilting them, means for actuating said rack bar, blades detachably fixed upon the hooks, and means for securing the blades in said hooks.

4. In looms for weaving pile or plush fabrics, the combination of a series of hooks having elongated stems and adapted to engage the threads of pile warp, means for supporting said hooks, devices for effecting reciprocation of said supports and hooks in the direction of the length of the latter, means for causing the hooks to tilt in order to lay hold of the threads of warp, and blades mounted upon said hooks and having their cutting edges beneath the body parts thereof and between said blades and the stems or body parts of the hooks.

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