

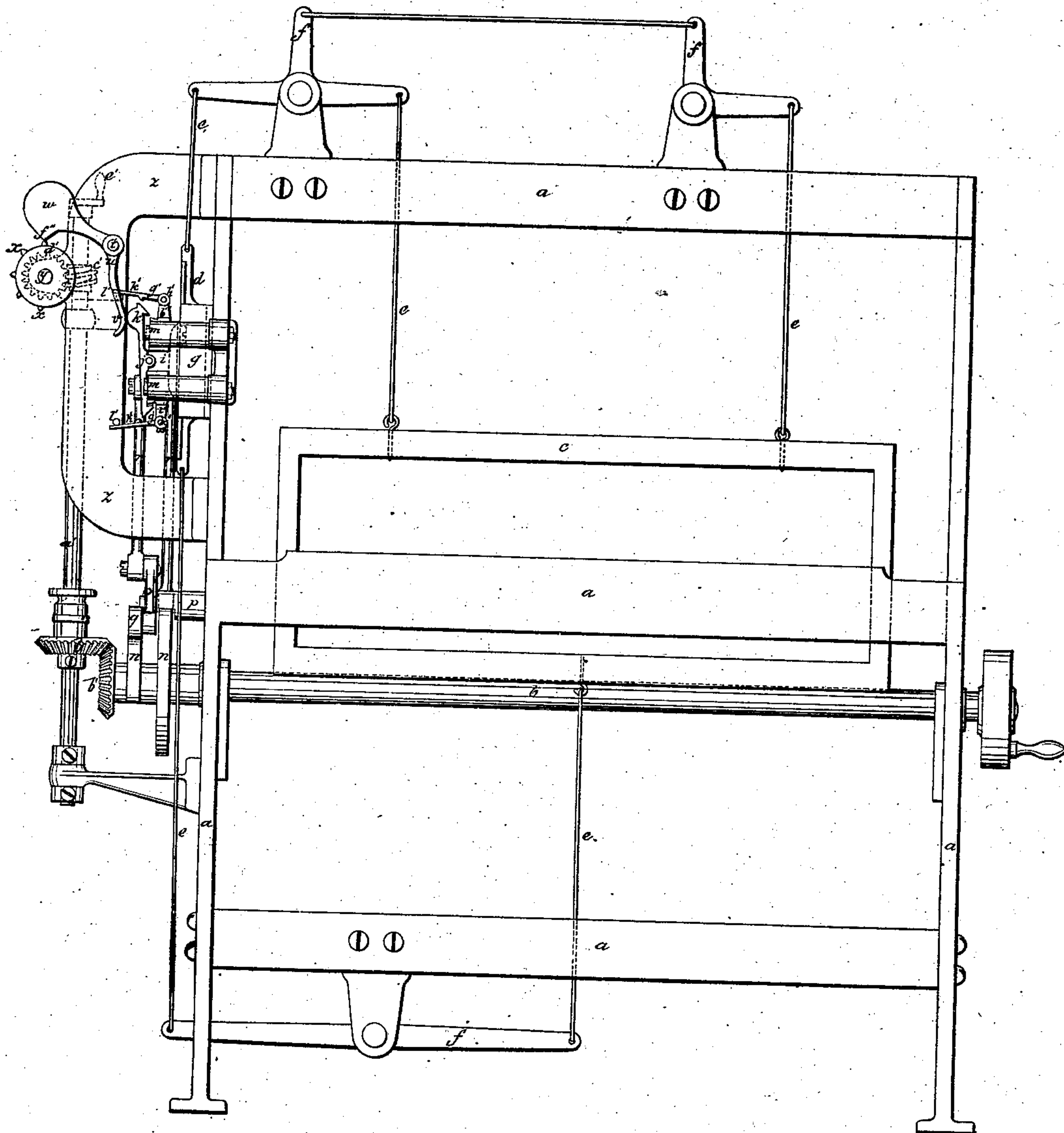
No. 93,799.

PATENTED AUG. 17, 1869.

E. B. BIGELOW.
HARNESS OPERATING MECHANISM FOR LOOMS.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses
Nancy E. Meaus.
Herbert J. Whitman.

Inventor
E. B. Bigelow.

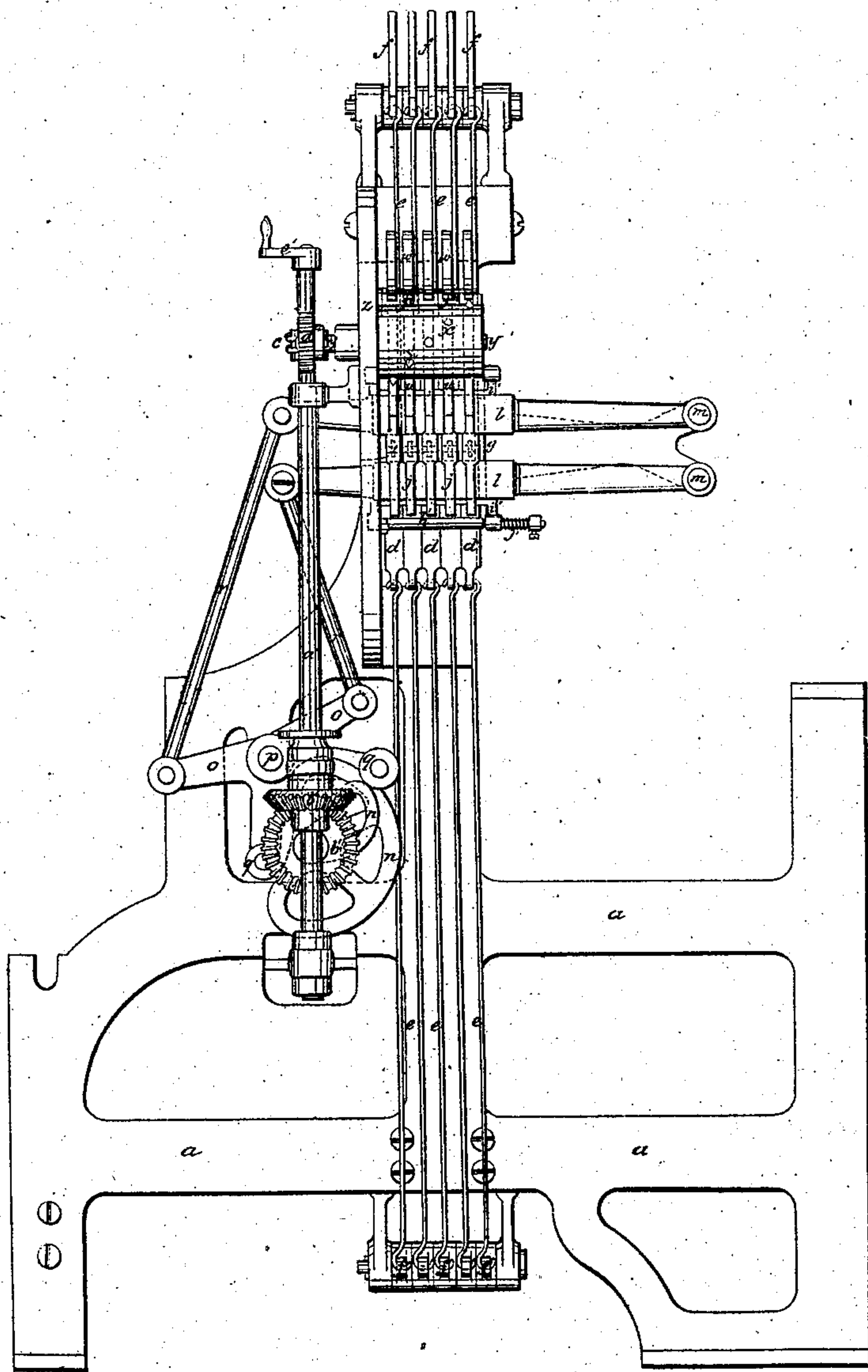
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3 SHEETS—SHEET 2.

Fig. 2.



Witnesses.

Nancy E. Head.
Herbert T. Whitman.

Inventor.

E. B. Bigelow.

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3 SHEETS—SHEET 3.

Fig. 3.

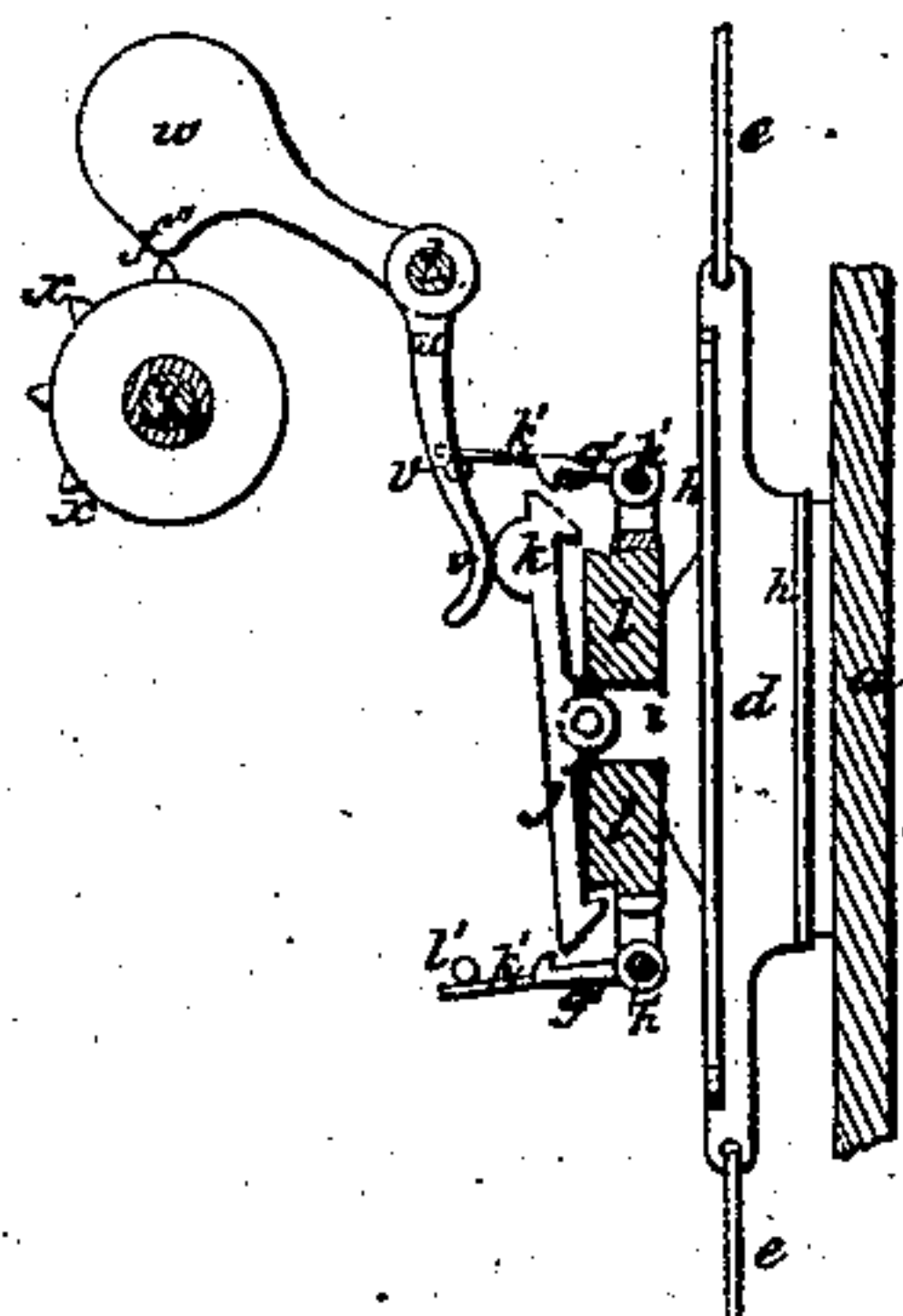


Fig. 4.

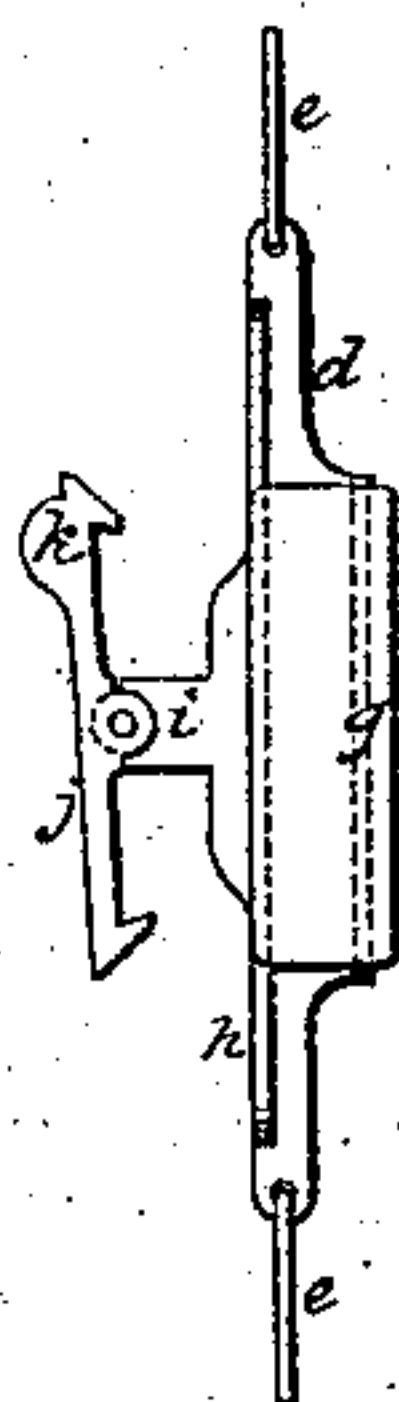


Fig. 5.

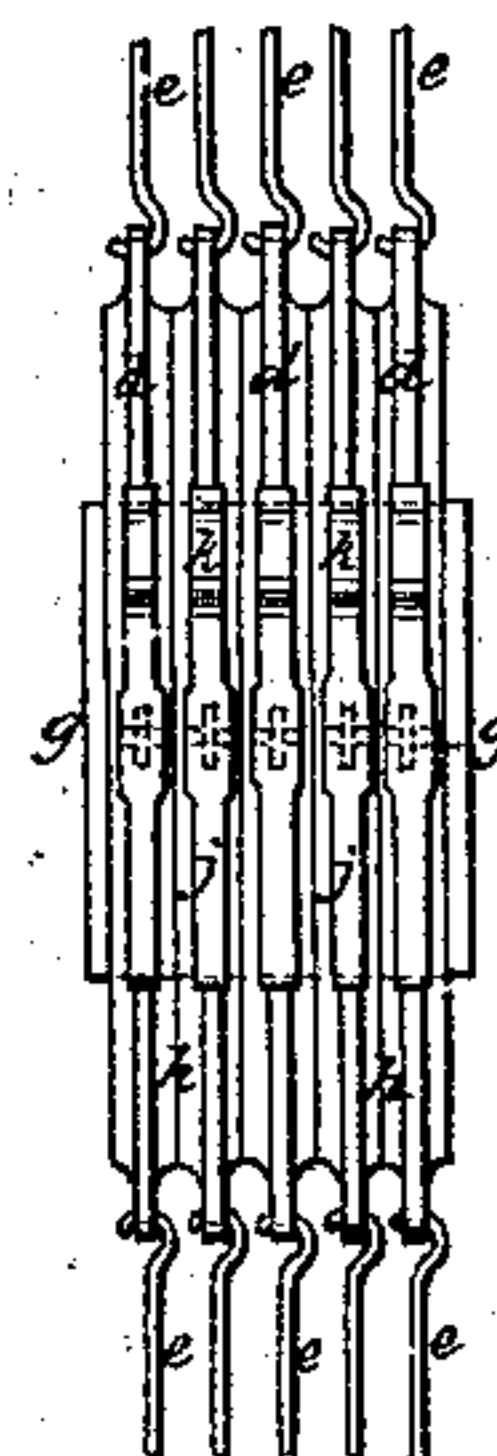


Fig. 6.

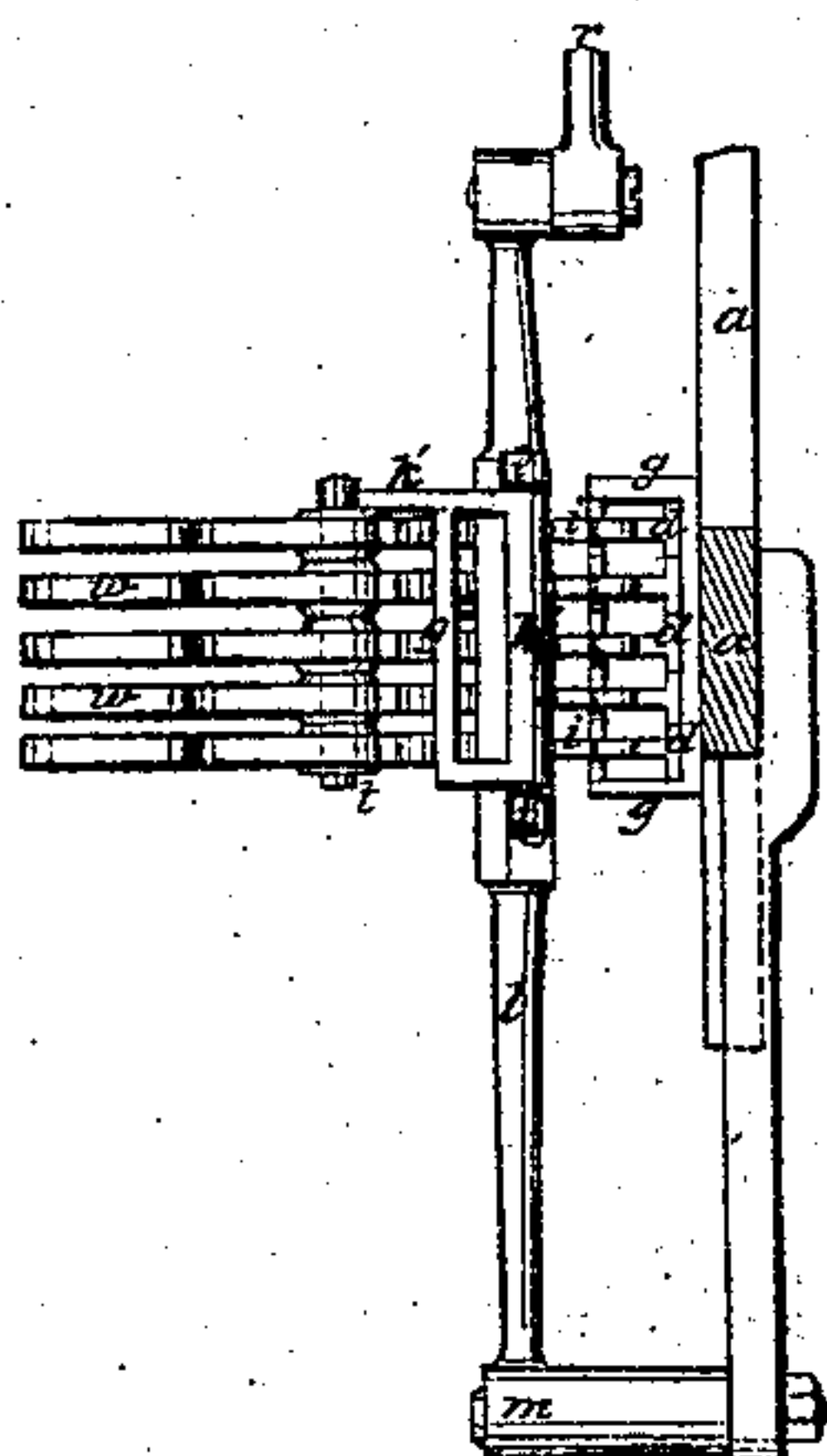


Fig. 7.

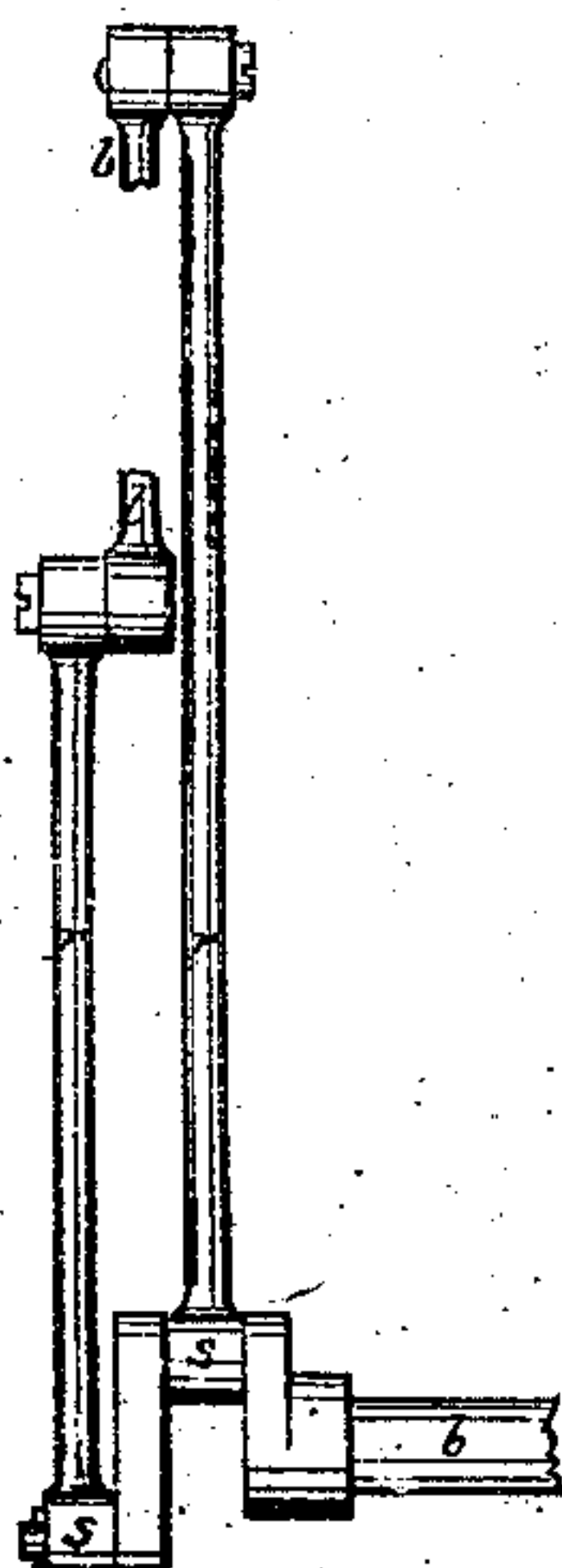


Fig. 8.

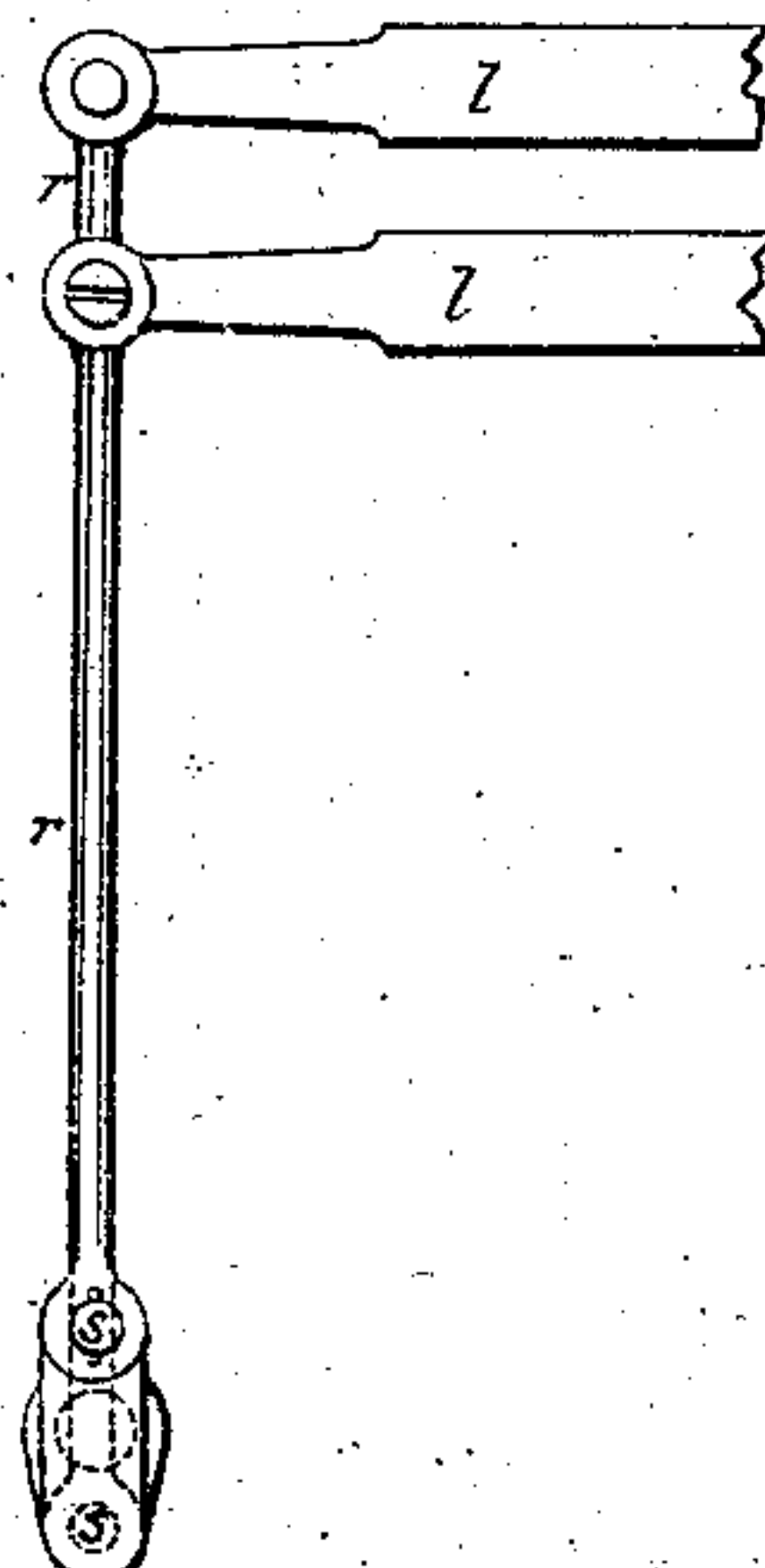
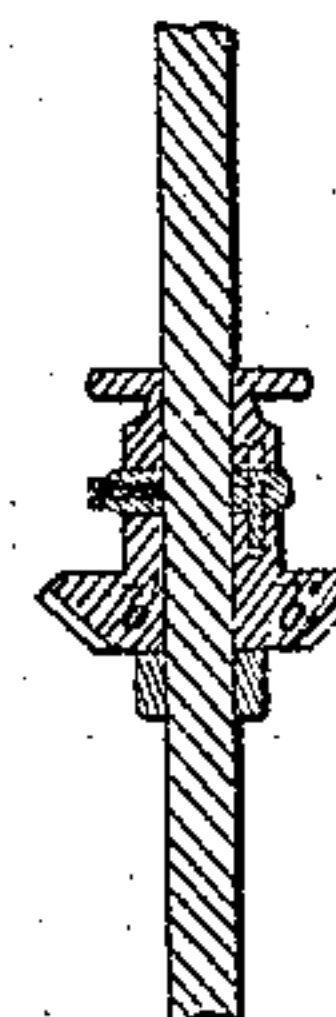


Fig. 9.



Witnesses

Nancy E. Mead.
Herbert J. Whitman.

Inventor

E. B. Bigelow.

United States Patent Office.

ERASTUS B. BIGELOW, OF BOSTON, MASSACHUSETTS.

Letters Patent No. 93,799, dated August 17, 1869.

IMPROVEMENT IN HARNESS-OPERATING MECHANISM FOR LOOMS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, ERASTUS B. BIGELOW, of Boston, in the county of Suffolk, and State of Massachusetts, have invented certain new and useful Improvements in the Harness-Motion for Power-Looms; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

Figure 1 is a front elevation of my improvements, and such other parts of a loom as are necessary to exemplify them, and

Figure 2, a left-hand elevation thereof.

A part of my invention relates to a mode of combining the latch-levers with the balance-levers, by a loose connection, whereby a continuous rotary movement of the pattern-surface is rendered practicable; another part relates to a mode of preventing the latch-levers from escaping unduly from the lifting-bars; and another part relates to a mode of vibrating the lifting-bars.

The loom-frame is marked *a*, and the lay-shaft, *b*.

The leaves of heddles or harnesses are marked *c*, and are severally connected with reciprocating jacks *d*, by rods *e* and levers *f*, or by cords, in the usual manner.

The reciprocating jacks *d* are arranged vertically, side by side, in a guide-trough, *g*, affixed to the loom-frame, a top view of which is given in Figure 6, and a view, as seen when standing at the end of the loom, in Figure 5.

They are shaped as represented in Figure 4, and have flanges, *h*, on their sides, of such thickness as to nearly fill the guide-trough when placed therein, as above described, sufficient play, however, being given to allow them to move up and down freely, as they are required to do, to operate the heddles with which they are connected.

They have arms, *i*, extending from them, to which latch-levers *j* are severally jointed, the latch-levers being formed with a hook on each end, and a cam-like projection, *k*, on their upper arms.

The reciprocating jacks *d* are operated by two horizontal lifting-bars *l*, which vibrate in a vertical plane, one above and the other below the arms *i*, and have their axes *m* over the cloth-forming line, to make an even shed, as is usual.

They are made to open and close like a pair of shears, by a double-faced cam, *n*, on the lay-shaft *b*, acting on a four-armed lever, *o*, which oscillates on a stud, *p*. Two of the arms of the four-armed lever carry cam-rollers, *q*, one for each of the faces of the cam, whilst the other two are connected by connecting-rods *r*, to their respective lifting-bars *l*.

The cam *n* may be varied in form, according to the

time it is desired to have the shed remain open for the passage of the shuttle.

When it is not desired to have the shed remain open and at rest for a time, for the passage of the shuttle, a double crank may be substituted for the cam, as shown in Figures 7 and 8, the lifting-bars being represented in fig. 7 as open, and in fig. 8, as closed. In this arrangement, the wrists *s* of the double crank are connected directly with their respective lifting-bars *l*, by the connecting-rods *r*.

When the lifting-bars are opened, they, by engaging with one or the other of the hooks of the latch-levers, raise or depress the reciprocating jacks, and form the open shed; and when they are closed, they, by acting on the arms *i* of the reciprocating jacks, bring them to a line, and close the shed, as is usual.

The cam-like projections *k*, before referred to, on the upper arms of the latch-levers, serve as weights, to draw the upper hooks of the latch-levers away from their lifting-bar, and cause their lower hooks to engage with their lifting-bar, so that if they were all left unsupported, all the latch-levers would engage with the lower lifting-bar, and all the heddles be moved in one direction.

The mode in which the latch-levers are shifted, to vary the order in which the heddles are raised and depressed, is as follows:

A series of balance-levers, *u*, corresponding in number with the number of the latch-levers, oscillates on an axis, *t*, and has, on its dependant arms, cam-surfaces, *v*, which act on the cam-like projections *k*, on the latch-levers, before described.

Their horizontal arms carry weights *w*, (for which springs may be substituted,) which are more than sufficient to counterbalance the weights of the cam-like projections *k*, on the latch-levers, so that when they are allowed to descend, they will throw the upper hooks of the latch-levers on to the upper lifting-bar, and release their lower hooks from the lower lifting-bar; then, when the weights *w* are raised, the weight of the cam-like projections *k* will draw the upper hooks of the latch-levers from the upper lifting-bar, and throw their lower hooks under the lower lifting-bar.

To govern the action of the balance-levers, a pattern-surface formed on a cylinder, or on chain or band carried by a cylinder, is employed, which has cam-like projections *x* arranged upon it, in accordance with the desired figure, as is usual.

It is carried by an axis, *y*, which turns in a long bearing projecting from a stand, *z*, affixed to the loom-frame, one end of the axis *y* being free, to facilitate the application and removal of the pattern-surface.

It has a continuous rotary movement imparted to it by the lay-shaft *b*, through the medium of an upright shaft, *a'*, bevel-gears *b'*, and worm and gear *c'* and *d'*.

To enable the weaver to adjust the pattern-surface, when required, the upright shaft *a* carries a crank, *e*, and is provided with a clutch-arrangement, (as shown in Figure 9,) by which its bevel-gear *b* may be easily engaged and disengaged therewith.

When the pattern-surface revolves, its cam-like projections *x* act upon similar projections *f*, on the weighted arms of the balance-levers, and by raising them, effect the required changes in the movement of the heddles.

It is important to note that the axis *t*, of the balance-levers, is stationary, whilst the latch-levers have an up-and-down movement, and that, by reason of the loose connection between the balance-levers and the latch-levers, the balance-levers may be moved by the pattern-surface to effect their changes, whilst the latch-levers are engaged with the lifting-bars, and thus render a continuous movement of the pattern-surface practicable.

Now, suppose the cam-like projection *k*, of the latch-levers, to be either above or below the cam-surfaces *v* of the balance-levers, as will be the case in weaving; and suppose, also, that the continuous movement of the pattern-surface has allowed the weighted arm of the balance-levers to descend, and throw their cam-surfaces *v* into the path of the cam-like projections *k*, it will be seen that the cam-like projections *k*, as they approach their central position to close the shed, will strike against the cam-surfaces *v*, and raise the weighted arms *w*, and hold them in a raised position until the lower hooks of the latch-levers are set free from the lower lifting-bar, when they will descend, and throw the upper hook of the latch-levers on to the upper lifting-bar.

It will be evident, from this description, that when the cam-like projections *k* strike against the cam-surfaces *v*, the weighted arms *w* will tend to throw the lower hooks of the latch-levers off of their lifting-bar, before they have completed their movement.

To prevent this, and also to prevent any of the latch-levers from escaping from their lifting-bars during their vibrations, latch-hooks *g* are employed, which hook on to the ends of the latch-levers, and hold the latch-levers in position whilst they are in action, and are withdrawn whilst they are being shifted.

The latch-hooks *g* are carried by shafts *h*, which oscillate in stands *i*, affixed to the lifting-bars *l*, before described.

The latch-hook *g* of the upper lifting-bar, tends toward the latch-levers by its own gravity, while that of the lower lifting-bar is drawn toward them by the coiled spring *f*, on the shaft *h*, and when they are left free to do so, they will hook on to the ends of the latch-levers, and hold them in position.

The latch-hooks are released to allow the latch-levers to be shifted, by arms *k* on the shafts *h*, which, when the lifting-bars are about completing their closing movement, strike against stops *l*, projecting from the stand *z*, and turn the shafts *h* far enough to release the latch-hooks. Then when the lifting-bars begin their opening movement, the arms *k* leave the stops *l*, and allow the latch-hooks to hook on to the ends of the latch-levers, and hold them in position until they are released as before.

Having described my invention, and pointed out some of the modifications of which it is susceptible, without departing from its distinguishing principles, What I claim as new therein, and desire to secure by Letters Patent, is—

The combination of mechanism herein described, for governing the order in which the leaves of heddles are raised and depressed, to form the shed, consisting of a pattern-surface, having a continuous rotary movement, latch-levers which engage interchangeably with lifting-bars, to form the shed, and balance-levers, which transmit the governing-action of the pattern-surface to the latch-levers by contact therewith, when their changes are effected, and are separated therefrom whilst the shed is formed, substantially as specified.

Also, in combination with the latch-levers, latch-hooks, or their equivalents, for preventing an untimely escape of the latch-levers from the lifting-bars, substantially as specified.

Also, the combination of mechanism herein described, for operating the lifting-bars, consisting of a double-faced cam producing two reciprocating motions in opposite directions, oscillating lever-arms and two connecting-rods, by which the two reciprocating motions of the cam are communicated to their respective lifting-bars, substantially as specified.

E. B. BIGELOW.

Witnesses:

NANCY E. MEANS,
HERBERT T. WHITMAN.