

No. 654,055.

Patented July 17, 1900.

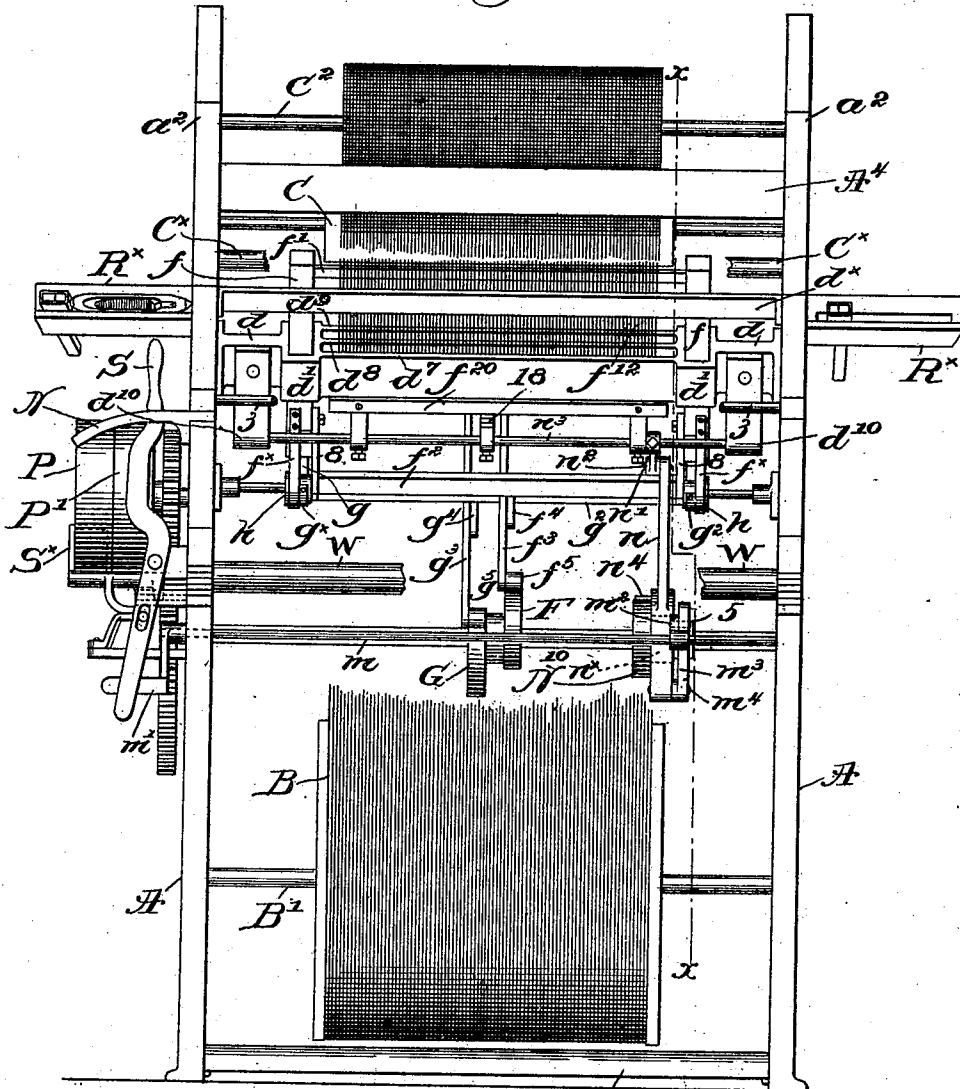
G. O. DRAPER.
UPRIGHT LOOM.

(Application filed Sept. 30, 1897.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.



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A²

Inventor:

George O. Draper
by Leroy Gregory
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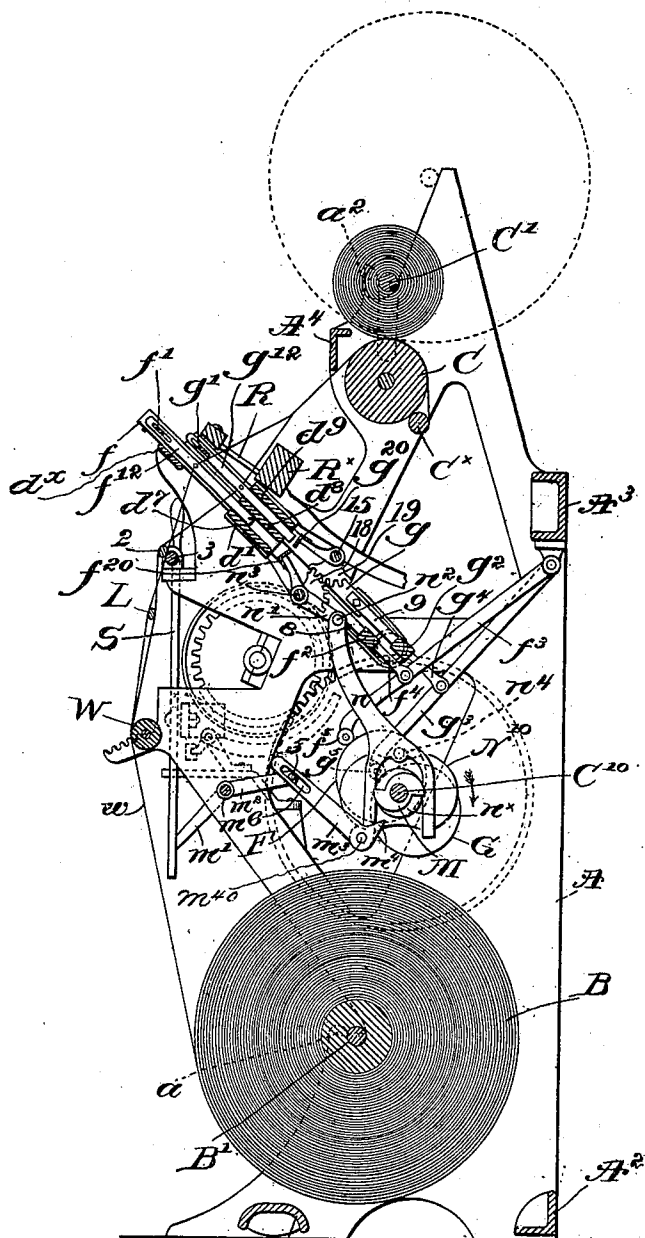
(Application filed Sept. 30, 1897.)

Patented July 17, 1900.

(No Model.)

2 Sheets—Sheet 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

GEORGE O. DRAPER, OF HOPEDALE, MASSACHUSETTS, ASSIGNOR TO THE
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UPRIGHT LOOM.

SPECIFICATION forming part of Letters Patent No. 654,055, dated July 17, 1900.

Application filed September 30, 1897. Serial No. 653,539. (No model.)

To all whom it may concern:

Be it known that I, GEORGE O. DRAPER, of Hopedale, county of Worcester, State of Massachusetts, have invented an Improvement in Upright Looms, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to that class of looms in which the warp-beam is mounted at the lower portion of the frame, the warps being carried upward and the finished cloth wound upon a roll near the top of the frame.

My present invention has for its object the production of an upright loom wherein the warp-stop-motion-actuating detectors operate by gravity, whereby I am enabled to utilize this valuable feature and also the valuable features of upright looms, such as saving in floor-space and making the different mechanisms convenient of access to the weaver. In the loom herein shown the detectors also serve as heddles, the harnesses working in inclined planes at such an angle that gravity will act to move a heddle into abnormal position upon breakage or undue slackening of its warp-thread; but it will be obvious that the detectors could be mounted in front or rear of the harnesses and sliding on an angle similar to that herein shown.

Various other novel features of my invention will be hereinafter described in the specification and particularly pointed out in the claim.

Figure 1 is a rear elevation of an upright loom embodying my invention, partly broken out and with some of the well-known devices omitted for the sake of clearness. Fig. 2 is a vertical sectional view thereof on the line *x x*, Fig. 1, looking toward the left.

The loom sides *A*, connected by cross-girths *A'*, *A*², *A*³, and *A*⁴, are of suitable shape to support the operative parts of the loom, the side frames *A* having at the back open bearings *a* near the bottom for the journals *B'* of the warp-beam *B*, the warp-threads *w* being led up from the beam over the whip-roll *W* at the back of the loom to the usual lease-ropes *L*, Fig. 2, and thence over guide-rods *2* *3*, which permit the warps to turn at a slight angle before passing to the harnesses. The warp-threads pass through the heddles, to be

described, through the reed *R* of the lay *R*^x, and over the take-up roll *C* and around a guide-roll *C*^x to the core or bar *C'*, on which the finished cloth is wound, the said core being mounted in suitable bearings *a*² in the side frames.

Inasmuch as the take-up mechanism forms no part of my invention and can be of any desired or well-known form, I have omitted the same for the sake of clearness in the drawings.

The lay-actuating devices may be of either the swinging or sliding type, both well known and not herein illustrated, nor is the picking mechanism shown for the same reason, the lay moving in an inclined path substantially at right angles to the plane of the harness-frame and in front of the latter, as clearly shown in Fig. 2.

Brackets *d*, secured to the inner faces of the loom sides *A*, are provided with bearings *d'* for the side bars *f g* of the heddle or harness frames, said bearings and bars being inclined to the horizontal, as best shown in Fig. 2, the side bars of the rear frame being shown as resting on and adapted to slide upon the bars *f* and being guided thereby. The upper ends of the side bars *f* are supported by an inclined rest *d*^x, extended across the loom. Cross-bars *f' g'* and *f*² *g*² rigidly connect the two pairs of side bars *f g*, respectively, at their upper and lower ends, to thereby form rigid rectangular frames, the side bars being of sufficient size to afford good bearing-surfaces.

At each side of the loom pulleys *h* are rotatably mounted, to which pulleys the harness or heddle frames are connected at their lower ends by flexible straps or connections *f*^x *g*^x, so that the movement of one frame effects a movement of the other in the opposite direction.

The lower cross-bars are herein shown as connected to extensions *8 9* of the side bars *f g*, owing to the proximity of the pulleys to the latter, the extensions coming at the inner sides of the pulleys.

Referring to Fig. 2, treadles *f*³ *g*³ are fulcrumed on the cross-girth *A*³ of the frame, said treadles being connected by links or bars *f*⁴ *g*⁴ with the two harness-frames, said treadles being shown as provided with rolls

$f^5 g^5$, respectively, which travel upon the edges of the harness-cams F G, mounted on the cam-shaft C¹⁰ of the loom. Ordinarily the harness-motion in looms is controlled by treadles provided with rolls which travel on the under portions of the cams, so that the frames are pulled down alternately. In my present invention, however, the cams push the treadles alternately, so that the harness-frames are positively pushed upward and depressed by the flexible connections attached to the pulleys h to give the necessary reciprocating motion. This arrangement of the cams and treadles imparts a steadier and more positive movement to the harness-frames and economizes space, permitting more room for the warp-beam than is obtainable in the ordinary loom.

Referring to Fig. 1, the usual fast and loose pulleys P P' are shown, with the belt-shipper S^x, controlled by the shipper-lever S, of usual construction, located at the back of the loom, held in the usual notched plate N when the loom is running properly. The lower end of said lever is adapted to be engaged by a knock-off arm m' , fast on a rock-shaft m , which has a second arm m^2 , connected, by a pin-and-slot connection 5 6, Fig. 2, with an actuating-arm m^3 . The said actuating-arm is fulcrumed at m^4 on a forked leg n , adapted to straddle a roll n^x on the cam-shaft C¹⁰, the leg depending from a rocker-arm n' , on which it is pivoted at n^2 , the arm being fast on a rock-shaft n^3 , mounted in bearings d^{10} , shown herein as secured to the brackets d .

Referring to Fig. 2, the actuating-arm m^3 is shown as having a toe m^4 near its fulcrum, adapted to be engaged by a suitable tappet-cam M on the cam-shaft whenever the leg n is lifted and maintained high enough to bring the toe into the path of the tappet. Such engagement acts to depress the actuating-arm, to thereby actuate the knock-off arm m' and release the shipper-lever S from the usual notch in the holding-plate N, to thereby stop the loom. A cam N¹⁰ on the shaft C¹⁰ acts on a roll or stud n^4 , extended from the leg n , to lift the latter twice at every rotation of the cam-shaft, to thereby rock the shaft n^3 , to which is attached a feeler f^{20} , which is thus vibrated back and forth below the front harness-frame. A similar feeler g^{20} is mounted below the rear frame on a suitably-supported rock-shaft 15, the two feelers being vibrated in opposite directions by intermeshing segment-gears 18 19 on the two rock-shafts. I have herein shown three plates $d^7 d^8 d^9$ extended in parallelism from one to the other bearing d' , said plates forming guides for the lower ends of the two sets of detectors $f^{13} g^{12}$, which also act as heddles, the detectors being made of thin sheet metal, provided each with a warp-receiving eye and an elongated slot at the upper end. The cross-bars $f' g'$ extend through the slots in the respective sets of detectors, and in the reciprocation of the harness-frames act to move the detectors, the

latter by reason of the length of the slots having a limited longitudinal movement independent of the frames. When a frame descends, the warp-threads normally maintain the lower ends of the detectors above the path of the cooperating feeler; but upon breakage or undue slackness of a warp-thread its detector slides down by gravity far enough to engage and stop its feeler, resulting in maintaining the leg n lifted, with consequent stoppage of the loom. The middle plate d^8 acts to separate the lower ends of the two series of detectors $f^{12} g^{12}$, while the outer plates act to support and retain the detectors from improper movement. The angle of the harness-frames is such that when a warp-thread breaks or unduly slackens its detector will slide down by gravity into abnormal position. The use of such detectors, the cooperating feelers, and the feeler-actuating means forming a part of the stopping mechanism of the loom are not broadly claimed herein, as I am not the inventor of such devices broadly; but so far as I am aware it is new to utilize in an upright loom warp-stop-motion-actuating detectors which do not drop vertically into abnormal position, but which slide on an incline into such position.

From an inspection of the drawings it will be seen that the harness-motion-actuating mechanism is located entirely below the path of the warp-threads and also that the warp-beam and the pivots for the harness-actuating treadles are located at opposite sides of the harness-frames, so that a great economy is effected in the necessary space for the operating parts of the loom.

The warp-stop-motion-actuating detectors and the shipper-lever are located back of the lay and the weaving mechanism is wholly above the warp-beam, the latter, even when very large, lying entirely within the main portion of the loom.

By means of the rests or guides for the warp-threads the latter, while given the proper direction, are bent only at obtuse angles, thereby preventing the strain due to a sharp turn or considerable change in direction.

Having fully described my invention, what I claim, and desire to secure by Letters Patent, is—

In a loom, a warp-beam, heddles through which the warp-threads pass, harness-frames to reciprocate the heddles, pivoted treadles, actuating-cams therefor, and direct connections between the treadles and harness-frames, to reciprocate them, the warp-beam and pivots of the treadles being located at opposite sides of the harness-frames, substantially as described.

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

GEORGE O. DRAPER.

Witnesses:

HERBERT S. MANLEY,
E. D. BANCROFT.