(No Model.) 2 Sheets—Sheet 1.

J. C. BILL.

LET-OFF MECHANISM FOR LOOMS.

No. 493,058. Patented Mar. 7, 1893.

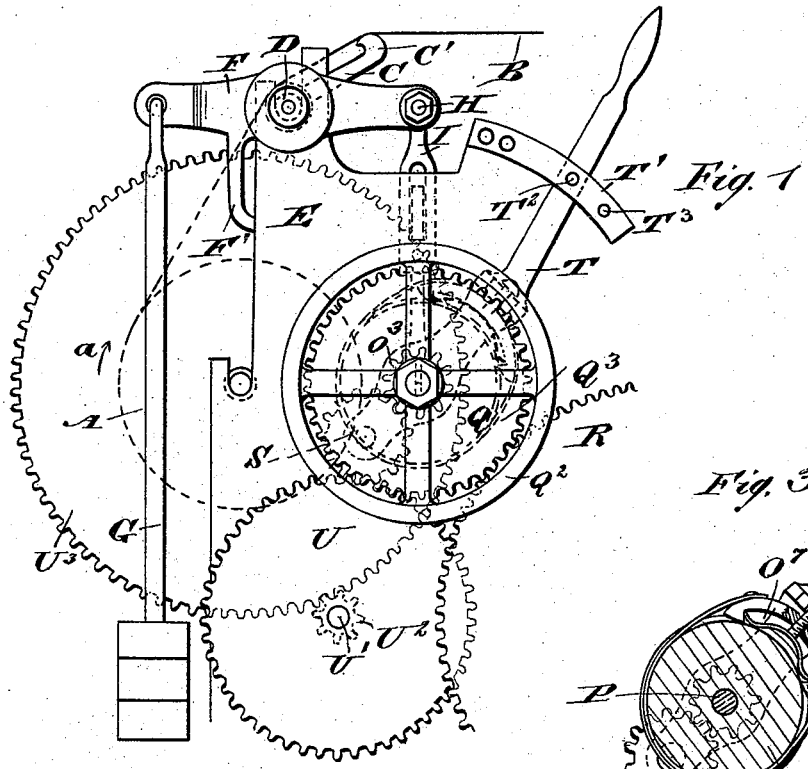

Fig. 1

Fig. 3.

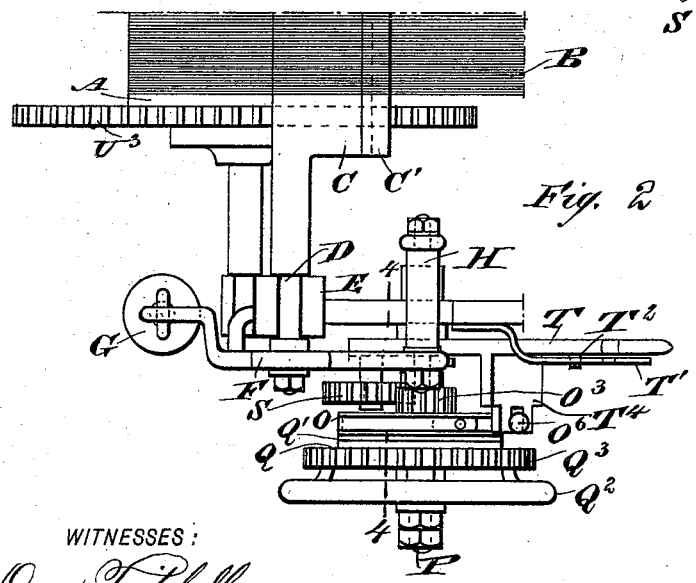

Fig. 2

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LET-OFF MECHANISM FOR LOOMS.

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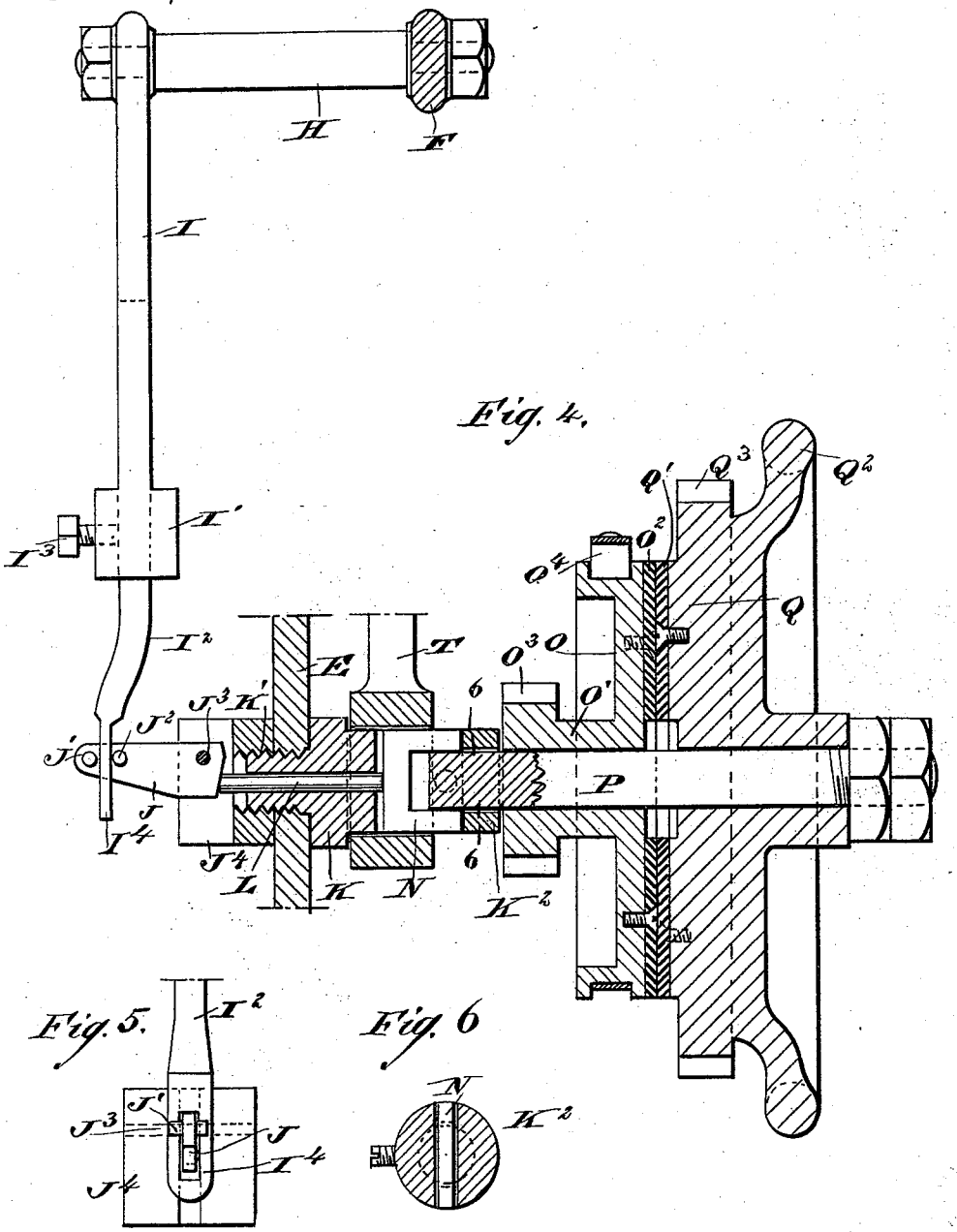

Fig. 4.

Fig. 5.

Fig. 6

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UNITED STATES PATENT OFFICE.

JEREMIAH C. BILL, OF WILLIMANTIC, CONNECTICUT.

LET-OFF MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 493,058, dated March 7, 1893.

Application filed April 21, 1892. Serial No. 430,042. (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 object of the invention is to provide a new and improved let-off mechanism for looms which is simple and durable in construction, very effective, sensitive, and automatic in operation.

The invention consists principally of an arm mounted to swing and controlled from the warp beam, the said arm being connected with a friction disk adapted to engage a second friction disk geared with the warp beam and driven from the operating mechanism of the loom.

The invention also consists of certain parts and details, and combinations of the same, as will be hereinafter described 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 as applied. Fig. 2 is a plan view of the same. Fig. 3 is a sectional side elevation of the brake mechanism of one of the friction disks. Fig. 4 is an enlarged transverse section of part of the improvement on the line 4—4 of Fig. 2. Fig. 5 is a side elevation of the lever and its connection; and Fig. 6 is a sectional side elevation of part of the improvement on the line 6—6 of Fig. 4.

From the warp beam A extend upwardly 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 forwardly and rearwardly, 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, see Fig. 1. On the forward end of the arm F is secured a stud H, carrying 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 formed with a loop I^4, engaging the free end of a lever J, formed on opposite sides of the loop I^4 with pins J′ and J^2, adapted to bind on the sides of the loop I^4.

The lever J is fulcrumed at J^3 in a forked bracket J^4, screwing on the threaded end K′ of a support K, fastened to the side E of the main frame. The inner edge of the lever J abuts against the outer end of a pin L, fitted to slide in the support K and abutting with its front end on a U-shaped plate N, fitted to slide transversely in a recess formed on the offset K^2 of the support K. The ends of the U-shaped plate N are adapted to engage one end of a hub O′ of a wheel O, mounted to rotate loosely on a stud P, secured in the offset K^2 of the support K.

One face of the wheel O is formed by a leather disk O^2, adapted to engage a corresponding disk Q′, formed on one face of a wheel Q also mounted to rotate loosely on the stud P. 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 a lever T, fulcrumed loosely on the offset K^2 of the support K. The pinion S is adapted to be moved in or out of 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 a 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. The lever T carries a pin T^2, adapted to engage one of two apertures T^3, formed

in a supporting segment T', secured on the main frame of the loom, see Figs. 1 and 2. When the lever T is in the position shown in the said figures, then the pinion S is in mesh with the train of gear wheels connected with the warp beam A, so that a rotary motion given to the wheel O, as above described, is transmitted by its gear wheel O^3 to the said pinion S and by the latter to the train of gear wheels so that the warp beam A is rotated to let off the warp B.

When it is desired to disconnect the warp beam A from the driving mechanism above described, then the operator moves the lever T downward until its pin T^2 engages the lower most aperture T^3 in the segment T'. By thus swinging the lever T the pinion S is moved out of mesh with the gear wheel U and consequently no rotary motion is transmitted from the wheel O to the warp beam.

In order to brake the wheel O, a brake band O^4, is provided, engaging the periphery of the said wheel and attached at its ends to an arm O^5, engaged by a screw O^6, mounted to turn loosely in an arm T^4, projecting from the front face of the lever T. The inner end of the screw O^6 abuts against a spring O^7, resting on the periphery of the wheel O between the hook ends of the arm O^5, as will be readily understood by reference to Fig. 3. Now, by turning the screw O^6 the brake band O^4 may be drawn tighter on the periphery of the wheel O, so as to brake the latter with more force. By reversing the movement of the screw O^6, the brake band is loosened accordingly, so as to brake the said wheel with less force. By thus adjusting the bolt O^6, the wheel O can be braked to any desired degree.

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 I^2 moves downward and presses against the free end of the lever J, with its loop I^4. This downward swinging motion given to the lever J causes its inner end to press the pin L forwardly, whereby the plate N is caused to slide transversely and outwardly to finally press against the hub O' of the wheel O so that the disk face O^2 of the latter moves 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 leather disks O^2 and Q'. The rotary motion of the wheel O 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 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 consequent lift of the lever J, whereby the pin L is relieved of its pressure and the disks O^2 and Q' move out of frictional contact, as the wheel O is not pressed laterally in frictional contact, as above described with the wheel Q. Hence the rotary motion of the wheel O and consequent turning of the wheel O and the warp beam A cease.

It is to be understood that as soon as the slightest 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 is to be further understood that the transmission of rotary motion from the wheel Q to the wheel O can be regulated by the brake mechanism above described and shown in detail in Fig. 3. Thus, by increasing the braking force of the band O^4, on the wheel O it requires more force 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. The combination with a warp beam, of a continuous rotary friction disk, a second friction disk mounted to slide on its shaft, and provided with a gear wheel on its hub, gearing between the warp beam and the gear wheel of the sliding friction disk, a pivoted arm over which the warp threads pass, forwardly and rearwardly projecting arms secured to one of the pivots of the first named arm, a weight carried by the rear arm, a pivoted lever, a rod connecting the lever with the forwardly projecting arm, and a sliding connection between the said lever and the sliding friction disk, substantially as described.

2. In a let-off mechanism for looms, the combination with a pivoted and counterbalanced arm over which the warp threads pass, of a lever connected with the said weighted arm, a pin mounted to slide and engaged by the said lever, a plate engaged by the said pin, a friction wheel adapted to be pressed on by the said plate and connected with the warp beam, a second friction disk having a continuous rotary motion adapted to be engaged by the first named friction disk, a train of gear wheels connecting the said first-named friction disk with the warp beam, and a pinion in the said train of gear wheels and adapted to be thrown in or out of mesh therewith, substantially as shown and described.

3. In a let-off mechanism for looms, the combination with a pivoted and counterbalanced arm over which the warp threads pass, of a lever connected with the said weighted arm, a pin mounted to slide and engaged by

the said lever, a plate engaged by the said pin, a friction wheel adapted to be pressed on by the said plate and connected with the warp beam, a second friction disk having a continuous rotary motion adapted to be engaged by the first named friction disk, a train of gear wheels connecting the said first named friction disk with the warp beam, a pinion in the said train of gear wheels and adapted to be thrown in or out of mesh therewith, and a lever carrying the said pinion, substantially as shown and described.

JEREMIAH C. BILL.

Witnesses:
E. E. BASS,
N. D. WEBSTER.