No. 634,037. Patented Oct. 3, 1899.

R. N. W. SMITH.

APPARATUS FOR WEAVING PILE FABRICS.

(Application filed Nov. 16, 1897.)

(No Model.) 3 Sheets—Sheet 1.

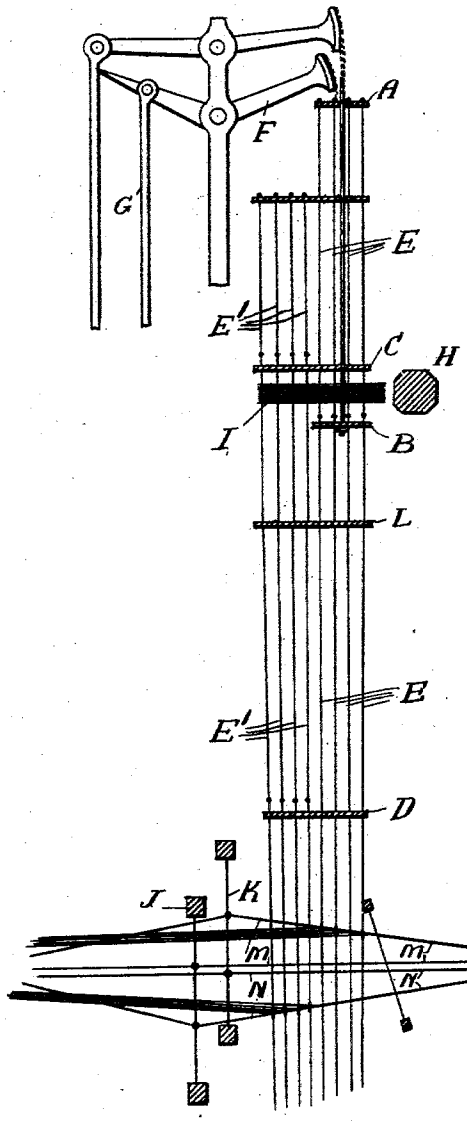

FIG. 1.

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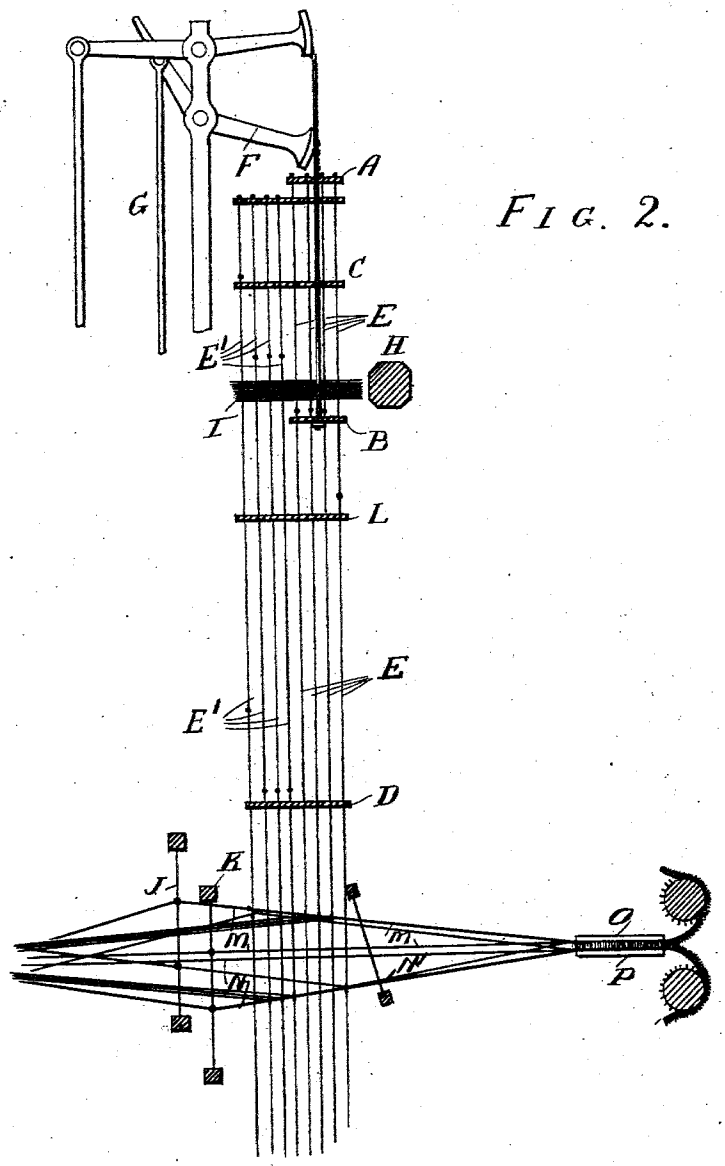

FIG. 2.

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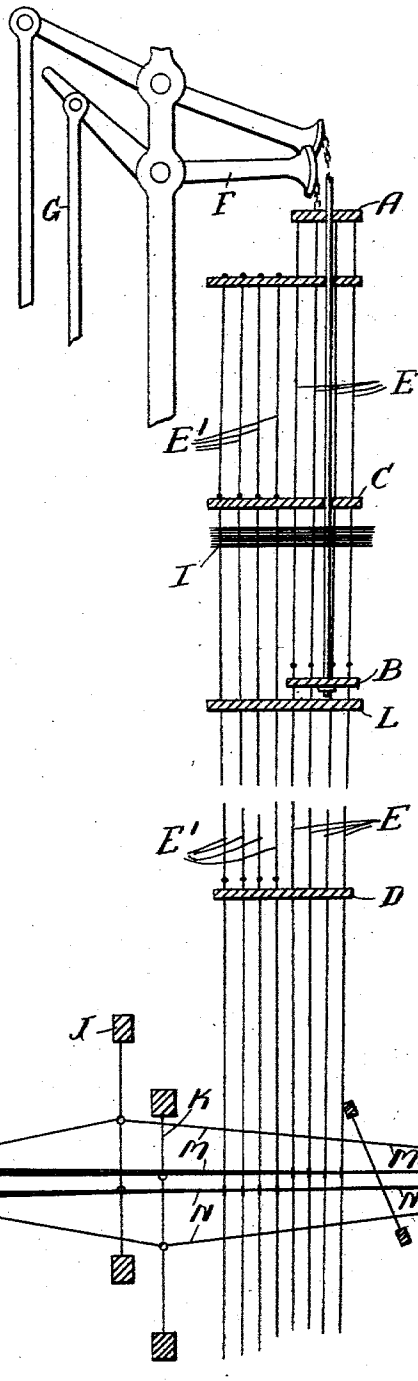


FIG. 3.

FIG. 4.

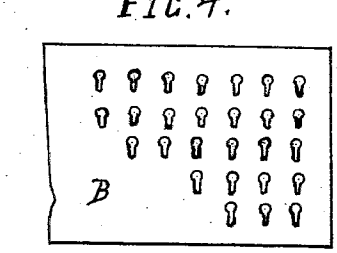
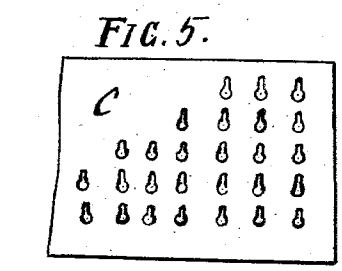


FIG. 5.



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UNITED STATES PATENT OFFICE.

RICHARD NORVILLE WATSON SMITH, OF PAISLEY, SCOTLAND.

APPARATUS FOR WEAVING PILE FABRICS.

SPECIFICATION forming part of Letters Patent No. 634,037, dated October 3, 1899.

Application filed November 16, 1897. Serial No. 658,690. (No model.)

To all whom it may concern:

Be it known that I, RICHARD NORVILLE WATSON SMITH, carpet-manufacturer, of Paisley, in the county of Renfrew, Scotland, have invented certain new and useful Improvements in Apparatus for Weaving Pile Fabrics, (which have not been patented in any country except Great Britain by Letters Patent dated April 24, 1894, No. 8,078,) of which the following is a specification.

The object of my invention is to obtain increased production in looms for weaving figured pile fabrics with the pile face to face and a backing for each fabric, the double fabric being subsequently split by cutting the pile which joins the backings.

Figures 1, 2, and 3 are views showing my apparatus in three different stages of operation. Figs. 4 and 5 are plan views, respectively, of a lifting-board and a comb.

In my invention, as illustrated in the various positions of the lifting-boards at Figs. 1, 2, and 3, I use two boards or lifts A B, supplementary to the ordinary boards C D, and arrange the knotting of that portion E of the harness-cords above the lifts A B and that E′ above the lifts C D, so that I obtain the power of forming two cloths with the warps usually required for one cloth, thereby saving material. This arrangement of four lifts A B C D with the harness-cords knotted as described allows of working the two cloths with two shuttles, one for each cloth, simultaneously. Half of the harness-cords E′ are knotted in the usual way—that is, above the jacquard-comb C and above the comber-board D—the warps in this part of the harness forming the bottom cloth. The other half of the harness-cords E′ are taken through the top of the jacquard-machine and fixed onto the board A. The board A is raised or lowered by a bell-crank lever F, with a rod G attached to a cam on the loom. When raised, the cords E are taut from the top of the jacquard to the lingoes on the bottoms of the cords, and those cords are then controllable by the needles I and the cylinder H without requiring to be lowered for this purpose.

Fig. 1 illustrates the position of the harness E, by which the pile-face of the top cloth is formed. The top lift A is raised, and the jacquard-board B is in position to take and hold up any knots that may be left in it by the effect of the needles with the card or design. Jacquard-board C and comber-board D are not moved, and in this position the foundation of the two cloths is formed by two shuttles crossing simultaneously, the one leaving a weft-shot below the warp-threads controlled by boards A and B and the other leaving a weft-shot above the warp-threads controlled by the boards C and D. The heddles J K at this time remain unmoved. The portion of the harness E taken through the jacquard-board C and comber-board D is not knotted above the jacquard-comb C or comber-board D, so that in raising or lowering those two lifts C D this portion of the harness is not affected in any way; but below the needles, immediately above the neck-board L, there is placed the comb or lifting-board B, the holes in which are placed the reverse way from those in the jacquard-comb C, and this portion of the harness is knotted above the comb B. The boards B and C are shown, respectively, in Figs. 4 and 5, the holes for the harness-cords being arranged reversely in the two boards. This comb B being raised up when the top lift A is up it gets its selection of the harness from the ordinary needles in the jacquard H, as the top lift A raises all the knots on this portion E of the harness close enough to the needles I to be affected by them. When this comb B gets its selection, the top lift A lowers the remainder of this harness E down to the bottom of the bottom cloth, and at the same time the usual jacquard-comb C raises the portion of the harness E′ it has selected to the top of the top cloth, thus forming the full design. The heddles J K carry the warp binder-threads M N and the harness E E′ controls the pile-forming warp-threads, the threads carried by the heddles varying with the number of binder-threads used and the threads carried by the harness E E′ varying with the pile pattern to be produced.

Fig. 2 shows the top board A lowered and board B in position as in Fig. 1, but with cords retained in it as arranged in the design, the board C being at this time raised and by it the cord as selected by the card or design. The comber-board D is unmoved

and the shuttles cross again. In this portion the pile raised by the board C is bound into the top cloth, and the pile-warp lowered by the top lift A is bound into the bottom cloth by the shots of weft taken across by the shuttles. The heddle J is lowered and K is raised. As may be arranged in the design, the top lift may lower all the design, and as the warps are bound in with a weft-shot into the cloth on the side opposite that from which they started on their recovering their original positions the pile on the cloth is formed.

Fig. 3 shows the top lift A half raised, the jacquard-board B lowered, the jacquard-board C lowered, and the comber-board D raised, in which position the shuttles cross, one shuttle putting a shot of weft on top of the pile-forming threads of top cloth and the other putting a shot of weft on the bottom of the pile-forming threads of the bottom cloth. The heddles J K are not moved. The cloths are severed by a suitable knife. The depth of pile is formed by the distance apart of the two fine chains M N, suitably strained in each cloth, and is regulated by two plates O P, one placed below the bottom cloth and one above the top cloth.

Having now described the invention, what I claim, and desire to secure by Letters Patent, is—

1. In a jacquard-machine the combination with the ordinary harness-lifting board C and comber-board D, of two supplementary lifting-boards A, B, two portions E, E′ of harness, the knotting of one portion E of the harness-cords being above the board B, and the knotting of the other portion E′ being above the boards C, D, one board D and knots of the part E of the harness being placed below the jacquard-needles I and the other board C and knots of harness E′ being placed above the needles I so that the harness of both boards is controlled simultaneously in order to form two cloths simultaneously with the pile-warps usually required for one cloth substantially as described.

2. In a jacquard-machine adapted to weave a double-pile fabric, the combination with heddles J, K, adapted to control binder warp-threads for the ground fabrics of harness-cords E′, lifting-board C and comber-board D for cords E′, cylinder H and needles I for controlling said harness-cords E′, board C being above needles I, board D being below said needles, harness-cords E′ being knotted above boards C and D, harness-cords E, a vertically-movable lift-board A above the needles from which board A cords E are suspended, the cords E being taut from end to end when board A is up, said cords being then controllable by needles I without being lowered for the purpose, lift-board B below needles I, cords E being knotted above board B, said board A being movable downward when board B gets its selection of cords E thereby carrying the remainder of cords E to the bottom of the bottom cloth, board C being simultaneously movable upward to raise the selected portion of harness-cords E′ to the top of the upper cloth.

3. In an improved jacquard-machine for simultaneously making two pile fabrics, the combination of ordinary harness-lifting board C having lifting-holes, comber-board D, harness-cords E′, a support therefor, said cords E′ being knotted above boards C and D, two supplemental lifting-boards A, B, the latter having reverse lifting-holes to board C, harness-cords E suspended from supplemental board A and knotted above board B, which board is below but near to the usual jacquard-needles I, cords E being taut when board A is up, board B being in position to hold any knots of cords E left in it by the jacquard cords and needles, whereby two shuttles can be simultaneously thrown, one below the warp-threads controlled by boards A, B, and the other above the warp-threads controlled by boards C, D, means for moving board A down after board B gets its selection of cords E, whereby board A carries the remainder of the harness E to the lower position, comb C being then carried up raising the part of harness E′ left therein by the jacquard.

Signed at Glasgow, county of Lanark, Scotland, this 2d day of November, 1897.

RICHARD NORVILLE WATSON SMITH.

Witnesses:

WALLACE FAIRWEATHER,

JNO. ARMSTRONG, Jr.