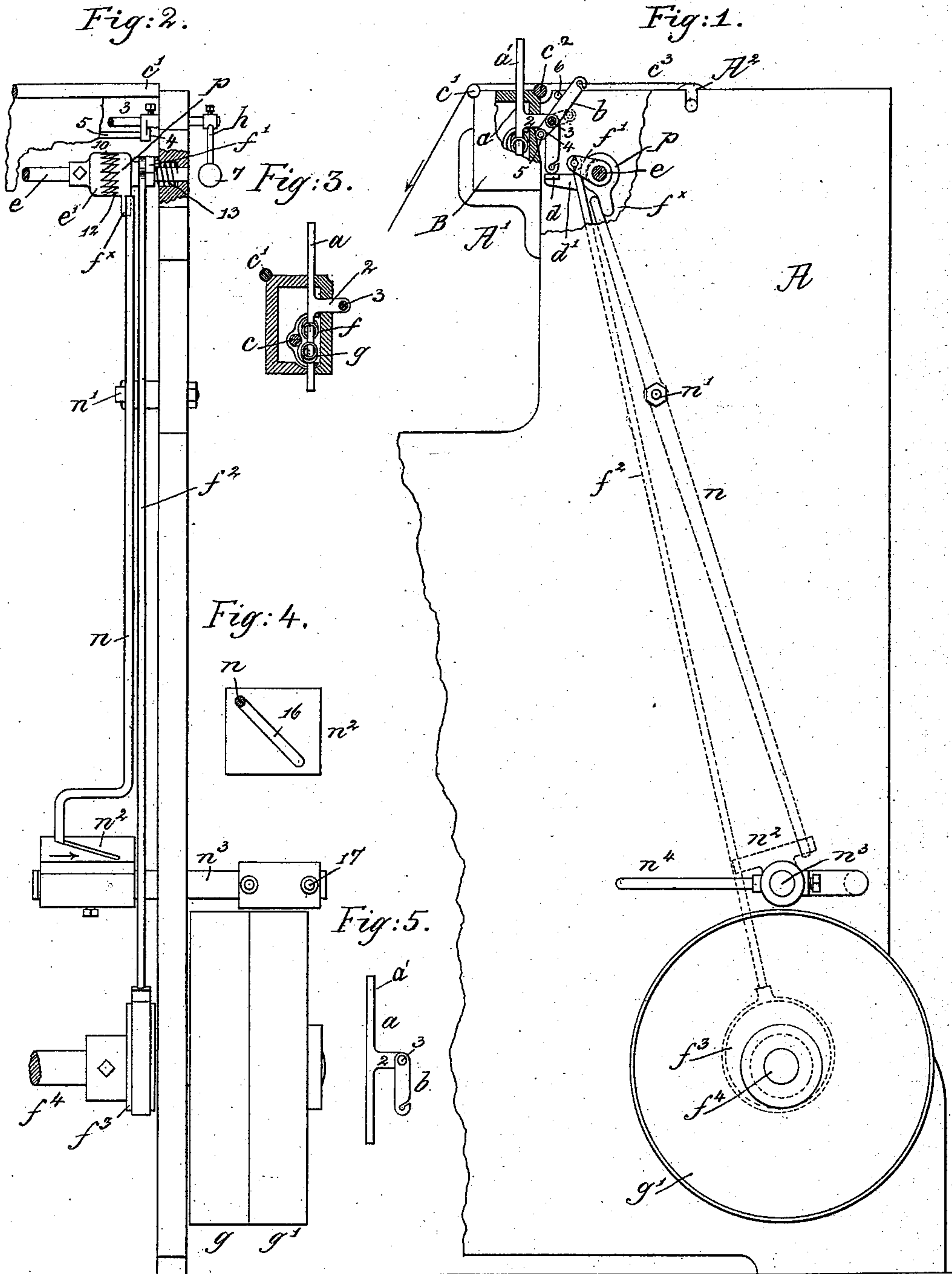


(No Model.)

W. BANCROFT.
WARPING MACHINE.

No. 377,659.

Patented Feb. 7, 1888.



Witnesses.
Arthur Gifford
John F. C. President

Inventor.
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UNITED STATES PATENT OFFICE.

WILLIAM BANCROFT, OF HOPEDALE, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO THE HOPEDALE MACHINE COMPANY, OF SAME PLACE.

WARPING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 377,659, dated February 7, 1888.

Application filed August 31, 1886. Serial No. 212,318. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM BANCROFT, of Hopedale, county of Worcester, and 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 figures on the drawings representing like parts.

My invention has for its object to improve warping-machines in such manner that the drop-wires and the dents of the reed may be adjusted together, the said dents having their upper ends extended above the guide-box to separate the threads.

My invention consists, essentially, of a guide-box and a series of dents therein, having their upper ends extended above the guide-box to separate the threads, and having laterally-extended ears, combined with drop-wires—one for each dent—and with means to support the said drop-wires, whereby the lateral adjustment of the dents effects the lateral adjustment of the drop-wires, a vibrator, and means to operate it, substantially as will be described.

Figure 1 in side elevation and partial section represents a sufficient portion of a warping-machine to enable my improvements to be understood by those skilled in the art; Fig. 2, a partial front elevation of Fig. 1, chiefly to show the devices for moving the vibrator and the devices broken off from Fig. 1, which are instrumental in elevating the drop-wires to be threaded. Fig. 3 is a partial section of the guide-box, broken out to show portions of the usual expanding-springs, with the dents of the reed in place to be expanded; Fig. 4, a top view of the cam-plate connected to the belt-shipper; and Fig. 5 is a modification to be described.

The frame-work A, of usual or proper shape to support the working parts, has brackets A', which sustain the guide-box B, provided with usual expanding-springs, *f* and *g*, which in practice will be the same as the springs designated by like letters in United States Patent No. 221,799, dated November 18, 1879, to which reference may be had, the said springs in practice being expanded and contracted by a screw-shaft, *c*, such as described and shown in the said patent, but not necessary to be herein

fully shown or described, because not of my invention.

The machine is provided with rolls *c'*, *c''*, and A², also of usual construction, to support the threads *c*³. The dents *a*, having their upper ends, *a'*, extended above the guide-box to separate the threads, (see Fig. 1,) are placed in the box B with their lower ends between coils of the springs by which the dents are expanded or contracted, and have laterally-extended ears 2, which are made to project outwardly through a slot or opening at the front side of the said box. The ear of each dent receives through it loosely a wire or rod, 3, the said rod also acting as a support for the drop-wires *b*, there being a co-operating drop-wire for each dent, the said rod 3 acting as a pivot upon which is mounted loosely the series of drop-wires.

Instead of pivoting all the drop-wires upon one rod, I may, it is obvious, pivot each drop-wire loosely upon the ear 2 of a dent by a pin, as shown at 3, Fig. 5.

Each drop-wire (see Fig. 1) has an eye to receive the thread *c*³, and when a thread becomes slack the drop-wire may turn down one-fourth of a circle, or even more, without being struck by the vibrator-bar *d*; but should a thread break, the drop-wire will fall and hang vertically, and in such position it will be struck by the vibrator.

The drawings show one of the drop-wires as having fallen and the vibrator as having been stopped by it and having effected the movement of the shipper-lever to stop the machine.

The rod 3 described has near each side frame of the machine an arm, 4, that serves to hold a lifting-rod, 5, which is extended across the machine parallel to the rod 3, but below it. The rod 3 has a handle, *h*, which is weighted, as at 7, the weight normally keeping the lifting-rod 5 in the full-line position, Fig. 1.

When a drop-wire falls, it may be lifted in place to be threaded by taking hold of the handle *h* and turning the rod into the dotted-line position, Fig. 1.

The vibrator is composed of a bar, *d*, attached to arms *d'*, secured to a rock-shaft, *e*, having its ends mounted in bearings of the frame-work. This rock-shaft has attached to it a hub, *e'*, provided at one side with beveled teeth 10. (See Fig. 2.) At one side of this

hub the shaft *e* is surrounded loosely by a sleeve, *p*, provided with beveled teeth 12, which are normally kept engaged with the teeth 10 by a spring, 13. The sleeve has an arm, *f'*, and a finger, *f^x*. The arm *f'* has attached to it a connecting-rod, *f²*, joined to a strap embracing an eccentric, *f³*, fast on the shaft *f⁴*, provided with usual fast and loose pulleys, *g g'*. When the teeth of the sleeve *p* fully engage the teeth of the hub *e'*, the sleeve oscillates the shaft *e* for the full throw of the eccentric *f³*, and the finger *f^x* stands to the left of the upper end of the belt-shifting lever *n*, so as not to hit the said lever; but as soon as a drop-wire falls, as shown by one of the drop-wires in Fig. 1, the vibrator strikes the said drop-wire, and the vibrator is stopped, which stops the further rotation of the shaft *e* and hub *e'*; but the sleeve continues to move, owing to its connection to the rod *f²*.

The movement of the sleeve *p* after the hub *e'* is arrested, as described, causes the said sleeve *p* to be slid to the right, (see Fig. 2,) owing to the action of the bevel-teeth of the said sleeve against the bevel-teeth 10 of the hub, and in its lateral movement the finger *f^x* is brought into position at the rear of the belt-shifting lever *n*, as shown in Fig. 2, and in the further rotation of the sleeve the said finger strikes against the upper end of the said lever, moving it on its fulcrum *n'*, so that the lower end of the said lever, resting in the

diagonal slot 16 of the plate *n²*, causes the said lever to move the belt-shipper slide or bar *n³* to the right, causing the belt-fork 17 to transfer the usual belt (not shown) from the fast upon the loose pulley. 35

Normally, with all the threads unbroken, the arm *f'* and the arms *d'* are in substantially the same horizontal plane. 40

I do not desire to limit my invention to the exact mechanism shown by which to actuate the vibrator, and instead of it I may employ any other usual or well-known mechanical contrivances. 45

I claim—

A guide-box and a series of dents therein, having their upper ends extended above the guide-box to separate the threads, and having laterally extended ears, combined with drop-wires—one for each dent—and with means to support the said drop-wires, whereby the lateral adjustment of the dents also effects the lateral adjustment of the drop-wires, a vibrator, and means to operate it, substantially as described. 50 55

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

WILLIAM BANCROFT.

Witnesses:

A. W. BEARDSSELL,
F. J. DUTCHER.