(No Model.)

# J. C. BILL.

## LET-OFF MECHANISM FOR LOOMS.

No. 513,867. Patented Jan. 30, 1894.

Fig: 1.

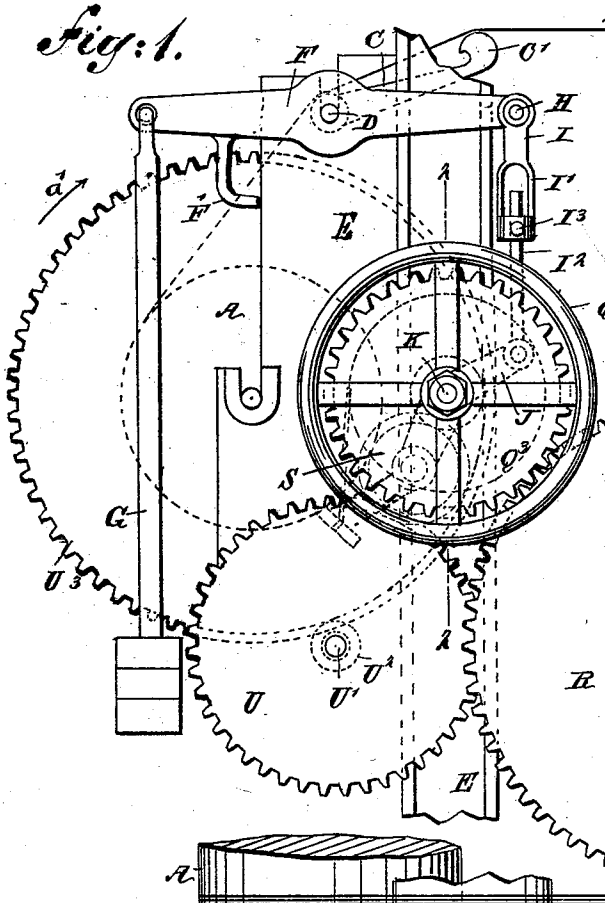


Fig: 2.

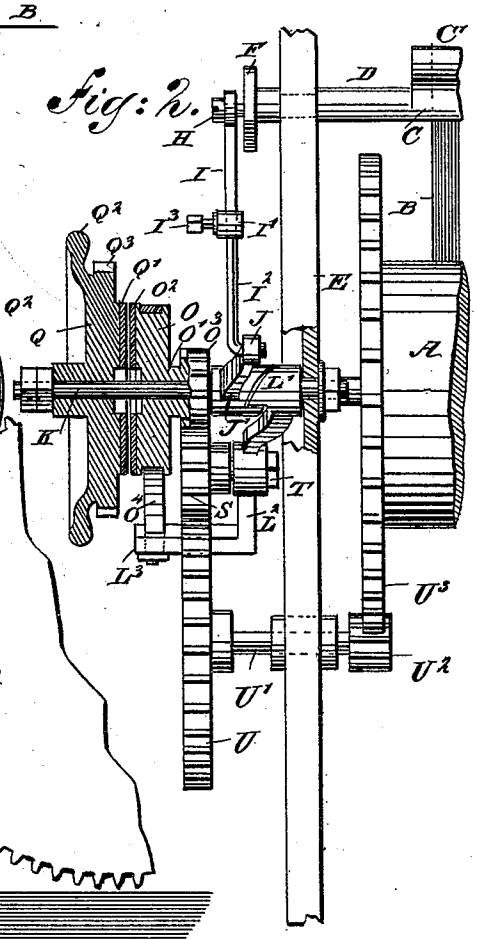
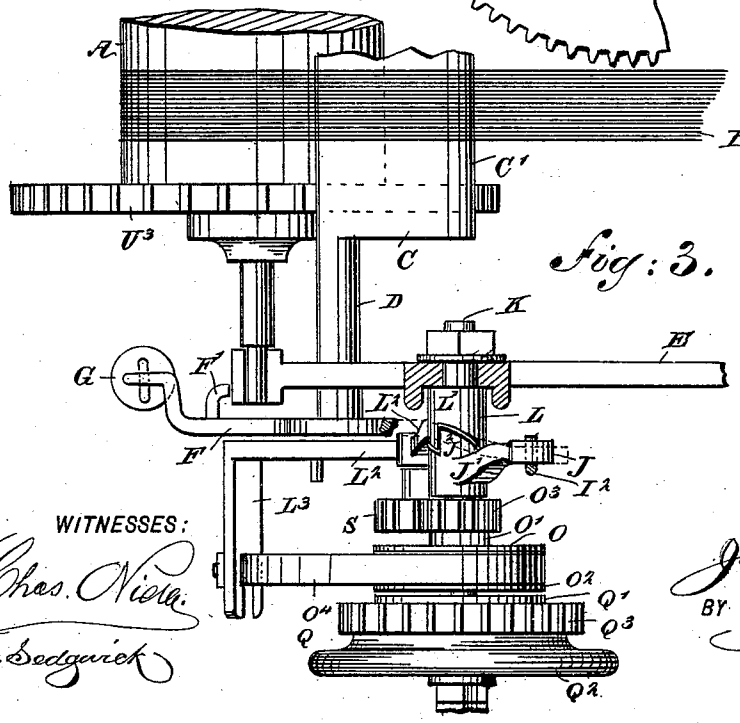


Fig: 3.



WITNESSES:

Chas. Nieta.

C. Sedgwick

INVENTOR

J. C. Bill

BY

Munn & Co

ATTORNEYS.

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

# UNITED STATES PATENT OFFICE.

JEREMIAH C. BILL, OF WILLIMANTIC, CONNECTICUT.

## LET-OFF MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 513,867, dated January 30, 1894.

Application filed May 5, 1893. Serial No. 473,052. (No model.)

*To all whom it may concern:*

Be it known that I, JEREMIAH C. BILL, of Willimantic, in the county of Windham and State of Connecticut, have invented a new and Improved Let-Off Mechanism for Looms, of which the following is a full, clear, and exact description.

The invention relates to let-off mechanisms for looms, such as shown and described in Letters Patent of the United States No. 493,058, granted to me March 7, 1893.

The object of the present invention is to provide a new and improved let-off mechanism for looms, which is simple and durable in construction, composed of comparatively few parts, is not liable to get out of order, and is very sensitive and automatic in operation.

The invention consists of certain parts and details and combinations of the same, as will be fully described hereinafter and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of the improvement. Fig. 2 is an end elevation of the same with parts in section, on the line 2—2 of Fig. 1; and Fig. 3 is a plan view of the improvement with part of the frame in section.

From the warp beam A extend upward the warp threads B, passing over the rounded end C′ of an arm C formed with trunnions D journaled in the sides E of the main frame of the loom on which the device is applied. On one of the trunnions D is secured an arm F, extending both forward and rearward, the rear end of the said arm supporting a weight G for counterbalancing the parts connected with the said arm. A lug F′ projects from the rear end of the arm F, and is adapted to engage one end of the side frame E, to limit the downward swinging motion of the rear end of the arm F, on which the weight G is hung, as is shown in Fig. 1.

The forward end of the arm F is pivotally connected at H with a downwardly extending rod I, formed with a socket I′, in which is held vertically adjustable the extension rod $I^2$, adapted to be secured in place in the socket I′ by a set screw $I^3$. The lower end of the extension rod $I^2$ is pivotally connected with an arm J, projecting from a cam J′ mounted to turn loosely on a stud K, secured to the side E of the main frame. The inner end of the cam J′ is formed with cam teeth $J^2$ adapted to engage similarly shaped cam teeth L′ formed on a second cam L, also held loosely on the stud K.

The forward end of the cam J′ is adapted to engage the inner end of the hub O′ of a friction wheel O also mounted to rotate loosely on the stud K, the said wheel being formed on its front face with a leather disk $O^2$ adapted to engage a corresponding disk Q′ formed on one face of a second friction wheel Q, also mounted to rotate loosely on the stud K. This wheel Q is formed with a hand wheel $Q^2$ and with a gear wheel $Q^3$ in mesh with a gear wheel R driven from a suitable gear wheel actuated by the operating mechanism of the loom. Thus, when the two disks $O^2$ and Q′ are in frictional contact with each other, and the gear wheel $Q^3$ is rotated from the operating mechanism of the loom, then a rotary motion is transmitted to the wheel O by the disks Q′ and $O^2$.

On the hub O′ of the wheel O is formed or secured a gear wheel $O^3$ in mesh with a pinion S journaled on an arm $L^2$, formed on the cam L and extending downward and rearward therefrom, as is plainly shown in the drawings. The pinion S is in mesh with a large gear wheel U forming part of a train of gear wheels connected with the warp beam A. This train of gear wheels consists principally of the before-mentioned wheel U secured on the shaft U′ mounted to turn in suitable bearings in the main frame E and carrying a pinion $U^2$ in mesh with a large gear wheel $U^3$ attached to the warp beam A. See Figs. 1 and 2.

When a rotary motion is given to the wheel O, as above described, then this motion is transmitted by the gear wheel $O^3$ to the said pinion S, and by the latter to the train of gear wheels U, $U^2$ and $U^3$, so that the warp beam A is rotated in the direction of the arrow *a*′, to let off the warp B.

In order to brake the wheel O, a brake band $O^4$ is provided, engaging the periphery of the said wheel and attached at one end to an extension $L^3$ of the arm $L^2$, the other end of the said band being fastened to a projection of the main frame E.

The operation is as follows: When the operation of the loom requires a forward feeding of the warp B, then the latter exerts a pull or pressure on the rounded-off end C′ of the arm C, whereby the latter swings downward and causes a like downward swinging movement of the front end of the arm F, so that the rod I with its extension rod $I^2$, moves downward and imparts a swinging motion to the arm J, so that the cam J′ is turned on the stud K, whereby its cam teeth $J^2$ in mesh with the cam teeth L′ of the cam L, cause a forward sliding of the said cam on the stud K. By this movement the cam J′ presses on the hub O′ of the wheel O, so that the latter is moved forward on the stud K and its disk face $O^2$ is pressed in frictional contact with the disk face Q′ of the wheel Q. As the latter has a constant rotary motion derived from the actuating mechanism of the loom, a rotary motion is imparted to the wheel O, owing to the frictional contact of the disks $O^2$ and Q′. The rotary motion of the wheel Q is transmitted, as above described, by the wheel $O^3$ to the pinion S, which, by being in mesh with the train of gear wheels U, $U^2$ and $U^3$, causes the warp beam A to turn in the direction of the arrow $a'$, whereby part of the warp is unwound, to compensate for the feed of warp required by the loom. As soon as the warp beam A turns, to put out the necessary amount of warp, then the weight G causes a return movement of the arms F and C, and a second upward swinging of the arm J, whereby the cam J′ is turned in an opposite direction and the wheel O is relieved from its pressure, so that the disks $O^2$ and Q′ move out of frictional contact, as the wheel O is not pressed laterally in frictional contact and held therein, as above described, with the wheel Q; hence the rotary motion of the wheel O and consequent turning of the pinion S, gears U, $U^2$, $U^3$ and the warp beam A cease.

It is to be understood that as soon as the slighest pull is exerted on the warp B, the friction disks $O^2$ and Q′ are moved in frictional contact with each other, so that the warp beam A is turned a sufficient distance to let off sufficient warp required by the working of the loom. It will also be seen that when a downward swinging motion is given to the arm J to turn the cam J′, then the teeth of the latter, by engaging the teeth of the cam L cause a slight turning of the said cam L and an upward swinging of the arm $L^2$ and extension $L^3$, so that the brake band $O^4$ is slackened and the wheel O is free to turn when moved into frictional contact with the wheel Q. As soon as the arm J commences to swing upward, then the pressure on the cam L is reduced, whereby the arm $L^2$ swings downward by its own weight, to draw the brake band $O^4$ tight, and thereby causes the braking of the wheel O, so as to prevent frictional rotation of the latter. By this arrangement the transmission of the rotary motion from the wheel Q to the wheel O can be regulated, it being understood that by increasing the braking force of the band $O^4$ on the wheel O, more force is required for holding the disk $O^2$ in frictional contact with the disk Q′ to force the latter to rotate the wheel O, and vice versa.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. In a let off mechanism for looms, the combination with a pivoted counterbalanced arm over which the warp threads pass, of a pivoted sliding cam connected with and rocked on its axis from said arm, a friction wheel loose on the axis of the cam, moved laterally by the cam and geared to the warp beam, a power driven friction wheel also on said axis and engaged by the first named friction wheel when the cam is rocked from the counterbalanced arm, substantially as set forth.

2. In a let off mechanism for looms the combination with a pivoted counterbalanced arm over which the warp threads pass, a pivoted sliding cam having an inclined end, a friction wheel on the axis of the cam and engaged by the non-inclined end of the cam, gearing connecting the said friction wheel with the warp beam and a power driven friction wheel also on the cam axis alongside the first named friction wheel and clutched thereto by the lateral movement of the cam, of the second cam on the axis of the first cam and having an inclined end face in engagement with the inclined end thereof, an arm extending from the second cam, and a brake belt secured at one end to the frame, extending over the first named friction wheel and connected with the arm of the second cam, substantially as set forth.

JEREMIAH C. BILL.

Witnesses:
F. H. TOPLIFF,
N. D. WEBSTER.