

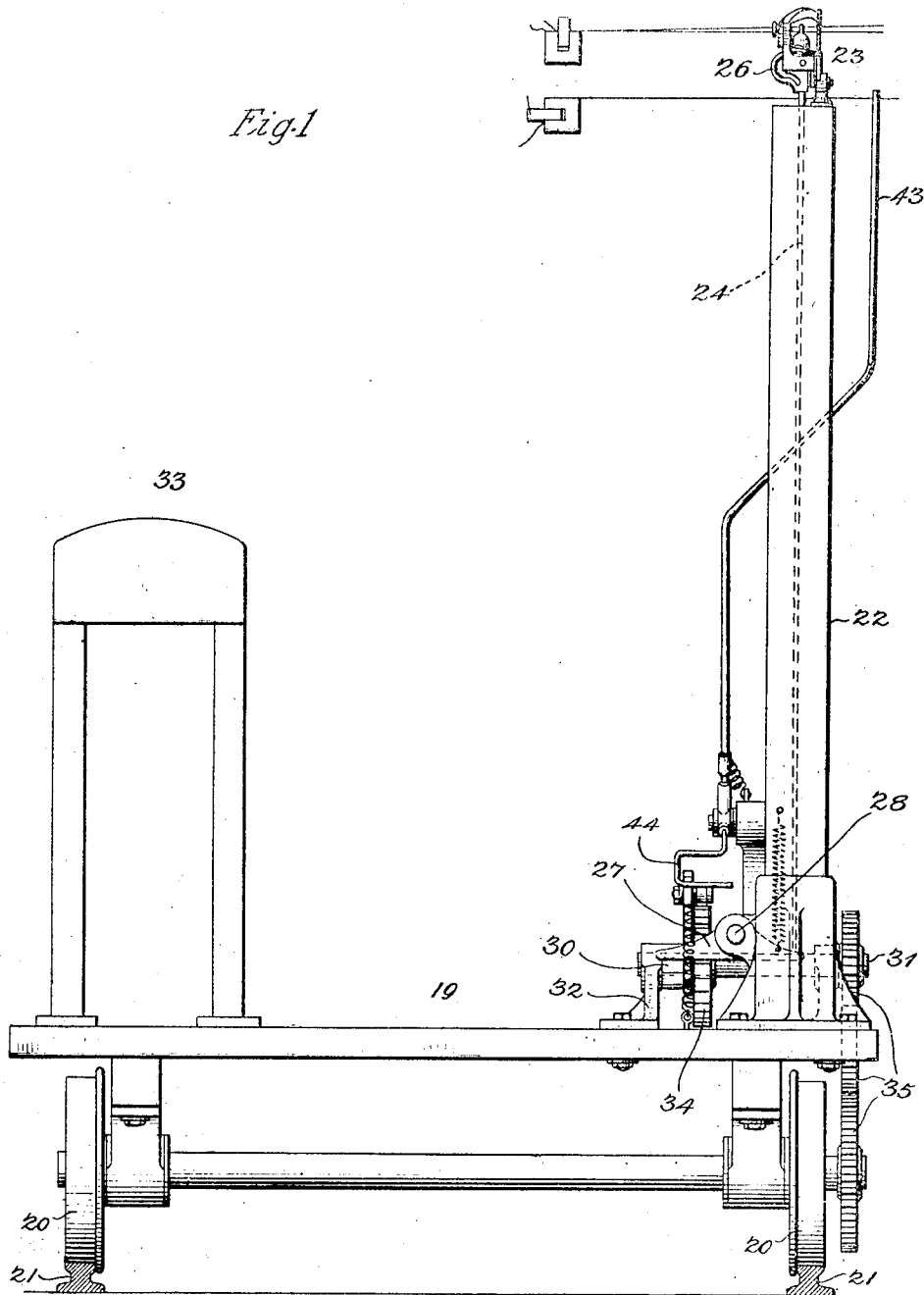
T. E. BINGHAM.
MACHINE FOR OPERATING UPON WARPS.
APPLICATION FILED SEPT. 28, 1910.

1,064,044.

Patented June 10, 1913.

3 SHEETS-SHEET 1.

Fig. 1



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3 SHEETS—SHEET 3.

Fig. 4.

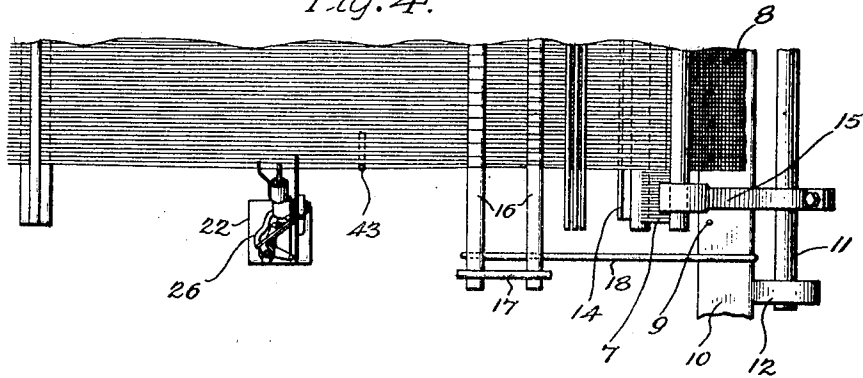
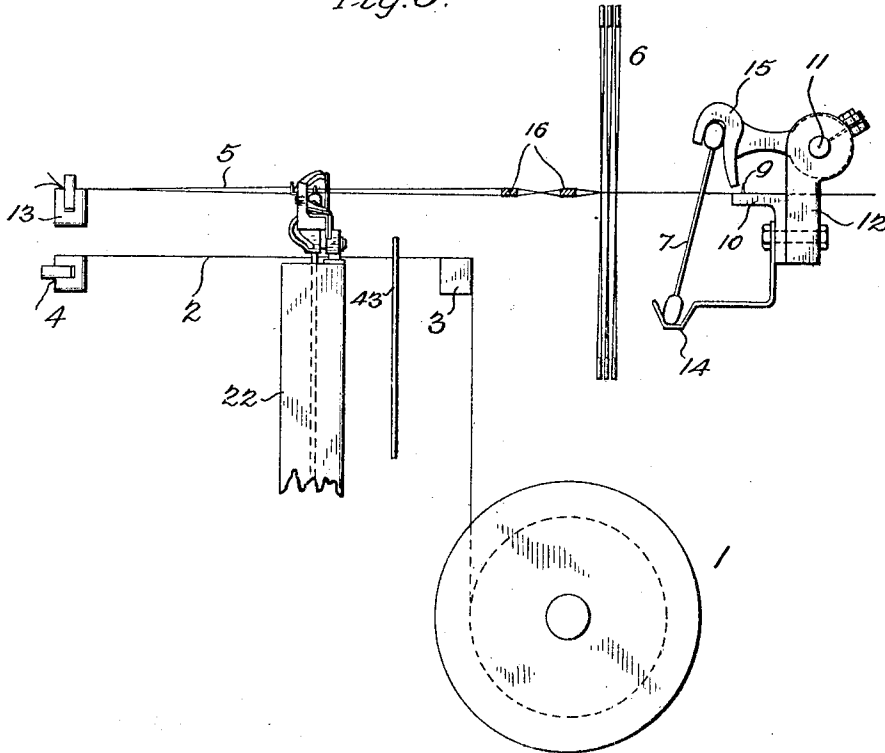


Fig. 5.



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UNITED STATES PATENT OFFICE.

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MACHINE FOR OPERATING UPON WARPS.

1,064,044.

Specification of Letters Patent.

Patented June 10, 1913.

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To all whom it may concern:

Be it known that I, THOMAS E. BINGHAM, a subject of the King of Great Britain, residing at Manchester, England, have invented certain new and useful Improvements in Machines for Operating Upon Warps, of which the following is a specification.

The object of my invention, generally stated, is to produce a simple machine for operating upon warps wherein some of the operations shall be manually performed, and which may be actuated by the operator.

In the accompanying drawings, Figure 1 is a side elevation of a warp-uniting machine embodying the features of my invention, a portion of the supports for the warps and the supports for the loom harness and the loom reed being omitted. Fig. 2 is a front elevation of the machine with all of the supports and the seat for the operator omitted. Fig. 3 is a horizontal sectional view taken in the plane of dotted line 3 3 of Fig. 2. Fig. 4 is a fragmental top plan view of the supports for the warps and the reed. Fig. 5 is a side elevation, somewhat diagrammatic, of the warp supports and the reed support, showing also the warp-uniting mechanism and the upper portion of the sensitive feeler that governs the feed movement of the mechanism.

In the present embodiment of the invention the work is stationarily supported and the operating mechanism is arranged to travel transversely of the work. The warps, the harness and the reed may be supported in any suitable manner, as, for example, in a frame generally similar to that shown in United States Patent No. 933,383, to Howard D. Colman.

1 indicates the loom beam upon which the new warp 2 is wound.

3 is a stationary bar across which the new warp extends, and 4 is a suitable holding means, such as a tongue-clamp, in which the free end of the new warp is held, the portion of the warp extending between the bar 3 and the clamp 4 being, in this instance, substantially horizontal.

5 indicates a section of warp removed from a loom, with the harnesses 6 and the reed 7 in place thereon. One end of the warp 5 terminates in a strip of fabric 8 (Fig. 4) cut from the cloth last woven in the loom, said

strip being secured in place in any convenient manner, as, for instance, by being impaled upon pins 9 carried by a bar 10, said bar being secured to a rod 11 by brackets 12. The rod 11 may be slidably mounted in the work-supporting frame in any suitable way, as, for example, that illustrated in the Colman patent hereinbefore referred to. The other end of the section of warp 5 may be held by any preferred means, such as a tongue-clamp 13 forming a part of the work-supporting frame. The harnesses 6 may be suspended in any desired way, as, for example, that indicated in said Colman patent. The reed 7 is herein shown as supported by a channel 14 secured to the pin bar 10, said channel being arranged to receive the lower edge of the reed. The upper edge of the reed is releasably engaged by clips 15 which are pivotally mounted upon the rod 11. The weft of the fabric 8 bears against the rear side of the reed.

I have herein shown the old warp as leased over two rods 16, said rods being releasably held together by means of caps 17 slidden over their ends. Brackets 18 attached to the pin bar 10 underlie the lease rods in position to support the ends of the latter. As shown in Figs. 2 and 5, the two warps lie substantially parallel and in a horizontal plane.

The warp-uniting mechanism is mounted upon a carriage 19, said carriage being provided with wheels 20 arranged to roll upon rails 21 extending transversely of the warps. At the rear end of the carriage 19 is fixed a standard 22 upon the upper end of which is rigidly mounted a thread-uniting mechanism 23. In this instance the uniting mechanism is arranged to unite the threads by means of knots. Any suitable form of uniting mechanism may be employed, that herein shown being similar to the knoter illustrated in United States Patents Nos. 672,636 and 755,110 issued to Howard D. Colman. As indicated in the drawings, the uniting mechanism is supported adjacent to the horizontal planes of the warps.

The means herein shown for actuating the uniting mechanism comprises a link 24 pivoted at its upper end to a crank arm 25 fixed to the actuating sector 26 of the knoter. The lower end of said link is pivotally connected to one arm of a lever 27, which

lever is pivotally supported at 28. A spring 29 attached at one end to said lever, and at its other end to a point upon the standard 22, tends to rock said lever in the direction to restore the knot-tying mechanism to its initial position. A foot lever or treadle 30 is pivotally mounted upon a shaft 31, which shaft is carried in bearing brackets 32 fixed to the carriage. One end of the foot lever 30 underlies one end of the lever 27. A seat 33 of any suitable construction may be placed upon the carriage in a position convenient for the operation of the machine. It will be seen that when the treadle is depressed by the operator, the knotter 23 will be actuated to unite threads that may be presented to it, and that when the operator releases the treadle the spring 29 restores the knotter to its initial position.

The selection of threads from the warps, and the presentation of said threads to the knot-tying mechanism, may be accomplished manually by the operator when seated upon the seat 33, the foremost thread of the old warp being selected with, say, the left hand, the foremost thread of the new warp being selected with the right hand, and both threads placed in the knotter with the right hand. When selecting the threads, the operator may rest his left hand upon the adjacent lease rod 16, the brackets 18 being provided partially for the purpose of supporting the weight thus placed on the lease rod, and partially to support the lease rods as the upper warp threads are severed and tied to the lower warp threads by the knotter.

It will be apparent from Fig. 5 that the work and the mechanism are so supported that there is a clear space above the warps which renders manual selection of the threads possible.

The selection of the threads and the presentation of the same to the uniting mechanism being manual, it is desirable that said mechanism be under the immediate control of the operator; hence I have, in this embodiment, provided a knotter adapted for intermittent operation and arranged for actuation by the operator.

The means herein shown for moving the carriage 19 so as to carry the knot-tying mechanism across the warps comprises a ratchet wheel 34 fixed upon the shaft 31, said shaft being connected by means of a gear train 35 with one of the axles of the carriage 19. A bell-crank lever 36 is pivotally mounted upon the shaft 31, and carries upon one of its arms a pivoted pawl 37 adapted to engage the ratchet wheel 34, the other arm of said bell-crank lever underlying a pin 38 fixed in the foot lever 30. A spring 39 tends to rock the bell-crank lever in the direction to give the pawl 37 its restoring movement. It will be seen that when the operator depresses the treadle 30

the pawl and ratchet wheel will be actuated to traverse the carriage transversely of the warps.

In order that the feed movement of the carriage shall be proportionate to the rate at which the tying of the warps progresses, I provide a two-arm lever 40 pivotally supported at 41 upon a bracket 42 fixed to the carriage. Said lever comprises an upwardly-extending arm or feeler 43 arranged to lie in contact with the foremost thread of the lower or new warp. The other arm 44 of said lever is bent into hook form, as indicated in Figs. 1 and 3, to engage the pawl-carrying arm of the bell-crank lever 36. The weight of the bell-crank lever 40 is counterbalanced, and the feeler 43 lightly held against the lower warp, by a spring 45. When the uniting mechanism is sufficiently near the warps, the contact of the feeler 43 with the foremost thread of the lower warp holds the hooked end of the arm 44 behind the bell-crank lever 36 so as to limit the restoring movement of the pawl 37. When the restoring movement of the pawl is thus limited, depression of the treadle is ineffective to advance the pawl far enough to turn the ratchet wheel 34. As the threads are withdrawn from the warp and united, the feeler 43 swings in the direction to maintain contact with the lower warp and in so doing the hooked end of the arm 44 is withdrawn from engagement with the bell-crank lever 36, whereupon the spring 39 is free to give the pawl 37 a complete restoring movement. The next depression of the treadle will cause the pawl to rotate the ratchet wheel 34 and thus feed the uniting mechanism toward the warps. I may, if desired, employ a brake or brakes to prevent overrunning of the carriage.

When all the threads of one warp have been tied to the corresponding threads of the other warp, the new warp may be drawn through the harness eyes by moving the pin bar 10 and the reed-support 14 rearwardly until the knots have passed through the heddle eyes. The reed may then be released from its support and drawn over the knots onto the new warp threads. It will, of course, be understood that the handling of the warps, harness and reed after the warps are united may be varied as desired.

The apparatus herein described facilitates the performance of manual operations upon textile elements, in that it comprises a carriage for the operator and means for moving the carriage to maintain operative relation between the operator and the work, said moving means being pedally actuated so that the operator may have the free use of both hands.

I claim as my invention:

1. In a warp-uniting apparatus, the combination of warp-uniting mechanism, a car-

riage for supporting the warp-uniting mechanism and the operator; means arranged to be actuated by the operator for actuating said mechanism and propelling said carriage; and means for controlling the rate of traverse of said carriage to suit the position of the threads being united.

2. In a warp-uniting apparatus, the combination of warp-uniting mechanism; a carriage for supporting the warp-uniting mechanism and the operator; a foot-operated lever on said carriage for actuating said mechanism and propelling said carriage; and means operated by the threads about to be united for controlling the rate of traverse of the carriage.

3. A warp-tying apparatus comprising stationary means for supporting the work; a knot-tying mechanism; a carriage for supporting the knot-tying mechanism and the operator; mechanism for intermittently operating the knotter; and carriage-moving means, said knotter-actuating means and carriage-moving means being located upon the carriage and being arranged for actuation by the operator.

4. In a machine for operating upon warps, stationary means for supporting the work; operating mechanism; a carriage for supporting the operating mechanism and the operator; a pedal on said carriage; a driving connection between said pedal and the operating mechanism; and carriage-moving means arranged to be driven by said pedal.

5. In a machine for operating upon warps, stationary means for supporting the work; operating mechanism; a carriage for supporting the operating mechanism and the operator, and arranged for movement transversely of the work; a foot lever pivoted between its ends upon said carriage; a lever pivoted between its ends upon said carriage, one end of the second mentioned lever being arranged to be engaged by one end of said foot lever; a link connecting the other end of the second mentioned lever with said operating mechanism, said foot lever being arranged to move said link in one direction; and means for moving said link in the opposite direction.

6. In a machine for operating upon warps, a stationary means for supporting the work; operating mechanism; a carriage for supporting the operating mechanism and the operator; a shaft supported upon said carriage; a foot lever pivotally supported upon

said shaft; a driving connection between said foot lever and said operating mechanism; an arm pivotally supported upon said shaft and arranged to be swung in one direction by said foot lever; means for swinging said arm in the opposite direction; a pawl carried by said arm; a ratchet wheel fixed upon said shaft, and arranged to be engaged by said pawl; and a driving connection between said shaft and said carriage.

7. In a machine for operating upon warps, stationary means for supporting the work; operating mechanism; a carriage for supporting the operating mechanism and the operator; pedal-actuated carriage-moving means located upon said carriage; and a sensitive feeler supported upon said carriage in position to engage the work and arranged to control said carriage-moving means.

8. In a machine for operating upon warps, a clamp for supporting one end of a section of old warp; means for supporting the other end of said section of warp; a clamp arranged below the first-mentioned clamp for supporting one end of a new warp; means cooperating with the second mentioned clamp for supporting a section of the new warp in a plane substantially parallel to and directly below the plane of the old warp, the space above said warps being unobstructed; operating mechanism; a carriage for supporting the operating mechanism and the operator; and pedal-actuated carriage-moving means located upon said carriage, and arranged for actuation by the operator.

9. A textile apparatus comprising a warp clamp and a rear member lying in substantially in the same horizontal plane for supporting a portion of a new warp with the warp beam behind and below said rear member, a warp clamp located above the other warp clamp, for supporting one end of a section of old warp, and means above and rearwardly of said rear member for supporting the cloth end of the section of old warp, whereby portions of the warps are disposed in substantially parallel planes one above the other, with a clear space in front of the warps and above the top warp.

In testimony whereof I affix my signature in presence of two witnesses.

THOMAS E. BINGHAM.

Witnesses:

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