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BEAM WARPING MACHINE.

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1,145,857.

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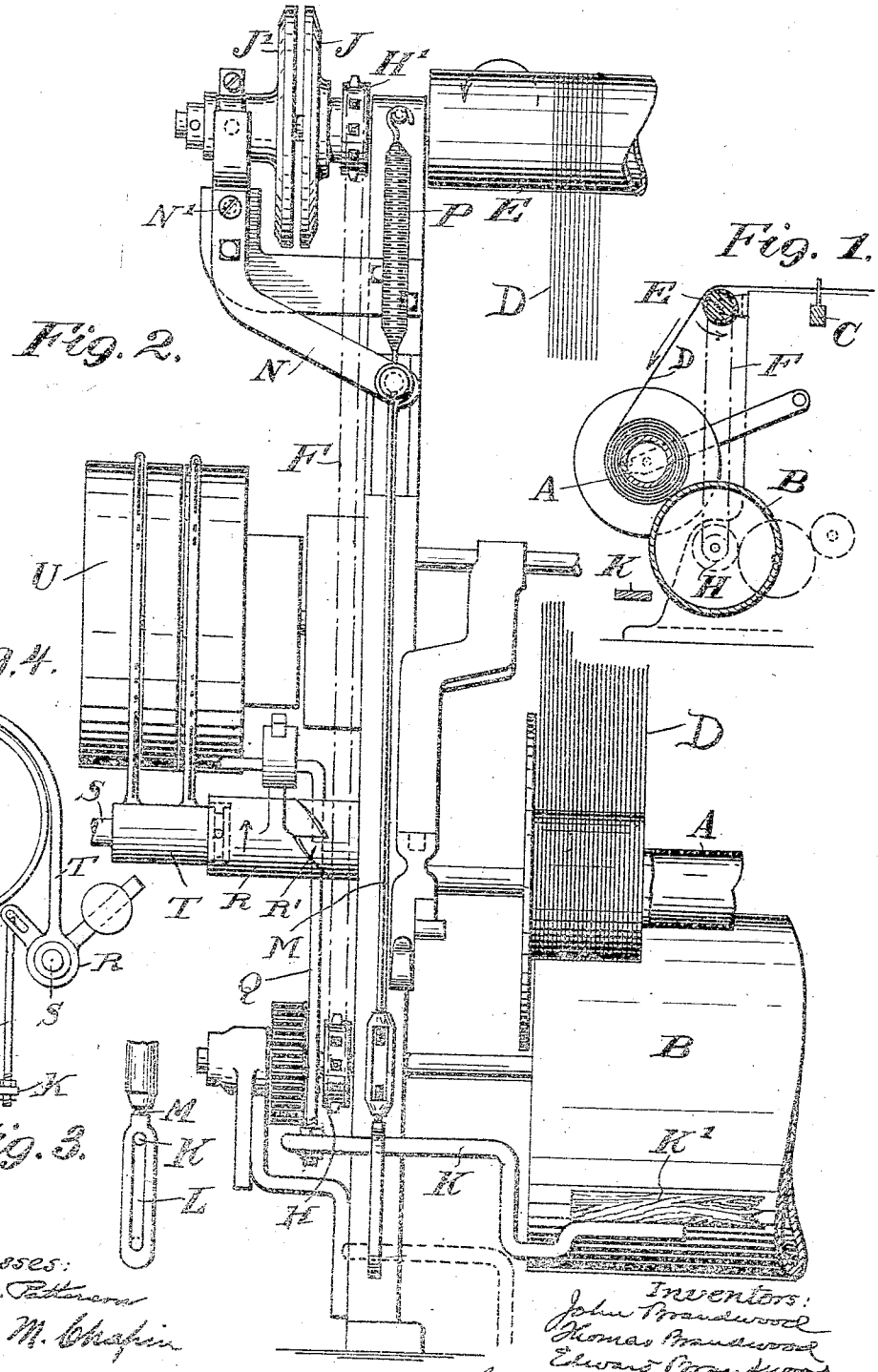


Fig. 2.

Fig. 1.

Fig. 4.

Fig. 3.

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UNITED STATES PATENT OFFICE.

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BEAM-WARPING MACHINE.

Specification of Letters Patent. Patented July 6, 1915.

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To all whom it may concern:

Be it known that we, JOHN BRANDWOOD, THOMAS BRANDWOOD, and EDWARD BRANDWOOD, all subjects of the King of Great Britain and Ireland, and all residents of Bury, in the county of Lancaster, England, have invented certain new and useful Improvements in Beam-Warping Machines, of which the following is a specification.

This invention relates to improvement in beam warping machines.

It consists in combining with such a machine a simple means or appliance by means of which the tension or the speed of travel of the warp threads proceeding to the beam to be wound thereon can be varied as desired so that the warp can be wound on the beam with any required degree of softness or looseness or of hardness and tension.

As such a machine is at present commonly constructed the beam, by its rotation, directly draws the yarns from the bobbins or the like in the creel or from other convenient source and winds them on itself either with or without the interposition of guide rollers. With such normal drawing there is a constant condition of tension throughout the lengths of yarns between the beam and the bobbins or other source of supply.

In carrying this invention into effect the beam is still solely responsible for drawing the yarns from the bobbins for winding upon itself, but between it and the creel is a controlling roller in contact with which the yarns pass and which is driven from a source outside the yarns in the same direction as the yarns. The contact between the yarns and the controlling roller is not sufficient for the latter to withdraw or unwind yarn from the bobbins; it is merely sufficient to enable the roller to vary the states of tension existing in the yarns on each side of it. Thus, if the controlling roller be driven at a surface speed slightly greater than the speed at which the yarns are being withdrawn from the bobbins by the pull of the beam, the extra frictional pull given to the yarns will tighten them up between the controlling roller and the bobbins and correspondingly slacken them between the roller and the beam. The yarns are thus presented to the beam in a slacker state than when the controlling roller is driven at the same surface speed as that at which the yarns leave the bobbins, and are wound on the beam in a softer condition or condition of less density.

Should the controlling roller be driven at a surface speed slightly less than the speed at which the yarns leave the bobbins, the slight retardation given by the roller to the yarns will tighten them up between the roller and the beam with a corresponding slackening between the roller and the bobbins. The yarns are then presented to the beam in a condition of greater tension than when the controlling roller is driven at the same surface speed as that at which the yarns leave the bobbins and are wound on the beam in a harder condition or condition of greater density.

When the controlling roller is driven at a surface speed which is the same as that at which the yarns leave the bobbins the effect of such controlling roller is *nil* as the tension put on the yarns between the roller and the beam is the same as that put on the yarns between the roller and the bobbins, and winding on the beam takes place at a density which is the same as that which would occur if the roller were absent.

The different required surface speeds of the positively driven controlling roller may be attained in various ways, as, for example, by driving the roller through a variable speed gear, or by altering the diameter of a roller which is driven at a constant number of rotations per minute, or by taking out a roller of one diameter and replacing it by another of a different diameter. In a convenient arrangement the positively driven roller itself may be of such a diameter and be so driven that it normally has a surface speed which is somewhat less than the normal speed of the warps. To bring its surface speed up to the normal speed of the warps the roller may be coated with leather or paper or cloth or even with paint until the required diameter is attained to give the surface speed desired. To obtain surface speeds higher than the normal speed of the warps the diameter of the positively driven roller can be still further similarly increased. To get back to the normal speed of the positively driven controlling roller the coatings may be removed.

The positively driven controlling roller may be driven in any suitable manner and

by any convenient devices, and is preferably driven through a clutch which is disconnected and stops before the beam is thrown out of drive and stops, and is not connected again until after the beam has started and commenced its normal drawing. With such an arrangement there is no over running and snarling of the yarn from the controlling roller when the beam stops and starts.

The accompanying drawings illustrate different parts of a beam warping machine constructed to embody our improvements and will now be referred to.

Figure 1 illustrates diagrammatically and to a small scale, in section transverse to the beam, such a machine. Fig. 2 represents certain parts of the machine in front elevation to a larger scale. Fig. 3 illustrates a detail. Fig. 4 is an end view of the belt shifter and connected parts.

A is the beam upon which the yarns are wound; B is the friction drum driving it; C is the comb or reed through which the yarns D pass on their way from the creel to the warp beam A. All these parts are of the well known construction and operation and no further description of them is here needed.

In carrying this invention into effect we provide a controlling roller E which is positively driven by the chain F in the direction of the arrows. The yarns D pass over and in contact with the roller E. The roller E is driven through a friction clutch, the chain F gearing with chain wheels H, H^1, fixed respectively to the shaft of the friction drum B and to the loose member J of the clutch. The fast member J^1 of the clutch can slide on its shaft although it always rotates therewith. India rubber disks or the like can be interposed between the two members J J^1 of the clutch.

Assume the machine to be stopped and the clutch of the controlling roller E open as shown in Fig. 2. The treadle K^1 is depressed and as it moves downward it imparts angular motion through the rod Q which has attached to it the helical clutch member R mounted on the shaft S on which shaft the belt shifter T is adapted to slide with the clutch member R. The angular motion given to the clutch member R against its fixed coöperating member R^1 results in motion being given to the belt shifter T so as to carry the belt away from the loose pulley upon which it is shown in Fig. 2 and to bring it on to the fast pulley U. This pulley shaft gears in any suitable way with the shaft of the drum B and rotates it. The beam A commences to wind. During this operation the extension K of the treadle K^1 has been passing idly down a slot L in the lower end of the rod M by which the controlling roller clutch is operated. The machine has properly started winding before the extension K reaches the bottom of the slot in M. Continued depression of the treadle then brings the extension K against the bottom of the slot L and the rod M is drawn down, tilts the bell crank lever N around its pivot N^1, moves the member J^1 of the clutch up against the rotating member J and positively drives the controlling roller E. According to the surface speed of the roller as compared to the normal speed of the warps the delivery of yarn to the beam may be accelerated, or such delivery may not be interfered with, or the yarn may be put under extra tension.

When the machine is to be stopped the rising of the treadle first disconnects the clutch of the controlling roller (under the pull of the spring P) owing to the ascent of the extension K in the slot L and then throws the friction drum out of gear to stop the winding by the usual devices operating with such a drum.

It is to be understood that the improved machine with the positively driven controlling roller is not only to be used for winding warps on a beam for treatment with liquid. Warps may be wound on a beam in the improved machine for any purpose.

What we claim is:—

1. A beam warping machine comprising a receiving beam adapted to wind a plurality of yarns upon itself and to draw such yarns by its own pull from a source, a driven controlling roller between said beam and said source for affecting the tension of the yarns and the density of their winding on the beam, in accordance with the surface speed of said roller, and means for driving the beam at a constant surface speed, substantially as set forth.

2. A beam warping machine comprising a receiving beam adapted to wind a plurality of yarns upon itself and to draw such yarns by its own pull from a source, a driven controlling roller between said beam and said source to affect the tension of the yarns and the density of their windings upon the beam, means for driving the beam at a constant surface speed, and starting and stopping devices for said beam and said roller, such devices operating to start said roller after said beam has started winding and operating to stop said roller before said beam stops, substantially as set forth.

3. In a beam warping machine, the combination of a beam on which the yarn or threads are to be wound, beam driving means for driving the beam at a uniform surface speed to draw the yarn or threads from a source of supply by the pull of the beam, a driven controlling device engaging the yarn or thread between the beam and source of supply for determining the draft upon the yarn pulled from the source of supply by said beam, and means for chang-

ing the controlling action of said controlling device in accordance with the density desired for the wound mass upon the beam.

4. In a beam warping machine, the combination of a beam on which the yarn or thread is to be wound and for drawing the yarn or threads from a source of supply by its own pull, a driven controller between the beam and source of supply for determining the draft upon the yarn or thread as it is being drawn from the source of supply by said beam, means for operating the beam and controller, and a manually operated device to start the operation of the beam before the operation of the controller and to stop the operation of the controller before the beam is stopped.

5. In a beam warping machine, the combination of a beam on which the yarn or threads are to be wound, means for driving the beam at a uniform surface speed to draw the yarn or threads from a source of supply by its own pull, a driven controlling roller between the beam and source of supply for varying the draft exerted on the yarn by the drawing action of the beam and the density of the mass wound upon the beam, and unitary means for starting and stopping the beam in advance of the controlling roller.

In testimony whereof we have hereunto set our hands in the presence of two subscribing witnesses.

JOHN BRANDWOOD.
THOMAS BRANDWOOD.
EDWARD BRANDWOOD.

Witnesses:
WILLIAM GEO. HEYL,
JOHN O'CONNELL.