No. 608,226. Patented Aug. 2, 1898.

G. H. SARGENT, R. H. COUPE & B. WALKER.

LOOM FOR WEAVING LOOPED PILE FABRICS.

(Application filed Sept. 3, 1896.)

(No Model.) 3 Sheets—Sheet 1.

FIG. 1

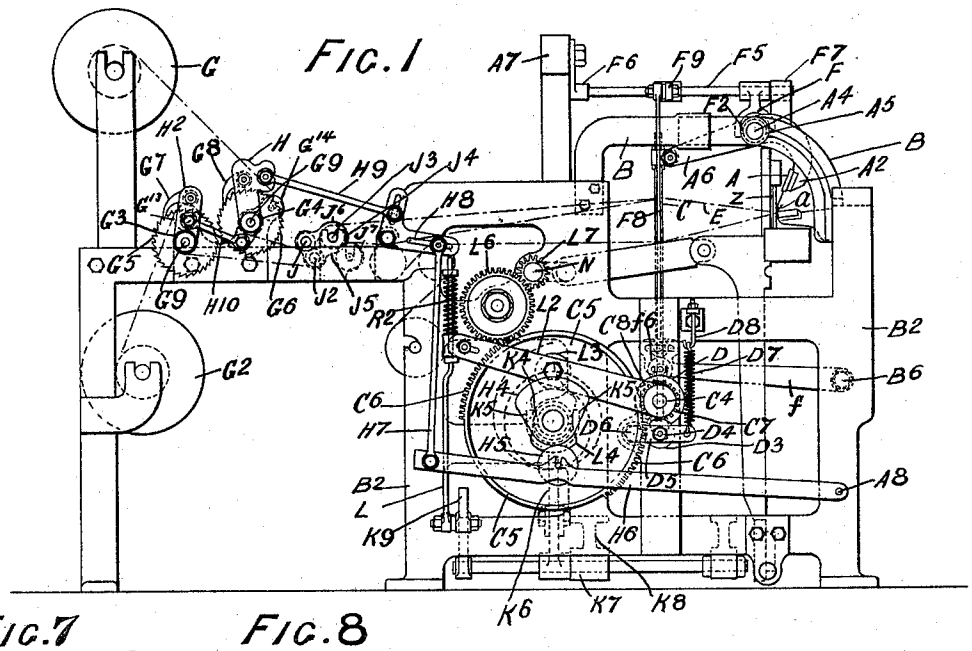


FIG. 7

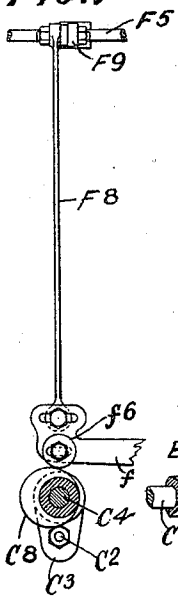


FIG. 8

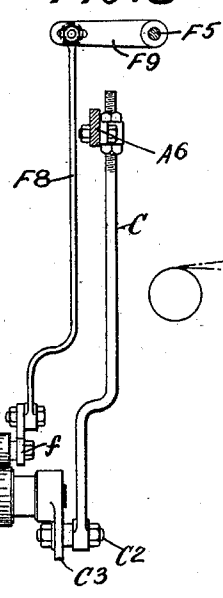
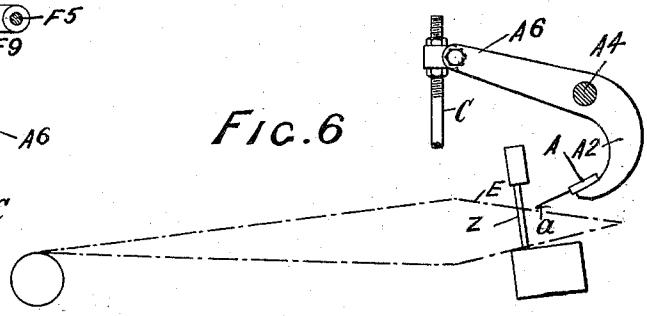


FIG. 6



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FIG. 2

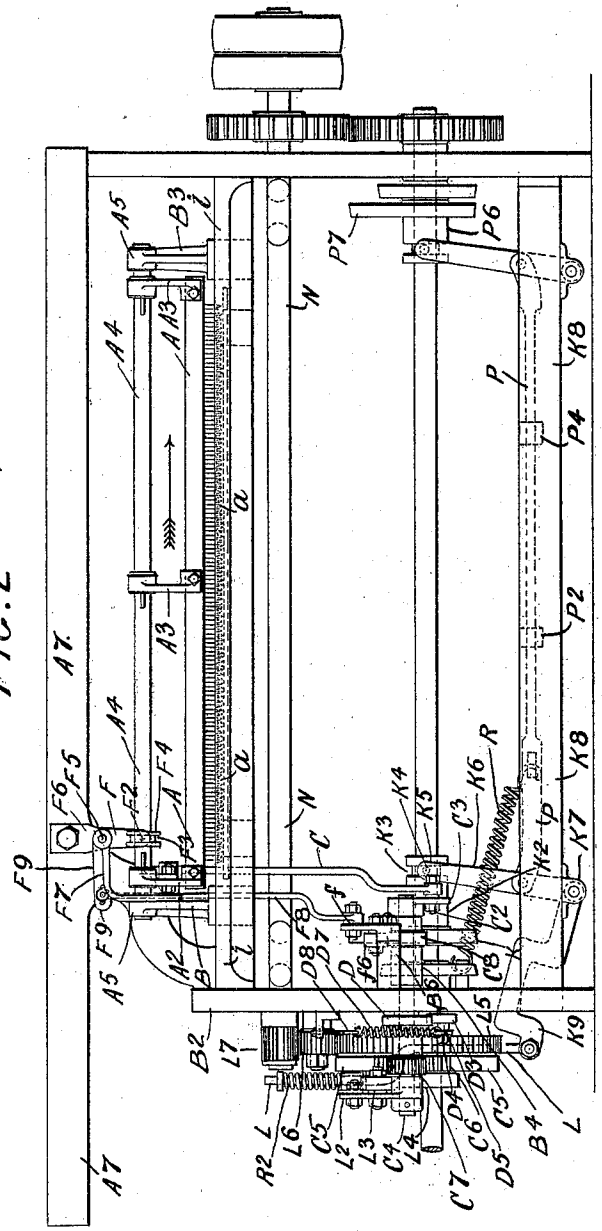


FIG. 5 a

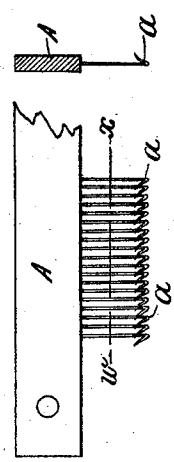


FIG. 5 b

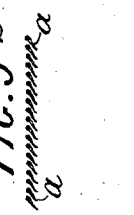
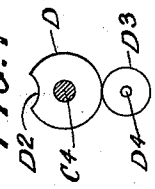


FIG. 4



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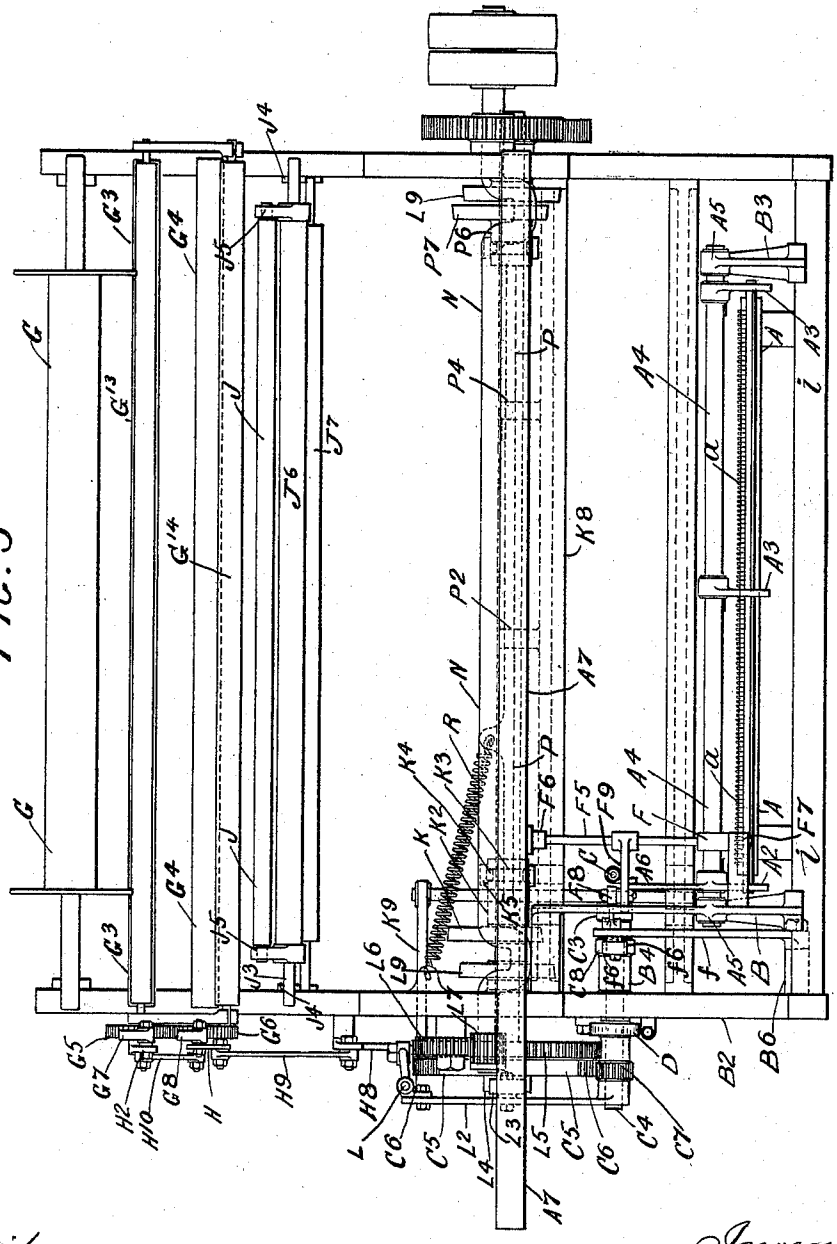
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(No Model.) 3 Sheets—Sheet 3.

FIG. 3



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UNITED STATES PATENT OFFICE.

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LOOM FOR WEAVING LOOPED PILE FABRICS.

SPECIFICATION forming part of Letters Patent No. 608,226, dated August 2, 1898.

Application filed September 3, 1896. Serial No. 604,694. (No model.) Patented in France January 30, 1896, No. 253,563, and in Belgium January 30, 1896, No. 119,591.

To all whom it may concern:

Be it known that we, GEORGE HENRY SARGENT, RICHARD HENRY COUPE, and BENJAMIN WALKER, subjects of the Queen of England, residing at Bingley, England, have invented certain new and useful Improvements in Looms for Weaving Looped Pile Fabrics, of which the following is a specification, and for which we have obtained Letters Patent in France dated January 30, 1896, No. 253,563, and in Belgium dated January 30, 1896, No. 119,591, and for which we also filed a provisional application in England January 14, 1895, No. 844, which application, however, was not completed.

This invention relates to improvements in that type of loom for weaving looped pile fabrics in which the warp-threads requiring to be looped are raised above the others and are engaged by a "comb" or a series of hooks brought into position for that purpose.

We employ a comb the hooks of which are pointed below, so as to readily pass down between the warp-threads, and the hook part is turned up and more or less twisted or inclined, so as to be out of line with the comb, and the extremity extends to or near the shank of the next hook. By this formation the hooks are readily passed below the warp and there is no fear of them failing to engage the whole of the warp-threads required.

In the accompanying sheet of drawings, forming a part of this specification, Figure 1 represents a side view of such parts of a loom as are necessary to illustrate the application of our improvements. Fig. 2 represents a front elevation of the same. Fig. 3 represents a plan view of the same. Figs. 4 to 8 represent views of detail hereinafter referred to.

The comb A is mounted on the curved arms A^2 and A^3, projecting from the rocking shaft A^4, mounted in bearings A^5, formed in the brackets B and B^3, fixed to the front rail or breast-beam *i*. The arm A^2 has an extension A^6 at the back, connected by the rod C to the crank-pin C^2 of the crank C^3, fixed on the inner end of the short shaft C^4, mounted in bearings B^4, formed in the side frame B^2. The short shaft C^4 is intermittently operated by the segment-wheel C^5 on the tappet-shaft, provided with two sets of teeth C^6 C^6, diametrically opposite each other, which alternately engage the spur-wheel C^7 on the shaft C^4 and impart a complete revolution thereto. In order to prevent the shaft C^4 from being turned more than a complete revolution, the disk D is fixed on said shaft and has a crescent-shaped depression D^2 in its periphery, arranged to engage the antifriction-roller D^3 at the end of each revolution. A separate view of this disk and antifriction-roller is represented by Fig. 4 in the position they occupy when the shaft C^4 is turned half-way around or diametrically to the position shown in the other figures. The antifriction-roller D^3 revolves upon the stud D^4, projecting from the arm D^5, mounted on the stud D^6, fixed in the side frame B^2, and the free end of this arm is supported by the spiral spring D^7, attached to the hook D^8, secured to the side frame B^2.

At each revolution of the crank C^3 a rocking motion is imparted to the shaft A^4, which moves the comb A toward the reed Z until the hooks *a* (shown on a larger scale in Fig. 5. 5^a represents a cross-section of Fig. 5, and 5^b represents a horizontal section on the line *w x*, Fig. 5) are passed through the pile-warp E, which is at that time raised for the purpose of being engaged by the said hooks, as shown by the separate cross-sectional view, Fig. 6. When the hooks begin to move in this way, a slight horizontal movement is also imparted to the shaft A^4 in the direction of the arrow, Fig. 2, and while the pile-warp is above the hooks the latter are returned to the position shown in Fig. 1, and at the commencement of the return movement the comb is moved bodily in the reverse direction to the above-mentioned arrow shown in Fig. 2, which longitudinal movement insures all the pile-warp threads (at that time raised) being retained by the hooks. The shedding mechanism now lowers these pile-warp threads, and the weft is introduced to bind the looped warp into the foundation of the fabric. Then when the next loops are required to be formed the comb is again moved toward the reed Z, and as it commences to move the longitudinal movement of the shaft A^4 again moves the hooks laterally, and this lateral movement disengages them from the

loops previously formed. The peculiar formation of the hooks greatly facilitates the loops being disengaged therefrom.

The longitudinal movement is imparted to the shaft A^4 by the vibrating fork F, having projections F^2 engaging the annular groove F^3, formed in the collar F^4, fixed on the shaft A^4. The fork F is mounted on the cross-shaft F^5, mounted in brackets F^6 and F^7, respectively secured to the top cross-rail A^7 and the bracket B. The shaft F^5 is rocked or operated, as required, by means of the cam or eccentric C^8 on the short shaft C^4 engaging the antifriction-roller f^6, carried by the arm f, mounted on the stud B^6, fixed in the side frame B^2, and the arm f is connected by the rod F^8 to the arm F^9, rigidly secured to the shaft F^5.

Fig. 7 represents a side view, and Fig. 8 a front view, of certain parts of the mechanism for imparting longitudinal movement to the shaft A^4.

The pile-warp is mounted on the warp-beams G and G^2 and is let off in any convenient manner. In the arrangement shown the warp is let off from these beams by means of the let-off rollers G^3 and G^4, operated by the ratchet-wheels G^5 and G^6, secured to their arbors and actuated by pawls G^7 and G^8, respectively pivoted on the levers H and H^2, loosely mounted on the arbors G^9 of the rollers G^3 and G^4. The levers H and H^2 are vibrated by means of the cam H^4 engaging the antifriction-roller H^5, carried by the treadle-lever H^6, pivoted on the stud A^8, fixed in the side frame B^2. The free end of this lever is connected by the rod H^7 to one arm of the bell-crank lever H^8, and the other arm of this lever is coupled by the rod H^9 to the lever H, and the opposite end of the lever H is coupled by the rod H^{10} to the lever H^2.

The warp from the beam G passes forward over and around a roller G^{14}, which lies against and turns with the roller G^4, thence between the said rollers, and from the latter under a swinging tension bar or roller J, as will be presently explained. The warp from the beam G^2 passes similarly over and around a roller G^{13}, which lies upon the roller G^3, thence between said rollers, and from the latter under a swinging tension bar or roller J^2. The two rollers G^3 G^4, in connection with their companion rollers G^{13} G^{14}, thus act as positive feed-rolls to draw from the warp-beams a definite length of warp at each operation of the pawls G^7 G^8.

The let-off motion is arranged and operated in such a manner that the moment the loops are commenced to be made the length of the pile-warp required to form them is let off. In order to keep the pile-warp at a suitable tension and at the same time allow the "shed" to be opened, the warp passes from the letting-off rollers G^3 and G^4 under the cross-bars J and J^2, suspended from the cross-shaft J^3 (loosely mounted in bearings J^4 J^4, fixed to the side frames) by the arms J^5 J^5, fixed to the shaft J^3. From the tension-bars J J^2 the warp passes over guide-rollers J^6 J^7 and from these to the reed, as usual. In operation the tension of the warp more or less raises the bars each time the shed is opened—that is to say, when the pile-warp is lifted—and they fall to a corresponding extent when the warp is lowered.

It is necessary (or at any rate we find it advantageous) to miss a "pick" while the looping mechanism is forming the loops. For this purpose the loom is fitted with a device adapted to throw the picking mechanism out of operation when required—as, for instance, the well-known mechanism employed to move either of the picking-cams K and K^2, Figs. 2 and 3, along the cam-shaft H^3 out of reach of the "cone" of the picking-shaft when a pick requires to be missed.

The means shown and described for throwing the picking mechanism into and out of action and for operating the weft-stop mechanism are not claimed herein, the same forming the subject of a separate application of even date, designated by Serial No. 604,695.

We claim—

1. In a loom, the combination with the reed, of an oscillatory shaft capable of being moved longitudinally, a comb mounted on arms rigidly connected with said shaft, means for oscillating said shaft to move the comb toward and from the reed, and means for imparting longitudinal movements to the shaft and to the comb supported thereby.

2. The combination with a reed, a rock-shaft, arms thereon, and a hooked comb supported by said arms, of a shaft C^4, a crank thereon, a rod connected to the latter and one of said arms, a segment-wheel having sets of teeth, and a spur-wheel on shaft C^4 engaged alternately by said sets of teeth, an eccentric on the shaft C^4, an arm in engagement with said rock-shaft, and connections between said arm and said eccentric, all as and for the purpose specified.

3. The combination with a reed, a rock-shaft, arms thereon, and a hooked comb supported by said arms, of a shaft C^4, a crank thereon, a rod connected to the latter and one of said arms, a segment-wheel having sets of teeth, a spur-wheel on shaft C^4 engaged alternately by said sets of teeth, a grooved collar on the rock-shaft, a vibrating fork engaging said groove in the collar, a second rock-shaft carrying the fork, a cam on the shaft C^4, an arm f, connected with the second rock-shaft and a roller on arm f, engaged by the cam.

In testimony whereof we have hereunto set our hands in the presence of the two subscribing witnesses.

GEORGE HY. SARGENT.
RICHARD HENRY COUPE.
BENJAMIN WALKER.

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