

F. F. ROCHE.  
LOOM FOR LENO WEAVING.  
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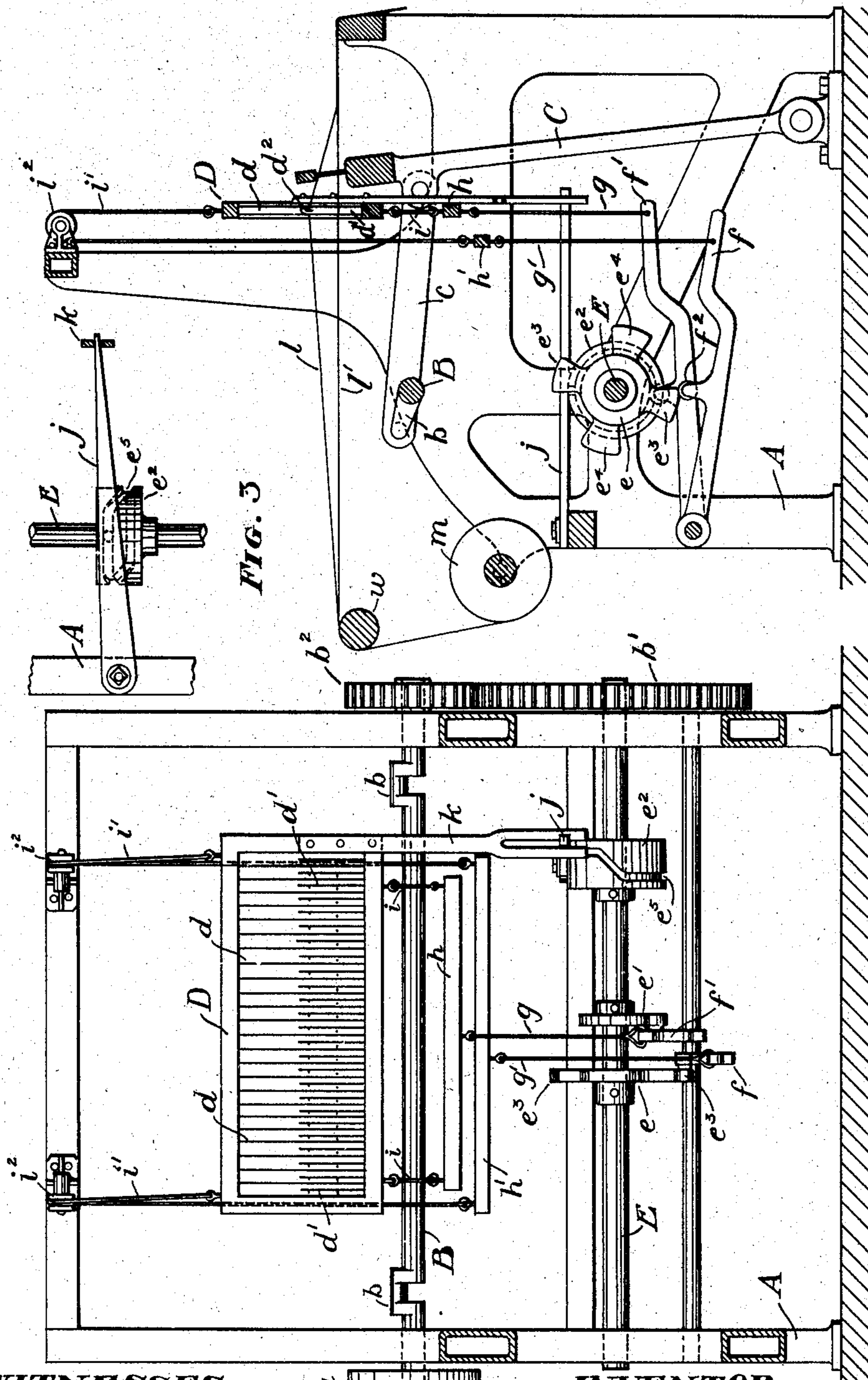


FIG. 2

FIG. 1

WITNESSES

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# UNITED STATES PATENT OFFICE.

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## LOOM FOR LENO-WEAVING.

SPECIFICATION forming part of Letters Patent No. 791,580, dated June 6, 1905.

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*To all whom it may concern:*

Be it known that I, FREDERICK F. ROCHE, of Lincoln, in the county of Providence and State of Rhode Island, have invented certain  
 5 new and useful Improvements in Looms for Leno-Weaving; and I do hereby declare the following specification, taken in connection with the accompanying drawings, forming a part of the same, to be a full, clear, and exact  
 10 description thereof.

The present invention relates to looms for weaving leno or gauze fabrics, and has for its object to provide a simple and efficient mechanism for producing fabrics of this character.

To that end the invention consists in the combination, with the usual parts of an ordinary loom, of a combined comb and reed, with mechanism for giving to such combined comb and reed both vertical and lateral movements,  
 20 whereby both the opening of the shed and the crossing of the threads will be effected by said combined comb and reed and without the employment of any harness or other additional devices.

Referring to the drawings, Figure 1 is a front elevation, partly in section, of a portion of a loom with my invention applied thereto. Fig. 2 is a vertical section of the same, and Fig. 3 a detail.

A represents the frame of the loom, in which is mounted the main shaft B, provided with fast and loose pulleys *a a*. The shaft B is provided with the usual cranks *b b* for operating the lay C through the connecting-links *c*.

D is the combined comb and reed, which is provided with alternate long dents *d* and short dents *d'*. The long dents *d* extend the full width of the reed and are secured at each end to the frame. The short dents *d'* extend about  
 40 one-half the width of the reed and are secured to the frame only at their lower ends. These short dents are provided near their upper or free ends with eyes *d''*, through which one set of the warp-threads are passed.

E is the cam-shaft, which is connected with the shaft B by gears *b' b''* of such relative size that the cam-shaft E will make one revolution for every two revolutions of the shaft B. The

cam-shaft E is provided with two cams *e e'* for giving to the combined comb and reed its ver- 50 tical or up-and-down movements and with a third cam *e''* for giving to the combined comb and reed its lateral or to-and-fro movements. Two treadles or levers *f f'* are pivoted to the frame and arranged to be actuated by the cams *e e'*, respectively. In practice the treadles or levers *f f'* are usually arranged to under- 55 lie the cams *e e'*, respectively; but for convenience in the drawings each of the treadles is shown as provided with an offset or projection carrying the roller *f''* to be acted upon by the cam. As the cam-shaft E makes only one revolution for every two revolutions of the shaft B, each of the cams *e e'* has two cam projections, the cam *e* being provided with 65 the cam projections *e'' e'''* and the cam *e'* being provided with the cam projections *e'' e'''*. One of the treadles, *f'*, is connected, by means of the cord *g*, jack *h*, and cords *i*, with the lower side of the combined comb and reed, and the 70 other treadle, *f*, is connected, by means of the cord *g'*, jack *h'*, and cords *i'*, with the upper side of the combined comb and reed, the cords *i'* passing over suitable pulleys *i'' i'''* on the frame. The arrangement of these parts is 75 such that when one of the treadles is depressed by its cam the combined comb and reed will be raised, and when the other treadle is depressed by its cam the combined comb and reed will be lowered. 80

Pivoted to the frame A is a lever *j*, which is arranged to overlie the cam *e''* and is provided with a pin or projection which enters a cam-groove *e''*, formed in said cam. Secured to the combined comb and reed and depending therefrom is an arm *k*, which is forked at its lower end, so as to embrace the free end of the lever *j*, so that the movement of said lever will be imparted to the combined comb and reed. As the cam-shaft E revolves the 90 lever *j* is moved back and forth by the cam *e''*, thereby giving to the combined comb and reed its lateral or to-and-fro movement. The slot in the forked end of the arm *k* permits the proper vertical movements of the 95 combined comb and reed, while maintaining

an operative connection between the lever and arm.

As shown in the drawings, the warp-threads  $l$   $l'$  are led from the warp-roll  $m$  over the whip-roll  $n$  and pass directly from the whip-roll to the combined comb and reed and thence pass directly through the reed of the lay to the fabric. One set of the warp-threads, as  $l$ , are passed through the eyes  $d^2$  of the short dents of the combined comb and reed, and the other set of warp-threads, as  $l'$ , are passed between the long dents and the short dents, as shown.

The operation is as follows: At the first pick the combined comb and reed is raised to open the shed, as shown in Fig. 2. After the shuttle has crossed to lay the weft-thread the combined comb and reed is depressed, and when the upper ends of the short dents have been brought below the warp-threads  $l'$  the combined comb and reed is given a short lateral movement, thereby changing the position of the short dents with relation to the warp-threads  $l'$  and carrying the threads  $l$  across the threads  $l'$ . The combined comb and reed is then raised to open the shed for the next pick, and when so raised the short dents will come up on the opposite side of the warp-threads  $l'$  and the threads  $l$  and  $l'$  will be crossed back of the weft-thread, thereby producing the leno or gauze weave. After the next weft-thread has been laid the combined comb and reed is again depressed, then moved laterally in the opposite direction to effect another crossing of the threads  $l$  and  $l'$ , and then raised to open the shed for the next pick, and so on. It will be seen that the opening of the shed for the next pick, as well as the crossing of the threads, is performed solely by the combined comb and reed and that no harness or other devices are required for the purpose, the cross-weaving being entirely performed by the combined comb and reed without the coöperation of any harness or other similar devices. It will also be noted that as no harness is employed or required the shed opens clear back to the whip-roll

and that by reason of this long shed no easer-roll is required.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a loom, the combination, with the operating mechanism, of a combined comb and reed comprising long dents and short dents, the short dents being provided with eyes to receive one set of the warp-threads, and means for giving to said combined comb and reed both a vertical and a lateral movement at each pick, substantially as described.

2. In a loom, the combination, with the operating mechanism, of a combined comb and reed comprising long dents and short dents, the short dents being provided with eyes to receive one set of the warp-threads, and means for giving to said combined comb and reed a lateral movement to cross the warp-threads, and then an upward movement to open the shed for the next pick and so on successively at each pick, substantially as described.

3. In a loom, the combination, with the operating mechanism, of a whip-roll, a combined comb and reed comprising long dents and short dents, the short dents being provided with eyes to receive one set of the warp-threads, said warp-threads being led directly from the whip-roll to the eyes in said dents, and means for giving to said combined comb and reed both vertical and lateral movements at each pick, substantially as described.

4. In a loom, the combination, with the cam-shaft provided with cams, of a combined comb and reed comprising long dents and short dents, the short dents being provided with eyes to receive one set of the warp-threads, and connections between said cam-shaft and combined comb and reed for giving to said combined comb and reed both vertical and lateral movements at each pick, substantially as described.

FREDERICK F. ROCHE.

Witnesses:

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