(No Model.) 3 Sheets—Sheet 1.

J. WALMSLEY.

WARPING AND BEAMING MACHINE.

No. 266,331. Patented Oct. 24, 1882.

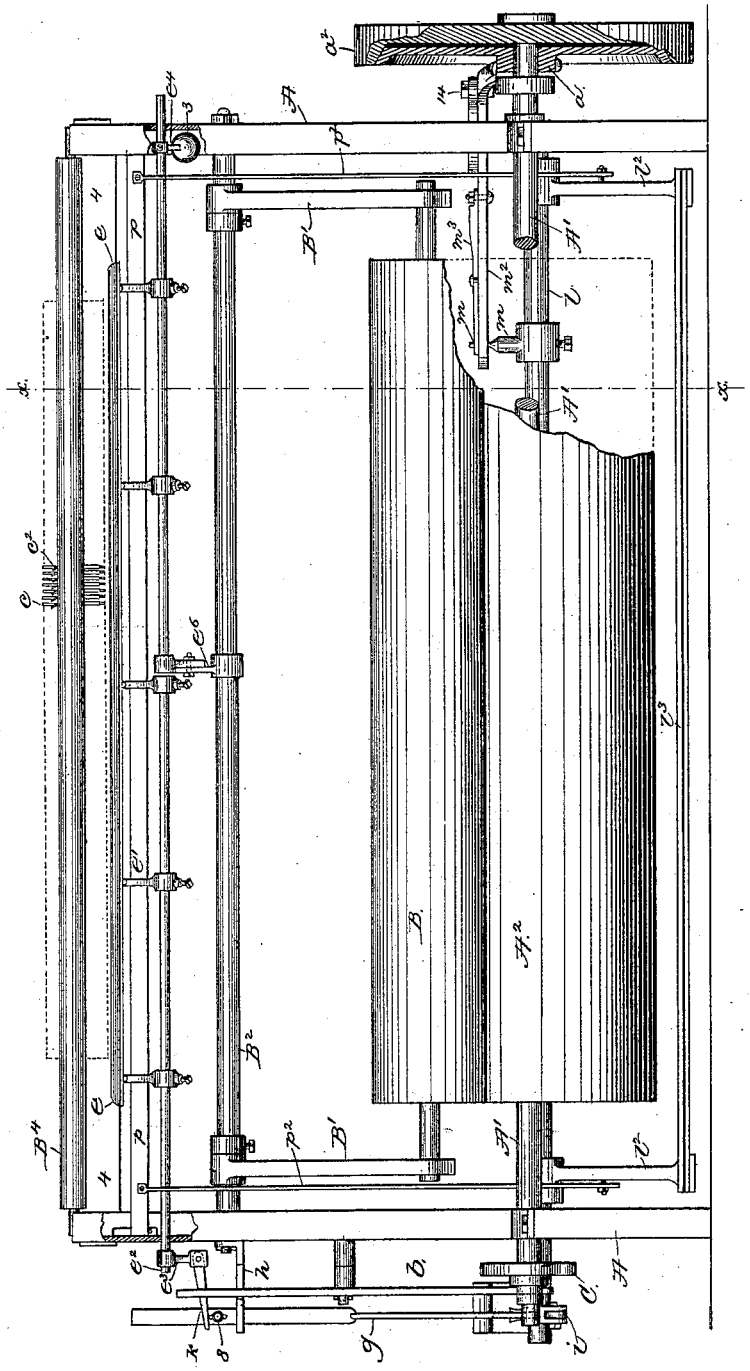

Fig. 1.

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WARPING AND BEAMING MACHINE.

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Fig. 3.

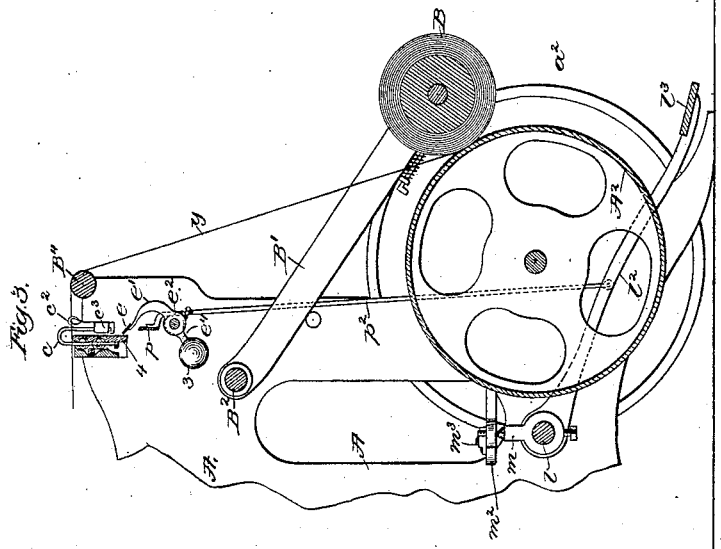
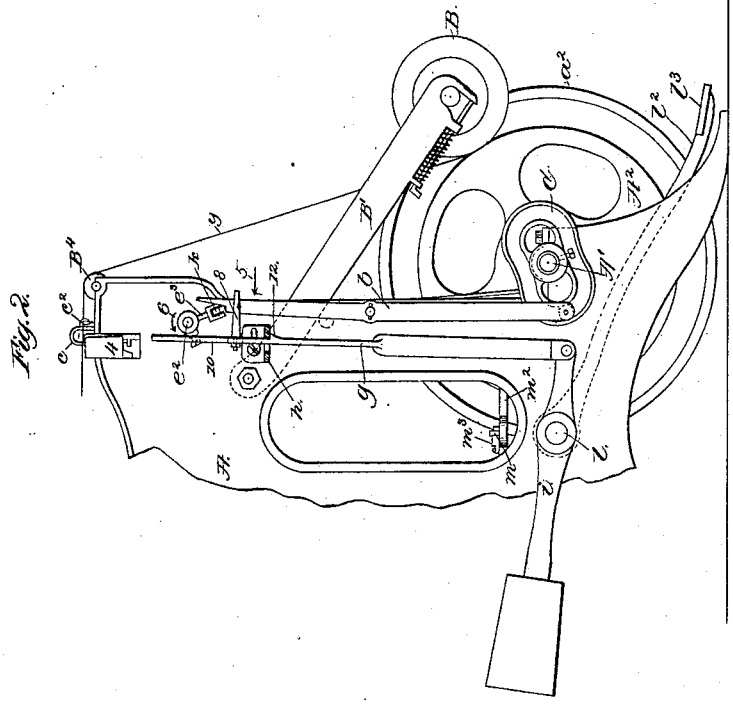


Fig. 2.



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(No Model.) 3 Sheets—Sheet 3.

J. WALMSLEY.

WARPING AND BEAMING MACHINE.

No. 266,331. Patented Oct. 24, 1882.

Fig. 5.

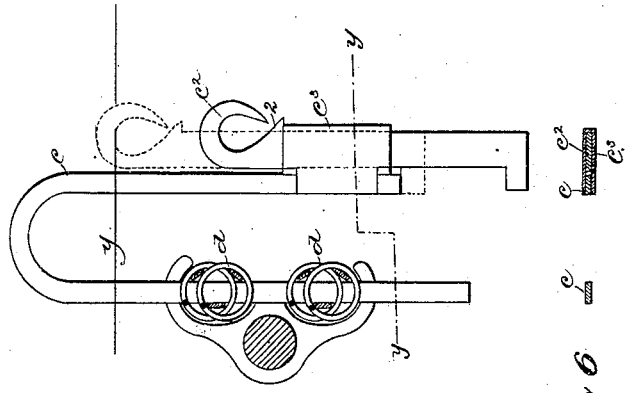


Fig. 6

Fig. 7.

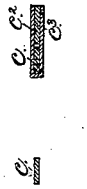
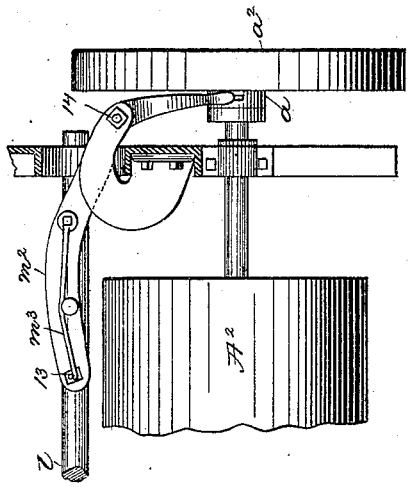


Fig. 4.



Witnesses.
John F. C. Brinkerhoff
L. F. Connor.

Inventor
James Walmsley,
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Attys.

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. 266,331, dated October 24, 1882.

Application filed January 7, 1882. (No model.)

To all whom it may concern:

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

This invention is an improvement on the apparatus represented in my English Patent No. 3,779, dated November 20, 1873. In that patent the drop-wires, formed of flat metal wires, in practice about one-eighth of an inch wide, were bent over upon themselves in the direction of their thickness to form hooks, which resulted in making the hooked parts of the drop-wires wider than the drop-wire carriers, the hooks being so wide that the drop-wires could not be arranged compactly for use in beaming all sizes or numbers of yarns. The drop-wires and carriers as herein constructed and combined occupy equal spaces. The carriers hold the drop-wires, and the latter, of sheet metal, have their eyes formed by curving the carriers over in front in the direction of the width of the shank and lower part of the drop-wire below the carriers, so that the space in thickness occupied by the drop-wire does not exceed that occupied by the drop-wire carrier. With the drop-wire and carrier as herein combined it is possible to place a greater number of yarns on a warp-beam of a given length than could be done with drop-wires and carriers such as shown in my said patent, for as the hooks of the drop-wires are not thicker than their bodies or shanks, and it is possible to place a greater number of drop-wires in the same space, the thickness of the bodies of the drop-wires, and not the thickness of the hooks, determines the space to be occupied by each drop-wire. The drop-wire in my said patent had a shoulder where the hook and body parts of the wire joined, which necessitated frequent cleansing to keep it free from flyings, so that the drop-wire could operate as freely as desirable; but in this my present invention I have avoided the formation of such a shoulder and the consequent accumulation of flyings thereon, and the drop-wire is free to fall as soon as the yarn breaks. In my patent referred to all drop-wires unsupported by yarn were lifted automatically by a bar having inclines and operated upon at its ends by means of arms on an upright shaft of the belt-shifting mechanism; but in this my present invention I have simplified the construction of the mechanism for so lifting the drop-wires, and have devised instead a vertically-moving lifting-bar actuated by a weighted treadle, the weight being effective to operate the treadle and elevate the lifting-bar while the machine is being stopped to mend a broken yarn.

Figure 1 represents a front elevation of a warping and beaming machine embodying my invention; Fig. 2, a partial view of the left-hand end of the machine; Fig. 3, a partial vertical section on the dotted line *x x*, Fig. 1; Fig. 4, a detail referring to the driving-pulley; Fig. 5, an enlarged detail of the drop-wire, its carrier, and the expanding springs which hold and space the said carriers and their drop-wires. Fig. 6 is a cross-section on the line *y y* of Fig. 5; and Fig. 7 is a modification, to be referred to.

The frame-work A, of suitable shape to sustain the working parts, has bearings for the main driven shaft A′, upon which is fixed the winding cylinder or drum A^2, upon which rests the warp-beam B, of usual construction. This shaft A′, as herein shown, has splined upon it the hub *a* of the male part of a friction-clutch pulley, made as a cone, adapted to enter the female part a^2 of the said friction-pulley, it being loose on the said shaft. The shaft A′ has at its opposite end a grooved cam, C, which imparts two complete vibrations to the feeler-moving lever *b* at each rotation of the winding-drum A^2.

The yarn *y* to be wound upon the warp-beam is passed between the drop-wire carriers *c*, thence through the eyes at the upper ends of the drop-wires c^2, the shanks or bodies of which are held loosely by and guided in the guides c^3 of the drop-wire carriers.

In operation the drop-wires, so long as the yarn is unbroken, will occupy the position Fig. 3, and as in dotted-line position, Fig. 5; but as soon as a yarn break the drop-wire held by it will drop into the full-line position, Fig. 5.

The legs of the drop-wire carrier are inserted between the coils of the usual expanding springs *d d*, which in practice will be operated in any usual way—as, for instance, in Patent No. 221,799.

My improved drop-wires are stamped or cut from sheet metal, preferably from sheet-steel, by means of suitable dies, leaving them in the shape shown most clearly in Fig. 5, the hooks thereof extending forward in the direction of the width of the drop-wires, and being of substantially the same thickness as the shanks or bodies of the drop-wires, a small open space, 2, being left for the ready introduction of the yarn under the hooks. This construction of the drop-wire, it being very thin, enables me to insure a very compact arrangement of drop-wires and get the greatest possible number in the least amount of space, which is a matter of very considerable importance to manufacturers. A yarn having been broken, the drop-wire will fall, as shown in full lines, Fig. 5, thus placing its lower end in line with the feeler *e*, which is composed of a long bar mounted upon arms e' of a rod, e^2, having another arm, e^3, provided with a pivoted catch, K, substantially such as shown in my said patent. The rod e^2 has at its other end an arm, e^4, provided with a weight, 3, the normal tendency of the weight being to turn the feeler toward the carrier-box 4, in front of which slide the drop-wires. The feeler-actuating lever *b*, at each movement in the direction of the arrow 5, Fig. 2, pushes against the catch K and rocks the rod e^2 in its bearings, moving the feeler *e* back from the front of the box 4, and as the said lever *b* is moved in the opposite direction the weight 3 is made effective to turn the rod e^2, so as to move the feeler toward the box 4 and strike the lower ends of any of the drop-wires which may have been permitted to fall by reason of a broken yarn. Should a drop-wire have fallen, the forward movement of the feeler will be arrested by its contact with the said drop-wire, and the rod e^2 will be prevented from turning farther in the direction of the arrow 6, and consequently the catch K, connected with the arm e^3 of rod e^2, (the catch then resting on a shoulder at the upper end of lever *b*, which lever at that time is being moved in a direction opposite the arrow 5 in Fig. 2,) will drop from the said shoulder upon a pin, 8, projecting from the knocking-off lever *g*, having at one side of it a lug, 12, which is then engaged with the lower side of a notched plate, *h*, secured to the frame-work. This lug is kept pressed against the under side of the said plate by the weighted lever *i* and by gravity. When the catch K drops from the shoulder of the lever *b* upon the pin 8, as described, after the feeler has been stopped by the drop-wire, the front edge of the lever *b*, at its next movement in the direction of the arrow 5, will strike the catch K, then lying between its front edge and the right-hand side (see Fig. 2) of the knocking-off lever, and will push the knocking-off lever far enough to the left to disengage its lug 12 from the notched plate, when the weighted lever *i* will immediately lift the knocking-off lever and permit the shaft *l*, with which the said weighted lever is connected, to turn. This shaft *l* has connected with it two arms, l^2 l^2, the outer ends of which are made to carry a foot-board, l^3, thus making a treadle. The shaft *l* has upon it a pin, *m*, which enters a slot, 13, of a lever, m^2, pivoted at 14. This lever m^2 is forked at one end to enter a groove in the hub *a* of the male part of the friction or clutch pulley device, and as it is moved in one or the other direction about its pivot or fulcrum 14 will separate or close the pulley parts to drive or leave the shaft A′ at rest. This lever m^2 has upon it a stiff spring, m^3, suitably held at one end, and receiving against its other end the pin *m*, referred to, so that the said pin, acting on the spring to move the lever in a direction to engage the clutch or friction parts of the said pulley, will press them together and hold them together with a force depending upon the stiffness of the spring. This contrivance enables me to always secure a close fit, notwithstanding the wear of the parts, which fit would not be possible if the pin *m* acted directly against the lever m^2.

The lifting-bar *p*, which acts upon the lower end of and lifts any drop-wires which have fallen by reason of broken yarns, is carried by rods p^2, jointed to the arms l^2 of the treadle contrivance referred to. As the shaft *l* is turned to unclutch the friction-pulleys and stop the machine, the rods p^2 are lifted, thus elevating the lifting-bar, as described, the end of the lifting-bar being guided in suitable slots of the side frames.

The rod e^2 is braced or supported at its center by the brace e^6, having two hubs (see Fig. 1) to embrace the said rod and the rod B, which supports the arms B′, that hold the usual warp-beam, B.

The heads of the warp-beam have been omitted from the drawings to avoid confusion.

The yarn-supporting roller B^4 is common to other beaming-machines.

Instead of attaching the guides e^3 to the drop-wire carriers, they may, it is obvious, be attached to the guide and slide up and down on the carriers, as shown in Fig. 6.

I am aware of the drop-wire shown in United Patent No. 213,608; but such drop-wire differs materially from the one shown by me. The drop-wire shown in the said patent has its hooked part formed by bending the material over in the direction of its thickness instead of its width, as shown and claimed by me, and the patented drop-wire cannot be arranged as compactly as required, and as especially provided for by this my invention. The patented drop-wire is twisted upon itself above the carrier, which is not the case in my invention.

I claim—

1. The straight drop-wire having the hook at its end extended in the direction of the width of the body of the drop-wire below the drop-

wire carrier, combined with the drop-wire carrier, with which the drop-wire is loosely connected, whereby the hook of the drop-wire and the carrier are enabled to occupy substantially the same extent of space in the direction of the thickness of the carrier, substantially as set forth.

2. The box 4 and its drop-wire carriers and connected drop-wires, and the shaft l, and its arms l^2 and means to move them, combined with the lifting-bar for the drop-wires, and rod p^2, to elevate the lifting-bar vertically and lift the drop-wires, all substantially as described.

3. The fast and loose parts of the friction or clutch pulley and the lever m^2 and its spring m^3, combined with the pin to press against the said spring and move the said lever, the shaft l, and means to operate said shaft, substantially as 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,
GEO. A. DRAPER.