(No Model.)

G. S. FENDERSON.

DROP-WIRE STOP-MOTION MECHANISM FOR WARPERS.

No. 359,014. Patented Mar. 8, 1887.

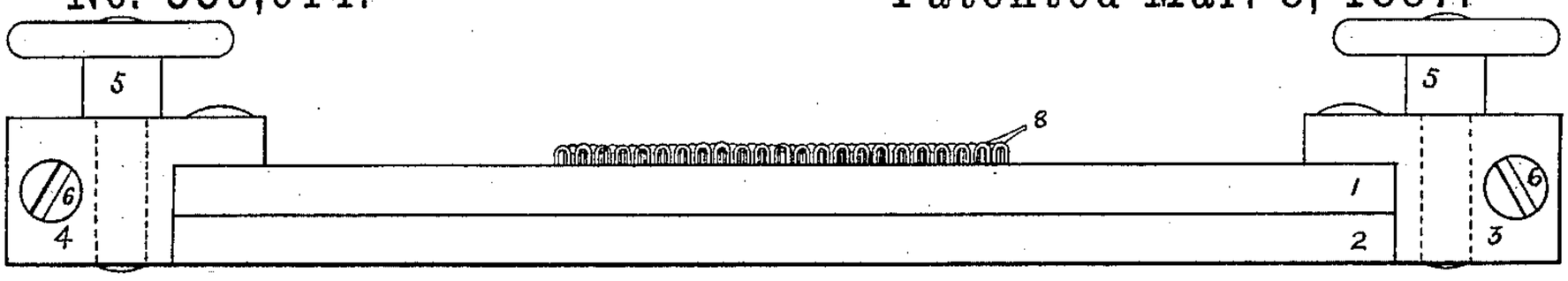


Fig. 1.

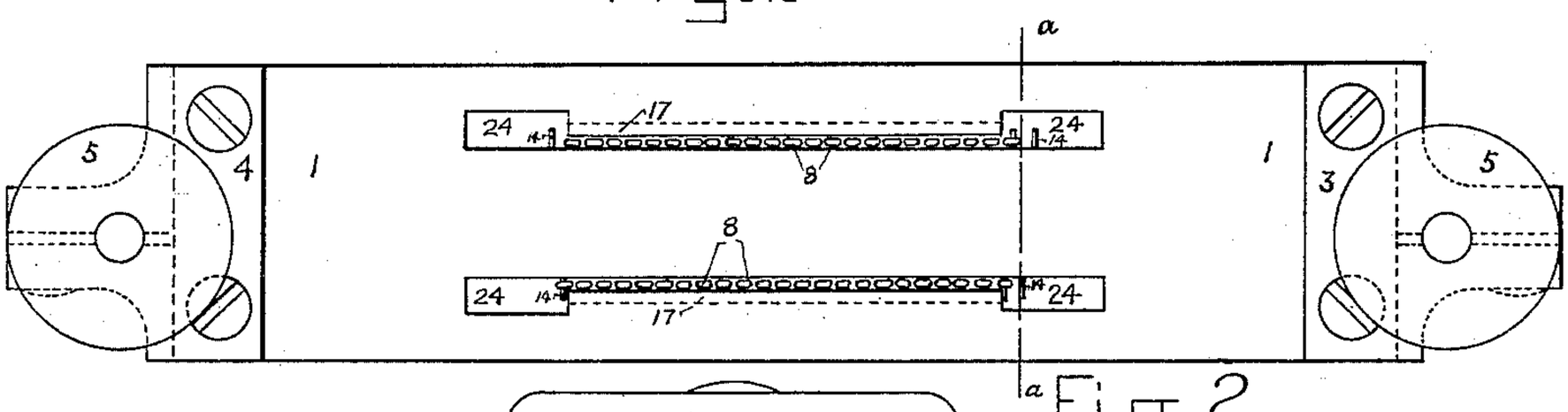
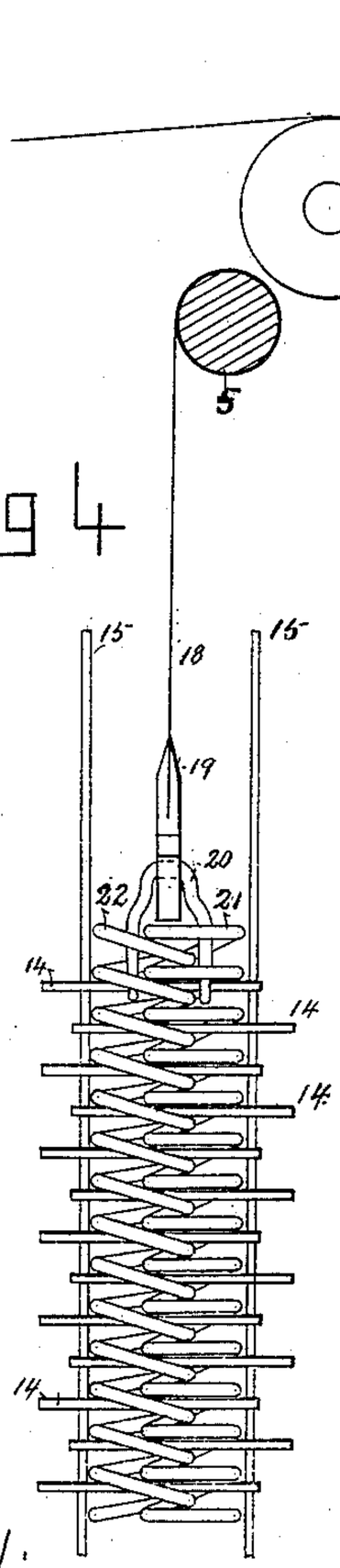


Fig. 2.

Fig 4



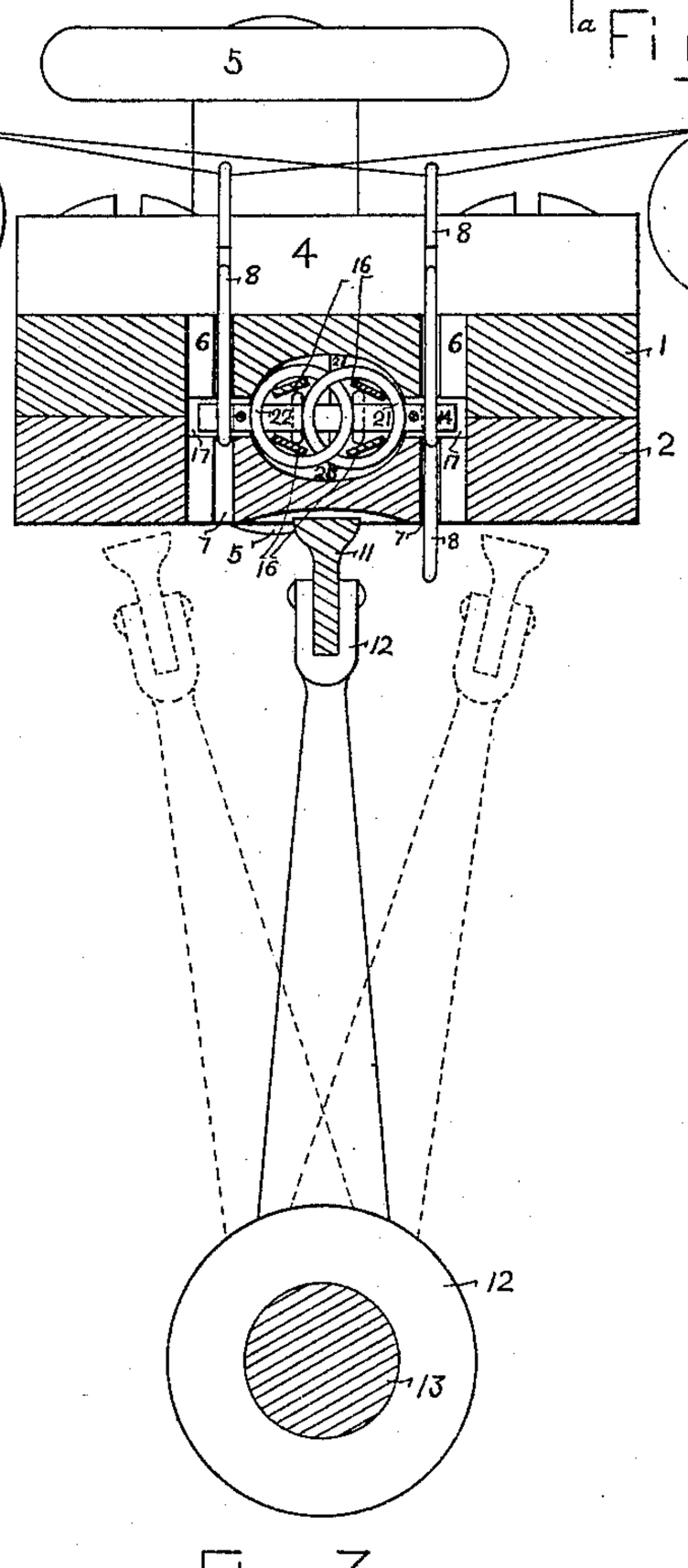


Fig. 3.

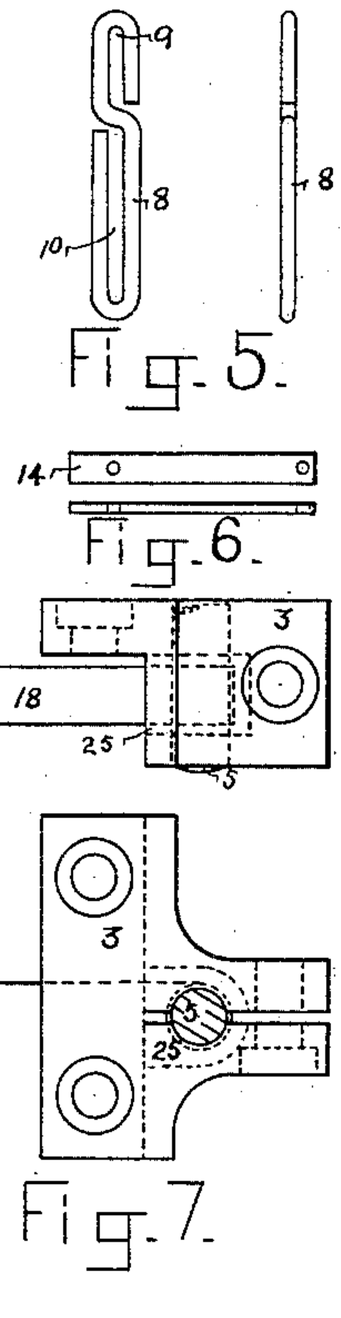


Fig. 5.

Fig. 6.

Fig. 7.

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UNITED STATES PATENT OFFICE.

GEORGE S. FENDERSON, OF LOWELL, MASSACHUSETTS, ASSIGNOR TO THE LOWELL MACHINE SHOP, OF SAME PLACE.

DROP-WIRE STOP-MOTION MECHANISM FOR WARPERS.

SPECIFICATION forming part of Letters Patent No. 359,014, dated March 8, 1887.

Application filed July 2, 1886. Serial No. 206,998. (No model.)

To all whom it may concern:

Be it known that I, GEORGE S. FENDERSON, a citizen of the United States, residing at Lowell, in the county of Middlesex and State of Massachusetts, have invented a new and useful Improvement in Drop-Wire Stop-Motion Mechanisms for Warpers, of which the following is a specification.

My invention relates to that kind of stop-motions for warping-machines where the machine is stopped whenever a thread breaks or runs off a spool when the warp is being wound from spools; and the object of my invention is to provide means of doing this work with greater certainty than heretofore, for evenly distributing the threads along the warp-beam, and for allowing the number of threads in a warp to be varied to a considerable extent.

My invention is illustrated in the accompanying drawings of portions of a drop-wire stop-motion, in which—

Figure 1 is a side elevation of the drop-wire-supporting mechanism. Fig. 2 is a plan of the same. Fig. 3 is an enlarged elevation of the same, partly in section at the line *a a* of Fig. 2, looking toward the left in that figure, as well as of the vibrator, and showing warp-threads passing through the drop-wires and guide-rolls for guiding the said threads. Fig. 4 is an enlarged plan of a portion of the double spiral expanding dent-support. Fig. 5 is an enlarged front and side elevation of one of the drop-wires. Fig. 6 is an enlarged plan and elevation of one of the dents upon which the drop-wires are supported, and Fig. 7 is a plan and elevation of one of the head-pieces which carry the expanding-studs.

In the drawings, 1 and 2 represent the main supporting-bars which carry the head-pieces 3 and 4, and which are provided with various grooves and recesses for supporting the other portions of the apparatus, as hereinafter set forth.

The bars 1 and 2, when clamped together as shown in Figs. 1 and 3, support in the central recess, 23, the double spiral dent-support 21 and 22. This dent-support is usually made by winding two wires side by side upon a round arbor and then running the wires 16 between the two interlocked spiral springs thus formed after the arbor has been removed. The wires 16 prevent the springs from springing back, so that their axes coincide, as they naturally tend to do.

The dents 14 are passed through the dent-support, as shown in Fig. 4, and are held from working out of place by the wires 15, which are passed through the holes with which the dents are provided. I prefer to pass the dents through the dent-support as shown, the long end of every alternate dent being at one side of the dent-support, while the short ends of the remaining dents are upon the same side of the support as illustrated in Fig. 4. By making the dents with a hole near one end and another hole at a little distance from the other end, as shown in Fig. 6, and by placing them, as shown in Fig. 4, in the dent-support, the wires 15 passing through the said holes, I am enabled to support upon the longer projecting ends of the dents a series of drop-wires, 8, as shown in Figs. 3, 2, and 1. As shown in Fig. 5, these drop-wires are made with an upper eye, 9, of some ordinary shape, for guiding the yarn and for allowing the said yarn to be readily inserted therein, a long lower dent-slot, 10, through which a dent, 14, passes, and the cross-bar 30 at the top of the slot 10, which supports the drop-wire by resting upon the top of the dent at the times when it is not supported in a more elevated position by a thread passing through it, or otherwise.

The axis of that part of the wire which forms the cross-bar 30 and the long eye 10 should be in a single plane in order to allow the drop-wire to be properly supported in narrower slots in the bars 1 and 2 than would be otherwise necessary. By adopting this construction less lint and dust are likely to work into the interior of the apparatus than would be the case if wider slots were used.

The drop-wires being arranged as shown, evenly distribute the threads of yarn within the space between the outer wires of the series. In order that the said space may correspond with the length of the warp-beam, and in order that the number of threads in that space may be varied somewhat, tapes 18 are attached by the hooks 19 and 20 to dents passing through the dent-support near the ends of the same, or

by other equivalent means to the dent-support, and the expanding-studs 5 provided, upon which one end of each of the tapes may be wound. By turning one or both of the studs 5 in a suitable manner the dent-support may be expanded or contracted very considerably, and, within quite extended limits, the number of drop-wires within the standard width of the warp be varied.

The head-pieces 3 and 4 are provided with chambers 25, within which the tapes 18 may be wound upon the studs 5, and with split projections, which support the studs 5, having clamping-screws 6, by which the studs 5 may be made to turn with more or less difficulty or prevented from turning, as desired.

The drop-wires are prevented from tipping over in one direction by the dents upon which they are directly supported by their eyes 10, and in a direction at right angles to this by the slots 7 in the bars 1 and 2. The drop-wires are preferably prevented from falling off the ends of the dents by making the drop-wire-supporting ends of the dents longer than would be otherwise necessary and supporting these ends in the grooves 17.

In order that the superfluous drop-wires may be easily removed when the number of threads is decreased, and in order that extra drop-wires may be added when that number is increased, I prefer to make the apertures 24 through the bars 1 and 2, within which the wires may be placed upon or removed from the end dents, as required, although this construction is not absolutely necessary. I am thus enabled to dispense with the tying up of unused drop-wires, which has hitherto been necessary with some other forms of drop-wire stop-motions.

When this device is being used, the drop-wires will all be held up by the yarn as high as the dents 14 will allow them to be raised, as shown in the left-hand row of wires in Fig. 3. Should a thread break or its end run through a drop-wire, the wire will drop into the position in which a wire is shown in the right-hand row of wires in Fig. 3 as low as its dent will allow it to fall. The lower end of the wire will then be below the lower surface of the bar 2, as shown, and in that position will be struck by the vibrator-bar 11, which is carried by a series of arms, 12, upon a rocking-shaft, 13. Since the shaft 13 is rocked by a flexible device, the vibration of the bar 11 between the extreme positions of its travel, indicated by the dotted lines in Fig. 3, will be arrested whenever any one of the drop-wires falls below the lower surface of the bar 2, and when this vibration of the bar 11 is arrested the warping-machine will be stopped by the action of any usual mechanism, which may be attached to the shaft 13 for that purpose.

In order that the drop-wires may not be bent by the vibrator-bar 11, I prefer to make the latter come in contact with the said wires as near as possible to the bar 2, and to this end, when a single vibrator-bar works over two rows of drop-wires, the lower surface of the bar 2 is recessed, as shown, so that the vibrator-bar may play in the recess, and the upper edge of the vibrator-bar is made wider than the remaining part, as shown in Fig. 3. The drop-wires may be made, as shown, of round wire or of wire of any other suitable section.

I have been enabled, in consequence of my improvement, to place a considerably larger number of drop-wires within a given width of machine, and in a single row, than has been possible with any of the methods previously known to me, and by this means am sometimes able to use a smaller number of rows of drop-wires than has hitherto been necessary. When a single row only of drop-wires is used, I prefer to place the wires above the axis of the rocking shaft of the vibrator and to place the drop-wire-supporting ends of the dents all upon the same side of the dent-support.

It is evident that the mechanism for expanding the dent-support may sometimes be dispensed with and the dent-support be fixed in its proper position by being suitably fastened at its ends to a fixed stud placed in the head-pieces 3 and 4 in place of the studs 5, or by equivalent means, when such a construction is desirable.

What I claim as new, and desire to secure by Letters Patent, is—

1. The drop-wire apparatus for warpers, which consists of the dent-support and the dents supported thereby, the drop-wires directly supported upon the said dents, which latter pass through the said drop-wires, and means, as set forth, of supporting the dent-support and of retaining the drop-wires in position, substantially as described.

2. The drop-wire apparatus for warpers, which consists of the dent-support and the dents supported thereby, the drop-wires supported directly upon the said dents, which latter pass through the said wires, and means of expanding the said dent-support and of retaining the drop-wires in proper relation thereto, substantially as described, and for the purposes specified.

3. The drop-wire apparatus for warpers, which consists of the dent-support and the dents supported thereby, the means of preventing the displacement of the dents in the dent-support, the drop-wires directly supported upon the said dents, which latter pass through the said wires, and the bars supporting the dent-support and having means for retaining the drop-wires and dents in position therein, and provided with the apertures 24, within which drop-wires may be removed from and placed upon the dents, substantially as described, and for the purposes set forth.

4. The drop-wire apparatus for warpers, which consists of the dent-support and the dents supported thereby, the means of preventing the displacement of the dents in the

dent-support, the drop-wires directly supported upon the said dents, which latter pass through the said wires, means of expanding the said dent-support at will, and the bars supporting the dent-support and having means for retaining the drop-wires and dents in position therein, and provided with the apertures 24, substantially as described, and for the purposes specified.

5. The drop-wires, each having the yarn-guide at one end and the long slot in the other, and the cross-bar 30 at the top of the said slot, the axis of the material which forms the said dent-slot and the said cross-bar lying in substantially the same plane, combined with a supporting-bar provided with a slot which is substantially as wide as the thickness of the material which forms the drop-wires, and a means of supporting the said wires in the said slot and of limiting their vertical motion therein, substantially as described, and for the purposes specified.

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