

(No Model.)

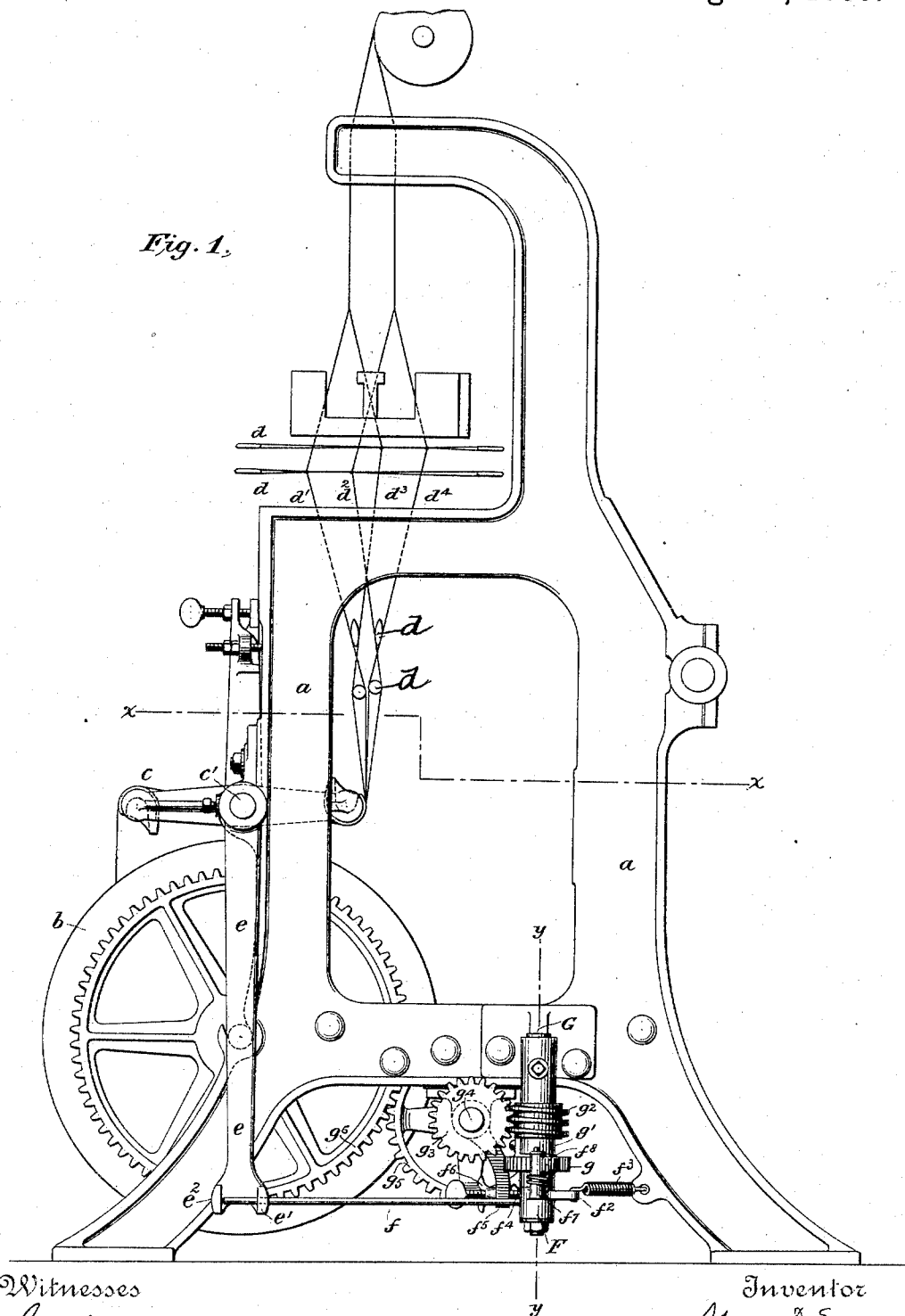
2 Sheets—Sheet 1.

A. D. EMERY.
LET-OFF MECHANISM FOR LOOMS.

No. 503,468.

Patented Aug. 15, 1893.

Fig. 1.



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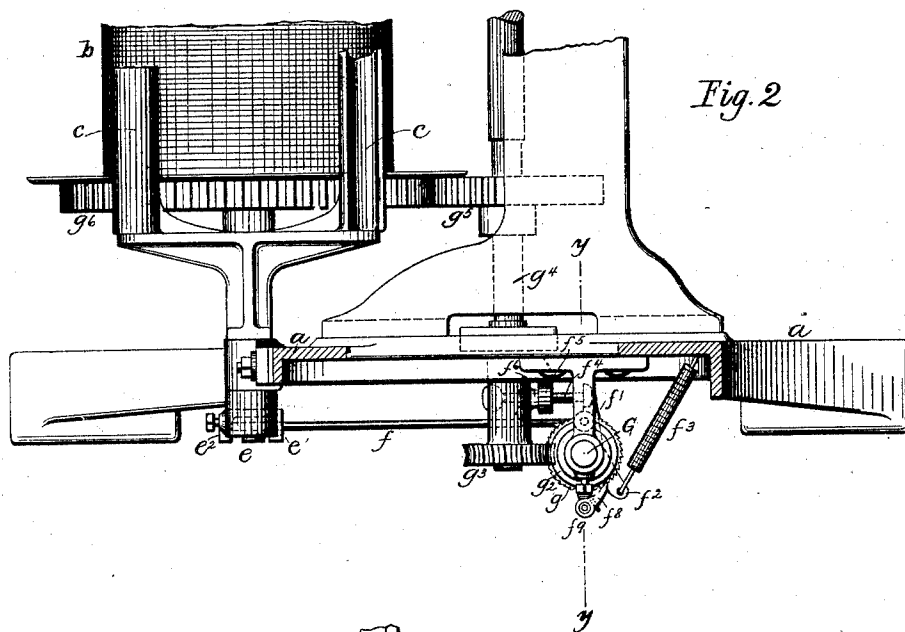


Fig. 2

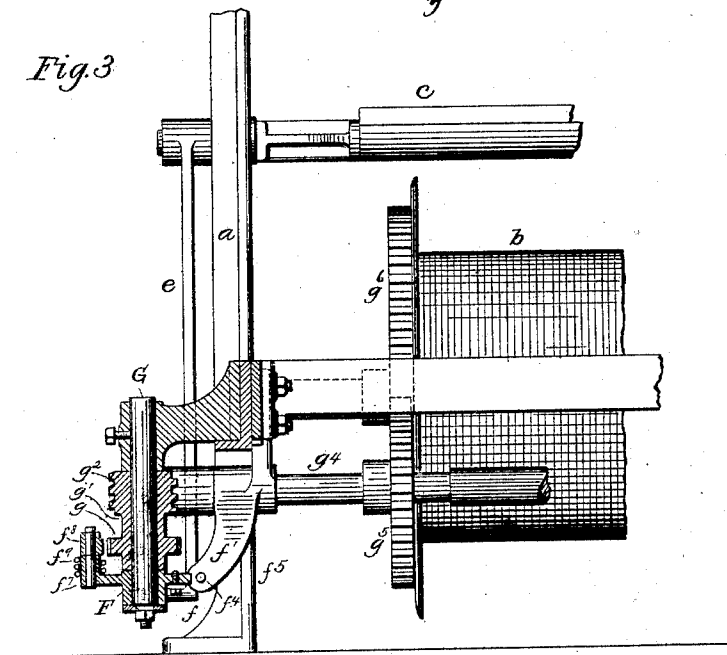


Fig. 3

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UNITED STATES PATENT OFFICE.

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LET-OFF MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 503,468, dated August 15, 1893.

Application filed December 2, 1890. Renewed January 19, 1892. Again renewed December 1, 1892. Serial No. 453,695.
(No model.)

To all whom it may concern:

Be it known that I, ABRAM D. EMERY, of Taunton, Massachusetts, have invented certain Improvements in Let-Off Mechanism for Looms, of which the following is a specification.

This invention relates to let-off mechanism in which a worm gear is employed to impart the unwinding motion to the warp roll, and in which the motion to set a driving pawl, and to at the same time store up in a spring the force required to operate such driving pawl, and thereby enable it to actuate the worm gearing, is derived from the motion of the whip roller induced by the upward strain of the warp threads upon the inner bar of the whip roller at the instant of the beat.

The accompanying drawings of the let-off mechanism, and so much of the adjacent portions of the loom structure as suffices to illustrate the construction and mode of operation of the invention, are as follows:

Figure 1 is a side elevation. Fig. 2 is a horizontal section taken through the plane indicated by the line xx on Fig. 1. Fig. 3 is a vertical section taken through the plane indicated by the dotted line yy on Figs. 1 and 2.

The drawings represent the frame, a , of an upright loom for weaving into two fabrics, side by side, the warp threads fed from a single warp roll, b , over a single whip roller, c , and across and between two systems of leaserods, d , d , by which the warp threads are divided into four equal groups, d^1 , d^2 , d^3 , d^4 , as described in pending application Serial No. 367,488, filed October 9, 1890, renewal No. 416,915, of January 4, 1892. The shaft or trunnion, c' , of the whip roller, c , has affixed to it the downwardly-extending radius arm, e , the lower extremity of which is provided with two laterally-extending ears, e' and e^2 , one of which, e' , is transversely perforated to admit of the extension through it of one end of the setting rod, f , the other end of which is pivoted to the radius arm f' , projecting inwardly from the pawl-carrying sleeve F , loosely mounted upon the lower end of the vertical worm spindle, G . The sleeve F is also provided with a radius arm f^2 , to which is attached one end of the contracting spiral spring f^3 , the other end of which is secured to the frame of the

loom. The contracting force of the spring f^3 holds the radius arm f' against the end of the adjustable horizontal stop bolt, f^4 , extending through a hole tapped transversely through an arm, f^5 , projecting downward and outward from the frame of the loom; the bolt f^4 being provided with a jam nut, f^6 , by means of which it may be secured in the position to which it may have been adjusted. Another radius arm, f^7 , projecting outwardly from the sleeve, F , is provided with an upright stud to which is pivotally attached a driving pawl, f^8 , the free end of which, by means of the spring f^9 , is pressed against the periphery of a ratchet wheel, g , which is affixed to, or formed in one piece with, the hollow shaft, g' , of the worm g^2 , engaging the worm wheel, g^3 , affixed to the counter-shaft g^4 , to which there is also affixed the pinion g^5 , which meshes with the teeth of the cog-wheel, g^6 , affixed to the shaft of the warp roll. At the instant of the beat, the backward sway of the radius arm, e , carries the ear e^2 into collision with the setting rod, f , and by rocking the sleeve F upon its axis, swings back the driving pawl f^8 causing it to ride over a greater or less number of teeth of the ratchet wheel, g . After the beat has taken place, the radius arm, e , swings forward, and the sleeve F is thus released to the action of the contracting spiral spring, f^3 , which by its contracting force rocks the sleeve F , and by the engagement of the pawl f^8 with the ratchet wheel g , imparts motion to the worm g^2 , which motion continues until the radius arm f' strikes against the end of the adjustable stop bolt, f^4 . By this partial rotation of the worm g^2 , the desired amount of unwinding motion is imparted to the warp roll. It will be seen that the extent of such motion may be varied by varying the position of the adjustable stop bolt. Thus, if the stop bolt be unscrewed, the radius arm f' will be permitted to swing forward, and the free end of the setting rod, f , will thereby be carried into a position in which it will be sooner engaged by the ear e^2 of the radius bar e , so that a larger proportion of the backward swinging movement of the radius bar, e , will be communicated to the setting bar f , with the consequent result that the driving pawl will be drawn backward

over a greater number of teeth at each beat. On the other hand, by screwing in the adjustable stop bolt f^4 , the setting rod, f , will be carried forward, and the collision of its free end with the ear e^2 will be postponed to a later stage in the backward swinging movement of the radius bar e , and a less range of setting motion will thereby be communicated to the driving pawl f^3 , so that after the beat a less range of motion will be imparted to the worm, and consequently a less range of unwinding motion will be given to the warp roll.

There is thus afforded ample means for adjusting the extent of rotatory motion of the let-off mechanism with relation to the gradual reduction in diameter of the warp roll as the warp threads are fed therefrom.

What is claimed as the invention is—

1. The improvement in let-off mechanism for looms herein described, the same consisting, essentially, of a worm for imparting motion to the train of gearing by which the warp roll is unwound, a ratchet wheel affixed to the shaft of said worm, a driving pawl for engaging the teeth of said ratchet wheel, a spring for forcing said driving pawl forward against the ratchet tooth on which it bears, a radius arm connected to the sleeve of said pawl, a stop arranged in the path of motion of said radius arm for arresting the backward motion of said driving pawl and thereafter holding the same against the force of said spring, a setting bar, for bearing at one end against the said radius arm connected to said sleeve, and for receiving at its opposite end the impact of a radius arm affixed to the shaft of

the whip roller for governing the tension of the warp threads, and thereby transmitting motion derived from the beat to set back said driving pawl and store up in said spring force to actuate the let-off gearing at the conclusion of the beat.

2. A worm shaft, constituting the prime member of a train of gearing for imparting unwinding motion to the warp roll of a loom, a ratchet wheel affixed to said shaft, a driving pawl carried upon a sleeve loosely mounted upon said shaft and adapted to engage the teeth of said ratchet wheel, a spring for giving the forward or driving motion to said driving pawl, a radius arm affixed to the whip roller shaft, a setting bar, for transmitting at the instant of the beat, motion derived from said whip roller to rock said sleeve and thereby set back said driving pawl, and coincidentally store up in said spring an additional amount of force for reacting upon said driving pawl, in combination with a movable stop for arresting the forward or actuating movement of said driving pawl, and thereby varying the stage in the swinging motion of said radius arm affixed to said whip roller shaft, at which its motion is communicated to said setting bar, and hence varying the range of setting movement imparted to said driving pawl, and consequently the range of unwinding motion communicated to the warp roll.

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