

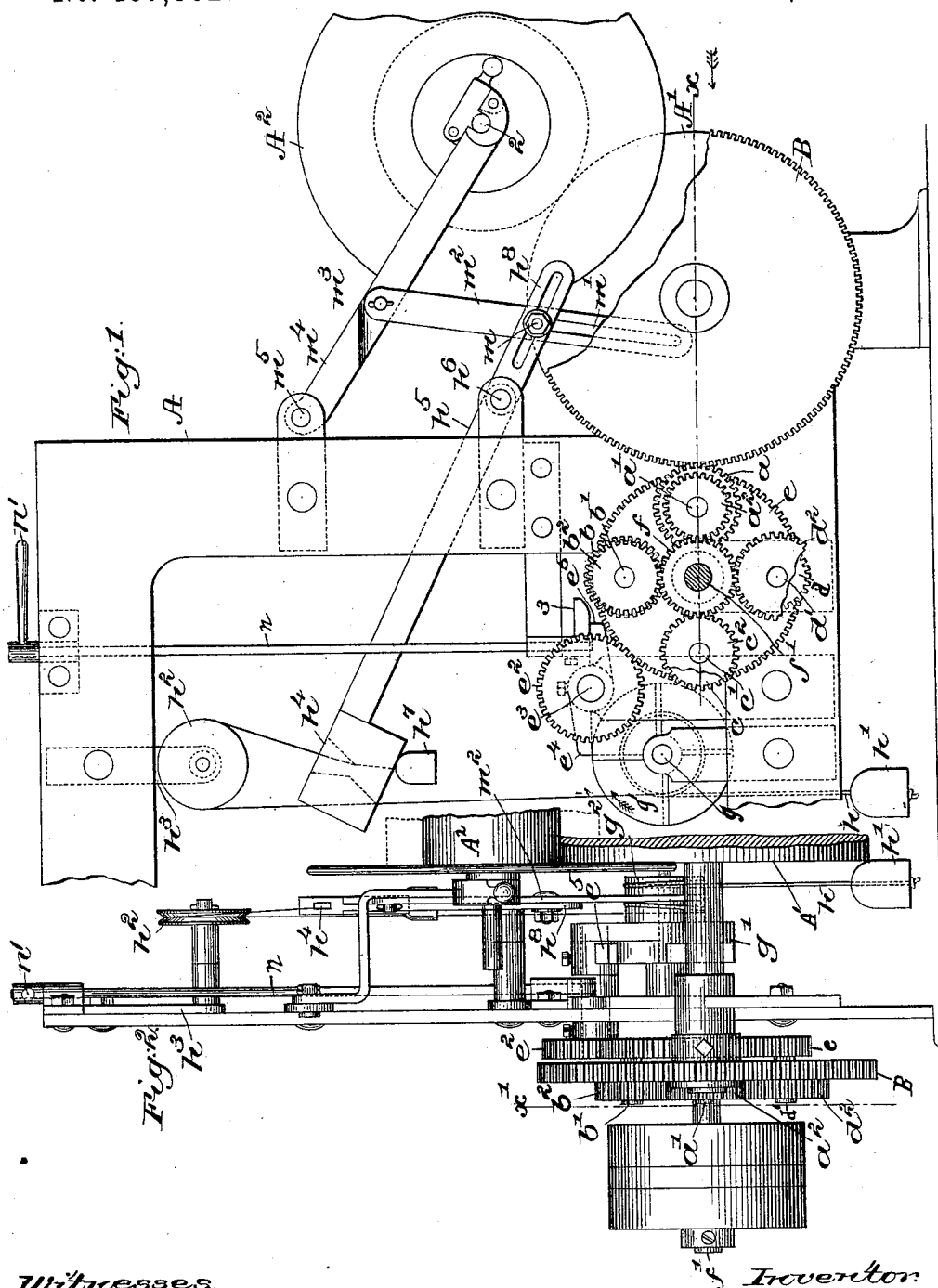
(No Model.)

2 Sheets—Sheet 1.

A. E. RHOADES.
WARPING MACHINE.

No. 487,682.

Patented Dec. 6, 1892.



Witnesses.

Fred S. Grumbach.
Edward F. Allen.

Inventor

Alonzo E. Rhoades
by Crosby Gregory Atty.

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Fig: 4.

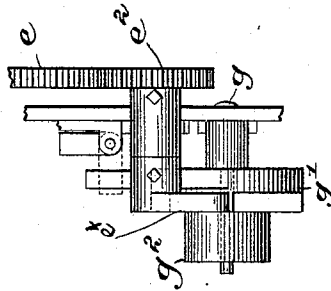
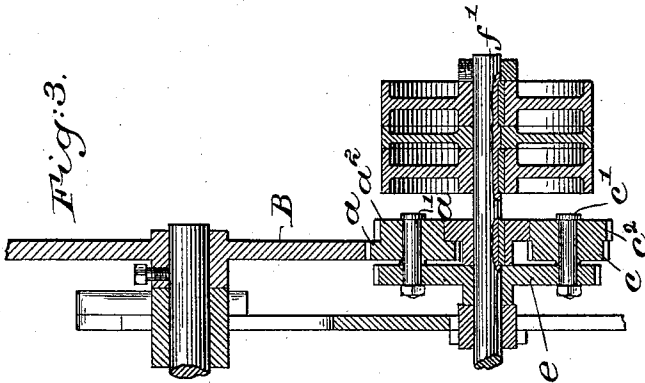


Fig: 3.



Witnesses.

Fred S. Greenleaf.
Edward Allen.

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by Crosby & Gregory
Attys.

UNITED STATES PATENT OFFICE.

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

WARPING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 487,682, dated December 6, 1892.

Application filed June 28, 1892. Serial No. 438,264. (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 Warping-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters and numerals on the drawings representing like parts.

This invention has for its object to improve the action of warping-machines, especially the parts employed for winding the yarn on the beam, so that the rotation of the driving-drum may be varied, according to the increase in diameter of the yarn wound on the beam.

In accordance with my invention, I have combined with the winding-drum a system of speed-changing gearing, whereby at intervals by or through the action of the controlling device governed by the varying diameter of the yarn on the beam a slower speed to the winding-drum is gradually brought into action.

Figure 1 is a partial end elevation of a sufficient portion of a warping-machine, the driving-pulleys at the left of the dotted line x' , Fig. 2, being omitted, to enable my invention to be understood. Fig. 2 is a partial elevation of the device shown in Fig. 1, looking at the same in the direction of the arrow, Fig. 1. Fig. 3 is a partial section in the line x , Fig. 1; and Fig. 4 is a partial plan view of the speed-changing gearing and some of its co-operating parts.

The framework A, the winding-drum A', and the winding-beam A², having a journal, as 2, at each end, are and may be all as common in warping-machines. The shaft of the drum A' has fast upon it a toothed gear B, which is adapted to be driven by either of a series of pinions $a b c d$, mounted loosely upon studs, as $a' b' c' d'$ of a larger pinion e , each of said pinions in succession having connected to or forming part of it pinions, as $a^2 b^2 c^2 d^2$. The pair of pinions a and a^2 vary in size, as do also the pairs of pinions b and b^2 , c and c^2 , and d and d^2 , their variations being such as to provide for differences in speed of rotation of the toothed gear B. The pinions $a^2 b^2 c^2 d^2$ are all in mesh with a pinion f , fast

upon a shaft f' , which in practice will be provided with suitable fast and loose pulleys, which receive upon them their driving-belt employed to rotate the machine. The pinion e is loose on the shaft f' and is engaged by a pinion e^2 , fast on a shaft e^3 , having suitable arms $e^4 e^5$ extended in opposite directions and set one at one side, the other in a vertical plane. Substantially parallel to the shaft e^3 is a stud g , on which is mounted an escape-wheel g' , having attached to or forming a part of it a cord-drum g^2 , the said escape-wheel having portions of its periphery, as herein shown, at ninety degrees apart, cut away for ninety degrees and at opposite sides of the escape-wheel, so that a pocket and a projection lie practically side by side. One arm, as e^4 , co-operates with one line of projections and notches or pockets, while the arm e^5 co-operates with another round of projections and pockets.

The cord-drum g^2 receives about it a cord h , shown as provided with a weight h' at its lower end, the cord being passed upwardly about a sheave h^2 , supported upon a suitable stand, as h^3 , and having its end extended down through a hole, as h^4 , in the weighted end of the lever h^5 , pivoted at h^6 , said cord at its end below said lever having, as herein represented, a second weight or projection, as h^7 . The lever h^5 is slotted at h^8 to receive a bolt or stud m , extended through a slot in a link m^2 , jointed at m^3 to a lever m^4 , pivoted at m^5 on a suitable stand or bracket attached to the frame, the said lever m^4 —there being one at each side of the frame—having suitable bearings for the journals 2 of the warp-beam upon which is to be wound the warp.

In the drawings the fastest speed of the speed-changing mechanism shown is represented as operating—that is, the pinion f in mesh with the pinion a^2 effects the rotation of the pinion a , which in engagement with the gear B rotates the winding-drum A' at its fastest speed, as when the warp is being first wound on the spool or beam A². Now as the beam increases in diameter the links m^2 , acting through the lever h^5 , will pull upon the cord h and gradually rotate the escape-wheel, it being supposed that the said wheel in the draw-

ings has been rotated nearly ninety degrees. In the further rotation of the escape-wheel in the direction of the arrow upon it in Fig. 1 the arm e^4 will dip into the pocket at the outer side of the escape-wheel, and thus leave the gear e^2 free to be rotated for ninety degrees or until the arm e^5 strikes the periphery of the escape-wheel opposite the pocket in which the arm e^4 entered.

10 Inasmuch as it will appear that the gear e is loose on the shaft f' carrying the pinion f used to rotate the pinion a and gear B, the said gear e in engagement with the gear e^2 is held by the latter pinion in place and the gear e^2 is held in place by the escape-wheel. 15 As soon, however, as the arm e^4 comes opposite the pocket referred to, then the strain upon the gearing, the gear e being no longer held positively, starts and effects the rotation of the gear e^2 for ninety degrees, or until the arm e^5 again strikes the locking-plate. This quarter-rotation of the gears e and e^2 will permit the pinion b to come into driving engagement with the gear B, and so long as the arm e^5 acts upon the periphery of the escape-wheel so long will the pinion b be the driver, but at a slower speed, for the gear B. At the completion of the second quarter-rotation of the escape-wheel the arm e^5 will enter the pocket at the rear side of the wheel and the gear e will at once start rotating the gear e^2 until the arm e^4 again comes in contact with the periphery of the wheel, and at such second rotation the pinion c becomes the driver for the gear B. At the next release of the arm e^4 the same operation will take place and the pinion d will become the driver for the gear B, and consequently at that time the speed of the drum will be the slowest.

40 Prior to my invention I am not aware that a warping-machine has ever been constructed in such manner that the winding-drum could be driven at varying speed at different intervals as the beam was being filled, so that this invention is not limited to the particular form shown for the speed-changing gearing, and instead I may employ any other usual or suitable gearing whereby differences in speed of the gear B may be effected automatically.

50 To enable the arms e^4 e^5 to be held in proper position when it is desired to rotate the escapement-wheel, I have provided the machine with a rod n , having a handle n' , and at its lower end the rod has a shoe 3, which bears upon the arm e^5 or e^4 , and by partially rotating the rod n the shoe 3 may be made to stand across the arm e^5 or e^4 , whichever may be near it,

thus preventing the rotation of the shaft e^3 and gear e^2 .

This invention is not limited to the particular form shown for the escapement-wheel, and instead I may employ any usual or equivalent wheel or a device of the Geneva stop-motion order. The gear e constitutes a carrier for the series of pinions of varying diameters.

65 Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with a winding-drum and its gear, of a speed-changing gear and an escapement, the escapement enabling the speed-changing gear to be operated to effect differences in the speed of the winding-drum, substantially as described.

2. A winding-beam, a winding-drum therefor, a gear f , and a series of intermediate pinions of different diameters driven thereby, means for moving the series of pinions bodily, whereby by bringing either series of pinions between the gear f and gear of the winding-drum the speed of rotation of the winding-drum may be varied, and connections between the winding-beam and said means for moving the series of pinions, substantially as described.

3. A winding-beam, a winding-drum and its gear B, a shaft provided with a gear, as f , a series of gears of varying diameters adapted to be interposed singly between the said gear f and gear B, a carrier upon which the said pinions of varying diameter are mounted, and mechanism, including an escapement, to intermittently rotate said carrier, and connections between said escapement and winding-beam, to operate substantially as described.

4. A winding-beam, a winding-drum therefor, a shaft having an unvariable motion, variable-speed devices conveying rotation from the shaft to the drum, by which the said drum may be intermittently driven at different speeds, an escapement to enable the speed of said devices to be varied, and connections between the beam and said escapement, whereby the speed of said devices is directly controlled by the beam, 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:

MYRON J. BIGELOW,
C. F. ROPER.