

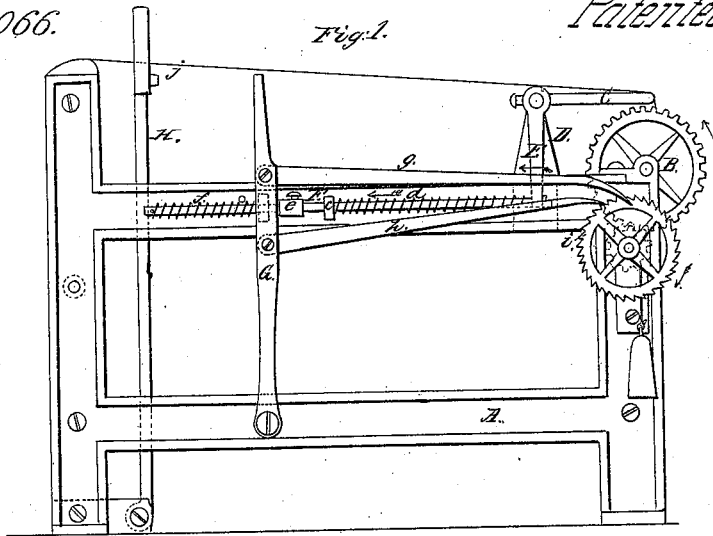
*S. Estes.*

*Let-Off for Loom.*

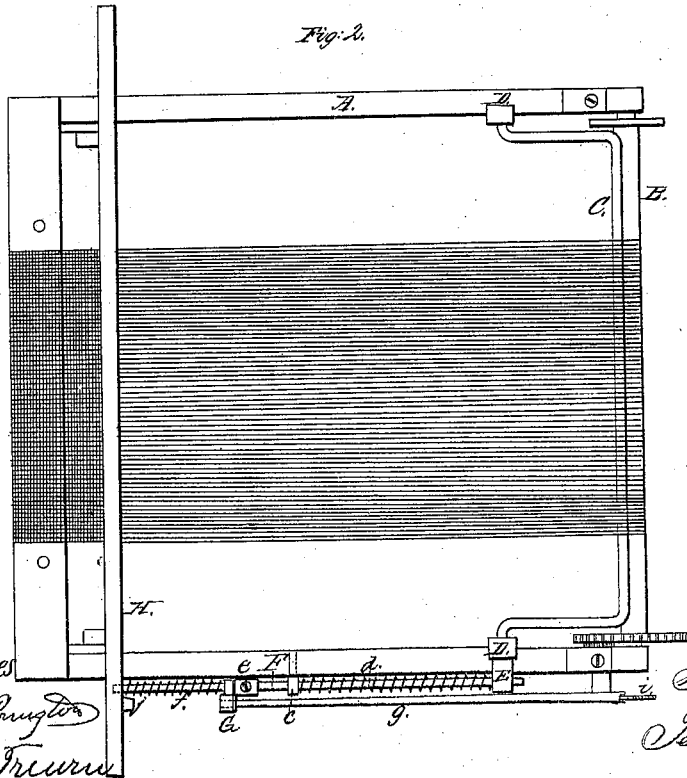
*N<sup>o</sup> 54,066.*

*Fig. 1.*

*Patented Apr. 17, 1866.*



*Fig. 2.*



*Witnesses*  
*Wm. B. Conington*  
*Wm. Freeman*

*Inventor.*  
*Saml. Estes*  
*Per Wm. H. G.*  
*Attorneys*

# UNITED STATES PATENT OFFICE.

SAMUEL ESTES, OF NEWBURYPORT, MASSACHUSETTS, ASSIGNOR TO  
C. OSGOOD MORSE AND HIRAM LITTLEFIELD, OF SAME PLACE.

## IMPROVEMENT IN LET-OFFS FOR LOOMS.

Specification forming part of Letters Patent No. 54,066, dated April 17, 1866.

*To all whom it may concern:*

Be it known that I, SAMUEL ESTES, of Newburyport, in the county of Essex and State of Massachusetts, have invented a new and Improved Let-Off Motion for Looms; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents a side elevation of this invention. Fig. 2 is a plan or top view of the same.

Similar letters of reference indicate corresponding parts.

This invention relates to a let-off motion which is governed by the force with which the batten meets the fabric in striking up, or, in other words, by the density of the fabric itself.

The invention consists in the arrangement of an angular rock-shaft, (or a shaft or roller supported by the arms of two elbow-levers,) over which the warp runs, and on the end of which an arm is mounted, from which extends a spring-bar, in combination with a lever carrying one or more pawls, which gear into a ratchet-wheel mounted on the end of the warp-beam in such a manner that, by the tension of the warp produced by the batten in the act of beating up, the shaft or roller over which the warp passes is depressed and a longitudinally-sliding motion is imparted to the spring-bar, and thereby the lever which carries the pawls is caused to swing back more or less in proportion to the force exerted by the batten on the fabric in beating up, and the pawls are made to take one or more teeth of the ratchet-wheel, and as the batten recedes the angular rock-shaft or its equivalent returns to its original position, and the lever which carries the pawls is moved back by the action of a spring or by the direct action of the spring-bar, causing the pawls to act on the ratchet-wheel and to turn the warp-beam in proportion to the number of teeth previously taken by said pawls.

A represents the frame of a loom, made of iron or any other suitable material. One end of this frame forms the bearings for the warp-

beam B, which is provided with a friction device of any suitable construction.

The warp passes from the warp-beam over an angular rock-shaft, C, which has its bearings in standards D rising from the frame, and on one end of this rock-shaft is mounted an arm, E, as shown in the drawings. Instead of the angular rock-shaft, however, a straight shaft might be used, bearing two horizontal arms, which in this case would form the bearings for a rod or roller and another vertical arm similar to the arm E.

The arm E connects with a rod, F, which is guided in a lug, c, projecting from the frame A, and passes freely through a lever, G, that is pivoted to the side of the frame, as shown in Fig. 1.

A spring, d, situated between the lug c and arm E, has a tendency to keep said arm and the angular rock-shaft C in the position shown in Fig. 1 of the drawings, and an adjustable sleeve, e, which is secured on the rod F by a set-screw or any other suitable means, transmits the motion of said rod to the lever G. A spring, f, which acts on the lever G in any suitable manner, carries said lever back to its original position. From this lever extend two pawls, g h, which catch in the teeth of the ratchet-wheel i, that is mounted on the end of the warp-beam or on a stud or shaft which carries a cog-wheel gearing in another cog-wheel mounted on the warp-beam.

H is the batten, which is arranged in the ordinary manner. From the back of said batten projects a nipple, j, which strikes the lever G whenever the batten is moved back.

It must be remarked that the shape of the spring-rod and of the sleeve, and also the form of the springs, might be changed without changing the result.

The operation is as follows: When the batten is moved forward so as to beat up, the tension exerted thereby on the warp depresses the rock-shaft C and causes the arm E to swing in the direction of the arrow marked on it in Fig. 1. By this motion the spring-rod F is caused to move in the direction of the arrow marked on it, and the lever swings forward to the position shown in Fig. 1. By this motion the pawls are enabled to take into a new tooth,

and when the batten recedes it strikes the lever G and carries it back to its original position, causing the ratchet-wheel to turn and to produce a corresponding motion of the warp-beam. The let-off motion is thus controlled by the action of the batten on the fabric in beating up.

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

1. The arrangement of the rock-shaft C, arm E, spring-rod F, lever G, spring *f*, batten H,

pawls *g h*, and ratchet-wheel *i*, constructed and operating in the manner and for the purpose herein described.

2. The adjustable sleeve *e*, in combination with the spring-rod F, lever G, spring *f*, batten H, pawls *g h*, and ratchet-wheel *i*, arranged and operating as herein described.

SAMUEL ESTES.

Witnesses:

JAMES CURRAN,

JEREMIAH A. MARDEN.