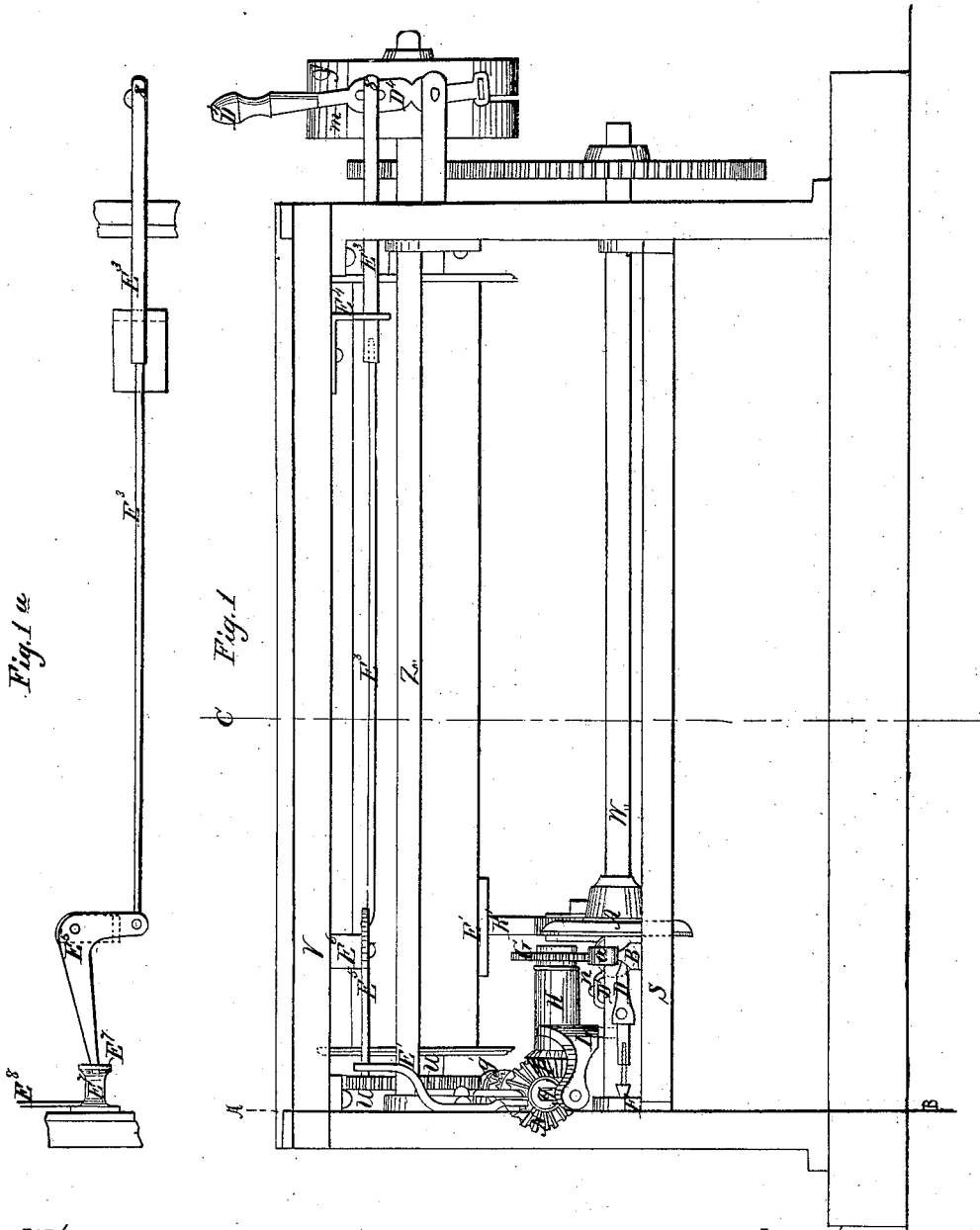


Fletcher & Page.

Let-Off for Looms.

N^o 104,949.

Patented Jul. 5, 1870.



Witnesses
J. L. Whitney
John C. Grant

Inventors
Lewis N. Fletcher
Geo. W. Page

Fletcher & Page

Let-Off for Looms.

N^o 104,949.

Patented Jul. 5, 1870.

Fig. 2

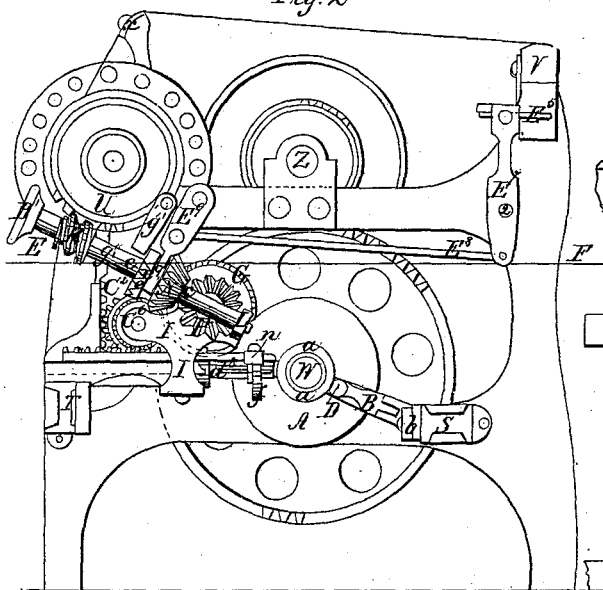


Fig. 5.

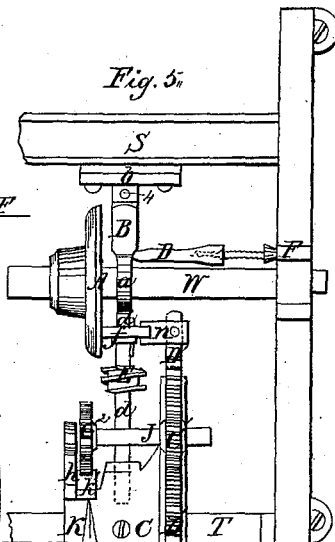
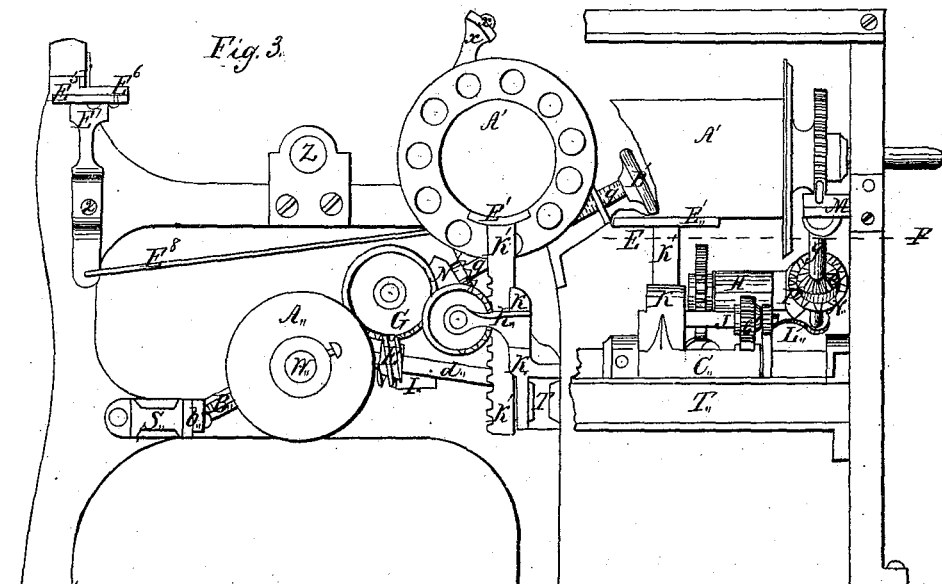


Fig. 4.



Witnesses

J. L. Whitney
John E. Coone

Inventor

Lewis N. Fletcher
Geo. M. Page

United States Patent Office.

LEWIS N. FLETCHER AND IRA M. PAGE, OF LOWELL, MASSACHUSETTS.

Letters Patent No. 104,949, dated July 5, 1870.

IMPROVEMENT IN LET-OFF MECHANISM FOR LOOMS.

The Schedule referred to in these Letters Patent and making part of the same

To all whom it may concern:

Be it known that we, LEWIS N. FLETCHER and IRA M. PAGE, both of Lowell, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Looms, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing making part of this specification, in which—

Figure 1, sheet 1, represents the front side of an ordinary loom, having our improvements applied thereto.

Figure 1', a plan of detached parts connected therewith.

Figures 2 and 3, sheet 2, opposite transverse sections of fig. 1, the former on the line A B, and the latter on the line C D thereof.

Figure 4 represents a rear-side view of that portion of the loom where our improvements are applied, the same being shown in this figure.

Figure 5 represents a horizontal section on the line E F' of figs. 2 or 4, as the same appears after the stand I, gears N and P, and the incline shaft *g* and the yarn-beam A' have been removed purposely, to show the operative devices which are arranged beneath the parts named above.

This invention relates to that part of a loom which is called the let-off, being a certain combination or combinations of devices arranged and connected with the yarn-beam and with some other operating mechanism for regulating the uniform delivery of warp from the beam.

This invention has for its object to provide a positive let-off for looms, or a let-off that will be so near positive in its operation and effect that it would seem to be difficult to make it more positive, and at the same time readily adjustable, to increase or diminish the tension on the warp to any desired degree, and also to provide for detaching the let-off mechanism from the operating mechanism, when the driving-belt is changed or shipped from the fast or tight driving-pulley to the loose one, thereby preventing the escape of warp from the beam, when the filling has run out of the shuttle, and the belt is shifted to stop the loom and renew the filling.

In carrying out our invention, the yarn-beam A', the cam-shaft W, and the crank-shaft Z, the connecting-girts S and T, breast-beam V, and back-roll or bar X, may remain the same as on almost any loom, but on the cam-shaft, and near one end of it, we secure a friction-disk, A, and at one end of this a hinged stand, B, the collar *a* of which loosely encircles the shaft.

The foot *b* of the hinged stand is fastened to the girt S, and the shank and collar are movable from

or toward the disk A, by swinging on a pivot, 4, seen in fig. 5.

To the opposite side of the collar *a* one end of a cross-shaft, *d*, is loosely connected.

The other end of this shaft has a bearing or step in the stand C, which is fastened on the back girt T.

Near the first-named end of the cross-shaft *d*, and on the same, we arrange a friction-wheel, *f*, which bears or is pressed against the face of the disk A, and this wheel is adjustable for greater or less pressure by an adjusting screw-bar, D, the ends of which are set in centers or sockets in the side of the box F' of the cam-shaft, and in the side of the hinged stand B.

On the central portion of the shaft *d* is a worm, E, which engages with a gear G, on a longitudinal shaft supported in the box or barrel H projecting from one side of a stand, I, which also forms a support for one end of a gear-shaft, J, above the shaft *d*, seen in fig. 5.

The opposite end of the shaft J is supported by an arm, *h*, projecting inward from the vertical rack-guide K, rising from the back stand O.

A curved arm, L, extending downward and outward from one end of the barrel H, forms a step for an inclined transverse shaft *g*, the upper portion of which is held by a bearing-bracket, M, seen in fig. 4.

On the last-named shaft we arrange a bevel-gear, N, which slides on a spline, *c*, and rotates with the shaft.

The upper end of this bevel-gear has a necked hub and a serrated or toothed collar, *e*, the former for moving the gear on the shaft, and the latter for stopping the motion of the gear and shaft when thrown out of gear or from contact with the bevel-gear P, which is fastened to one end of the shaft in the barrel H, a toothed stand, *g*', being fastened to the end of the loom, in the right position to engage with the serrated upper edge of the collar *e*.

On the upper portion of the incline shaft is a worm, R, which meshes into the gear U on the end of the yarn-beam A', and a wheel, B', furnishes means for turning the shaft *g* and the yarn-beam backward when desired.

On the shaft J we arrange two gears, C' and C². The former meshes into a horizontal rack, D', which is movable in the upper grooved side of the rear stand C, and the latter meshes into a vertical rack, K', which is movable in the grooved guide K.

On the top of the vertical rack-bar is a pressure or friction-pad, E', which presses against the body of yarn on the beam A', when actuated by the connecting mechanisms.

On one end of the rack-bar D^1 we apply a guide, n , which forks onto each end of the friction-wheel f , and guides it as it is rotated by and while pressed against the face of the friction-disk A , the latter being rotated with the cam-shaft W .

It will be observed that the friction-wheel f is movable endwise on the shaft d , and on a spline, 3 , and this spline causes the wheel f to rotate the shaft d and the worm E , and this worm imparts motion to the gear G and the bevel-gear P , and through this to the bevel-gear N , the shaft g , and the worm R , which operates the gear U and the yarn-beam to unwind the warp, and, in order to hasten or to retard the unwinding action of the warp from the beam, a larger or a smaller gear is substituted for the gear G , or a larger or smaller friction-wheel, f , may be applied to the shaft d , and thus operate the shaft d and the connected parts slower or faster; or for any slight change in the unwinding action of the warp the screw-bar D may be slackened, so as to relieve the friction between the wheel f and the face of the disk A ; but this is not advisable, and should only be resorted to temporarily.

The best mode of operating the device is to keep the wheel f pressing hard against the face of the disk A , and this, in connection with the other operating and actuating devices, makes our invention a positive let-off, or so near positive that it would seem to be difficult to make it more positive.

When the friction-wheel f is pressing against the face of the revolving disk A , and is operating as described, the tendency of said friction-wheel is outward, or toward the periphery of the disk. Taking advantage of this outward tendency or crowding action of the friction-wheel, the guide n is purposely forked on to the wheel, and connected with the rack-bar D^1 .

By this means the crowding action of the friction-wheel is transferred to the rack-bar, thence to the gear C^1 , and through the shaft J to the gear C^2 , and through this to the vertical rack and bar K' and the pad E^1 , and this keeps a constant frictional pressure of the pad against the body of the warp or yarn on the beam, whether the bevel-gears N and P are meshed in together or thrown out by sliding the former upward on the shaft g .

This last-named operation is only necessary when the belt is shifted from the fast or tight driving-pulleys I' onto the loose one, n , when the loom is to be stopped to renew the filling in the shuttle.

At such times the lay or lathe will generally beat up, or perform from one to three or more backward and forward motions before its momentum is fully overcome.

This, in the use of the ordinary let-off, which allows the warp to unwind from the beam while the lay has motion, makes a thin place in the fabric, by drawing the web and the warp forward by the action of the take up, and when the filling has all run out of the shuttle, by leaving partially blank space of one, two, or more picks, which would have been full had the filling not run out of the shuttle.

Against the above-named difficulties we have amply provided, not only by the forked guide and the combination of horizontal and vertical racks, gears, and friction-pad, for retaining frictional pressure on the warp and beam, but means for shipping, disengaging, or throwing the let-off mechanism out of action when the driving-belt is shifted.

The means above referred to are as follows:

A longitudinal rod, E^2 , is supported beneath the breast-beam by a depending hanger, E^4 , and by passing through the end-frame portion.

This rod extends to near the opposite end of the loom, and there connects with one arm of a bell-crank, E^5 , which is pivoted to a stand, E^6 , secured to the inner edge of the beam V .

The other arm of the bell-crank passes through the top end of a lever, E^7 , which swings on a screw, 2 , passing through it into the end of the frame.

To the lower end of the last-named lever one end of a rod, E^8 , is connected, and its other end connects with a clutch-lever, E^9 , which is pivoted to the loom end, and its lower end engages with the groove 9 , between the bevel-gear N and the serrated collar e , (see fig. 2.)

The shipper-handle D^4 is connected with one end, 8 , of the rod E^8 , as clearly shown in fig. 1, and when the shipper is moved to run the driving-belt from the tight pulley onto the loose one, the rod E^8 is moved endwise, operating the bell-crank, the lever E^7 , the rod E^8 , and the clutch-lever E^9 , which disengages the bevel-gear N from its mate P , and the unwinding motion of the yarn-beam ceases, and no backward or forward motion of the lay will cause the yarn-beam to turn or the warp to unwind therefrom, until the shipper is moved in the opposite direction, which slides the gear N downward on the incline shaft g , and brings the latter gear into acting contact with the gear P , at the same instant the belt is shifted from the loose pulley onto the tight one, and the lay set in motion.

When the gear N is thrown upward on the shaft g , the serrated rim of the collar e comes in contact with the stop g' , and the rotary motion of the gear N is instantly suspended, and the yarn-beam is at rest, as before described.

It will be obvious that a roll may be substituted for the pressure-pad on the top end of the vertical rack-bar K' , and serve the same purpose of the pad, which we prefer.

Having described our invention,

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

1. The combination, substantially as described, of the friction-disk A and friction-wheel f , the shaft d , worm E , gear G , bevel-gears N and P , shaft g , and worm R , with the gear U of the yarn-beam, all arranged and operating in the manner and for the purpose set forth.

2. The hinged stand B , in combination with the shaft d and friction-wheel f and with the disk A , as described.

3. The adjustable screw-bar D , in combination with the hinged stand B , in the manner and for the purpose specified.

4. The combination, substantially as described, of the disk A , wheel f , forked guide n , rack D^1 , gears C^1 and C^2 , rack K' , and friction-pad E^1 , or its equivalent, with the yarn-beam, all arranged and operating in the manner and for the purpose specified.

5. The forked guide n , in combination with the rack D^1 and friction-wheel f , and with the gear C^1 , shaft J , gear C^2 , vertical rack K' , and pad E^1 , all arranged and operating substantially in the manner and for the purpose set forth.

6. The combination, substantially as described, of the stand I , barrel bearing H , and curved arm L , which serve as supports for the gears P and G and their shaft, for one end of the shaft J , and for a step for the inclined shaft g , as set forth.

7. The combination, substantially as described, of the rear stand O , having a shaft-supporting arm, h , and guides for the rack-bars D^1 and K' , and a step for the shaft d , as set forth.

8. The combination with the shipper D^4 of the rod E^2 , the bell-crank E^5 , the lever E^7 , the rod E^8 , and the lever E^9 , with the necked gear N , and the stop g' , all combined, arranged, and operating substantially in the manner described, to release the let-off and allow the unwinding action of the yarn-beam to cease, and to return such parts to action or operation.

9. The combination of the shipper D^4 , the rod E^2 ,

bell-crank E^5 , lever E^7 , rod E^1 , lever E^7 , shaft g , splined and sliding gear N , toothed rim e , stop g' , worm R , gear U , the friction-pad E^1 and rack K' , and its connections, all arranged and operating substantially as described, for the purpose of regulating or controlling and stopping and restoring the unwinding action of the yarn-beam.

10. The shipper D^4 and rod E^3 , combined with the bell-crank lever E^5 , the lever E^7 , the connecting-rod E^3 , and the clutch-lever E^3 , arranged and operating as set forth.

11. In connection with the disk A and wheel f , as described, the combination of two branches or sets of

operating devices, one set consisting of the worm E , gear G , bevel-gears N and P , shaft g , and worm R , with the gear U of the yarn-beam and the other set of devices, consisting of the forked guide n , rack D^1 , gears C^1 and C^2 , rack K' , and friction-pad E^1 , acting against the body of warp on the beam, all arranged and operating substantially in the manner set forth.

LEWIS N. FLETCHER.
IRA M. PAGE.

Witnesses:

J. S. WHITREY,
JOHN E. CRANE.