G. CROMPTON.

HEDDLE-FRAME.

No. 190,708. Patented May 15, 1877.

Fig. 1.

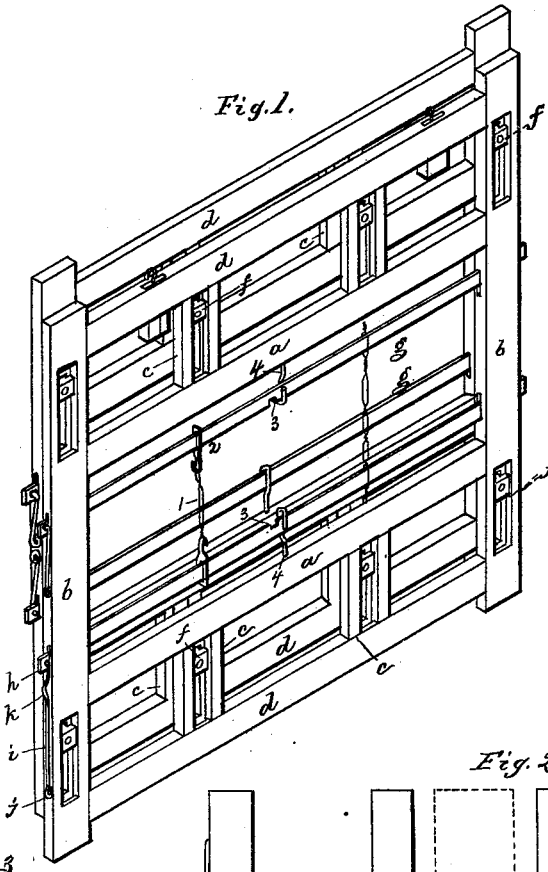


Fig. 5.

Fig. 6.

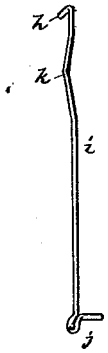


Fig. 4.

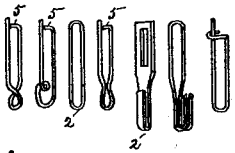


Fig. 3.

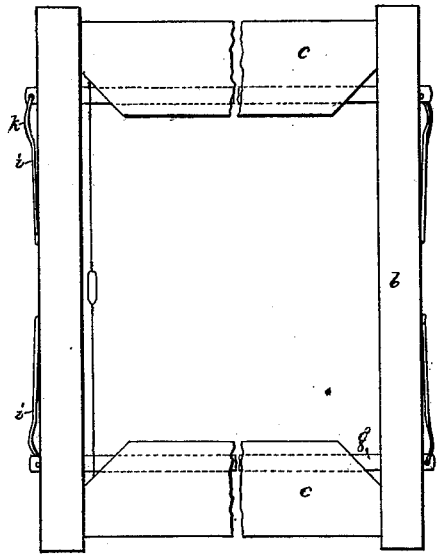
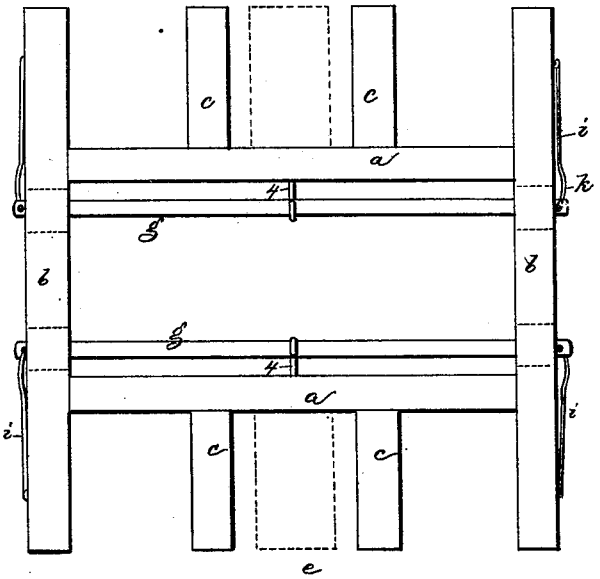


Fig. 2.



Witnesses.
Elmer E. Perkins.
L. H. Latimer.

Inventor.
George Crompton
per Crosby & Gregory Attys

UNITED STATES PATENT OFFICE.

GEORGE CROMPTON, OF WORCESTER, MASSACHUSETTS.

IMPROVEMENT IN HEDDLE-FRAMES.

Specification forming part of Letters Patent No. **190,708**, dated May 15, 1877; application filed March 7, 1877.

To all whom it may concern:

Be it known that I, GEORGE CROMPTON, of Worcester, in the county of Worcester and State of Massachusetts, have invented an Improvement in Heddle-Frames, of which the following is a specification:

This invention relates to heddle-frames for looms; and has for its object to make the frames very thin, so that a greater number of frames may be brought into a smaller space than heretofore common. To accomplish this, and at the same time to prevent the contiguous frames from catching against each other when being raised and lowered, I extend the top and bottom of each frame or portions thereof, so that such projecting portions at the top or bottom of a lowered or raised frame will always bear against the adjacent frame, and prevent such movement of the frames in the direction of the length of the warp as would cause the cross-bar of the frame next the heddle-carrying bars to catch one against the other as is now common when such cross-bars in ordinary heddle-frames are strained, bent, or sprung, as they are apt to be if made thin, so that they are not very rigid.

The invention also consists in so arranging the heddle-carrying bars in the frame that one or both of them may be moved toward the other, and combining therewith a separable heddle, to permit the removal of an eye portion of a heddle without removing a bar; also, in the combination of two heddle-frames with retaining connections, whereby each frame is permitted to move over the other only in the direction of its height.

Figure 1 represents two heddle-frames and retaining connections. Figs. 2 and 3 represent modifications of heddle-frames; Figs. 4 and 5, different plans of hooks for the heddle-wires; and Fig. 6, a heddle-bar holder detached.

The heddle-frame is composed of cross-bars *a a*, connected as usual by means of side bars *b*. In an ordinary frame the side bars terminate substantially at the edges of the cross-bars *a*. The shed in an ordinary open shed-loom is about seven inches in depth, requiring each frame to rise or fall at the widest part a distance of three and one-half inches. As ordinarily constructed, the lower and upper ends of each side bar, when the frames are raised or lowered, pass above or below the cross-bar of the adjacent frame, and in order to prevent one cross-bar from catching upon another the frames have to be made quite thick, usually three-eighths of an inch or more.

My frames are made much thinner, commonly not over one-fourth of an inch in thickness. The cross-bars being so thin would spring and catch against each other when the shed was being formed or closed, if they were not provided with extensions from the top cross-bars upward and the bottom cross-bars downward. These extensions *c c* are equal in thickness to the thickness of the bars *a*, and their length below the top of the lower bar *a*, or above the bottom of the upper bar *a*, is greater than half the distance of the depth of the shed. In a shed seven inches deep, the length of the extensions and bar would be each about four inches.

In Fig. 1, the extensions *c* at their ends remote from the center of the heddle-frame enter an auxiliary cross-bar, *d*, that acts to steady the extreme ends of the extensions, while at the same time they act to prolong the extensions. These auxiliary cross-bars may be omitted, as shown at Fig. 2, and instead of the two extensions *c* one may be used, as shown in dotted lines at *e*, or more than two extensions may be used. So also the upper and lower portions of the frame may be composed of a broad plate of metal, as in Fig. 3, or of a single broad bar of a depth greater than the extent of movement of the heddle-frame.

In Fig. 1, the extensions *c* are held together by means of retaining-connections *f* made as bolts, with a head at each end, and fitted within slots made in the frames, the heads of the bolts being below, or flush with, the surface of the extensions. In this way two adjacent frames may slide, one over the other, and one may be made to stiffen the other more than if the two frames merely rested one against the other.

The heddle-holding rods *g* are made, as usual, of metal, and provided with eyes or holes at each end to receive a hook, *h*, of a heddle-bar holder, *i*, composed of a piece of wire provided with a coiled-spring-like projection, *j*, to enter a hole in the side bar, and with a curved or bent portion, *k*, by which to easily

operate the holder, to insert or remove its hook from the eye of the bar *g*. The heddles are of wire, and when broken or injured need to be removed and new ones substituted therefor.

The drawings show several forms of hooks and heddles, whereby any heddle may be removed or put upon the bars *g* without removing other heddles from the bars.

In the first form the wire eyes 1 are attached to hooks 2 placed upon the bars *g*. These bars are, or one only of them may be, placed in a slot in the side bar, the slot being of a length greater than the width of the bar, so that the bar, when released from its holder, may be moved in such slot toward the other bar *g*, which will permit the eye to be detached from the hook 2 of sheet metal or wire.

A notch, 3, in the bar permits it to be moved toward the other bar, the notch then being opposite the center stay 4 of the bar *g*.

Instead of making the hook removable from the heddle-eye that contains the warp, the hook may be made, as at 5, so as to be sprung upon or from the bar. With a hook like 5 the bars need not be moved. The hook may be made, as at 6, of the same wires that constitute the eye-part for the warp.

With such a hook the bars must be moved toward the center of the frame to remove the heddle. In the frame shown in Fig. 2, wherein the auxiliary cross-bars are omitted, the ends of the side bars need not extend farther than usual below the cross-bars *a*. The heddle-frames are connected with and raised and lowered through cords attached to harness-levers in the manner common to my ordinary looms.

I claim—

1. The combination, with the main portion of the heddle-frame, of extensions at the top and bottom thereof, whereby the said heddle-frame is adapted to remain in contact with an adjacent heddle-frame at both its highest and lowest position, to prevent the adjacent frames catching one against the other when raised or lowered to form the shed, substantially as described.

2. The combination, with the frame and heddle-holding bar made movable toward the other bar of the frame, of a heddle and hook, whereby the heddle may be removed from the frame or be secured therein, substantially as described.

3. The combination, with two heddle-frames provided with extensions, of heddle-retaining connections, to hold them together, substantially as described.

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

GEO. CROMPTON.

Witnesses:

J. B. SYME,

J. A. WARE.