May 8, 1923. 1,454,767

J. A. PORTER

POSITIVE LET-OFF MOTION FOR LOOMS

Filed Jan. 10, 1922 3 Sheets-Sheet 1

Fig. 1.

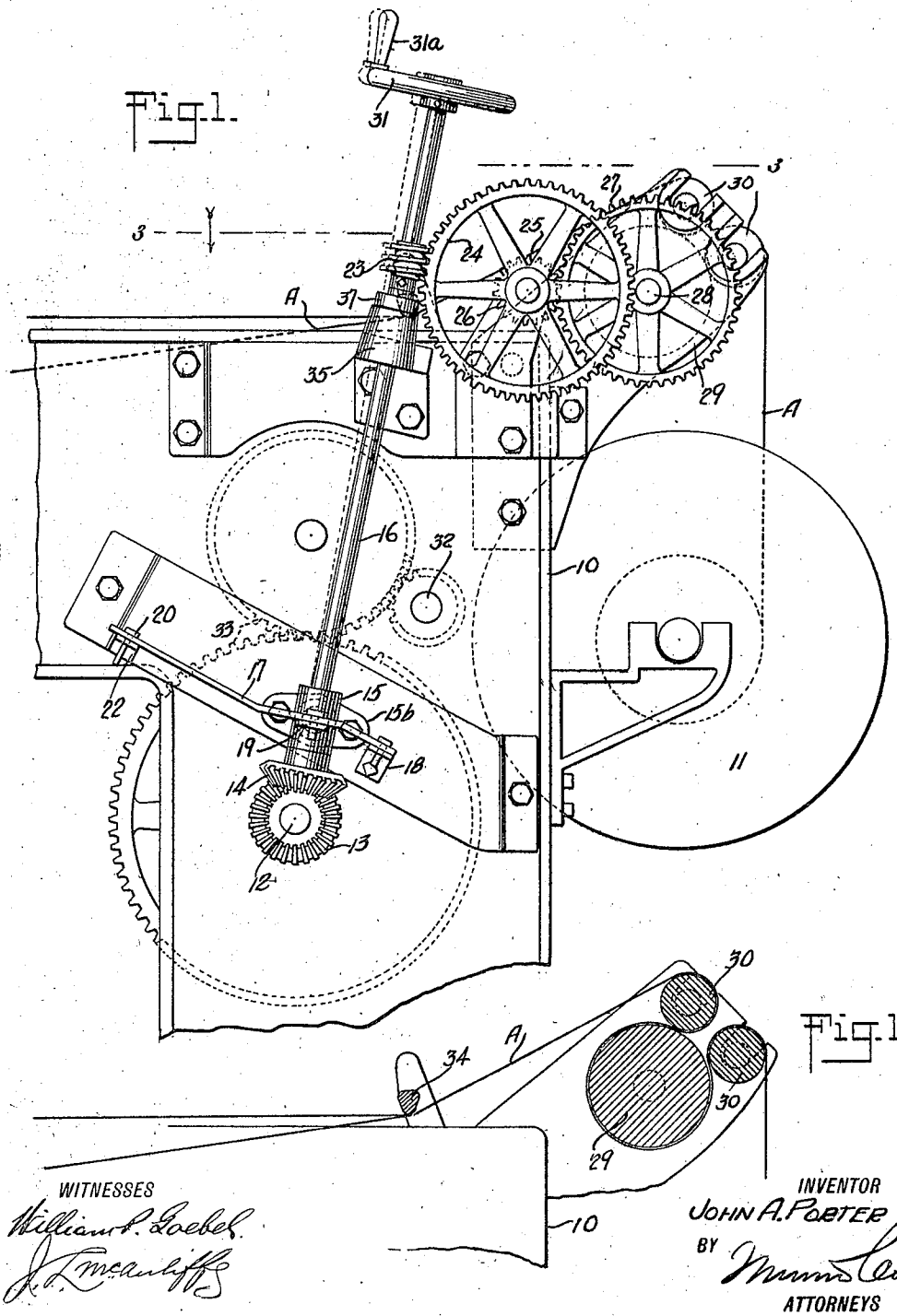


Fig. 1a

WITNESSES

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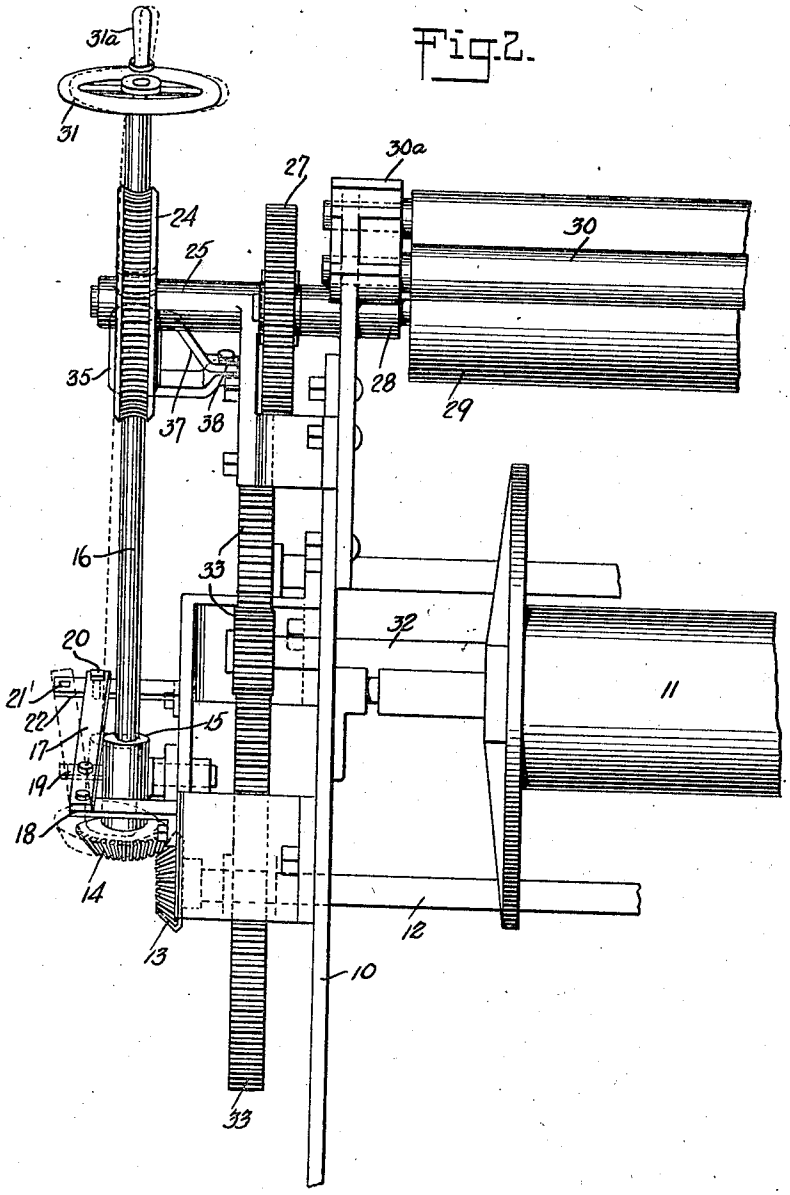
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Fig. 2.



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Fig. 3.

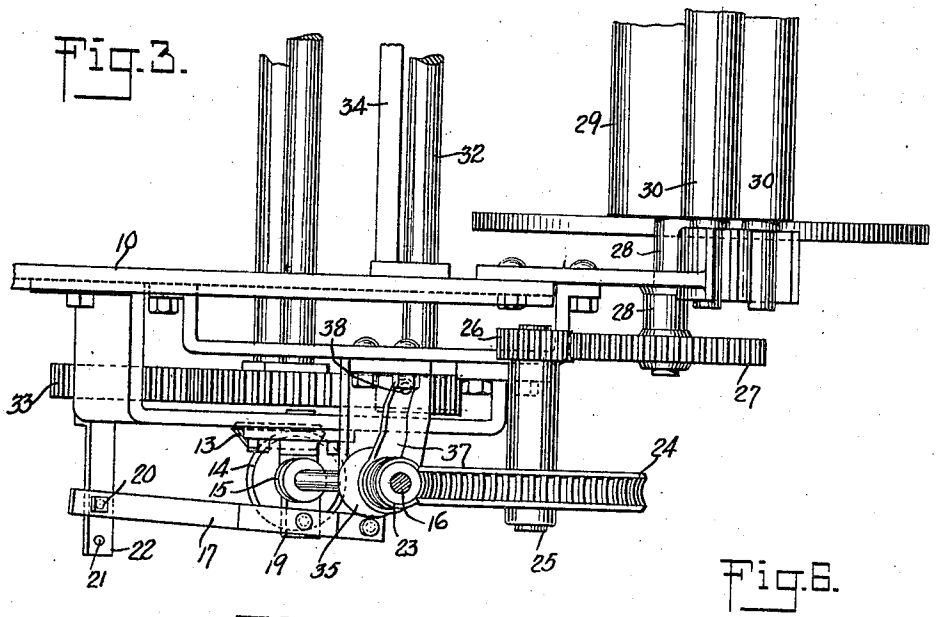


Fig. 6.

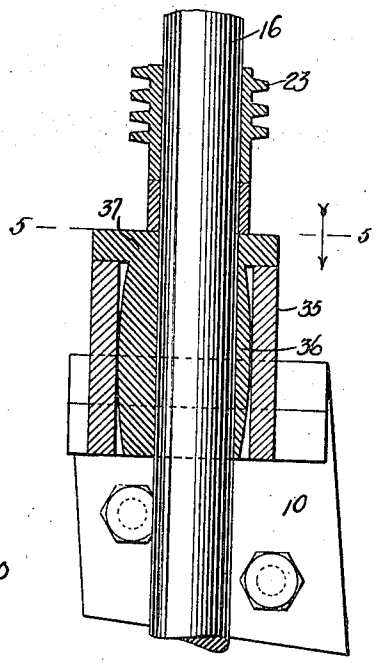


Fig. 4.

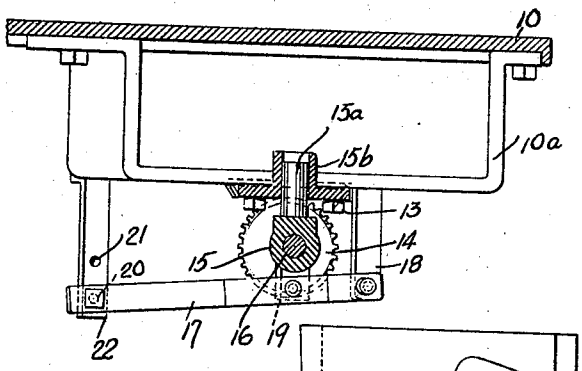
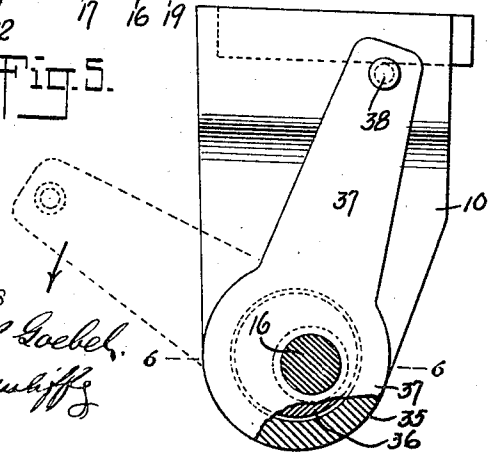


Fig. 5.



WITNESSES

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UNITED STATES PATENT OFFICE.

JOHN A. PORTER, OF MACON, GEORGIA.

POSITIVE LET-OFF MOTION FOR LOOMS.

Application filed January 10, 1922. Serial No. 528,163.

To all whom it may concern:

Be it known that I, JOHN A. PORTER, a citizen of the United States, and a resident of Macon, in the county of Bibb and State of Georgia, have invented a new and Improved Positive Let-Off Motion for Looms, of which the following is a description.

The general object of my invention is to provide a positive let-off for looms by the action of which the warp will be at all times under perfect control.

A further important object of the invention is to provide a positive let-off motion that will be independent of the beam so as not to be subject to the variation due to the varying diameter of the warp beam. I would here mention that fabric experts engaged in the production of builder tire fabric and tire makers are agreed upon the necessity of additional manipulation of the fabric after it leaves the loom on account of its unbalanced condition, the warp threads being longer than the filling threads in the same equal length and breadth of fabric. Under the most favorable conditions heretofore, all things considered, it has been found practical in the smallest areas of square fabric to attain not nearer than within four per cent of a perfect square. This is ascertained by taking say a ten-inch square of fabric, measuring each individual thread, both warp and filling, and finding from the actual measurements that the warp threads are four per cent greater in length than the filling threads, the stated condition making the fabric highly unsuitable for the production of safe and balanced tires because the filling threads will have a greater tension and will bear the stresses and strains developed by the outward pressure and depression when the tire is in use. The unbalanced strain on the filling threads in the tire tends to cause breaking of the filling threads. It is a fact well known among fabric and tire makers that fabrics, unbalanced or "off-square", means unbalanced elasticity and varied tensile strength, the warp in all such cases showing less tensile strains than the filling threads.

With a view to neutralize or minimize the objectionable characteristics of "off-square" fabrics some tire makers subject fabric to high tension in the direction of length and afterward cut the fabrics on the bias in such sizes as necessary to meet the requirements of the tire but the process is slow and costly and the results are far from satisfactory.

An important object of my invention is to provide a let-off motion for looms that will permit of fine adjustments of the warp being obtained in a ready and practical way.

The invention furthermore has for an object to provide for complete operative disassociation of the let-off motion and the warp beam so that the beam gear may be turned repeatedly in opposite directions as is a necessary condition in weaving and when starting up new warp in a loom.

The invention also has in view to effect control over the tension and predetermined amount of let-off from the beginning to the end of the warp.

An important object also of the invention is to provide a let-off motion by which any desired variations in the crimp and contraction of the fabric can be controlled, by providing a let-off motion that will serve the purpose of holding the yarn tight during the action of the lay of the loom in beating up the pick in the fabric to proper position, thereby dispensing with crimp bars or warp rails for this purpose.

Reference is to be had to the accompanying drawings forming a part of this specification, it being understood that the drawings are merely illustrative of one example of the invention.

Figure 1 is a side elevation of a positive let-off motion for looms embodying my invention, illustrating the same emplaced on a loom shown in part;

Figure 1ª is a detail in vertical section, the view being given to show the passage of the warp threads about the tensioning elements;

Figure 2 is an elevation of the stop motion;

Figure 3 is a plan view thereof with parts in section on the line 3—3 of Figure 1;

Figure 4 is a detail partly sectional plan view, showing the shift means for the driven bevel pinion of the worm shaft.

Figure 5 is a cross-section on the line 5—5 of Figure 6;

Figure 6 is a view with parts cut away, of the shift means for the worm at the let-off assemblage.

In the drawings the numeral 10 indicates the loom frame and 11 the warp beam. In accordance with my invention a shaft 12 is utilized as a prime mover for the let-off mo-

tion. The drive connections in the form shown comprise a bevel pinion 13 on the shaft 12 meshing with the similar pinion 14 on a worm shaft 16 extending upwardly obliquely and serving to actuate, as hereinafter described, a revoluble element of the let-off motion. The drive of the let-off motion, it will be seen, is not tied up with but is independent of the warp beam 11.

In order to establish or disestablish the drive connection between the pinions 13, 14 or equivalent drive elements, I provide for the lateral shifting of the worm shaft 16 at its lower end for which purpose the hub 15 of the pinion 14 has a lateral arm 15^a fitting in a bracket 15^b. A shift lever 17 is fulcrumed at one end to a bracket 18 or a fixed part of the loom frame or other fixed part appurtenant to the loom frame and between its ends the lever is pivotally secured to a bracket 19 on the hub 15 of the pinion 14. The terminal of the lever is securable by a pin 20 in either of two positions by engaging the pin 20 in one of a pair of pin holes 21, 21′ on a bracket 22. When moved to the outer position, as in Figure 4, the lever 17 will have carried the pinion 14, hub 15, and worm shaft 16 to a position with the said pinion 14 out of engagement with the drive pinion 13 when the lever 17 is moved to the other position with the pin 20 engaged with the inner pin hole 21, a driving connection will have been established between the pinions 13, 14.

Means is provided for the manual turning of the shaft 16 when desired after the engagement between the pinions 13, 14 is broken, there being shown for the purpose a handwheel 31 with a handle 31^a thereon. The mechanical driving of the shaft 12 from the prime moving shaft 32 is through a suitable back gear train 33.

The worm 23 on the shaft 16 meshes with a worm wheel 24 on a horizontal stud shaft 25, said shaft having a small pinion 26 driving a gear wheel 27 on a shaft 28, which in turn operates the elements in the let-off motion. Advantageously the let-off assemblage comprises three rollers of which a larger roller 29 is on the shaft 28 or at all events turns with the turning of said shaft and associated with said roller are two smaller rollers 30, the trunnions of which rest in bearings 30^a under the weight of said rollers 30. The warp threads conventionally indicated at A run from the beam 11 upwardly over one roller 30 of the pair and thence downwardly between the rollers 30 and about the roller 29, the threads being returned about the second roller 30 of the pair and directed to the harness not shown. A tension bar 34 is disposed beyond the assemblage of rollers 29, 30 beneath which bar the warp threads are passed as indicated in Figure 1^a.

For precisely and minutely adjusting the tension of the warp threads my arrangement permits of the free turning of the beam 11 back or forth and also permits turning of the roller 29 freely back and forth by throwing out the drive connection with the worm shaft 16. The disconnection between the worm wheel 24 and the worm 23 is provided for in the present instance by the following means: An upper bearing 35 is disposed remote from the lower drive elements 13, 14 and lever 17 and within said bearing is an eccentric sleeve 36 rigid with which is a lateral arm 37 at the top of the bearing 35. Said arm 37 is adapted at its outer end to receive a pin 38 to be engaged in a hole in a part of the frame 10. The removal of the pin 38 permits of the arm being swung in the direction of the arrow in Figure 5 to a position to cause the eccentric form of the sleeve 36 to carry the shaft 16 laterally to disengage the worm 23 from the worm wheel 24, thereby breaking the drive connection between the shaft 16 and the driven element 29 of the let-off assemblage composed of said driven element 29 and the pair of elements 30. It will be observed from Figures 5 and 6 that the eccentric sleeve 36 is bellied at the center and is tapered on rounding lines toward the ends, the purpose of which arrangement is to permit said sleeve to respond to the shifting of the lower driven end of said shaft by a throw of the lever 17.

It will be readily understood from the foregoing that the driven element 29 of the let-off assemblage is independent of the beam 11 and that with the worm wheel 23 disengaged from the worm wheel 24 by turning of the sleeve 36, the roller 29 may be manually turned by turning the pinion 27 so that the roller 29 may be turned back or forth at will without affecting the warp beam. Similarly, the warp beam may be turned freely, independently of the let-off assemblage and thereby any desired adjustment of the tension of the warp threads A may be effected.

I would state in conclusion that while the illustrated example constitutes a practical embodiment of my invention, I do not limit myself strictly to the exact details herein illustrated, since, manifestly, the same can be considerably varied without departure from the spirit of the invention as defined in the appended claims.

Having thus described my invention, I claim:

1. A positive let-off motion for looms, including an assemblage of let-off elements, a driving element, a connecting element between said driving element and the let-off assemblage and means to permit a disconnection of said connecting element either at the assemblage or at the driving element.

2. In a positive let-off motion for looms, a let-off assemblage including a driven element, a worm shaft, driven means for said shaft, means to optionally establish or disestablish connection between said driven means and said shaft, a worm wheel actuated by the worm shaft and actuating said driven element of said assemblage, and means optionally to establish or disestablish connection between the worm shaft and the worm wheel.

3. In a positive let-off motion for looms, a let-off assemblage including a driven element, said assemblage being positioned to receive the warp from the warp beam of the loom, a worm shaft, a worm wheel driven by said worm shaft, a bearing through which said shaft extends, an eccentric sleeve on said shaft within said bearing, and means to manually turn said sleeve to establish or disestablish engagement of the worm shaft and the worm wheel.

4. In a positive let-off motion for looms, a let-off assemblage including a driven element, said assemblage being positioned to receive the warp from the warp beam of the loom, a worm shaft, a worm wheel driven by said worm shaft, a bearing through which said shaft extends, an eccentric sleeve on said shaft within said bearing, means to manually turn said sleeve to establish or disestablish engagement of the worm shaft and the worm wheel; together with drive means for said shaft at one end, and means to shift the driven end of said shaft to disestablish connection with the drive means thereof, said eccentric sleeve being tapered toward its ends to conform to the different positions of the shaft.

5. In a positive let-off motion for looms, an assemblage of let-off elements through which the warp may pass from the warp beam, said assemblage including a driven element, a shaft, a driven pinion on said shaft, a drive pinion with which the first-mentioned pinion is adapted to mesh, a guide member on the hub of the driven pinion, a fixed guide for said hub member, and a lever connected with said hub and adapted to be moved to effect the engagement or disengagement between the pinions.

6. In a positive let-off motion for looms, an assemblage of let-off elements, one of which is a driven element, a driven shaft, a drive connection between said shaft and said driven element, means to manually turn said shaft, a drive pinion, a driven pinion on the shaft adapted to mesh with said drive pinion, a bearing for said shaft remote from said pinion, means to shift said driven pinion and the adjacent end of the shaft to engage or disengage the pinions, and a sleeve on said shaft within said bearing, said sleeve being tapered toward the ends to respond to the shifting of the shaft.

7. In a positive let-off motion for looms, an assemblage of let-off elements, one of which is a driven element, a driven shaft, a drive connection between said shaft and said driven element, drive means for said shaft, means to shift the shaft laterally to make and break the last-mentioned connection, a bearing for said shaft remote from the driven end thereof, and a sleeve on said shaft within said bearing, said sleeve being tapered toward the ends to respond to the shifting of the shaft.

8. In a positive let-off motion for looms, a shaft mounting a worm adapted to engage a gear connected to said let-off elements of the let-off motion, means to optionally permit engagement and disengagement of the worm with the gear, and means at one end of said shaft to optionally engage and disengage said shaft with means driving the same.

9. In a let-off motion of the character described, a pivotally mounted shaft provided with a worm adjacent one end and a gear at the other and means at each end for disengaging the worm or the gear from their respective co-acting elements.

JOHN A. PORTER.