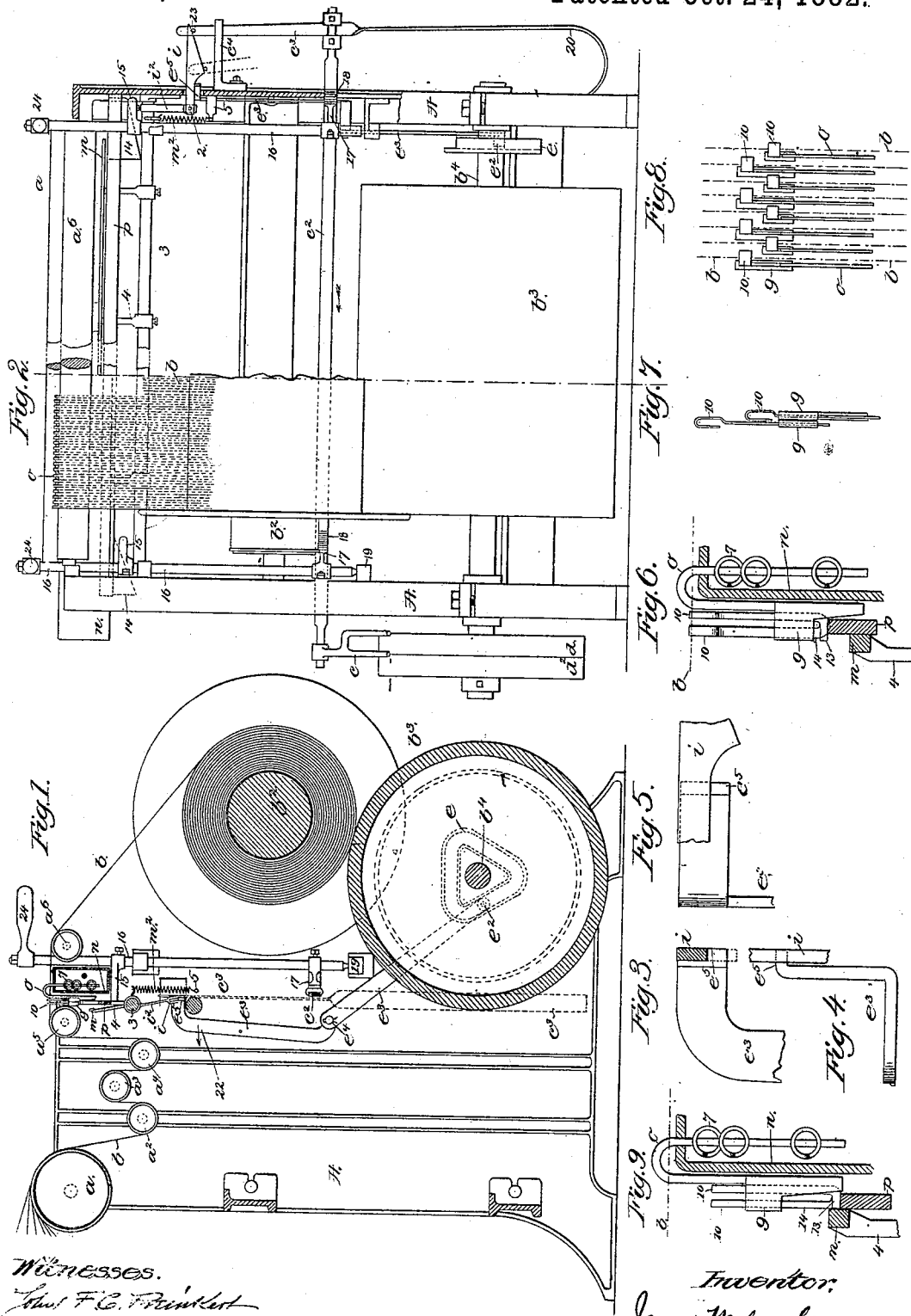


(No Model.)

J. WALMSLEY.  
WARPING AND BEAMING MACHINE.

No. 266,330.

Patented Oct. 24, 1882.



WITNESSES.

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Atty.

# UNITED STATES PATENT OFFICE.

JAMES WALMSLEY, OF HOPEDALE, MASSACHUSETTS, ASSIGNOR TO THE  
HOPEDALE MACHINE COMPANY, OF SAME PLACE.

## WARPING AND BEAMING MACHINE.

SPECIFICATION forming part of Letters Patent No. 266,330, dated October 24, 1882.

Application filed January 26, 1882. (No model.) Patented in England November 20, 1873, No. 3,779.

*To all whom it may concern:*

Be it known that I, JAMES WALMSLEY, of Hopedale, county of Worcester, and State of Massachusetts, have invented an Improvement  
5 in Warping and Beaming Machines, of which the following description, in connection, with the accompanying drawings, is a specification.

My invention relates to an improved construction of drop-wire and drop-wire carrier,  
10 whereby one may slide or reciprocate on the other.

My invention also includes a vibrator provided with an arm or catch which, if the vibrator is arrested by the descent of a drop-wire consequent on the breakage of a yarn, will  
15 fall, and thereafter be instrumental in effecting the release of the shipper-lever and stoppage of the machine.

My invention also includes a lifting-bar which, as the shipper-lever is operated to stop the machine, elevates automatically those drop-wires which by their fall served to effect the  
20 release of the shipper-lever.

Figure 1 represents in vertical cross-section  
25 a sufficient portion of a warping and beaming machine to illustrate one embodiment of my invention; Fig. 2, a broken front elevation of Fig. 1, the central part of the machine being also broken out to save space on the drawing; Figs. 3, 4, and 5, enlarged details of the catch  
30 or arm of the vibrator and the shipper-actuating lever by which it is carried when all the the yarns are whole. Fig. 6 shows in section part of the box which holds the drop-wire carriers, and the drop-wire lifter, and upper end  
35 of the vibrator, the drop-wire lifter being elevated to lift the series of drop-wires all into the same plane, as it will do immediately after a yarn has been broken or become too slack; Fig. 7, a front elevation of two adjacent drop-wires and the guides in which they slide, the  
40 latter being supposed to be carried by the drop-wire carriers shown in other figures. Fig. 8 is a plan or top view of several of the drop-wires and carriers, showing them arranged in two rows, to thus allow a greater number of  
45 drop-wires to be placed in the machine of a given length than would be possible if the drop-wires were arranged in one single row; and  
50 Fig. 9 is a detail showing a drop-wire as hav-

ing descended, the yarn supporting it having been broken, and with the vibrator as having been stopped by it.

The frame-work A, of suitable shape to receive and sustain the working parts, has a series of rollers,  $a$ ,  $a^2$ ,  $a^3$ ,  $a^4$ ,  $a^5$ , and  $a^6$ , over which  
55 the yarn  $b$  is passed to the warp-beam  $b^2$ , which is rotated in the usual way by the contact of the winding-drum  $b^3$  against the yarn on the beam  $b^2$ . The drum  $b^3$  is secured to shaft  $b^4$ , having  
60 upon one end of it, as in Fig. 2, the fast and loose belt-pulleys. The belt (not shown) which will run on these pulleys will be embraced by the fork  $c$  on the rod or bar  $c^2$ , which at its other  
end is connected with the shipper-lever  $c^3$ , made  
65 as a spring-lever, and having its upper end extended through a slot in the shipper-holding plate  $c^4$ , which in practice will have a notch, all as usual, in one side of its slot, into which the upper  
end of the shipper-lever will enter when  
70 the fork  $c$  is in place, to keep the driving-belt on the fast pulley  $d$ ; but as soon as the said lever is knocked off or thrown out of the said notch, so that its upper end assumes the dotted-line position, Fig. 2, the fork will be shifted  
75 to place the belt on the loose pulley  $d^2$ .

The shaft  $b^4$  has secured to it, as herein shown, a three-throw cam,  $e$ , into the grooved side of which (see Fig. 1, dotted lines) is inserted a roller or stud,  $e^2$ , of the lever  $e^3$ , pivoted  
80 at  $e^4$ , and which, as it actuates the shipper-lever at the proper times, I denominate the "shipper-actuating lever." The upper end of this lever  $e^3$  has a projection,  $e^5$ , (shown in several  
different positions in Figs. 3, 4, and 5,) on which  
85 rests the arm or catch  $i$ , pivoted by pin 2 (see Fig. 2) upon the lower end of an arm,  $i^2$ , depending from the rock-shaft 3, having other  
upwardly extended arms, 4, upon the upper  
90 end of which is placed the vibrator  $m$ , which is shown as a long bar extended from end to end of the machine, as in Fig. 2. The spring  
 $m^2$ , connected at its upper end with a stud or  
projection on the rock-shaft 3 and at its lower  
95 end with a stud, 5, acts to throw and hold the vibrator  $m$  toward the box  $n$ , in which one leg  
of each drop-wire carrier  $o$  is placed, the said  
leg entering between the coils of spiral spring  
7, (one or more,) as shown in Fig. 7, such spiral  
spring, in common use before my invention, 100

being operated as usual to regulate the space between each drop-wire carrier, according to the number of drop-wires and yarns being used in the machine.

5 The drop-wire carrier herein shown is made to resemble an inverted staple, as represented clearly in Figs. 1 and 6. Each drop-wire carrier is provided with a guide or loop, 9, in which is fitted loosely the shank of a drop-wire, 10, the latter, as herein shown, being made from narrow flat strips of steel bent over in the direction of their thickness, as shown in Fig. 7, to form eyes at their upper ends to receive the yarns *b*. Because of the thickness of the upper ends of these hooks, I prefer to and have arranged the drop-wires in two parallel rows, as shown in Fig. 8, to thus enable me to employ a greater number of drop-wires in a machine of a given size than if I employed but one row of drop-wires. The drop-wires of the rearmost series of drop-wires have projections 13, which extend out from their shanks substantially as far as the front edges, 14, of the series of drop-wires farthest from box *n*.

25 Below the drop-wires is the drop-wire lifter *p*, herein shown as a bar placed in vertical guiding-slots in the frame-work, and having at its under side, near each end, inclines 14, against which bear the fingers 15 on the upper right shafts 16, supported by steps 19, the said shafts having connected with their sectors 17, the teeth of which are engaged by the rack-teeth 18 on the slide-rod *c*<sup>2</sup> of the shipping mechanism, so that whenever the shipper-lever is released from its holding-notch in the plate *c*<sup>1</sup>, as will be hereinafter described, the spring part 20 of the shipper-lever will throw rod or bar *c*<sup>2</sup> in the direction of the arrow, Fig. 2, turn the shafts 16, move the driving-belt upon the loose pulley *d*<sup>2</sup>, and cause the fingers 15 to act against the under sides of the incline 14 and elevate the lifting-bar *p*, so that it will lift all the drop-wires which may have descended into the position Fig. 9 by reason of a broken yarn. In Fig. 6 the lifting-bar *p* is shown as having been elevated to lift the drop-wires, so that their upper ends occupy the proper position to receive yarn. When the yarns are unbroken each drop-wire is held up, as shown in Figs. 1 and 6 and as shown by the left-hand drop-wire of Fig. 7, and the lifting-bar *p* will be in its lowest position, as in Figs. 1 and 9, instead of as in Fig. 6—its highest position. The cam *e* will cause the lever *c*<sup>3</sup> to vibrate three times to each rotation of the winding-drum and its shaft *b*<sup>1</sup>, and the upper end of the said lever, acting against the catch or arm *i* resting on it, will carry the said catch or arm with it, leaving the rock-shaft 3 in its bearings and causing the vibrator *m* to approach toward and recede from the front of the box *n*. The spring *m*<sup>2</sup> keeps the catch or arm *i* pressed closely in contact with the notched upper end of lever *c*<sup>3</sup>, and the said catch or arm and lever move in unison and without breaking contact unless the vibrator is obstructed as it approaches box

*n* by reason of a drop-wire having fallen (a thread having broken) into the position shown Fig. 9, when the lower end of a drop-wire is shown as in its lowest position and directly in the path of movement of the vibrator. In its regular movements toward the box *n* the vibrator comes close to the front side of the box; but if the lower end of a drop-wire falls in the path of the vibrator and between it and the front of the box *n* the vibrator strikes the drop-wire, as in Fig. 9, and the further movement of the vibrator toward the box *n* is arrested. The movement of the vibrator *m* toward the box *n* is caused by the spring *m*<sup>2</sup>, and the said spring is permitted to assume control of the vibrator only as the upper end of lever *c*<sup>3</sup> is moved backward from the box *n* in the direction of the arrow 22, Fig. 1. After the vibrator has been arrested by a drop-wire, as stated, the further backward movement of the upper end of lever *c*<sup>3</sup> causes its shoulder *c*<sup>5</sup> to pass from below the catch or arm *i*, so that the latter turns on its pivot 2 and drops into the dotted-line position, Fig. 3, so that as the upper end of lever *c*<sup>3</sup> is again moved forward toward the box *n* the projecting end *c*<sup>6</sup> strikes the side of the catch or arm *i*, the opposite side of which rests against the upper end of the lever *c*<sup>3</sup>, as shown in Fig. 2, and as the lever *c*<sup>3</sup> moves the said catch before it the latter, by its action against the shipper-lever *c*<sup>3</sup>, pushes it laterally out of the usual notch in the holding-plate *c*<sup>1</sup> and permits the spring part of the shipper-lever to move the upper end thereof into the dotted-line position, Fig. 2, and with it move the rod *c*<sup>2</sup>, as stated, to transfer the driving-belt to the loose pulley *d*<sup>2</sup> to stop the machine, and at the same time the rods 16 are turned so that their fingers 15 elevate the lifting-bar *p* and lift the drop-wire, the descent of which caused the machine to be stopped.

The shipper-lever *c*<sup>3</sup> has a pin or projection, 23, at one side of it, which, as the shipper-lever is released from the usual notch in its holding-plate *c*<sup>1</sup>, acts to lift the catch or arm *i* and place it above the projection *c*<sup>5</sup> of lever *c*<sup>3</sup>, so that as the upper end of the lever *c*<sup>3</sup> is again moved forward, after having made the said catch or arm knock off the shipper-lever, the said catch or arm will be automatically placed in the said notch, thus enabling the machine to be started when desired and operate correctly, so long as the yarns do not break, by simply moving the driving-belt upon the fast pulley *d*, this being done by shifting the rod *c*<sup>2</sup> from either end of the machine by engaging either of the handles 24 on the upright rods 15, referred to as provided with the sectors 17.

I claim—

1. In a warping and beaming machine, the drop-wire carriers *o* and their guides, combined with drop-wires fitted to slide vertically with relation to the said carriers, substantially as described.

2. The box *n*, the drop-wire carrier *o*, pro-

vided with guides for the drop-wires, and the expanding springs to receive parts of and adjust the said carriers, and the drop wires fitted to slide vertically with relation to the said carriers, combined with the vibrator and means to operate it to engage a drop-wire when the latter is permitted to fall by reason of a broken yarn, substantially as described.

3. The box *n*, drop-wire carriers, movable drop-wires mounted to move vertically with relation to the said carriers, a vibrator, a catch or arm pivoted thereon, a spring to move the vibrator in one direction, and a lever or bar having a projection, *e*<sup>5</sup>, means to move the said lever and also to move the vibrator in the opposite direction, combined with shipper-lever and its holding-plate *e*<sup>4</sup>, from which the shipper is released when the movement of the vibrator is arrested by a drop-wire interposed between it and the box *n*, substantially as described.

4. The lever *e*<sup>3</sup>, having the projection *e*<sup>5</sup> and means to operate it, and the vibrator and its pivoted catch or arm *i*, combined with the shipper lever and its pin or projection to lift the said catch or arm and permit it to be placed on the projection of the said lever *e*<sup>3</sup>, substantially as and for the purposes described.

5. The drop-wire carriers and loosely-connected drop-wires and means to hold the carriers and the drop-wire lifter, combined with

means to elevate the said lifter and simultaneously lift all the drop-wires which have descended below the path of movement of the vibrator, substantially as described.

6. The combination, in a warping and beam- ing machine, of the following instrumentalities, viz: a series of drop-wire carriers and means to hold them, a series of drop-wires loosely connected therewith and adapted to hang on the yarn, a shipper-lever, a vibrator the movement of which is arrested by the descent of a drop-wire into its path, a catch or arm moved with the said vibrator, a spring to move the vibrator in one direction, a shipper-actuating lever to move the vibrator in the opposite direction, suitable means to move the shipper-actuating lever, a shipper-lever, a holding-plate for it, a lifting-bar to act upon and lift the drop-wires, and suitable connecting means between the shipper-lever and the lifting-bar to elevate it automatically as the shipper-lever is released from its holding-plate, substantially as and for the purposes described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES WALMSLEY.

Witnesses:

G. W. GREGORY,  
BERNICE J. NOYES.