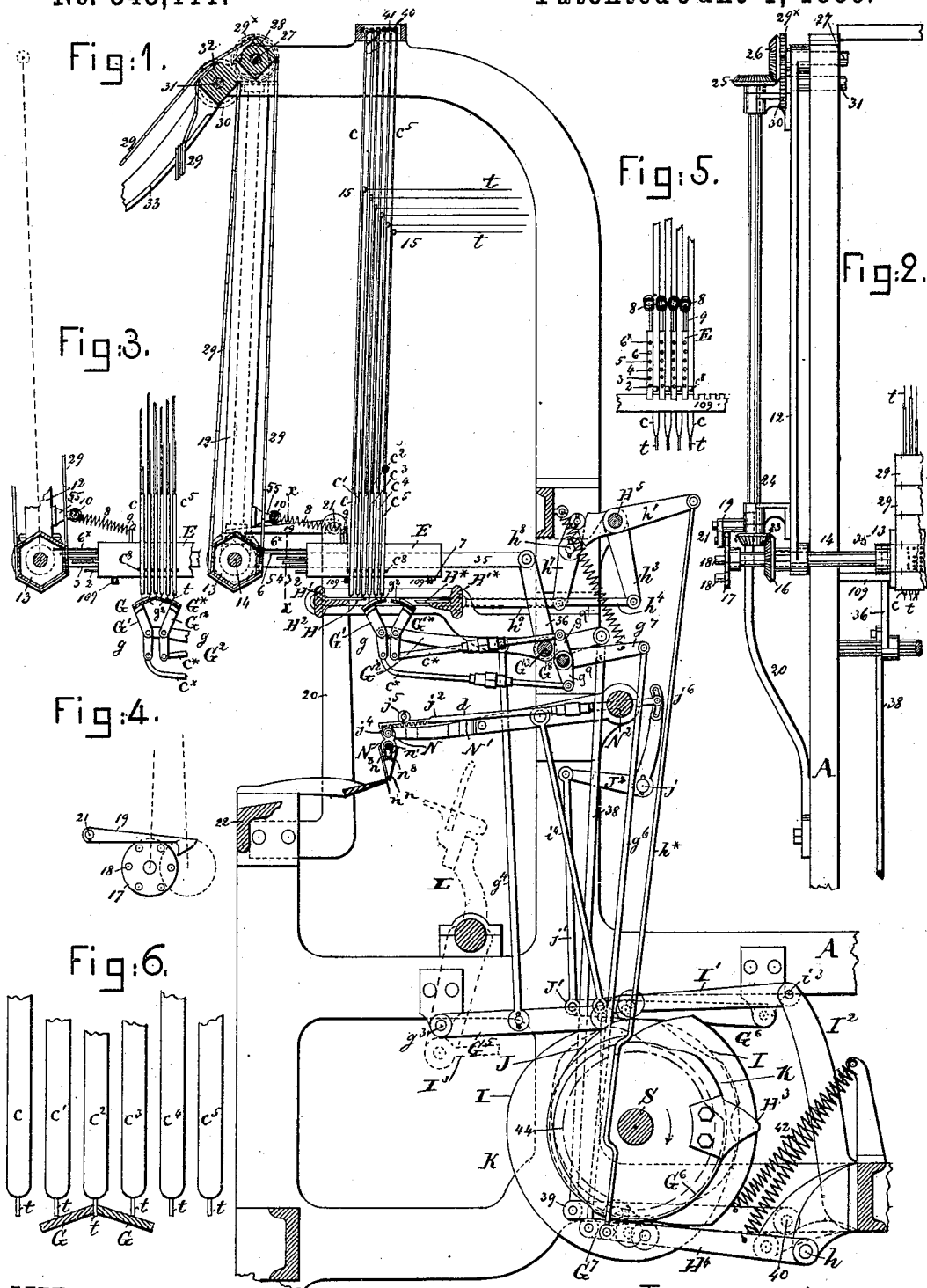


G. CROMPTON & H. WYMAN.
LOOM FOR WEAVING TUFTED FABRICS.

No. 343,111.

Patented June 1, 1886.



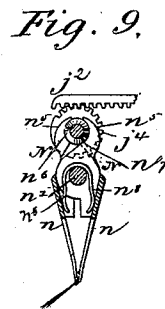
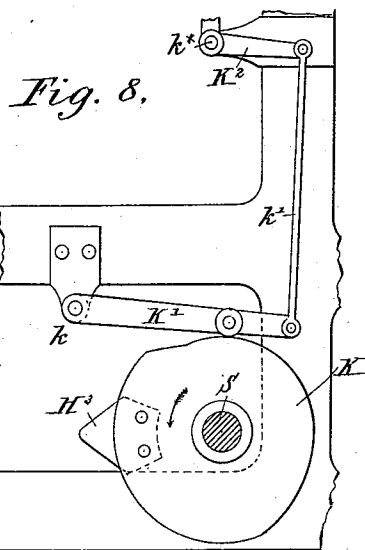
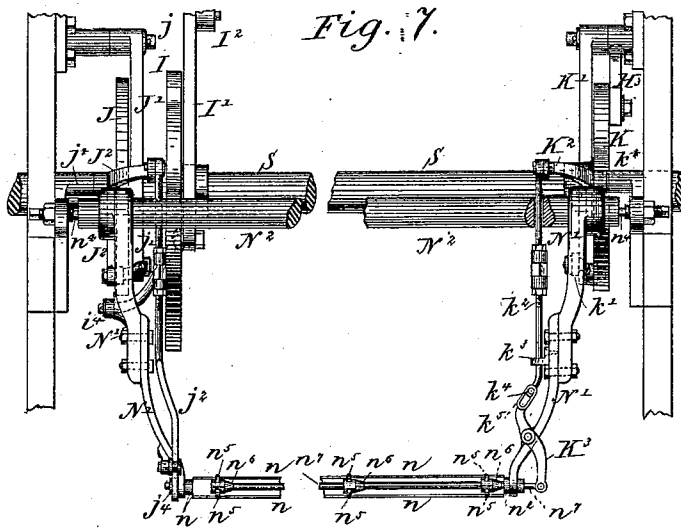
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UNITED STATES PATENT OFFICE.

GEORGE CROMPTON AND HORACE WYMAN, OF WORCESTER, MASSACHUSETTS; SAID WYMAN ASSIGNOR TO SAID CROMPTON.

LOOM FOR WEAVING TUFTED FABRICS.

SPECIFICATION forming part of Letters Patent No. 343,111, dated June 1, 1886.

Application filed September 8, 1884. Serial No. 142,487. (No model.)

To all whom it may concern:

Be it known that we, GEORGE CROMPTON and HORACE WYMAN, of the city and county of Worcester, Massachusetts, have invented an Improvement in Looms for Weaving Tufted Fabrics, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to looms of the class adapted for the production of tufted fabrics—such, for instance, as moquette carpet—the object of the invention being to improve and simplify the means for controlling the tuft-yarns, in order that the same may be taken directly from independent spools or bobbins, one for each yarn, thus obviating the beaming of yarns of different colors on separate warp-beams, one for each transverse row of tufts, and also dispensing with the beam-supporting chains and moving devices therefor, as heretofore usually employed.

This invention consists, essentially, in a series of carriages arranged side by side, means to move them varying distances in the direction of the length of the warp-threads, and a series of tuft-yarn carriers or needles arranged in the said carriages, one behind the other, in the direction of the length of the warp, combined with cutting mechanism to cut the tuft-yarns, and with nipper-like plates to seize the ends of the tuft-yarns and carry and place the tufts between the warps after they are cut into tuft-forming lengths, as will be hereinafter described. Other features of our invention will be hereinafter described, and pointed out in claims.

Figure 1 is a vertical section of a sufficient portion of a loom to enable our invention to be understood. Fig. 2 is a partial front elevation of the loom shown in Fig. 1. Fig. 3 is a detail showing a carriage, tuft or yarn carriers or needles therein, a pattern-barrel, pattern-cards, and jaws to draw off the tuft-yarns, the same being in different position from that represented in Fig. 1. Fig. 4 is a detail showing the devices to rotate the barrel. Fig. 5 is a sectional detail in the line *xx*, Fig. 1, showing several carriages side by side on their

rests and holding tuft-yarn carriers or needles. Fig. 6 is an enlarged detail to be referred to. Fig. 7 is a detail plan view of a sufficient portion of a loom to show the manner of operating the spring-nippers instrumental in introducing the tufts; Fig. 8, a detail of part of the devices represented in Fig. 7 and Fig. 9 an enlarged section showing the nippers.

This invention is intended as an improvement upon the loom described in United States Patent No. 251,304, to which reference may be had.

Referring to the drawings, the frame-work A, cam-shaft S, lever G⁵, rod g⁴, arm G², rock-shaft G³, levers G¹ G⁶*, plates g² g³, to engage the ends of the tuft-yarns, links c² c³*, arms g³ g³*, with which they are connected, shaft G⁸, arm g⁷, link g⁶, connected with lever G⁷, the cam G⁶, the tuft-cutting mechanism composed of the blades H H*, the slides H¹ H²*, rods h³ h³, lever h⁷, pivoted at h⁸, shaft H⁵, having arms h¹ h³, rod h²*, extended downward and connected with lever H⁴, the cam H³, and the nippers having the plates n n, springs n⁸ n⁸, jaws N N, extensions n⁵, rod n¹, pinion j⁴, sliding rack j², roller j³, arms N¹, rock shaft N², rod i¹, lever I¹, cam I, lever J¹, cam J, rod j¹, elbow-lever J², and pin j⁵, the lay L, link L³, cam K, projection H², lever K¹, pivoted at k, link k¹, elbow-lever K², rod k²*, sliding connecting-rod k², guide k³, pin k⁴, horizontally-moving lever K³, having its fulcrum on one arm, N¹, and connected with rod n¹, and its cams or wedges n⁶, to enter between the extensions n⁵ of the jaws N N, are all substantially the same as the parts designated and described by like letters in the Patent No. 251,304, except that the link c shown in the said patent is herein marked c², and in a working-loom embodying the invention hereinafter claimed the said parts will be operated by mechanism such as fully described and shown in the said patent, and hence not herein illustrated in detail, the said parts, when embodied in our improved loom, operating as in the said patented loom to manipulate the tuft-yarns.

Desiring to dispense with the long chains and the series of spools, of which there is one

for each transverse row of tufts to be made in the production of the pattern in the fabric as contemplated in the said patent, each of the said spools having tuft-yarns wound thereon in the order of the colors to appear in some one transverse row of tufts, we have provided the loom with a series of carriages, E, arranged side by side in grooves of rests or bars 109, the said carriages being free to be slid or moved backward away from the breast-beam and in the direction of the length of the warp by the action of a pattern surface, to be described, it acting upon one or the other of a series of projections, 2 3 4 5 6 6*, extended horizontally from the end of each carriage, as shown best in Figs. 1 and 3. Each carriage has a stop, 7, which is normally kept pressed against one of the bars or rests 109 by a spring, 8, connected at one end with a pin, 9, attached to the carriage E, and at its other end with a rod, 10, held at each end by a bracket, as at 55, secured to the frame 12, which supports the shaft 14 of the hollow hexagonal barrel 13, preferably composed of metal plates joined to head-pieces, the latter receiving the shaft 14.

Each of the plates composing the barrel 13 is provided, as herein shown, with six longitudinal rows of holes to correspond with the six projections 2 to 6*, inclusive, of each carriage, there being as many holes in each longitudinal row of holes as there are carriages E in the series of carriages from side to side of the loom, there being as many carriages as there are tufts in each transverse row of tufts.

In practice we find that but five rows of holes and five projections are necessary, as the projection 2 may be omitted and the carriage rest against the pattern-surface when the needles *c* are to be operative. But one end of the shaft 14 is shown in the drawings, and in practice the other end thereof will be supported in like manner as shown.

The shaft 14 shown in the drawings is provided with a bevel-gear, 16, and with a wheel, 17, having pins 18, which are engaged by a pawl, 19, pivoted at 21 on a standard, 20, attached to the loom-frame near the breast-beam 22. The bevel-gear 16 engages a bevel-gear, 23, on the upright shaft 24, held in bearings attached to frame 12. The upper end of the shaft 24 has a bevel-gear, 25, which engages a bevel-gear, 26, on a shaft, 27, having upon it a barrel, 28. The shaft 27 has a toothed wheel, 29*, which engages a toothed wheel, 30, on a shaft, 31, provided with a third barrel, 32, and below this barrel is a suitable cradle, 33, to support the chain of pattern-cards 29 in usual manner, the said barrels being operated to move the chain of pattern-cards intermittently. The pattern-cards 29, connected together in the proper order and constituting the pattern-surface, are each provided with holes, some of which coincide with those of the barrel 13; but each pattern-card serves to close one or more of the holes of each vertical row of holes in the barrel, the par-

ticular hole which is so closed depending upon the exigencies of the pattern in the fabric being woven.

Fig. 2 shows a portion of one of the pattern-cards punched in design. The frame 12 is vibrated or swung backward and forward at regular intervals by link 35, attached in practice to the shaft 14 of the barrel 13, and to the elbow-lever 36, mounted loosely on a shaft, G³, the said elbow-lever being connected by link 38 with a lever, 39, pivoted at 40, and acted upon by a cam, 44, these parts being duplicated at opposite sides of the loom. As the barrel is swung outward by the devices described, the hooked pawl 19, in engagement with a pin, 18, effects the rotation of the said barrel, bringing a new card in position with relation to the projections 2 3 4 5 6 6*.

The carriages are provided at one side with pins *c*³, leaving spaces between them, which constitute pockets or grooves for the reception of a series of tuft carriers or needles, *c* to *c*³, inclusive. These pockets receive and guide the tuft carriers or needles *c* to *c*³, respectively arranged in a row, one back of the other, as shown best in Fig. 1.

The points of the tuft carriers or needles are made as flattened tubes, having eyes for the delivery of the tuft-yarn, and above their ends the carriers or needles are composed of wire having at their upper ends eyes 40, by which they are suspended upon rods or wires 41, each carrier or needle having an intermediate guide-eye, 15, through which is led the tuft-yarn *t*, the tuft-yarn entering the eye of each needle coming in practice from an independent spool or cop containing but one yarn, the spool or cop being supported upon a frame, as described and shown in our application No. 136,604, filed July 2, 1884. Herein the tuft-yarn carriers or needles which receive the tuft-yarn through them are placed under the control of carriages, and the said tuft-yarn carriers or needles are of such length as to hold the said yarns frictionally, so that when the yarns are cut off outside the carriers or needles they will not slip back. After the formation of each row of tufts the barrel 13 and pattern-cards are moved to the left, viewing Fig. 1, by the spring 42, connected with the lever 39, before described, and the barrel is turned one step, bringing a new card in working position. The projections 2 to 6* are of different lengths, their difference being substantially equal to the distance from center to center of the different tuft-yarn carriers.

In Fig. 1 the barrel 13 is shown as moved nearly into its extreme position toward the front of the loom, the hook just commencing to act to turn the barrel. When the barrel 13 is moved farther toward the front of the loom, or to the left in Fig. 1, and away from the projections 2 to 6*, the springs 8 act to draw all the carriages in the same direction until the stops 7 meet the rest 109, in which position the parts will be as in Fig.

1, the rearmost needle, c^5 , of the series of needles being nearest the plates $g^2 g^2$ of the levers $G' G'^x$. The barrel 13 has a hole for each projection 2 to 6^x , inclusive, and the pattern-card, by covering one hole in the barrel opposite the series of projections of each carriage, acts to arrest or prevent one or the other of the said projections from entering the hole prepared for its reception in the barrel. The distance which the barrel and card will move the carriages backward from the breast-beam depends upon which of the projections 2 to 6^x is acted upon by the card. The projections 2 to 6^x respectively control the placing of the needles c^2 to c respectively in working position, or so that the tuft-yarns carried by them may be taken by the nippers which rise between the levers $G' G'^x$, as in the patent referred to, No. 251,304.

In Fig. 3, wherein the barrel is shown as moved backward or away from the front of the loom, the projection 5 is shown as acted upon by the card, thus placing the tuft-yarn carrier or needle c^2 of the series in operative position. If the projection 6^x were arrested, the carrier or needle c would be in operative position, and if projection 2 the carrier or needle c^5 would be in operative position.

Fig. 6, on a larger scale, shows the lower ends of the series of tuft-yarn carriers or needles with the tuft-yarns protruding from them, and with the yarn of the carrier or needle c^2 caught by the plates $g^2 g^2$, which, as herein shown, are employed to draw the tuft-yarns for a short distance from the needles, holding them in a row, while the nippers, with the plates $n n$ separated and pointed upward, are made to grasp the row of the tuft-yarns in the set of carriers or needles which have been placed as described in working position, a carrier or needle of each carriage, the movement of the latter for a greater or less distance placing in working position that one of the series of needles containing the tuft-yarn of the color from which it is desired that each carriage, from one of its needles, shall furnish in the production of the transverse row of tufts to be made. The nippers having been raised at each side of the row of tuft-yarns, and having been operated to grasp or seize the tuft-yarns, the latter are cut off by the blades $H H^*$, and the nippers are lowered and turned downward, bringing them into position above and so as to pass the tufts carried by them between the warp-threads, to be woven into and form part of a fabric, as fully described in the said patent.

In another application, Serial No. 179,213, filed October 7, 1885, we have shown a series of carriages provided with openings or passages for the reception of the tuft-yarns, the tuft-yarns coming into the said carriages from guides independent of the carriages, and in the said application the carriages are moved horizontally in the same manner and by the same devices as are herein shown; and in the

said application we have claimed the said devices broadly, this present application being intended to be subordinate to it. So, also, in another application, Serial No. 136,604, we have shown and claimed a series of carriages containing independently movable tuft-yarn carriers or needles adapted to be selected by a Jacquard mechanism.

We claim—

1. A series of carriages arranged side by side across the loom, a series of tuft-yarn carriers or needles arranged in the said carriages, one behind the other, and holding the tuft-yarns, combined with means, substantially as described, to automatically move the said carriages horizontally or in the direction of the length of the warp for different distances, whereby any desired one of the carriages may be made to present any desired one of the tuft-yarn carriers or needles in position to be seized by nippers, and with nippers to engage the tuft-yarns below the under sides of the carriages, substantially as described.

2. A series of carriages arranged side by side, means, substantially as described, to move them automatically for varying distances, and a series of tuft-yarn carriers or needles arranged therein, one behind the other, in the direction of the length of the warp-threads, combined with cutters or blades to cut the tuft-yarns, and with nippers to seize the tuft-yarns and carry and place the separate tufts between the warps, and with means to actuate the said cutters and nippers, substantially as described, whereby the nippers, when turned upward, are opened to embrace the tuft-yarns, and are subsequently turned downward to introduce the short tufts held by them between the warps, as and for the purpose set forth.

3. The series of independent tuft-yarn carriers or needles, means to support them, the sliding carriages E , provided with projections of different lengths and moving the said tuft-yarn carriers or needles, rests upon which the said carriages are mounted side by side, combined with means, substantially as described, to move the said carriages and tuft-yarn carriers or needles in the direction of the length of the warp and for different distances, and with the nippers, and means, substantially as described, to open and close and partially rotate them, whereby they are caused to place the tuft-yarns cut into tuft-lengths between the warp for the formation of tufts, substantially as described.

4. The rests and the carriages thereon, combined with the tuft-yarn carriers or needles pivoted above and extended down through the said carriages, substantially as described.

5. A series of carriages placed side by side across the loom-frame, a series of projections of different lengths, rests to support the said carriages, and a series of tuft-yarn carriers or needles pivoted at their upper ends and held or directed near their lower ends by the

5 said carriages, combined with means to act upon and move the carriages different distances in the direction of the length of the warp, to thus place any one of the series of needles of each carriage in position to furnish a tuft-yarn of the proper color for the production of the transverse row of tufts next to be inserted, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of 10 two subscribing witnesses.

GEO. CROMPTON.
HORACE WYMAN.

Witnesses:

J. B. SYME,
J. A. WARE.