

(No Model.)

A. E. THOMPSON & W. LUND.  
HEDDLE OR HARNESS FOR LOOMS.

No. 419,382.

Patented Jan. 14, 1890.

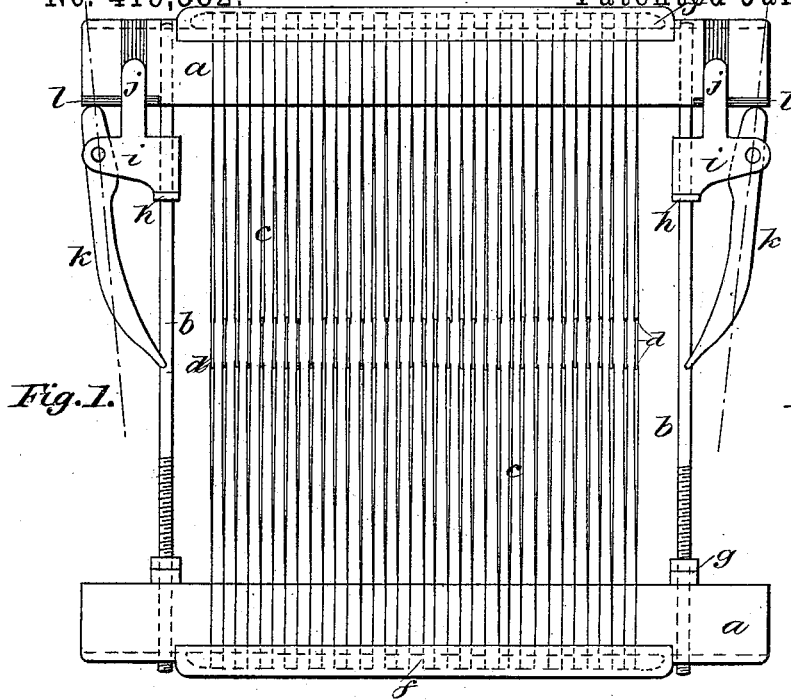


Fig. 1.

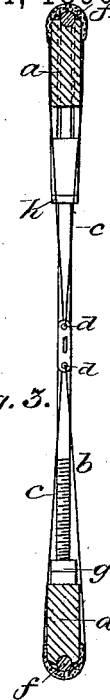


Fig. 3.

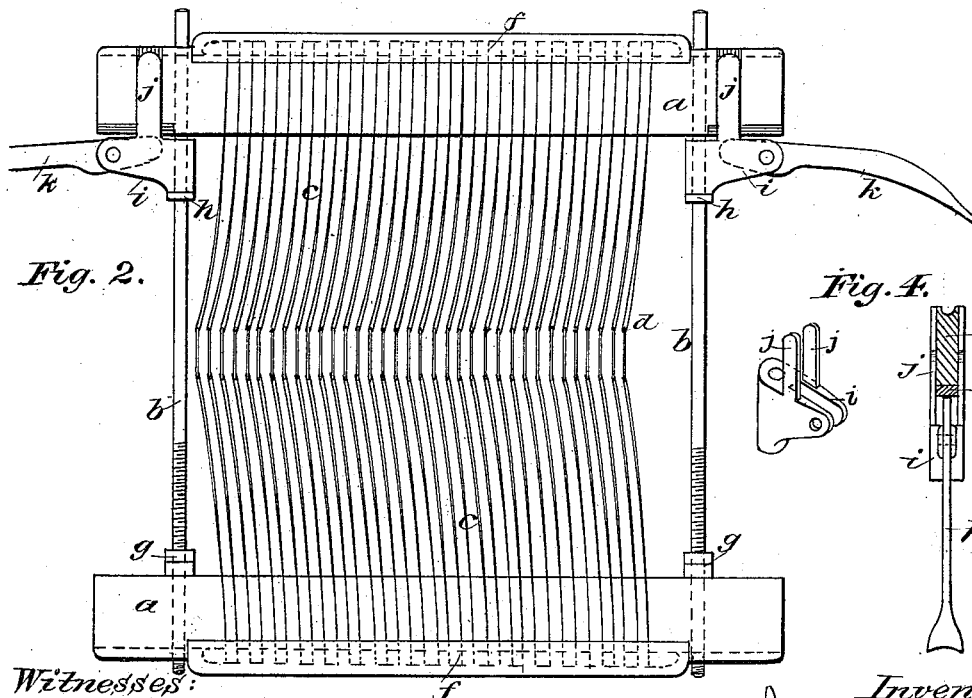


Fig. 2.

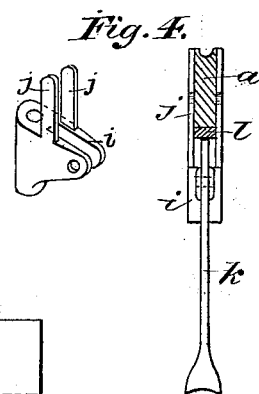


Fig. 4.

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# UNITED STATES PATENT OFFICE.

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## HEDDLE OR HARNESS FOR LOOMS.

**SPECIFICATION** forming part of Letters Patent No. 419,382, dated January 14, 1890.

Application filed May 10, 1889. Serial No. 310,349. (No model.)

*To all whom it may concern:*

Be it known that we, AUGUSTUS E. THOMPSON and WILLIAM LUND, citizens of the United States, residing at Boston, county of Suffolk, State of Massachusetts, have invented new and useful Improvements in Heddles or Harness for Looms, of which the following is a specification.

Our invention consists of certain improvements in heddles or harnesses for looms, which are specifically pointed out in the claims concluding this specification.

The object of our improvement is to provide for quickly and easily slackening the wires which form the leashes, so that the weaver can easily pass his hands between the wires for the purpose of tying or connecting a broken warp-thread. Especially is our improvement found to be important in looms doing more than "two-shade" work—that is, in looms working more than two harness-frames—for in such cases in the event of the breaking of a warp-thread between or behind the shades the weaver in his efforts to mend or connect it must pass his hands entirely or partially through the wires of all the harnesses on the loom to reach and tie the broken thread. If, therefore, it were not for the facility afforded by our improvement for slackening the leash-wires of the several harnesses at once, it would be difficult for the weaver to pass his or her hands between the wires, which in working are under tension and could only with great difficulty be spread apart sufficiently to allow the weaver's hands and wrists to pass between them.

The following is a description of the accompanying drawings, wherein is illustrated our improvement.

Referring to the drawings, Figure 1 represents in elevation a heddle or harness for looms containing our improvement and showing the leash-wires under tension. Fig. 2 is a similar view showing the leash-wires released from tension by an eccentric cam-lever device which permits all the wires to be slackened at once. Fig. 3 is a vertical cross-section of the heddle, and Fig. 4 are details of the eccentric cam-lever device.

*a a* are the heddle bars or staves, and *b b* are the screw-rods which pass through open-

ings at each end of said bars and support them and permit their adjustment in parallel relation to each other to put the proper tension upon the leash-wires, as I will more fully explain hereinafter.

*c* are the leash-wires, which are continuously passed in upper and lower sets through openings in each end of the eyes *d*, through the middle openings *e* of which eyes the warp-threads are passed.

The outer edges of the bars are formed with grooves throughout their length to receive ropes or rubber cushions *f* loosely placed therein, and the continuous wires are passed alternately around a bar and over its cushion and through the end openings in the eyes to form the upper and lower sets of leashes. The leashes are formed of fine annealed wire, and each set is formed of a continuous wire which is fastened at each end to a bar. In the operation of forming the leashes the eyes are maintained in perfect alignment, while the cushions allow the wires to be embedded slightly within their surface, and thus maintain the relative and proper spacing of the wires upon their bar-bearings. The wires are made taut by the straining of the bars or staves apart from each other to give a proper tension to the wires by means applied to the supporting-rods. One end of each rod, preferably the lower end, is screw-threaded, and each is provided with lock-nuts *g*, which bear against the inner edge of the bar. The other ends of the rods, preferably the upper ends, which pass through openings in the other bar, are not screw-threaded, and are provided with shoulders *h* about an inch and a half below the inner edge of said bar. Outward-projecting-arms *i* are fitted, preferably, loosely upon these rods, and, resting upon the shoulders thereon, are prevented from turning upon the rods by means of guide-fingers *j*, which project from said arms on each side of the bar and allow the latter to be moved vertically between them. For placing these guide-fingers flush with the sides of the bar they are fitted into recesses in the sides thereof. Eccentrics or cam-levers *k* are pivoted preferably to the outer ends of the arms in such manner as to bear against the under side of the heddle-bar, which for this

purpose is provided with face-plates *l*, to form bearings for the eccentric-lever device. When, therefore, this device is in position for straining the bars apart to apply tension to the wires, the eccentric-lever device is placed or turned to produce the maximum tension in connection with adjustment at the other ends of the rods or braces upon the wires and to maintain such tension. A simple way of holding the eccentric-lever device securely for this purpose is to form a lever-arm upon the eccentric device so as to extend down and bear against the rod some distance below the pivot of said eccentric device, and thereby lock the eccentrics in their acting positions by bringing the acting point beyond or outside the vertical centers of the pivots to maintain the wires under tension, as shown by dotted lines in Fig. 1. In the event, however, of the breaking of a warp-thread, and to permit the weaver to easily and freely get access to such broken thread to tie or twist it together, the leash-wires must be slackened, so that they can be freely spread apart or opened to admit the hands and wrists of the weaver to reach the broken and separated ends of the thread and to tie them together. This slackening of the leash-wires is effected at once by turning the eccentric-levers out from their bearing upon the rods, which releases the eccentric action upon the bar and allows it to fall by its weight and spring of the wires upon being relaxed, and, resting upon the rod-arms, bring all the leash-wires in a loose or slackened condition, as shown in Fig. 2, through which the weaver can place his hands and wrists for the purpose stated. The warp-thread having been repaired, the eccentric-lever devices are again turned to strain the bars apart from each other, and thus restore all the leash-wires to their proper tension. This proper tension is effected by the adjustment of the lock-nuts on the rods against the lower bar, because the eccentric-lever device only acts to maintain the tension so produced by forcing out the movable bar upon its rods. Referring, therefore, to the harness-frame as a complete thing, it will be seen that one of its bars is adapted for being moved freely upon the rods without disturbing the adjustment of the latter in relation to the means by which the bar is moved or the means by which the rods are adjusted.

We prefer to cement the leash-wires to their bearing-cushions and to cement the latter within their grooves in order that we may hold and fix the leash-wires in their proper places upon their bearing-cushions, the proper and uniform tension of the leash-wires around the bars being made, however, before the cementing is done. This cementing sometimes becomes important to prevent the operator (when handling a single heddle) from disturbing the wire at its bearing-point upon the cushion.

It will be understood that the leash-wires

can be tightened when required by turning up the nuts, and that the lever device shown for the liberation of the upper bar from the straining action of the leash-wires can be replaced by any equivalent device that will act quickly to liberate the bar to slacken the wires and to again thrust it out to bring all the wires again to their proper tension. In this operation the facility afforded for quickly slackening the wire is of great advantage in lessening the time which the loom is required to stop work in mending a broken thread.

The provision for slackening all the leash-wires at once by means which freely permit the upper bar to fall toward the lower bar upon its supporting-rods and the connecting of the leash-wires to the outer edges of the bars co-operate to preserve the proper relation of the wires to each other in the operation of slackening and tightening them.

We have shown the straining and relaxing devices as being mounted upon the supporting-rods of the heddle-bars; but it is obvious that such or similar devices may be suitably mounted upon the bars themselves and adapted to act upon fixed parts of the rods to bring the wires to their proper tautness and to render them slack.

We have stated that the spring of the leash-wires will pull the bar down when released from its lever devices, and it will be understood that this spring in the leash-wire is produced by their tautness and continuous alternate winding through the eyes and over the bars.

Referring to the holding and fixing of the leash-wires upon the bars, it is obvious that such provision co-operates with the provision for suddenly relaxing the leash-wires; otherwise the latter would be liable to become loose at their bearings on the bar and by their spring action become displaced from their relative relation.

We claim as our improvement—

1. In a shade or harness-frame for looms, the combination of a lower bar or stave, rods engaging in the same and provided with fixed shoulders or stops near their upper ends, an upper bar or stave which is adapted to slide freely upon the smooth upper ends of said rods, and means intermediate said stops and upper bar for forcing said upper bar or stave outward from the said shoulders or stops upon said rods, substantially as described.

2. In a shade or harness-frame for looms, the combination, with the bars, the leashes attached to the same, and rods having means for adjusting the relative distance between said bars, and consequently the tension of said leashes, of lever devices upon said rods for quickly releasing and spreading apart said heddle-bars, substantially as described.

3. In a shade or harness-frame for looms, the combination of an upper and a lower bar or stave, rods having the lower bar or stave mounted upon them and having the upper bar or stave adapted to slide upon their upper ends, and lever devices upon said rods for

raising and releasing said upper heddle-bar, substantially as described.

4. In a shade or harness-frame for looms, the combination of an upper and a lower bar or stave, rods having the lower bar or stave mounted upon them and having the upper bar or stave sliding upon their upper ends, stops upon said rods for limiting the downward play of said upper bar or stave, and lever devices intermediate said stops and upper bar for raising and releasing said upper bar or stave, substantially as described.

5. In a shade or harness-frame for looms, the combination of an upper and a lower bar or stave, rods having screw-threaded lower ends inserted through the lower bar or stave and smooth upper ends inserted through the upper bar or stave and formed with stops or shoulders near said upper ends, lock-nuts upon the lower screw-threaded ends of said rods bearing against the lower heddle-bar or stave, arms secured upon said rods and above said stops or shoulders, and lever devices pivoted in said arms to raise and release said upper bar or stave, substantially as described.

6. In a shade or harness-frame for looms, the combination of an upper and a lower bar, rods engaging said lower bar and having the upper bar sliding upon their smooth upper ends and formed with shoulders at said upper ends, arms supported upon said rods and above said shoulders and formed with upwardly-projecting guide-fingers which straddle said upper bar, and lever devices upon said arms to raise or release said upper bar, substantially as described.

7. In a shade or harness-frame for looms, the combination of an upper and a lower bar, rods engaging said lower bar and having said upper bar adapted to slide upon their upper ends, arms projecting laterally from said rods near their upper ends, and levers pivoted in the ends of said arms and having their upper short arms bearing against the under side of said upper bar and having their lower long arms adapted to bear against said rods, substantially as described.

8. In a shade or harness-frame for looms, the combination of an upper bar or stave

having vertical bores near its end and vertical recesses in its sides and beyond said bores, a lower bar or stave having vertical bores near its ends, rods having lower screw-threaded ends in the bores of the lower bar and upper smooth ends in the bores of the upper bar and provided with shoulders near said upper ends, lock-nuts upon said screw-threaded ends, arms fitted loosely upon said rods above the shoulders and having upwardly-projecting guide-fingers in the recesses of the upper bar, and levers pivoted in the outer ends of said arms and having their short upper arms bearing against the under side of said upper bar and their lower long and curved arms adapted to bear against the rods, substantially as described.

9. The combination, in a shade or harness for looms, of the bars, the rods, and a pivoted straining and relaxing device on one end of each of said rods, with the eyes and the leash-wires, the latter having a fixed bearing on the bars, whereby in the sudden relaxing of one of the bars the leash-wires and their eyes will retain their proper relation to each other and to the bar.

10. In a shade or harness for looms, the combination, with the eyes, the leash-wires, the bars and their supporting-rods, of a pivoted lever device secured upon each rod to give an outward movement to one of said bars within certain limits, for the purpose stated.

11. In a shade or harness for looms, the combination, with the bars for the leash-wires, the eyes, and the supporting-rods for said bars, of pivoted straining and relaxing devices adapted to strain and relax said leash-wires, substantially as described, for the purpose specified.

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

AUGUSTUS E. THOMPSON.  
WM. LUND.

Witnesses:

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JAS. P. GORDON.