

No. 617,045.

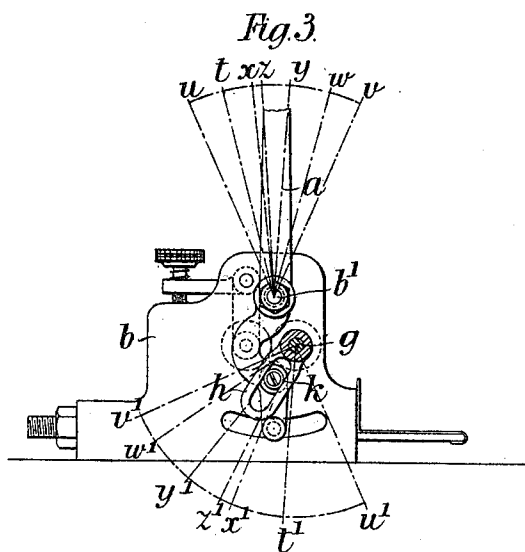
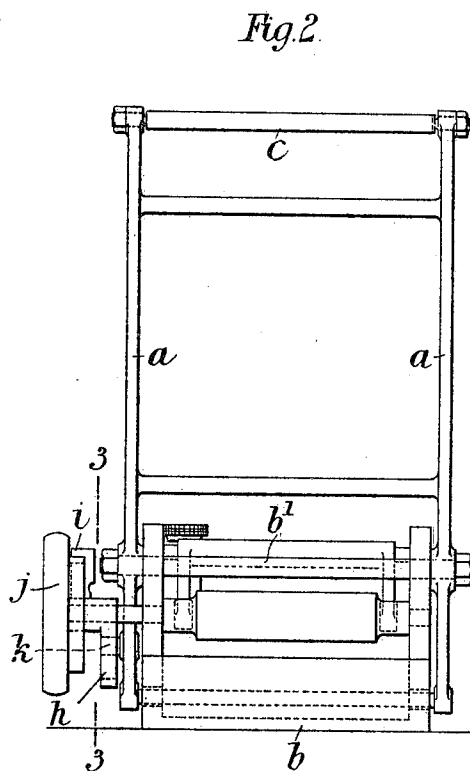
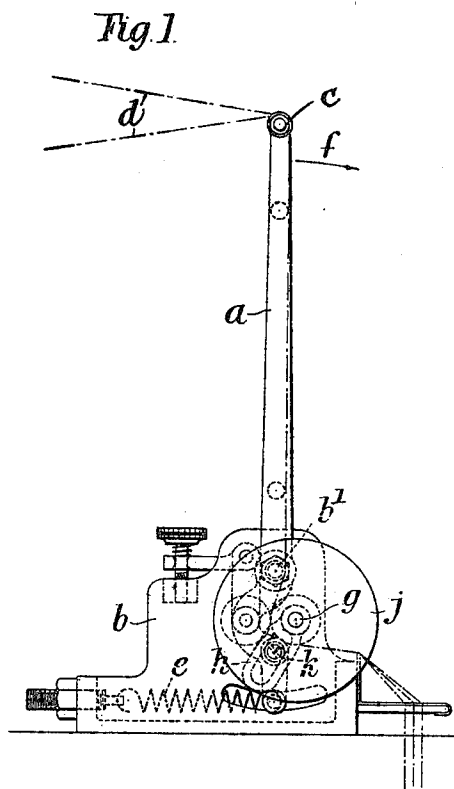
Patented Jan. 3, 1899.

J. POYSER & F. L. BALL.
LET-OFF MOTION FOR WEAVING LOOMS.

(Application filed Nov. 23, 1896.)

(No Model.)

5 Sheets—Sheet 1.



Witnesses

F. L. Mearns
C. S. Middleton

Inventors

John Poyser
F. L. Ball
By Fetherstonhaugh & Co. attys

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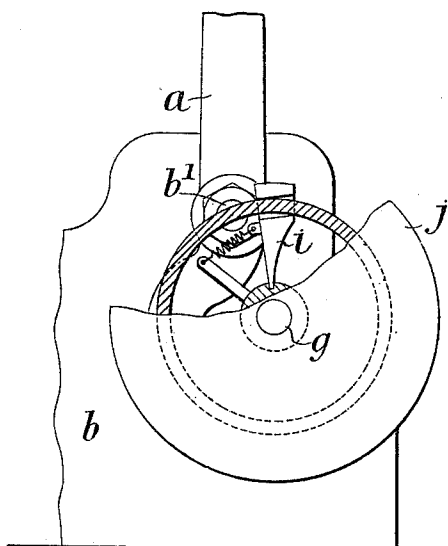
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(No Model.)

5 Sheets—Sheet 2.

Fig. 3^a



Witnesses

James M. Allen

F. L. Mindelton

Inventors

John Poyser

Francis L. Ball

By Hutchinson & Co. Attys

J. POYSER & F. L. BALL.

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(No Model.)

5 Sheets—Sheet 3.

Fig. 4.

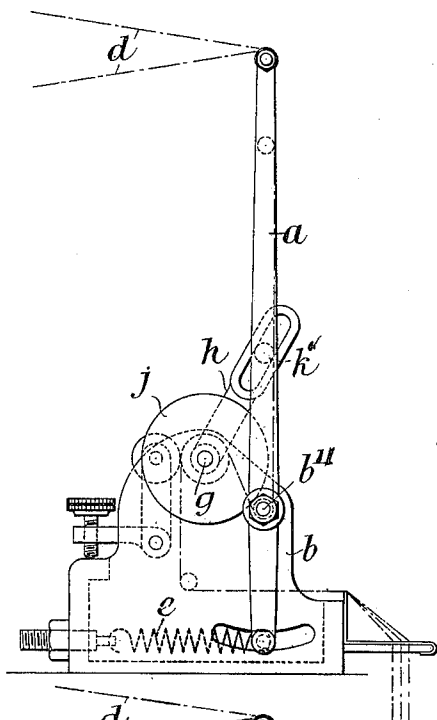


Fig. 5.

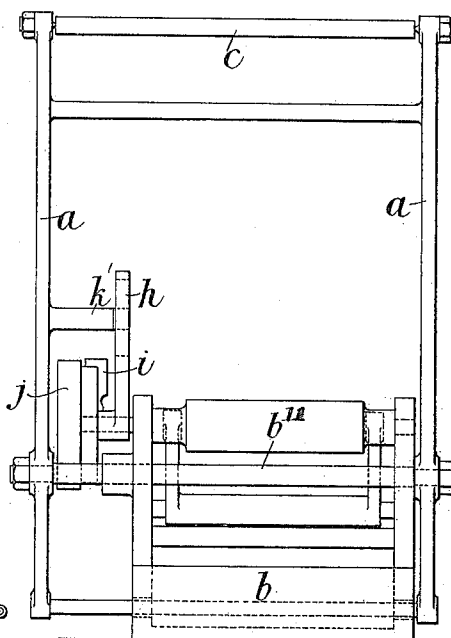


Fig. 6.

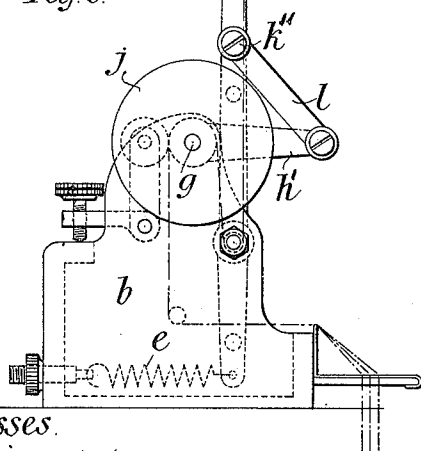
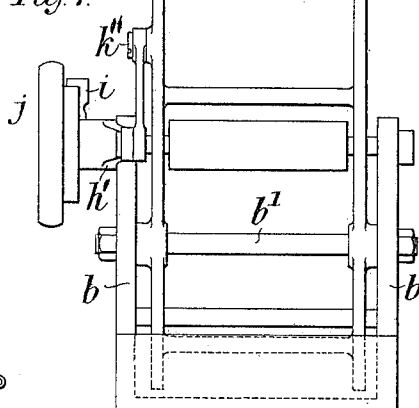


Fig. 7.



Witnesses.

F. L. Mordell
C. S. Mordell

Inventors.

John Poysier
F. L. Ball
By J. H. Hinton, atty.

No. 617,045.

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Fig. 8

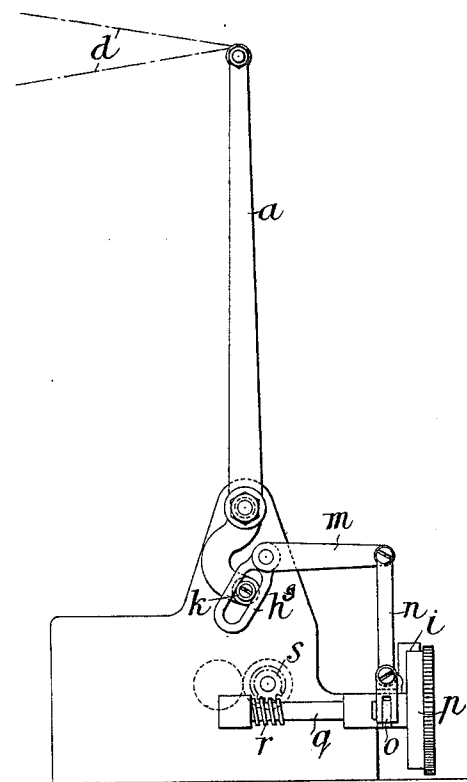
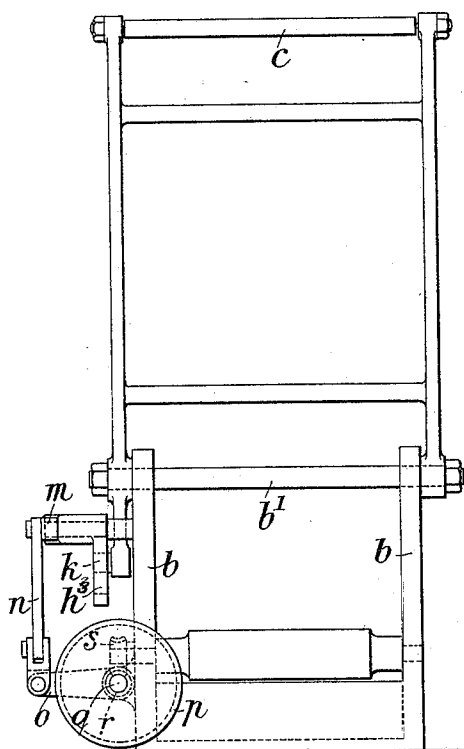


Fig. 9



Witnesses.

J. L. Middleton

C. S. Middleton

Inventors.

John Poyser

F. L. Ball

By Gutherie & Co. attys.

No. 617,045.

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5 Sheets—Sheet 5.

Fig. 10.

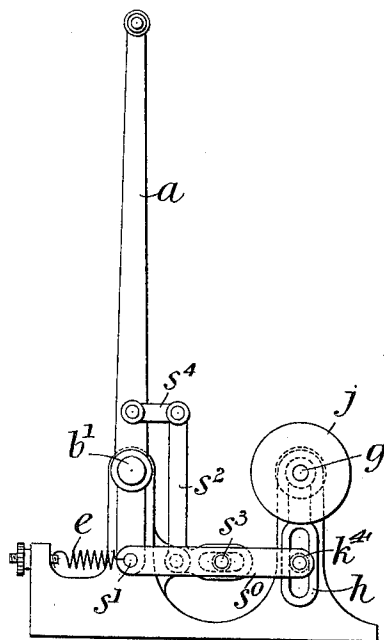
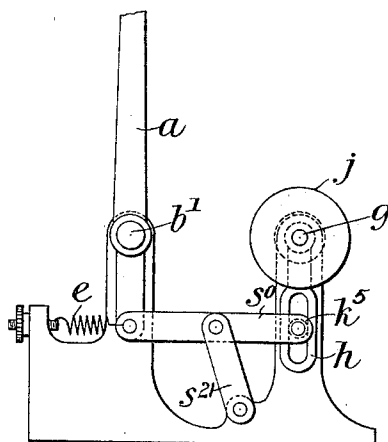


Fig. 11.



Witnesses.

J. L. Middleton
C. S. Middleton

Inventors.

John Poysier
F. L. Ball
By Frederick A. B. B. B.

UNITED STATES PATENT OFFICE.

JOHN POYSER, OF WIRKSWORTH, AND FRANCIS LIVINGSTONE BALL, OF
BIRMINGHAM, ENGLAND.

LET-OFF MOTION FOR WEAVING-LOOMS.

SPECIFICATION forming part of Letters Patent No. 617,045, dated January 3, 1899.

Application filed November 23, 1896. Serial No. 613,180. (No model.)

To all whom it may concern:

Be it known that we, JOHN POYSER, of Wirksworth, near Derby, and FRANCIS LIVINGSTONE BALL, of Birmingham, England, subjects of the Queen of Great Britain, have invented new and useful Improvements in Let-Off Motions for Weaving-Looms, of which the following is a specification.

This invention has been patented in the following countries: England, No. 9,660, dated May 6, 1896; Austria, No. 46/5,018, dated December 16, 1896; Canada, No. 54,465, dated December 28, 1896; Belgium, No. 124,371, dated November 4, 1896; Italy, No. XXXII, 43,051, LXXXIV, 274, dated December 31, 1896; France, No. 261,036, dated November 5, 1896; Spain, No. 19,878, dated December 26, 1896; India, No. 424, 1896, dated June 7, 1897; Switzerland, No. 13,500, dated November 5, 1896; Sweden, No. 8,467, dated November 5, 1896, and Denmark, No. 1,367, dated December 13, 1897.

This invention relates to let-off motions for weaving-loom.

In the specification of an application of even date, Serial No. 613,148, in the name of one of us there is described a let-off mechanism providing for varying, through the medium of an oscillating vibrator therein described, the point of connection between a let-off lever and a rod through which motion is communicated from the loom to the said lever in order to vary the amount of let-off. As the result of exhaustive experiments we have found that the let-off may be operated directly from such a vibrator, as aforesaid, whereby mechanism of simpler construction than that described in the said former specification is provided. According to the present invention it is preferable that the axis of oscillation of the vibrator should be at a distance from the axis of rotation of the let-off roller or of the warp-beam and in such a position that a pin or projection upon the said vibrator, and through which the movements of the vibrator are communicated to the lever operating the let-off roller or warp-beam, should approach and recede from the axis of the said let-off roller or warp-beam.

To enable our invention to be fully under-

stood, we will describe the same by reference to the accompanying drawings, in which—

Figure 1 is a side elevation of so much of a loom as is necessary to illustrate the construction and application of our improved let-off mechanism. Fig. 2 is a rear view of the same; and Fig. 3 is a section on the line 3 3, Fig. 2. Fig. 3^a is a sectional view of a detail. Figs. 4 and 5 are a side elevation and rear elevation, respectively, illustrating a modification; and Figs. 6 and 7 are views similar to Figs. 4 and 5, respectively, illustrating another modification. Figs. 8 and 9 are a side view and rear view, respectively, illustrating a modification wherein motion is imparted to the let-off roller or warp-beam through the medium of worm-gearing. Figs. 10 and 11 are side views illustrating two other modifications.

Similar letters of reference indicate corresponding parts in the several figures.

a is the oscillating vibrator, which is mounted in the frame *b* upon the axle or shaft *b'*, which frame may be independent of the other parts of the loom-framing or integral therewith. The said vibrator has at its upper end a roller *c*, over which the warp-threads (indicated in the drawings by the letters *d d*) pass to the heddles, and connected to its lower end a spring *e*, which serves to retain the warp-threads taut by tending to move the vibrator in a direction opposite to that in which it is moved by the pull of the warps on the opening of the shed by the heddles and by any shortenings of the length of the warps between the fell of the fabric and the delivering-points of the let-off roller or warp-beam—that is to say, in the direction of the arrow *f*.

g is the shaft of the warp-beam or operating let-off roller.

h is a lever carrying a pawl *i*, engaging with a wheel *j* on the end of the shaft *g*, as shown in Fig. 3^a, and *k* is the pin upon the vibrator which engages with the lever *h*.

In the arrangement of our invention shown in Figs. 1, 2, and 3 the pin *k*, which engages with the let-off lever *h*, is arranged below the axis of the shaft *b'* of the vibrator, the said pin *k* engaging with a slot in the said lever *h*.

The operation of this mechanism will be

understood from the following description: Assume that the take-up and let-off are so adjusted that the amount taken up is, when no weft is laid and woven up, equal to that let off. Assume now that weft-thread is laid and woven up. Then as the bending of the warps around the weft causes slightly more warp to be taken up than when weft is not laid then if the amount of warp let-off is kept constant the length of warp between the fell of the woven fabric and the delivering-point of the let-off rollers or warp-beam will be so decreased that the position of the arc of oscillation of the vibrator will be brought nearer by progressive steps to the heddles until tension on the warps reaches breaking-point. Assume now that while no weft is laid and take-up and let-off are equal in amount the vibrator moves through the arc $y'z'$ in Fig. 3 and the lever through the arc $y'z'$. Upon weft being laid, as there will at once arise an excess of warp taken up over that let off while the lever oscillates only from y' to z' , the vibrator will be drawn to a position corresponding, say, to the line x , and by our invention as the vibrator is so drawn the pin k will approach nearer to the axis of the let-off roller and move the lever to a position corresponding, say, to the line x' , thus letting off a greater amount of warp than would be let off by the lesser oscillation y' to z' . If the relation of the parts is such that the additional amount of warp let off by the movement of the lever to x' does not compensate for the extra amount of warp taken up by the laying of the weft, the vibrator will not return to its initial position at y and during the next vibration will move still farther to the left toward t and u and oscillate the lever farther to the right toward $t'u'$ until positions are reached in which the oscillation of the vibrator through its arc will let off an amount of warp equal absolutely or approximately to that taken up while weft is being laid. If a thicker warp-thread be laid, the same process will be carried further, and if weft-thread cease to be laid or a thinner thread be laid the reverse process will take place.

When let-off rollers are used, the position of the arc of oscillation of the vibrator will be practically invariable or constant about a mean arc of oscillation. When, however, the warp is drawn direct from a beam the diameter of which is constantly diminishing as the warp is being used, the position of the arc of oscillation will vary very considerably. For instance, when the beam is nearly full a very slight rotation will give the required length of warp, while when the diameter is small a much larger angle of rotation is required. In this case, therefore, when the warp-beam is full the vibrator will be in such a position that the pin k will be carried toward the outer end of the slot in the lever h —that is to say, the vibrator will have an arc of oscillation, say, from v to w —while the amount of rotation imparted to the warp-beam will corre-

spond with the arc $v'w'$. As the diameter of the warp-beam decreases the vibrator will gradually assume an upright position—say corresponding with the arc $y'z'$ —and as the warp is nearly exhausted from the beam it will assume an arc of oscillation $t'u$, so that the beam will have an amount of rotation imparted to it corresponding to the arc $t'u'$.

The modification of our invention shown in Figs. 4 and 5 is substantially the same as that shown in Figs 1 and 2, the only difference being that the pin k' instead of being placed below the axis of the shaft b'' of the vibrator is placed above the said axis.

In the arrangement shown in Figs. 6 and 7 the only difference is that instead of directly connecting the let-off lever h' with the pin k^2 the said lever is connected with the said pin by a link l .

In Figs. 8 and 9 we show an arrangement wherein the motion of the vibrator is transmitted to the warp-beam through the medium of worm-gearing. In this modification the lever h^3 instead of directly rotating the feed-roller or warp-beam is provided with an arm m , connected by a link n with the lever o of a gripping-pawl z , which pawl engages with a wheel p , on a shaft q having fixed to it a worm r , engaging with a worm-wheel s on the end of the warp-beam or feed-roller.

The modifications of our invention shown in Figs. 10 and 11 only differ from the arrangement shown in Fig. 1 in that the pin k^4 is not rigid relatively with the vibrator, but is carried by a rod s^0 , jointed to the vibrator at s' , which necessitates the employment of an adjusting device s^2 . As shown in Fig. 10, this device is in the form of a bell-crank pivoted on the framing, to which the vibrator also is pivoted, the said bell-crank lever being slotted at one end to engage with a pin s^3 on the rod s^0 , while the other end is connected to the vibrator by a link s^4 . In Fig. 11 the device s^{21} , corresponding to the device s^2 , is a simple pivoted arm. In both cases it will be obvious that the more the vibrator is inclined to the left the nearer will the pin k^5 approach the axis g to increase the let-off—that is to say, as the distance between the upper end of the vibrator and the heddles varies the distance between the axle of the let-off roll and the pivotal connection formed by the pin k varies correspondingly.

We wish it understood that the above arrangements are only given as examples, there being various other mechanical arrangements whereby the motion of the vibrator may be directly transmitted to the feed-roller or warp-beam.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is—

1. In combination, the let-off roll, the vibrator, the arm pivoted on the axis of said roll, the mechanism operated by said arm to feed said let-off, and a pivotal connection be-

tween said arm and said vibrator, said pivotal connection approaching the axis of said roll as the vibrator is tilted in one direction out of the perpendicular by a deficiency in the feed of the warp and away from said axis as the vibrator is tilted in the opposite direction out of the perpendicular, substantially as described.

2. In combination, the let-off, the vibrator, and mechanism interposed between said let-off and vibrator including a slotted lever for controlling the let-off and a connection between the vibrator and said slotted lever adapted to move toward the pivot of said lever when the vibrator is tilted in one direction by a deficiency in warp-thread and away from the pivot of said lever when the vibrator is tilted in the opposite direction out of the perpendicular whereby the throw of said lever is varied, substantially as described.

3. In combination, the let-off roll, the vibrator, a slotted lever pivoted on the axis of said roll, gripping mechanism operated by said lever to feed said roll and a connection between said vibrator and lever the distance between the pivot of said roll and the connection with the vibrator being variable directly as the distance between the upper part of the vibrator and the heddles varies, substantially as described.

4. In combination, the let-off roll, the slotted lever pivoted on the journal thereof, the vibrator, and a stud extending directly from said vibrator into the slot in said lever, substantially as described.

JOHN POYSER.

FRANCIS LIVINGSTONE BALL.

Witnesses:

HUME C. PINSENT,

HERBERT G. WESTLEY.