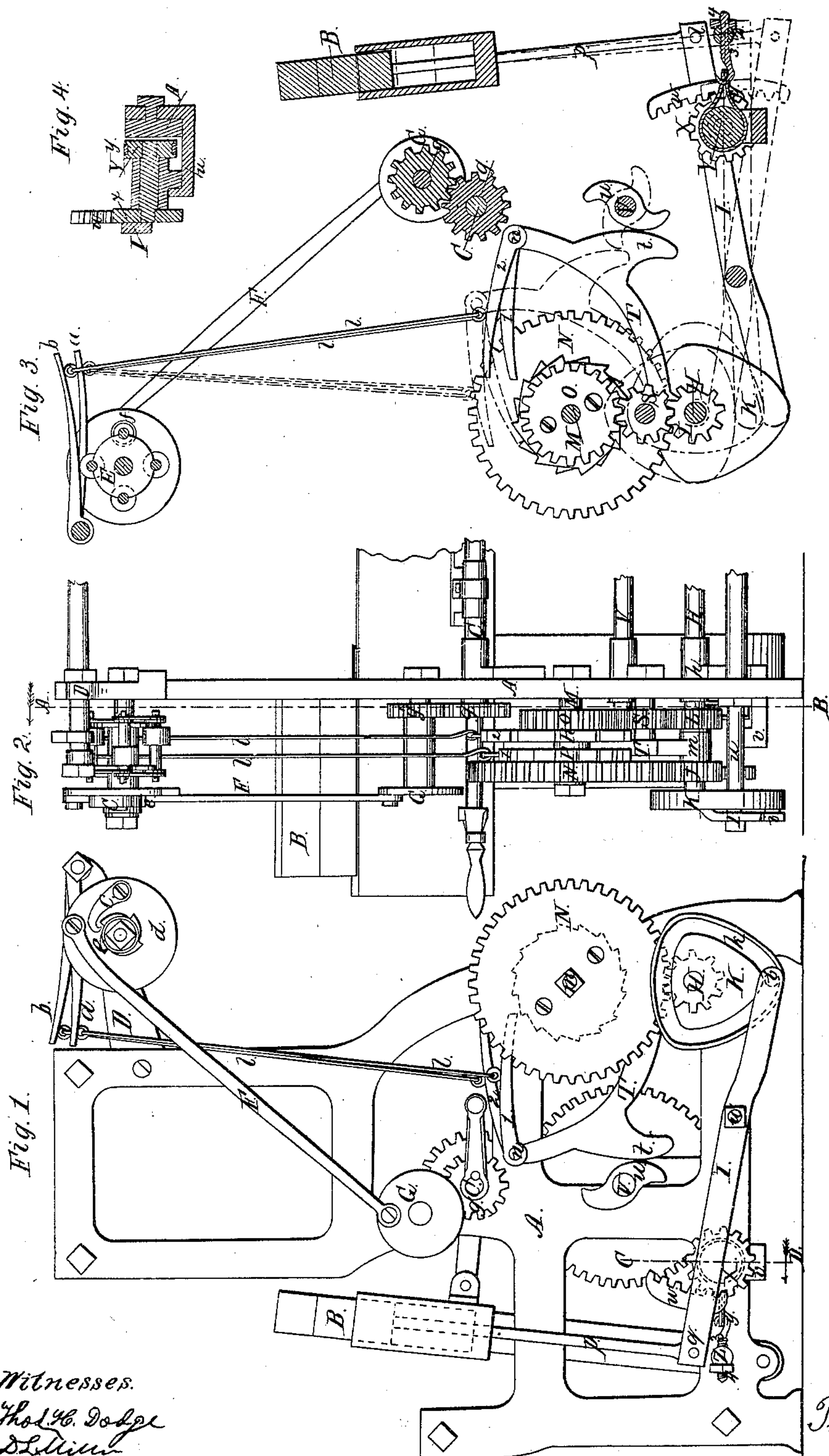


T. Cleary. Shuttle Boxes.

N^o 86,365.

Patented Feb. 2, 1869.



Witnesses.
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TIMOTHY CLEARY, OF MILLBURY, MASSACHUSETTS.

Letters Patent No. 86,365, dated February 2, 1869.

IMPROVEMENT IN OPERATING SHUTTLE-BOXES IN LOOMS.

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

Know all men by these presents:

That I, TIMOTHY CLEARY, of Millbury, in the county of Worcester, and Commonwealth of Massachusetts, have invented certain new and useful Improvements in Looms; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 represents an end view of my improvements in looms;

Figure 2 represents a rear view of the same;

Figure 3 represents a section on line A B, fig. 1, looking outward in the direction indicated by the arrow; and

Figure 4 represents a longitudinal section through the friction-wheel, shaft, gear, and bearing on line C D, fig. 1.

To enable those skilled in the art to which my invention belongs, to make and use the same, I will proceed to describe it more in detail.

The nature of my invention consists, first, in the peculiar construction, combination, and arrangement of the ratchet and gear-wheels, and working-dogs, for operating the tappet-wheels; second, in the peculiar construction and combination of the shuttle-box, friction, and steadying-device used in fancy looms.

In the drawings—

The part marked A is the frame of the loom,

B, the shuttle-boxes, and

C, the crank-shaft, arranged, in relation to each other, in the usual manner.

At the upper part of the frame A, at the back of the loom, an arm, D, projects to support the chain-levers *a* and *b*, and the pattern-wheel E, which carries the pattern-chain.

The pattern-wheel E is turned by the pawl-hook *c*, which engages ratchets *e*, upon the hub of the pattern-wheel E.

The pawl-hook *c* is pivoted to the circular plate *d*, which is caused to oscillate by the motion of the connecting-rod F, pivoted to the crank-plate G, which latter derives its motion from the crank-shaft C, through the spur-gears *g* and *g'*.

The pattern-chain consists of small rolls or bars and rolls of various sizes. In the present instance, there are but three different sizes shown, the different proportions of which are fully indicated in the drawings, at *f*, fig. 3.

Near the lower part of the frame A, at the back side, and connected thereto by bearings *h*, is a shaft, H, extending parallel to the length of the loom, and to its ends are fastened the tappet-wheels K, made in the form of heart-shaped cams, having in their faces grooves *k*, in which work the pins or rolls *i*, in the end of the shuttle-box levers I.

Upon the shaft H, between the tappet-wheels and the frame of the loom, are two gears, J and L, both of the same size, and rigidly keyed to the shaft.

Above the shaft H, there projects from the frame A

a stud, M, upon which are hung and turn two gears, N and O, and two ratchet-wheels, P and R.

The gear N meshes directly into the gear J, upon the tappet-wheel shaft H, and is four times the size of that gear in circumference; consequently the gear J and shaft H would make four revolutions to one revolution of the gear N.

The ratchet-wheel P is composed of sixteen points or ratchets, and is securely fastened to the inner side of the gear N, so that they both move together.

The gear O is twice the size of the gear L, or one-half the size of gear N, and is geared with gear L by an intermediate gear, S, which is supported by a stud projecting from the frame A.

The ratchet-wheel R is composed of eight points or ratchets, and is screwed firmly to the gear O, as fully indicated in the drawings.

From the shaft H, extending forward and upward in a curve, is an arm, T, connected thereto, between the gears J and L, by a hub, *m*, through which the shaft H passes, allowing it to swing freely thereon.

To the upper end of the arm T are fastened working-dogs or long pawls, 1 and 2, by means of the pivot *n*, whereby they are allowed to rise and fall with the motion of the levers *a* and *b*, to which they are attached by means of rods, chains, or cords *l l'*.

At the lower side of the arm T is a projection, *t*, which engages the cam U, and by which the arm T and working-dogs 1 and 2 are operated.

The cam U is fastened to the end of a shaft, V, extending parallel to the length of the loom, and receiving its motion from the ordinary driving-shaft, by means of suitable gearing.

The shuttle-box levers I extend, from the tappet-wheels K forward to beneath the shuttle-boxes B, and are connected to them by rods *p*, the latter being connected to levers I, at their lower ends, by means of pivots *q*.

Studs *u*, projecting from the ends of the frame A, form the fulcras of the levers I, near the forward ends of the levers I, and secured firmly thereto are internal segment-gears *w*, which mesh into gears X, connected to the outer end of the journals of friction-wheels Y, and by means of which the levers I are prevented from jarring or bounding, thereby moving the boxes steadily and with great precision.

It will be seen that, by applying the friction nearly under the shuttle-boxes, it required less power to hold the box-stems or rods *p* from jarring or rebounding, than it would if the friction were applied to the tappet-wheels, or even to the rear ends of levers I, thus requiring less power to operate the loom, while, at the same time, the tappet-wheels are subjected to less strain.

The shafts or journals of the friction-wheels Y and gears X are supported in pipe-bearings upon the curved arms *v*, fastened to the frame A of the loom, as indicated in the drawings by dotted lines and in section.

The friction-wheels are made with a smooth, flat

groove around their faces, to receive bands, *y*, of metal, leather, rubber, or any other suitable substance, the ends thereof being brought forward and held by hooks 3, the shanks of which pass through studs *z*, and are made adjustable by the nuts and screws 4, whereby the amount of friction can be regulated.

The operation is as follows:

The parts being in position, as shown in dark lines, fig. 3, the loom is started, the cam *U* carries up the arm *T* to the position shown in red lines, the dog 1 engaging with the ratchet-wheel *P*, and carrying it forward with the gear *N*, a distance corresponding to the length of two ratchet-points, or one-eighth of a revolution, which moves the gear *J* and tappet-wheel one-half a revolution, bringing down the boxes two spaces, to the position shown in red lines.

The change of the pattern-wheel *E* brings up the second-sized roll of the chain, which slightly raises the lever *a*, bringing up the dog 1, so that it passes over one point of the ratchet-wheel before engaging with it, and moves the ratchet and gear *N* a distance corresponding to the length of only one ratchet, or one-sixteenth of a revolution, thereby moving the tappet-wheel only one-quarter revolution, which moves the box-rod one space up, to the position shown in blue lines.

Now, if it be desired to move the tappet-wheel back to its former position, (the one shown in red lines,) the rolls in the pattern-wheel are so arranged as to raise lever *a* and dog 1, and lower lever *b* and dog 2, which engages the ratchet-wheel *R*, and moves it, with the gear *O*, forward one-eighth revolution, or a distance corresponding to the length of one of its points.

The gear *O* being only twice the size of the gear *L*, on the tappet-wheel shaft *H*, the tappet-wheel is moved back one-quarter revolution, to the position shown in red lines, the motion of the shaft being reversed by the use of the intermediate gear *S*.

It will be seen that the number of points on the ratchet-wheels is proportioned to the number of stations or points where the rolls or pins in the ends of lever *I* will rest, to bring all the shuttle-boxes in working position.

Thus, in this instance, there are four stations on the tappet-wheel. Two of them being opposite and the same distance from the centre, will bring the same box into working position.

The gear *N* being four times the size of the gear *J*, on shaft *H*, which moves the tappet-wheel, the number of points on the ratchet-wheel *P* is sixteen.

The gear *O* being twice the size of gear *L*, the number of points on the ratchet-wheel *R* is eight.

Therefore, to apply my invention to a loom with any number of boxes desired, construct the tappet-wheel so that the working of lever *I* will give the required number of stations, and make the ratchet-wheels with a proportional number of points. Then put as many-sized rolls into the pattern-chain as there are boxes, so that the dogs will engage one, two, three, four, five, or

six points on the ratchet-wheel, and the boxes can be moved one, two, three, four, five, or six spaces up or down, as the case may be; or, in other words, when the dog engages one point of the ratchet-wheel, the movement of the tappet-wheel carries the lever *I* from one station to the next, raising the boxes only one space. When it engages two points, the lever *I* is moved to the second station, raising the boxes two spaces, and when engaging three, to the third station beyond, raising the boxes three spaces, and in like manner through the whole number of boxes.

Thus it will be seen that any number of boxes may be used, and also that any box desired can be brought into working position with a single movement of the ratchet-wheels, thereby making my improvements very desirable upon looms for weaving complicated patterns, or when there are a great variety of colors.

By the use of my friction-device, a regular and steady movement of the lever *I* is produced, whereby the jarring and binding of the boxes, so incident to the use of the old tappet-wheel, is obviated, thus enabling me to run my looms at a higher rate of speed than can at present be done with the mechanism in common use.

For some classes of work or weaving, the inner system, consisting of the ratchet-wheel *R* and gears *O*, *S*, and *L*, may be dispensed with, using only the outer system or ratchet-wheel *P* and gears *N* and *J*, in connection with the tappet-wheel *K*; while, if preferred, the two systems may be made by constructing the inner and outer gears and ratchet-wheels both of the same size, and joining them to the tappet-wheel shaft, with one and two intermediate gears, respectively.

In lieu of the gears *X* and *w*, other devices may be substituted for combining the friction-device with levers *I*.

Having described my improvements in looms,

What I claim therein as new and of my invention, and desire to secure by Letters Patent—

1. The combination of the gears *N* and *J*, the tappet-wheel *K*, and ratchet-wheel *P*, of the pawl or dog 1, connected with and operated by the cam *u*, or its equivalent, and the pattern or chain-wheel, in the manner and for the purposes shown and set forth.

2. The combination, with the gears *N*, *J*, *O*, *S*, and *L*, the tappet-wheel, and the ratchet-wheels *P* *R*, of the vibratory dogs 1, 2, connected with and operated by the cam *u*, or its equivalent, and the pattern or chain-wheel, in the manner and for the purposes shown and set forth.

3. The combination, with lever *I*, of the friction-device *y*, gears *w* *x*, and the adjusting-hook or device 3, all constructed and arranged substantially as and for the purposes herein shown and described.

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Witnesses:

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