

J. C. ELLISON.

Looms for Weaving Pile Fabrics.

No. 144,077.

Patented Oct. 28, 1873.

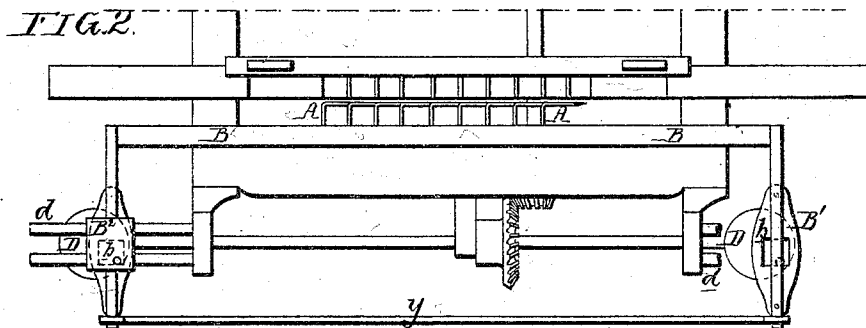
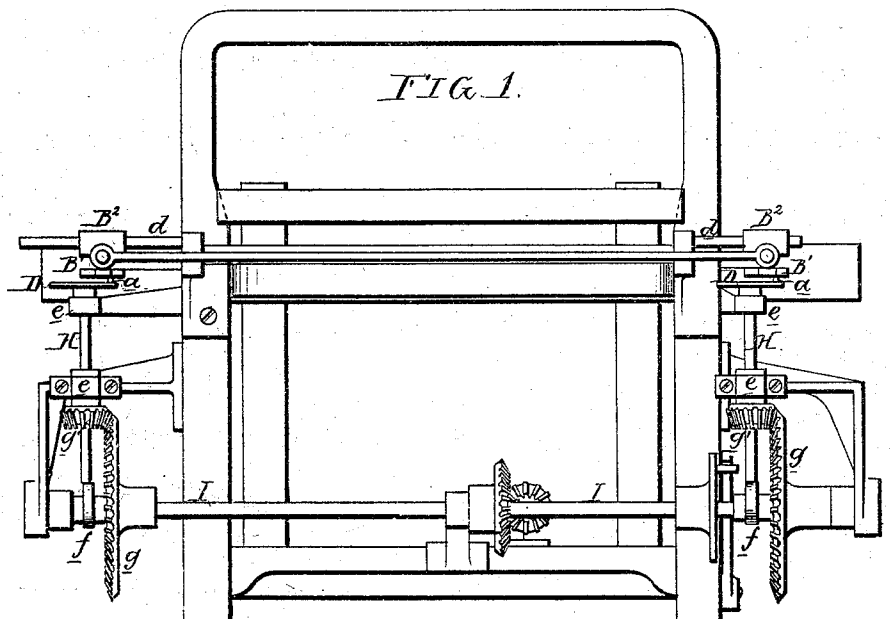


FIG. 3.

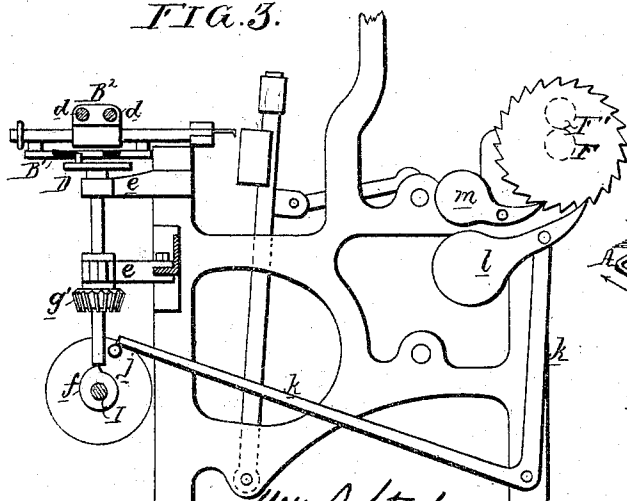


FIG. 4.

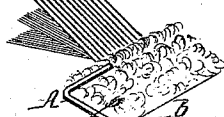


FIG. 5.

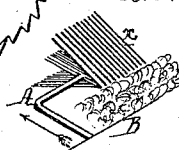


FIG. 6.

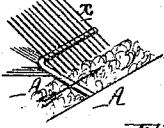
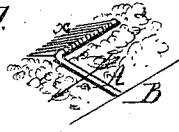


FIG. 7.



FIG. 8.



Witnesses,

Wm. A. Steel
Thomas M. Uvain

Jas. C. Ellison
by his Attys
Housman and Son

UNITED STATES PATENT OFFICE.

JAMES C. ELLISON, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO HIMSELF AND DAVID N. ROTHERMEL, OF SAME PLACE.

IMPROVEMENT IN LOOMS FOR WEAVING PILE FABRICS.

Specification forming part of Letters Patent No. **144,077**, dated October 28, 1873; application filed September 22, 1873.

To all whom it may concern:

Be it known that I, JAMES C. ELLISON, formerly of Bradford, Yorkshire, England, but now of the city of Philadelphia, State of Pennsylvania, have invented certain Improvements in Weaving Pile Fabrics, of which the following is a specification:

The object of my invention is to manufacture pile fabrics more rapidly and economically than they have heretofore been made, by dispensing with the usual wires and substituting therefor a system of hooks, which, by a peculiar movement described hereafter, will seize, retain, and release certain warp-threads especially raised or lowered so as to be within range of the said hooks, all as described hereafter, and illustrated in the front view, Figure 1, of the accompanying drawing, and in the plan view, Fig. 2, side view, Fig. 3, and diagrams 4 to 8.

In front of the lathe of the loom, the parts of which it will be unnecessary to describe, is a bar, B, carrying a system of hooks, A, and to this bar a compound movement is imparted by crank-wheels D D, the pins of which extend into rectangular openings, *b*, in plates attached to rods B¹, which are arranged to slide through blocks B², the latter being arranged to slide on guide-rods *d d*, in a direction at right angles to that in which the rods B¹ are arranged to slide. These rods B¹ are connected to bar B, which carries the hooks A. Independently of the usual warp-threads, which, with the weft, form the body of the fabric, there are special warp-threads, *a*, which are to be seized by the hooks and drawn into loops. These special warp-threads are wound on a supplementary beam and passed between delivery or let-off rollers, F F, and are under the control of special heddles, by which the threads are raised higher than the warp-threads controlled by the usual heddles. Each crank-wheel D is secured to the upper end of a shaft, H, to which an intermittent vertical reciprocating movement in its bearings is imparted by a cam, *f*, secured to a transverse shaft, I, adapted to suitable bearings in the frame of the loom. (See Figs. 1 and 3.) This shaft I derives its movement through suitable gearing from one of the shafts

of the loom, and has, near each end, a bevel-wheel, *g*, gearing into a bevel-pinion, *g'*, arranged to turn in the lower bearing *e*, the shaft H being at liberty to slide through the pinion, but not to turn independently of the same. The shafts H are raised simultaneously by the cams *f*, in order to introduce the pin *a* of their crank-wheels D simultaneously into the openings *b*, and thus operate the bar B from both ends. In the present instance, the shaft I is so geared to the driving-shaft of the loom that its cams *f* shall elevate the shafts H, and consequently operate the bar B and its hooks, after every fourth pick of the loom; and the rollers F and F' are operated positively from the said shaft I after every fourth pick through the medium of a pin and disk or cam, *j*, bell-crank lever *k*, pawl *l*, and ratchet *m*, Fig. 3, so that they shall deliver the special warp-threads *a* only during the movement of the bar B and its hooks. When the crank-wheels D are raised and their pins *a* introduced into the rectangular slots *b* of the rod B¹, the bar B with its hooks will have the following movements or succession of movements imparted to it: The bar is first moved in the direction of the arrow, Fig. 4, in order to withdraw the hooks A from the loops already formed, each hook, when the shed is opened and when the special warp-threads *a* are raised, occupying the position shown in Fig. 4 in respect to the said warp-threads. The next movement will be in the direction of the arrow to the position seen in Fig. 5, and the next in the direction of the arrow, Fig. 6, carries the hook beneath the special warp-threads. The final movement will be in the direction of the arrow, Fig. 7, to the position shown in Fig. 8, which causes the hook to draw the threads to a sufficient extent to form the loops, the delivery-rolls F being operated in order to let off the warps during this latter movement. When the hook has reached the position seen in Fig. 8, the crank-pins *a* will be disengaged from the slots *b* by the dropping of the shafts H, and the hook will remain in the same position, sustaining the loops until four picks have been made, and the weft-threads beaten up, after which the crank-wheels will again rise, the hook will be

withdrawn from its loops by a movement in the direction of the arrow, Fig. 8, and the above-described operation will be repeated.

The whole of the hooks are operated simultaneously and in precisely the same manner, and the loops formed by the hooks upon the surface of the fabric will constitute a pile, which may be either long or short, according to the extent of the movement of the said hooks and rolls F, and upon one or both faces of the fabric, according to the nature of the latter, and to the purposes for which it is intended. If the warps are to be looped upon the under as well as upon the upper side of the fabric, an additional bar, B, provided with hooks, must be employed, the warps to be looped by the hooks being, in such case, lowered beneath the ordinary warp-threads, instead of being raised above the same.

By changing the speed of the shaft I, or the character of the cams *f*, the number of picks between the several series of loops may be varied as required.

For some classes of fabric the loops may, if desired, be sheared so as to form a cut pile.

I claim as my invention—

1. The combination, in a loom carrying a special set of warp-threads controlled by spe-

cial heddles, of a system of hooks and mechanism, substantially as specified, for imparting to the said hooks the within-described movement, for the purpose of seizing the said warp-threads, forming them into loops, and retaining and releasing the same, all as set forth.

2. The bar B and its hooks, and the rods B¹, adapted to blocks B², which are arranged to slide on guides *d d*, in combination with cranks D D, the pins of which enter quadrangular openings in the said rods B¹, all substantially as set forth.

3. The combination of the rods B¹, carrying the bar B with its hooks, and the cranks D on the shafts H, to which an intermittent reciprocating movement is imparted, all as and for the purpose set forth.

4. The bar B and its hooks, having the within-described movements, in combination with the positive let-off motion by which the special warp-threads are controlled to accord with the requirements of the hooks.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

Witnesses: JAMES C. ELLISON.

WM. A. STEEL,
HARRY SMITH.