This invention relates to improvements in looms adapted for use by hand weavers.

One object of the invention is to provide an improved loom construction that enables the parts to be folded into compact form comprising a front frame and a rear frame, whereby the loom may be easily carried from place to place and stored in a relatively small space.

Another object of the invention is for an object the provision in a foldable loom of a frame and front and rear pairs of legs for supporting the frame in a substantially horizontal position, such pairs of legs being pivoted together in a X-formation and the front legs being pivoted at their upper ends to one end of the frame and the rear legs being detachably connected at their rear ends to the other end of the frame, and a castle, which is pivoted intermediate its ends to the frame at a location between the ends of the latter and which is pivotally connected near its lower end to the rear pair of legs, whereby when the rear pair of legs are detached from the frame and drawn toward the front pair of legs, the castle will be swung with them together with the frame and the legs, frame and castle moved into a compact relation closely approaching parallelism.

Another object of the invention is to provide a beater, having supporting arms that are fulcrumed on the front legs in a manner to enable facile disengagement and engagement and to provide means for connecting the beater to the castle, when the loom is to be folded, whereby the movement of the castle causes the supporting arms to disengage from their fulcrums and lie flatly against the front face of the castle.

Another object of the invention is to provide improved mechanism for actuating the heddle frames in the castle.

A further object is to provide in a loom of the type described a plurality of heddle threads, which are pivoted to a cross bar that interconnects the front pair of legs and extend rearwardly and have their rear ends connected by flexible members to the heddle-raising mechanism in the castle, whereby when the loom is folded, the swinging of the castle will through the flexible members draw the foot treadles upwardly and within the confines of the folded legs, frame and castle.

These and other objects will more particularly appear from the following detailed description of one illustrative embodiment of the invention in the accompanying drawings in which:

Fig. 1 is a side elevational view of a loom embodying the invention, the parts being shown unfolded and in active or working position with one of the treadles depressed to raise a pair of heddle frames and separate certain warp threads from others to form the shed;

Fig. 2 is a side elevational view showing the loom parts in partially folded position;

Fig. 3 is a side elevational view showing the loom parts in completely folded position;

Fig. 4 is a plan view of the loom with the parts shown in unfolded positions;

Fig. 5 is an end elevational view looking from the left of Fig. 1;

Fig. 6 is a cross sectional view taken on the plane 6--6 of Fig. 1 and showing the lifting means for the heddle frames;

Fig. 7 is a sectional plan view taken on the line 7--7 of Fig. 5;

Fig. 8 is a sectional plan view taken on the line 8--8 of Fig. 3;
and lower horizontally-disposed cross bars 37 from which the heddles 38 are slidably supported. The beater (Fig. 5) includes two side arms 39 which are inductively positioned on their lower ends one to each front leg 5 at a location near but above the pivot 7. Each such pivotal connection consists of a sleeve 40 clamped to the leg 5 by a bolt 41 and receive in an open-ended form in the lower end of a side arm 39. Each of the latter has a finger 43 extending beyond the open lower end of each slot 42 on the front side of the arm 39. These side arms 43 are also rigidly interconnected by upper and lower cross bars 44 and 45, respectively. Each such cross bar is secured to a side arm 39 by means of a bolt 46 which passes through a slot 47 in the arm 39. Thus these cross bars may be fixed to their supporting side arms 39 in various positions of longitudinal adjustment. The confronting faces of the upper and lower cross bars 44 and 45 are grooved to receive and clamp the arms 39 a hollow rectangular frame 48 carrying a plurality of closely-spaced vertical wires 49 which form the reed.

Referring to Fig. 1, the warp threads, such as 50, which are wound on roll 16, pass upwardly over cross bar 4 and thence forwardly with a downward inclination to the heddles and are threaded through the eyes of the latter, some passing through the eyes of selected heddles in one frame and other threads passing through the eyes of selected heddles in other frames. The threads then pass between the wires of the reed of the beater and continue upward inclination to the cross bar 3, over which they pass and then travel downwardly to roll 15. By raising some heddle frames while others remain lowered, some of the wires 49 are raised above others, forming the shed and enabling a shuttle to be manually passed through the space between the raised threads 50 and the lowered threads. The beater is manually raised or lowered toward roll 15 to press the warp threads 51 (Fig. 4) in place. The woven cloth 52 is wound up on roll 15.

For actuating the heddle frames 36, a series of foot treadles 64, as shown in Fig. 6, are provided in the castle 37 and each consists of a lever 64 and a longitudinally grooved rod 66 to separate the levers 64 and cause them to be positioned in proper underlying relation with the heddle frames 36 which they actuate. The beater arms 39 when in their inactive position, engage rubber bumpers 70 fixed on the castle.

The loom has been described in its active or working position. It is to be understood that when the castle is stationary, the warp threads are stored or for carrying. This folding operation causes the castle to be inverted and therefore the heddle frames 36 must be held against falling out of the castle. For this purpose 39 (Fig. 5) are provided and these are normally stored in inactive positions, one in each of two vertical holes in one of the upper cross bars of the castle, as shown in Fig. 1. These side bars 39 pass through each of the upper horizontal holes, one in each of the upper cross bars 31 of the castle, to overlie all of the heddle frames, as shown in Fig. 4. During the folding operation, the beater arms 39 become disengaged from their fulcrums and subsequently inverted. Consequently these arms must also be held in place and this is done by binding their upper ends to the castle by means of the pins 71 above described. The pins 71 are made to pass through screw eyes 72 provided one on each arm 39.

To hold the loom, the pins 71 are applied, as just described, to bind the beater arms 39 to the castle and hold the heddle frames 36 against vertical movement in the castle. The warp threads 50 are loosened by releasing the hold on the castle (cf. Fig. 1) and raising the beater arms 39. Then, if one stands facing the roll 15, the upper end of a back leg 6 can be pulled forwardly with one hand while the upper part of the castle is pushed rearwardly with the other hand, the warp threads 49 pass over the cross bars 32 and 36 through the slots 42 and move forwardly toward the front legs 5. The legs 6 are notched at as 73 (Figs. 1 and 6) to clear the bolts 33 as legs 5 move forwardly. The forward movement of the castle is immediately reversed, and the lower end of the castle moves forwardly. The castle is caused to swing clockwise as viewed in Fig. 1 and forces the side bars 39 (Fig. 1) to swing counterclockwise and the section of the castle which comes to lie close to legs 6.

To operate the loom, the operator places his foot on the cross bar 13 of one back leg 6 and lifts on the castle. As the castle turns counterclockwise, it lifts the side bars 1 and 6 and the front legs and 5. On the other hand, the front cross bar 13 and the lower parts of the castle being raised, the threads 61 engage the slots 62 and separate the levers from each other, and as the castle moves in a corresponding manner, the castle will be lifted off the back legs 6 as described, and the castle will sink back to the original position again. The loom may be used for weaving. It may be used for weaving.
in upright position when the supporting frame is in horizontal position; the frame, legs and castle being foldable into compact relation by pulling forwardly on the upper ends of the rear legs and by pushing rearwardly on the upper end of the castle.

2. The combination, as claimed in claim 1, in which a pair of cross bars rigidly interconnect the upper ends of the side members of the castle, a plurality of heddle frames are mounted for vertical sliding movement in the side members of the castle; and a member provided for spanning the last-named cross bars in overlying relation with the heddle frames to retain the latter in the castle when the latter is turned upside down during the folding of the frame, legs and castle; said last-named member being connected to the last-named cross bars for facile removal and replacement.

3. The combination, as claimed in claim 1, having a beater consisting of a cross member located adjacent and confronting the front face of the castle and two arms fixed near their upper ends to the said cross member, fulcrum pins fixed one to each front leg at a location near but above the pivot that connects the front and rear legs, each arm having a slot extending upwardly from its lower end and receiving one of said fulcrum pins; and means for binding the beater to the castle during the folding of the frame, legs and castle; whereby, when the castle is turned, the beater arms are turned with it and disengaged from said fulcrum pins.

4. The combination as claimed in claim 3, in which heddle frames are slidably mounted in the castle and the means for binding the beater to the castle serves to retain the heddle frames in the castle when it is turned upside down during folding of the frame, legs and castle.

5. The combination, as claimed in claim 3, in which each beater arm has a finger extending from its lower end on its front side for engaging the fulcrum pin and guiding the slot into engagement with it, when the frame, legs and castle are unfolded and moved back into working position.

6. The combination as claimed in claim 2, in which a cross bar interconnects the front legs near the lower ends, a plurality of foot treadsels are each pivoted at one end to the last-named cross bar and extend rearwardly with their lower ends underlying the castle, lifting means in the castle for the heddle frames, and flexible connections between such lifting means and the treadsels; whereby when the castle is turned upside down during the folding of the castle, legs and frame, the treadsels will be lifted by said flexible connections into substantially parallel relation with the front legs.

7. In a loom, a castle consisting of two laterally-spaced vertically-disposed side members having a plurality of vertical guides in their confronting faces, an upper pair of cross bars rigidly interconnecting said side members near their upper ends and a lower pair of cross bars rigidly interconnecting the side members near their lower ends, a plurality of heddle frames slidably mounted in said guides, a pair of pivot rods spanning the lower pair of cross bars and each supported at its ends one in each such cross bar, a plurality of lifting arms mounted one on each pivot rod and extending toward each other, a cross bar underlying each pair of lifting arms, links pivotally connecting the outer ends of each pair of lifting arms to the underlying cross bar, a series of foot treadsels pivotally supported near one end and having their other ends underlying all said cross bars, and flexible members connecting various treadsels to various cross bars.

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