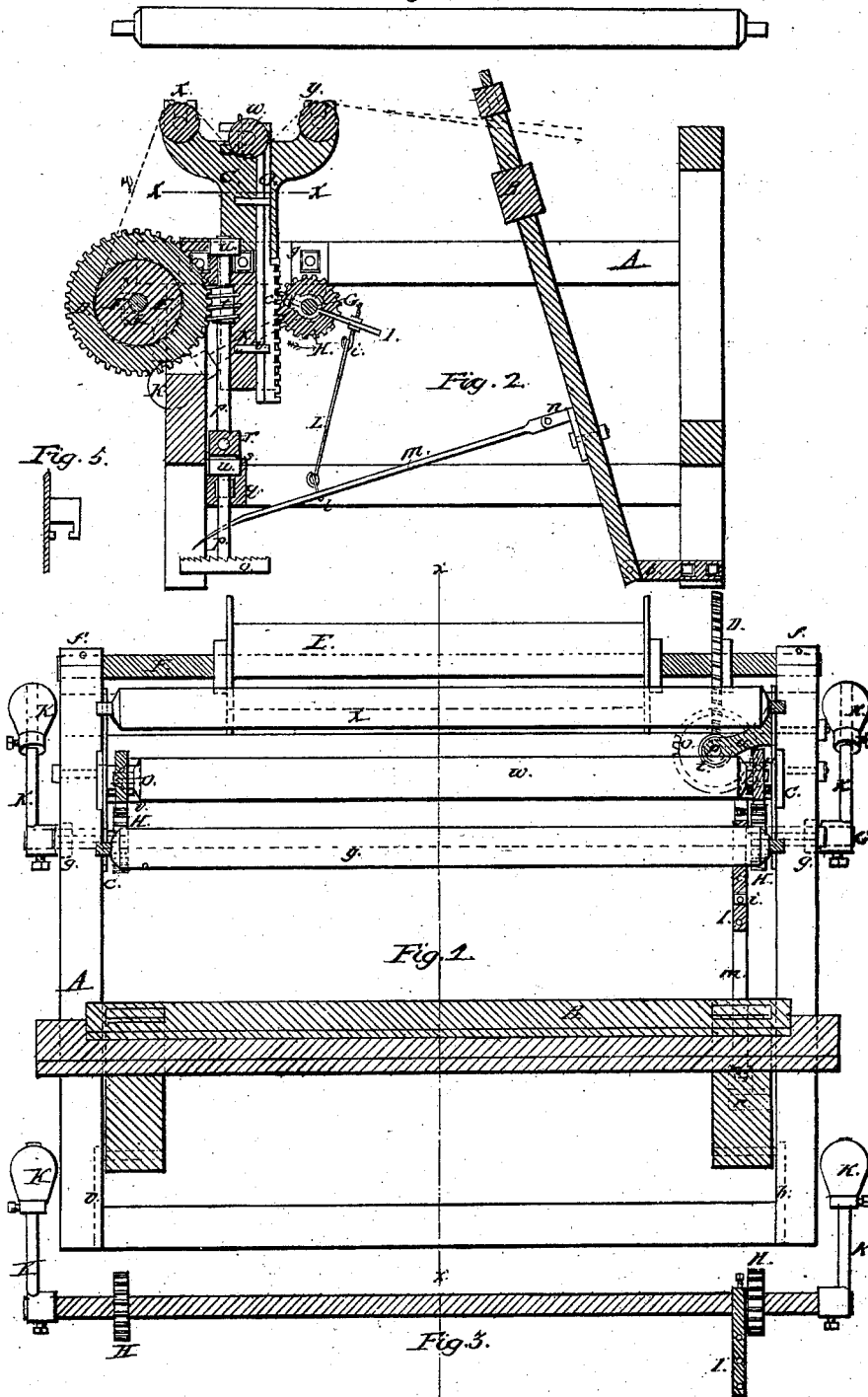


*J. Knowles,*  
*Let-Off for Looms.*

*No. 7,324.*

*Patented Apr. 30. 1850*

*Fig. 4.*



# UNITED STATES PATENT OFFICE.

JONATHAN KNOWLES, OF BUFFALO, NEW YORK.

## LET-OFF MOTION OF LOOMS.

Specification of Letters Patent No. 7,324, dated April 30, 1850.

*To all whom it may concern:*

Be it known that I, JONATHAN KNOWLES, of the city of Buffalo, in the county of Erie and State of New York, have invented a new and useful Improvement in Looms, which I denominate a let-Off Motion; and I do hereby declare that the following is a full, clear, and exact description of my invention, reference being had to the annexed drawing, which forms part of this specification, and in which—

Figure 1 is a plan of a loom representing only those portions which are essential to give a clear conception of my invention. Fig. 2 is a vertical transverse section at the line *x x* of Fig. 1; Fig. 3 is a plan of the counterpoise shaft and levers detached from the loom; Fig. 4 is a similar plan of a whip-roll; and Fig. 5 is a horizontal section at the line *x x* of Fig. 2 through one of the standards which support the stationary whip-rolls.

The invention consists in a combination of mechanical devices by means of which the warp is let off from the yarn-roll in exact proportion to the amount of filling inserted, while the force with which the filling is driven up can be regulated in proportion to the closeness or fineness required in the cloth.

In the drawing A is the frame of the loom which is represented in this instance as constructed of wood. The lay B is hinged to two brackets *b, b*, projected from the lower extremities of the front standards of the frame; it carries the reed, which is firmly secured to it in such a manner that it will not give when it strikes the filling inserted by the shuttle. The yarn-roll E is mounted in the usual manner at the back of the loom, it has a screw-wheel D secured to one of its extremities whose teeth engage with the worm of a screw *t* secured to an upright shaft *p* which is supported by brackets *u u*, projected inward from one of the sides of the loom frame. The lower extremity of the screw-shaft is furnished with a face ratchet-wheel *o* which is acted upon by a finger *m* hinged at its front end to one of the swords of the lay. The hinder extremity of the finger is suspended by a rod L from an adjustable hook *i* secured to an arm I attached to a horizontal shaft G which crosses the loom and projects at each extremity beyond the sides of the loom frame.

Two pinions H, H of equal size are se-

cured to the opposite extremities of this horizontal shaft (G) within the sides of the loom frame, these engage with the teeth of two equal racks *c, c*, secured to the two sliding standards O, O, of the middle whip-roll *w*; each standard is guided in a vertical direction by two guides *v, v*, projecting laterally from a stationary standard C secured to the side of the loom frame and forked at its upper extremity to support two stationary whip-rolls, the one *y* before, and the other *x* behind the middle whip-roll. The extremities of the shaft G which project beyond the sides of the loom are each furnished with an arm K to which an adjustable weight *k* is adapted; the latter is fitted with a clamp-screw by which it can be secured to its respective arm at any required distance from the center of the horizontal shaft. The tendency of the weights is to turn the shaft in the direction indicated by the arrow in the drawing and thus through the pinions H H and racks *c, c*, to depress the middle whip-roll *w*. The position of the arm I from which the finger *m* is suspended, and the length of the suspension rod L is regulated in such manner that when the middle whip-roll is at its lowest position the hinder end of the finger is lifted so high that it cannot engage with the teeth of the ratchet-wheel *o* hence the latter will not be turned when the whip-roll is in this position. The variation of the acting length of the suspension rod L is effected by changing the position of the hook *i* by means of screw-nuts above and below the arm I to which it is attached.

The operation of this combination of devices is as follows: The warp from the yarn-roll E is passed over the back whip-roll (*x*), under the middle one (*w*) and over the front one (*y*), it is then passed through the harness and reed and secured to the cloth roll. When the loom is put in motion the filling inserted in the shed by the shuttle is struck up by the reed at each vibration of the lay while at the same time the finger *m* receives a reciprocating motion from the sword of the lay B. As the reed is firmly secured to the lay it will strike the filling at each vibration with the full force communicated to the lay, but as the middle whip-roll is movable and is kept pressed down in the bight of the warp by the counterpoise weights alone, it gives upward to the strain on the warp and hence the in-

5 tensity of the blow of the reed is regulated  
 by the position of the counterpoise weights  
 which can be adjusted to produce any re-  
 quired firmness in the texture of the cloth  
 by shifting their position on their arms K,  
 K. As the shuttle continues to pass to and  
 fro a quantity of filling is gradually ac-  
 10 cumulated which is driven forward by the  
 reed and taken up by the cloth-roll, as the  
 warp behind the reed is thus progressively  
 tightened the movable whip-roll is gradu-  
 ally raised and the arm (I) projecting from  
 the counterpoise shaft being correspond-  
 15 ingly depressed, the finger (*m*) is lowered  
 sufficiently to act upon the ratchet-wheel  
 (*o*) which is turned by the backward stroke  
 of the finger; as the ratchet-wheel is thus  
 turned the screw (*t*), to whose shaft it is  
 20 secured, acting upon the screw-wheel (D)  
 on the yarn-roll turns the latter and un-  
 winds or lets off a portion of the warp, the  
 length of which is proportioned to the dis-  
 tance to which the ratchet-wheel is turned.  
 The higher the whip-roll is raised the longer  
 25 time will the finger be in gear with the  
 ratchet teeth and consequently the greater  
 will be the length of the warp let off from  
 the yarn-roll; hence it is obvious that by

adjusting the position of the counterpoise  
 weights (*k k*) and the length of the sus- 30  
 pension rod (L) of the finger (*m*) the cloth  
 may be woven of any desired texture.

The let-off motion thus described does  
 away with the necessity of the spring reed  
 usually employed in looms; the tension of 35  
 the warp which is regulated by a constant  
 weight is also uniform and constant and  
 hence every thread of the filling is driven  
 up with an equal amount of force, thus pro-  
 ducing a cloth of even texture throughout, 40  
 while at the same time the warp is let off  
 from the yarn-roll in exact proportion to  
 the amount of filling inserted by the shuttle.

What I claim as my invention and desire  
 to secure by Letters Patent is— 45

The arrangement of the yielding weighted  
 and the stationary whip-rolls in connection  
 with the let-off motion as herein set forth,  
 whereby the texture of the cloth is rendered  
 more uniform than has been heretofore done 50  
 while it can be varied at will.

JONATHAN KNOWLES.

Witnesses:

H. B. BENT,  
 WESLEY CHASE.