(No Model.) 2 Sheets—Sheet 1.

A. E. RHOADES.

MECHANISM FOR HANDLING BEAMS OF WARPING MACHINES.

No. 504,457. Patented Sept. 5, 1893.

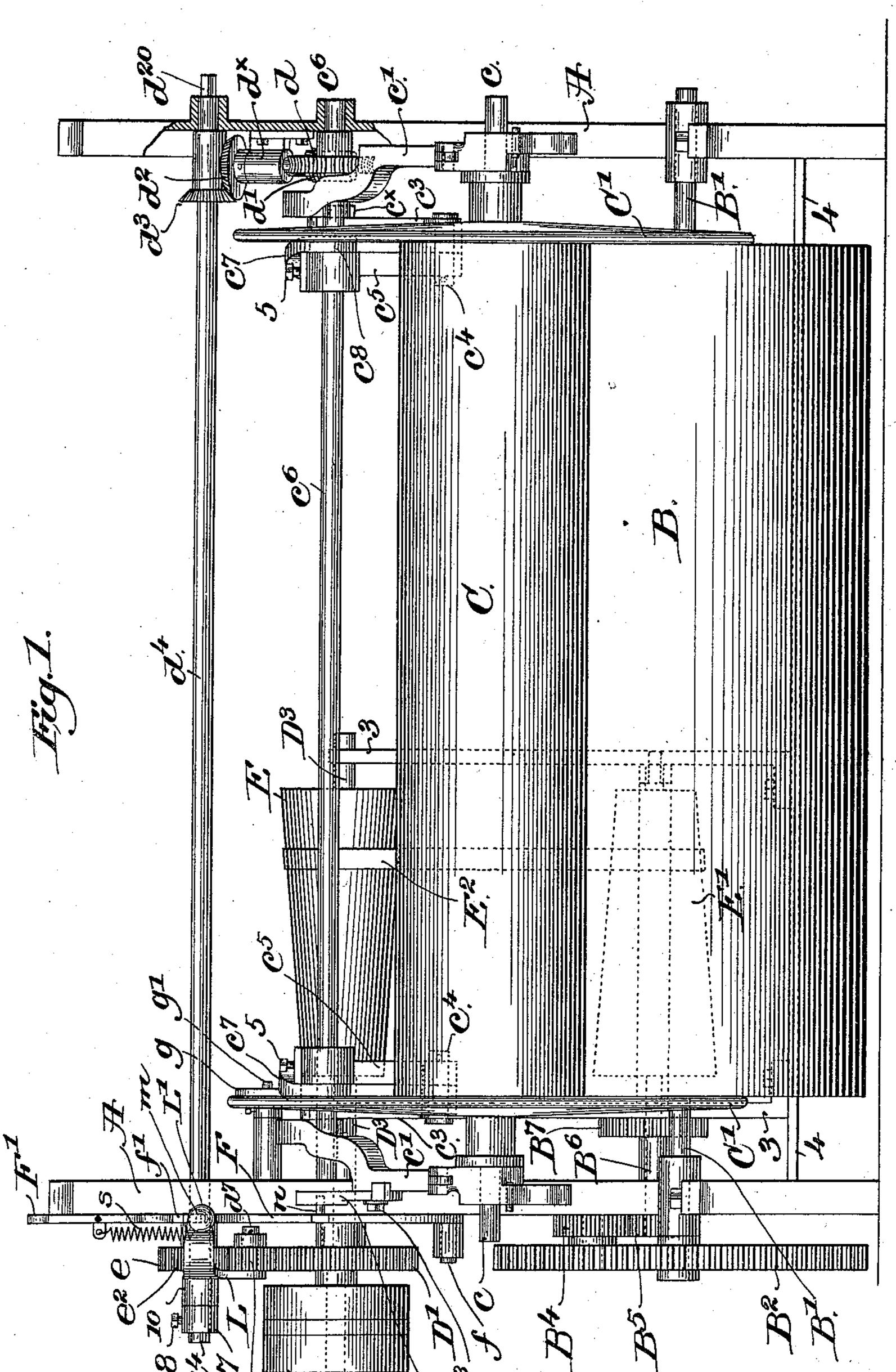

Fig. 1.

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John F. C. Brinkerhoff

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(No Model.) 2 Sheets—Sheet 2.

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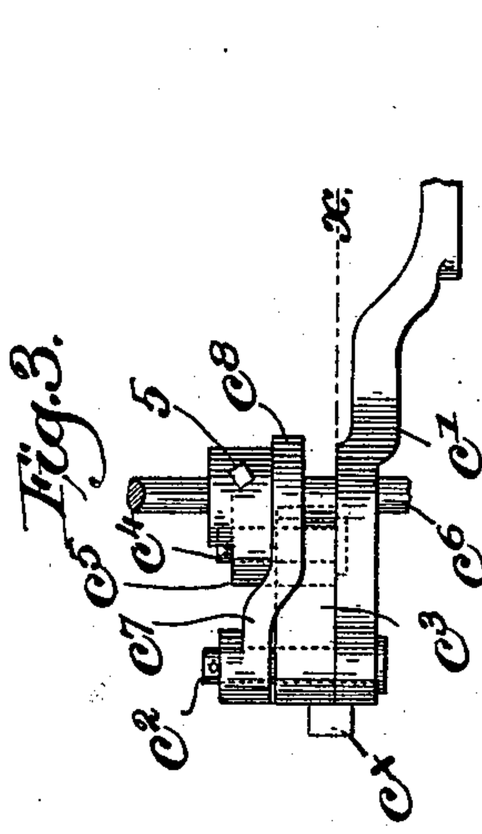
Fig. 3.

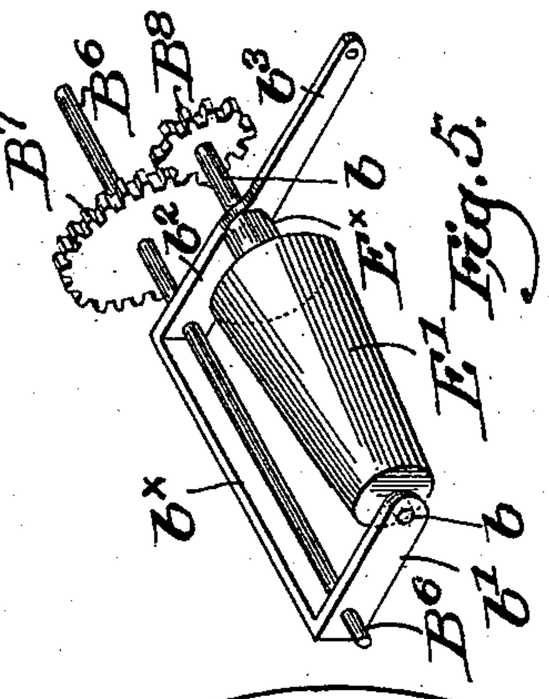
Fig. 5.

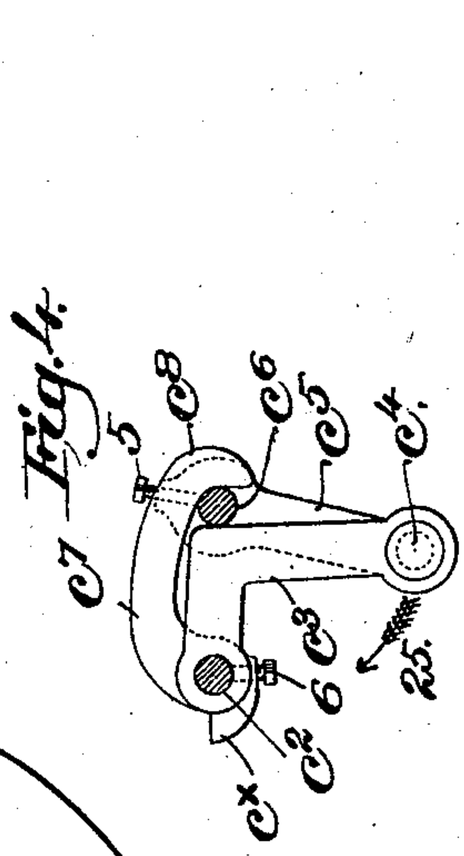
Fig. 4.

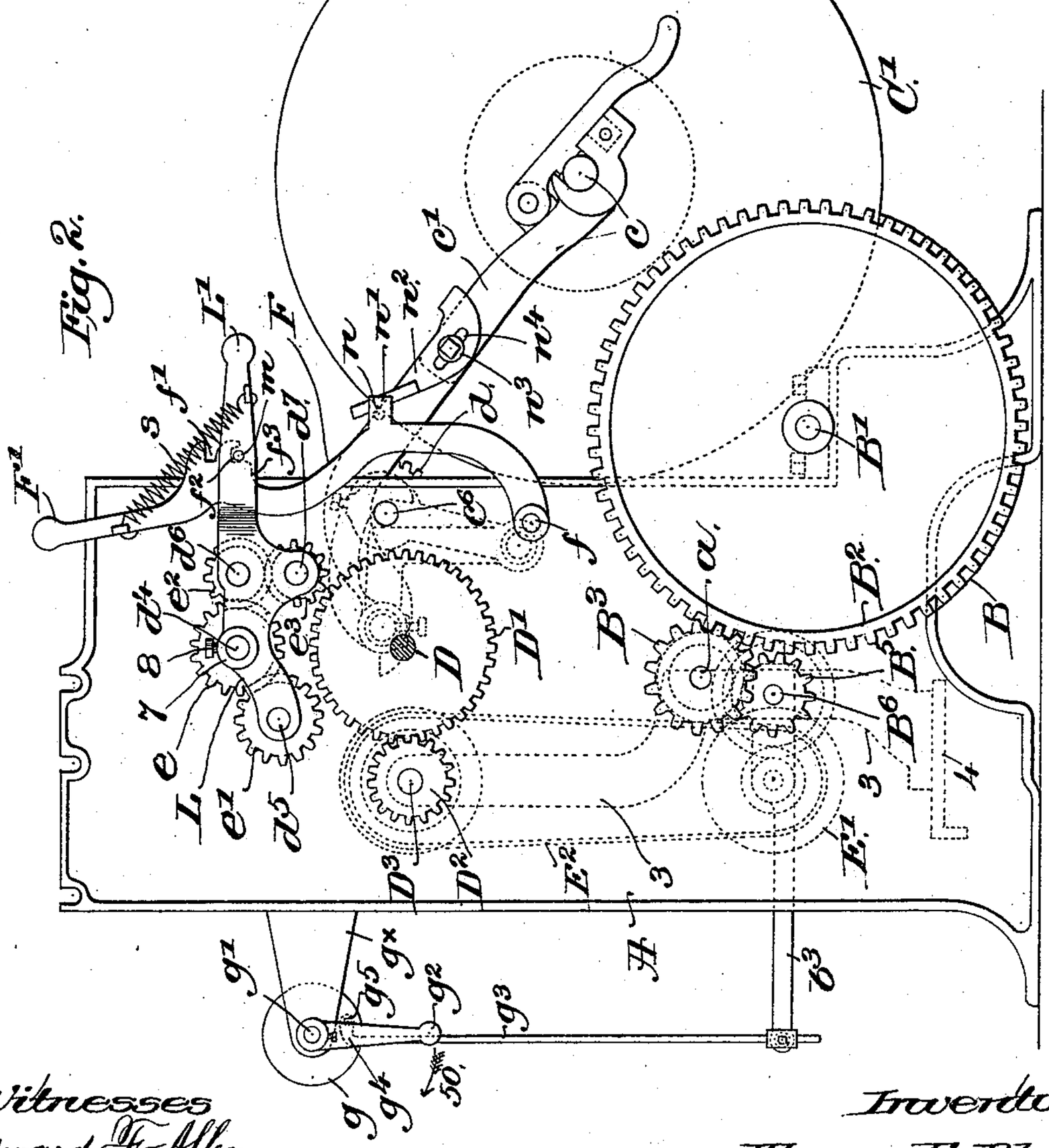
Fig. 2.

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UNITED STATES PATENT OFFICE.

ALONZO E. RHOADES, OF HOPEDALE, MASSACHUSETTS, ASSIGNOR TO THE HOPEDALE MACHINE COMPANY, OF SAME PLACE.

MECHANISM FOR HANDLING BEAMS OF WARPING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 504,457, dated September 5, 1893.

Application filed March 24, 1893. Serial No. 467,481. (No model.)

To all whom it may concern:

Be it known that I, ALONZO E. RHOADES, of Hopedale, county of Worcester, State of Massachusetts, have invented an Improvement in Mechanism for Handling Beams of Warping-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

This invention relates to that class of warping machines wherein the beam rests upon and is rotated by a winding drum, and has for its object the production of mechanism for doffing and replacing the warp beam by or through the drum actuating devices means being provided for stopping the rotation of the drum while the beam is being doffed or replaced.

In accordance therewith my invention consists in a warping machine, a beam driving drum, beam supporting arms having bearings for the journals of the beam which is to rest on and be rotated by said drum, and movable fulcra for said arms, combined with an independent operating shaft, connections between said shaft and said fulcra, and suitable means including normally disconnected actuating and reversing mechanism adapted to be brought into engagement with and to rotate said shaft at times in one or the other direction and thereby move the fulcra of and raise or lower said arms and warp-beam, substantially as will be described.

Figure 1 is a front elevation, partly broken out, of a warping machine embodying my invention. Fig. 2 in elevation represents the left hand end of the machine shown in Fig. 1, with the speed changing pulley omitted. Fig. 3 is a detail to be referred to, and Fig. 4 is a sectional view thereof, taken on the line x. Fig. 5 is a detail to be referred to.

The frame A, of suitable shape to sustain the operating parts, is provided with bearings to receive the shaft B′ of the usual driving drum B, the said shaft being extended beyond the frame at one side and having fast thereon a gear B^2, (see Figs. 1 and 2,) in mesh with a smaller gear B^3, sleeved on a short shaft a secured to the frame, said sleeve having fast thereon a pinion B^4, see Fig. 1, in mesh with a pinion B^5 fast on a shaft B^6 having its bearings in the side frame A and in the two uprights 3, 3, secured to a cross girth 4 connecting the sides of the frame near their lower ends, (see Fig. 1.) A gear B^7 is fast on the shaft B^6 and engages a smaller gear B^8 secured to a shaft b, having its bearings in arms b', b^2, pivotally supported on the shaft B^6 and connected by a cross piece $b^\times$, (see Fig. 5,) the arm b^2 having an extension b^3, for a purpose to be described. A cone pulley E′ is secured to the shaft b between the arms b', b^2, longitudinal motion therein being prevented by an extension or collar $E^\times$, (see Fig. 5.)

A short shaft or stud D extends from one side of the frame and has sleeved thereon a speed-changing pulley P, see Fig. 1, of usual construction, and a gear D′ secured to or rotated by said pulley engages a smaller gear D^2, fast on a shaft D^3, having its bearings in the frame and in the upper ends of the uprights 3, 3, see Figs. 1 and 2, said shaft D^3 having fast thereon a cone pulley E, arranged reversely to the cone pulley E′, as shown by full and dotted lines Fig. 1. Motion is transmitted in the usual manner to the pulley P by a belt, not shown, and thence through the gears D′, D^2, to the shaft D^3 and driving cone pulley E, connected by belt E^2 with the driven cone pulley E′, which in turn rotates the driving drum B through the gears B^8, B^7, B^5, B^4, B^3 and B^2, as described.

The parts are shown in Figs. 1 and 2 as in position to begin the filling of a beam C, of usual construction, provided with the usual enlarged heads C′, and journals c adapted to be supported in suitable bearings in the lower ends of supporting arms c', said arms being herein shown as bent inward and downward at their upper ends and pivoted each on like studs c^2 extended through the upper ends of elbow levers c^3 and held fast therein by set screws 6, see Figs. 2 and 4, said studs forming movable fulcra for the supporting arms. Each of said elbow levers has a projection $c^\times$ at its upper end extended rearwardly and to one side of its center line, as best shown in Fig. 3, and cut away at its upper side to receive therein the rounded end of the supporting arm c', forming a species of knuckle joint therewith. The lower ends of said elbow levers c^3 are pivotally connected at c^4 to

arms c^5, rigidly connected by suitable set screws 5 to a shaft c^6 extended across the machine from side to side, and a link c^7, having an offset hooked end c^8, is pivoted on each fulcrum stud c^2, the hooked ends of said links engaging the shaft c^6 adjacent to the arms c^5, and between them and the supporting arms c', as shown in Figs. 1 and 3, said links limiting the movement of the supporting arms in one direction. A worm-wheel d is secured to one end of the shaft c^6, (see Fig. 1,) engaged and rotatable by a worm d' supported in a suitable bearing $d^\times$ secured to the inside of the frame A, as clearly shown in Fig. 1, said worm having secured to its upper end a bevel gear d^2 in mesh with a bevel gear d^3, fast on an operating shaft d^4 having its bearings in and extended beyond each of the side frames A, (see Fig. 1.) A bent reversing lever L, see Figs. 1 and 2, is pivotally supported by its hub 10 on one end of the shaft d^4 beyond the frame-work, and retained thereon by a collar 7 secured to the shaft by a set screw 8, said lever being provided with a handle L', and also with projections or ears through which suitable studs d^5 and d^7 are extended inwardly to support loosely thereon gears e' and e^3 respectively. A gear e is secured to the operating shaft d^4 between the lever and frame, in mesh with the gear e' and also with an intermediate gear e^2 loose on a stud d^6 carried by the reversing lever L, said intermediate gear in turn engaging the gear e^3, the latter gear and the gear e' being adapted to be brought into mesh with the gear D' by depressing or raising the handle L', the parts being in neutral position in the drawings, the gears e', e^2, and e^3, with the lever L, forming actuating and reversing mechanism for the operating shaft d^4. The lever L has a pin or projection m on its inner side, adapted to enter one or the other of a series of depressions or notches f', f^2, f^3, in a locking lever F, pivoted at its lower end to the frame by a suitable stud f, said locking lever having a handle F' and being connected by a spring s with the reversing lever L, as best shown in Fig. 2, to normally draw them toward each other.

Referring now to Figs. 2 and 5, a disk g fast on a shaft g' is supported in suitable bearings in a bracket or standard $g^\times$ secured to or forming part of the frame, a handle g^2, secured to the shaft g', being provided to rotate the disk g, to which a link g^3, bent at g^4, is pivoted at g^5, the lower end of said link being attached to the extension b^3 of the arm b^2, as shown.

The parts thus described constitute a drum controlling device whereby its rotation may be started or stopped, as will now be explained. Rotation of the handle g^2 in the direction of the arrow 50 will turn the disk g a little more than one hundred and eighty degrees, such rotation raising the link g^3, and thereby the outer ends of the arms b' b^2, turning them upon the shaft B^6 until the cone pulley E' has been raised sufficiently to slacken the connecting belt E^2, so that rotation of the cone pulley E will no longer be communicated to E'. When the disk g has been turned until the end g^5 of the link is above and to the right of the shaft g', viewing Fig. 2, the link below the bend g^4 will rest against said shaft. In such position the controlling device is locked, for the weight of the parts connected to the link keeps the same against and prevents rotation of the shaft g', at the same time exerting a downward pull upon the link at one side of the center of the disk. While the controlling device is thus locked the drum will not be rotated, and the beam may be doffed or replaced. As the arms b', b^2 are pivoted upon the shaft B^6 the gear B^8 will move around the circumference of the gear B^7 when the cone pulley E' is raised or lowered by the devices described.

In the operation of the apparatus herein shown and described, when the winding drum B is rotated the yarn will be wound upon the warp beam C, and at the beginning of the operation the parts will be as shown in the drawings, and as the diameter of the mass of yarn upon the beam increases, the supporting arms c' will be turned upon their fulcrum points c^2 until the beam has been filled.

In order to doff the beam the handle g^2 of the drum-controlling devices is turned as described until the belt e^2 is sufficiently slackened and the rotation of the winding drum stopped, and then the handles L' and F' of the reversing and locking levers L and F are grasped by the operator and separated sufficiently to remove the pin m from the notch f^2 and into the notch f', such movement of the lever L depressing the rear end thereof and bringing the gear e' in engagement with the gear D' which is continuously rotated, as has been described, and its rotation is thus transmitted through the gear e' to the gear e fast on the operating shaft d^4 to turn the bevel gears d^3 and d^2 and thereby the worm d'. The rotation of the worm d' is transmitted to the worm gear d fast on the shaft c^6 in such direction that the arms c^5 and elbow levers c^3 are turned in the direction of the arrow 25 (Fig. 4), such movement of the elbow levers moving the fulcra c^2 upward and in a forward direction carrying with them the supporting arms c', and as the rotation of the shaft c^6 is continued, the said arms will be carried forward sufficiently to lower the beam C over the surface of the winding drum to the floor, and during such movement the projection $c^\times$ will move about the rounded upper ends of the supporting arms c' until they impinge against the upper sides thereof and act to force the said supporting arms forward and downward in a rigid and positive manner. When the beam has been doffed, the levers F and L are again grasped and moved until the pin m is brought into the notch f^2, pending the substitution of an empty beam for the full one just doffed. An

empty beam having been put in position in the bearings therefor in the lower ends of the supporting arms c', the handle L′ of the reversing lever L is depressed until the pin m rests in the depression f^3 of the lever f, and thereby the gear e^3 is brought into engagement with the large gear D′, which through the gears e^3 and e^2 transmits motion to the gear e fast on the operating shaft d^4, and thence to the worm wheel d as heretofore described, with this difference, however, that the worm wheel d and shaft c^6 are now rotated in the opposite direction, and as a result of such opposite rotation the supporting arms c' will be drawn upward and toward the rear until the parts regain the position shown in Figs. 2 and 4, the hooked ends c^8 of the links c^7 at such time engaging the shaft c^6 and preventing backward movement of the actuating arms.

In order that the rotation of the shaft c^6 may be stopped simultaneously with the engagement of the hooked links c^7 therewith, I have provided a releasing device, herein shown as a pin n projecting inwardly from a suitable lug or ear n' of the locking lever F, said pin or projection n being in the path of movement of the beveled end of a block n^2, carried by one of the supporting arms c', (see Figs. 1 and 2,) and secured thereto in adjusted position by a bolt n^3 extended through a slot n^4 in said plate. When the gear e^3 is in engagement with the gear D′ and the pin m is in the recess f^3, the spring s will draw the lever F forward slightly upon its pivot f, and when the supporting arms c' are drawn up by the rotation of the shaft c^6 as described, the beveled end of the block n^2 will be brought against the pin n on the lever F, and as the supporting arms are moved a little farther, the said block will press the lever F back until the pin m is free from the depression or notch f^3 up into the notch f^2, owing to the tension of the spring s, and raising the handle of the reversing lever L, thus quickly disengaging the gear e^3 from the gear D and stopping instantly the rotation of the shaft c^6. The shaft c^6 is locked from rotation in either direction by the worm d' engaging the worm wheel d, as described. It will be seen that if the operator should fail to move the lever L into neutral position when the beam had been brought into proper position, no damage would ensue, as the automatic action of the releasing device just described will move said lever into a neutral or inoperative position.

In case it should be desired to rotate the operating shaft d^4 by hand, I have herein shown the right-hand end thereof, viewing Fig. 1, as extended beyond the frame and squared as at d^{20}, to receive a suitable crank-arm thereon by which it may be turned to doff or replace a beam.

In another application pending concurrently herewith, Serial No. 467,483, filed March 24, 1893, I have shown means for shifting the belt E^2 from one to the other end of the reverse cone pulleys E and E′ to alter the speed thereof during the winding of the beam, but as such mechanism forms no part of this invention it is not herein illustrated.

This invention is not limited to the precise construction and exact arrangement of the co-operating parts, for it is obvious that the connections between the continuously rotating gear and the beam supporting arms may be changed without departing from my invention.

I claim—

1. In a warping machine, a beam driving drum, beam supporting arms having bearings for the journals of the beam which is to rest on and be rotated by said drum, and movable fulcra for said arms, combined with an independent operating shaft, connections between said shaft and said fulcra, and suitable means including normally disconnected actuating and reversing mechanism adapted to be brought into engagement with and to rotate said shaft at times in one or the other direction and thereby move the fulcra of and raise or lower said arms and warp-beam, substantially as described.

2. A beam driving drum, actuating mechanism therefor, and an operating shaft independent of said mechanism, combined with beam supporting arms having bearings for the journals of the beam to be rotated by said drum, movable fulcra for said arms, connections between said operating shaft and fulcra, and reversing mechanism intermediate the operating shaft and actuating mechanism, whereby said shaft may be rotated in one or the other direction to moye the fulcra of and raise or lower said arms and warp-beam supported thereby, substantially as described.

3. In a warping machine, a beam driving drum, actuating mechanism therefor, a controlling device intermediate said drum and mechanism to disconnect them at times, and an independent operating shaft, combined with beam supporting arms having bearings for the beam journals, movable fulcra for said arms, connections between said fulcra and said shaft, and gearing between said mechananism and shaft to rotate the latter in one or the other direction, to doff or replace the beam, substantially as described.

4. In a warping machine, supporting arms to support the warp-beam, movable fulcra for said arms, and an operating shaft connected with and to move said fulcra, combined with normally in-operative mechanism to rotate said shaft, a locking lever to maintain said mechanism in abnormal position to move the fulcra and place a beam in position to be wound, and an automatic releasing device to move said locking lever and stop the shaft actuating mechanism when the beam is in place, substantially as described.

5. In a warping machine, supporting arms to support the warp-beam, movable fulcra for said arms, and an operating shaft connected

with and to move said fulcra, combined with mechanism to rotate said shaft and move the fulcra to place a beam in position to be wound, stops to limit the movement of said fulcra in one direction, and a releasing device to automatically disengage said shaft and its actuating mechanism when the beam is in place, substantially as described.

6. In a warping machine, warp beam supporting arms, movable fulcra therefor, an operating shaft for and connected with said fulcra, and mechanism for rotating said shaft, combined with reversing and locking levers for said mechanism, a projection on one lever and a series of recesses in the other lever, and a yielding connection between said levers to normally hold said projection in one of said recesses, to thereby maintain said mechanism in-operative or in position to rotate the shaft in one or the other direction, substantially as described.

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

ALONZO E. RHOADES.

Witnesses:

GEO. E. STIMPSON,

H. W. BRACKEN.