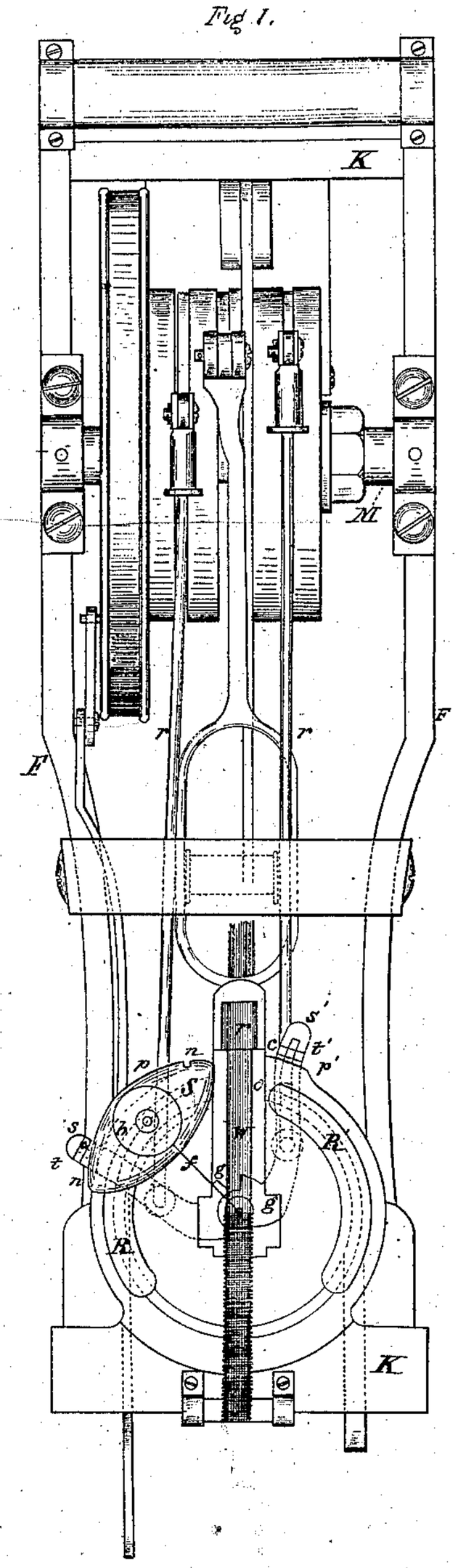
Sheet 1 - 2 Sheets

J. P. Humaston.

Loom.

No 79908 Patented Jul. 14, 1868.

Fig 1.



Witnesses
Edmund R. Wiggin
John Martin

Inventor
John. P. Humaston

Sheet 2 – 2 Sheets

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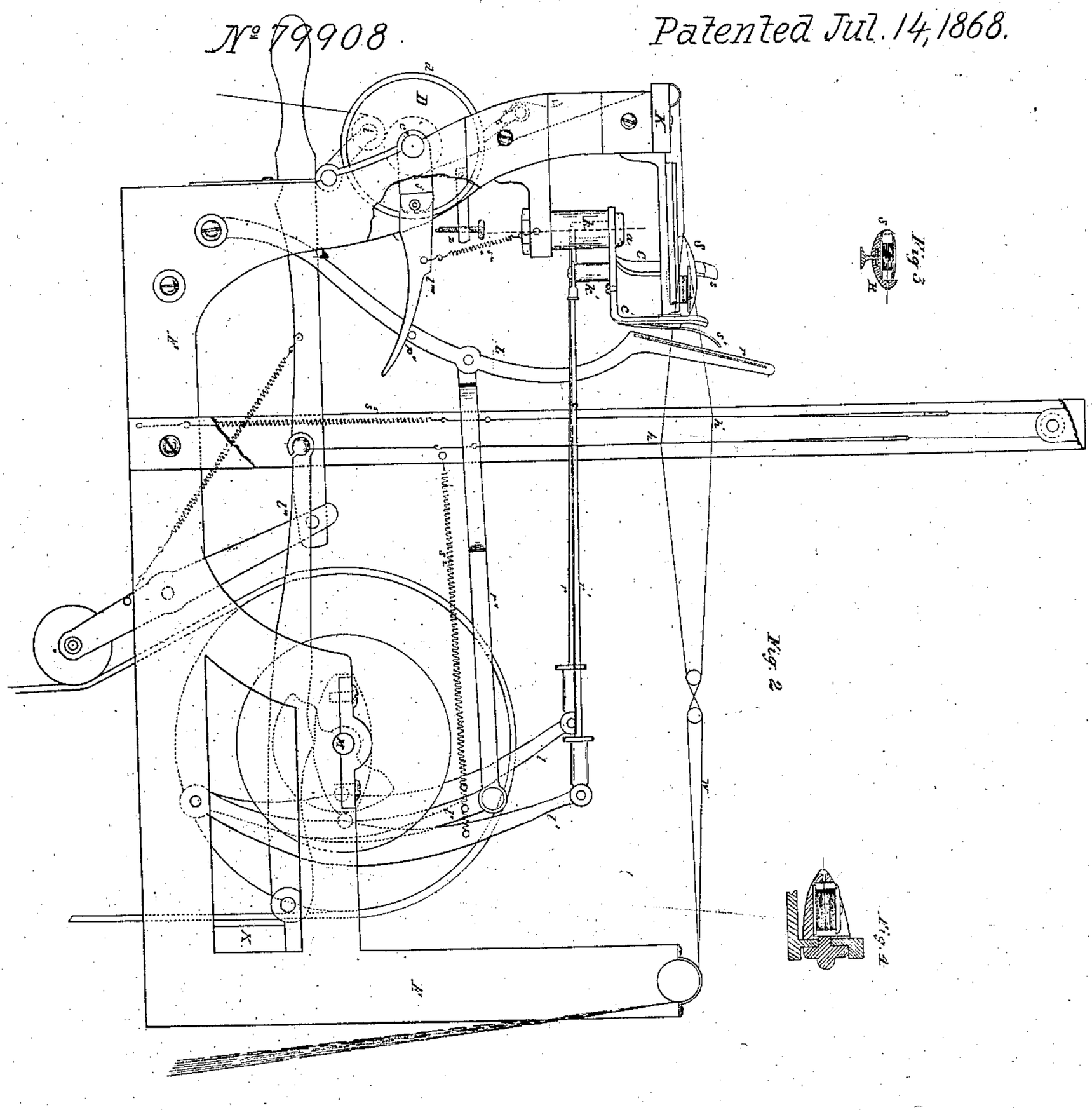

Fig. 2

Fig. 3

Fig. 4

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Inventor
John. P. Humaston

The drawing in this patent is not in print.

United States Patent Office.

JOHN P. HUMASTON, OF NEW YORK, N. Y., ASSIGNOR TO HIMSELF AND HAMILTON E. TOWLE, OF SAME PLACE.

Letters Patent No. 79,908, *dated July* 14, 1868.

IMPROVEMENT IN 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, JOHN P. HUMASTON, assignor to myself and Hamilton E. Towle, both of the city of New York, have invented certain new and useful Improvements in Looms to increase their capacity for weaving, and to improve the quality of their productions; 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.

This invention relates to certain improved construction and arrangement of looms for weaving narrow fabrics, and has for its object increased rapidity of production, and superiority and uniformity of the fabrics produced.

To enable others skilled in the art to make and use my improvements, I will proceed to describe their construction and operation.

Figure 1 is a plan,

Figure 2 is a side view of a loom.

The same letters refer to like parts in all the figures.

F F are the side-pieces forming the framework of a loom. They are kept the proper distance apart by the cross-frame pieces K K K, and the cross-bar or rod *x*.

All the motions in the machine are derived from the main shaft M, which may be driven in any of the usual ways of communicating rotary motion.

I construct my circular or curved shuttle or weft-race of sets of parallel curved bars, the shuttle sliding between them, as shown in Figure 4, but in some cases, as a modification, I prefer the construction shown at R R′, fig. 1. In this race, the shuttle or weft moves in a circular or other curved path, the centre of which is in or near the middle part of the fabric, where the weft or filling is being laid by the forward motion of the reed, and attach the same to the framework K.

In fig. 1, W is the warp of a web.

f is the weft or filling of the same, which is supplied from the bobbin *b* in the shuttle S.

R R′ is the curved shuttle or weft-race, attached to the breast-beam of the loom, and cut away or left open in the central part, as shown at *o*, for the purpose of allowing the reed *r* to beat up the filling as it is laid from the shuttle.

The shuttle is shown at S, figs. 1, 2, and 3, and may be described as having the form of a spindle, with an elliptical cross-section. It is provided with a recess, for the weft-bobbin *b*, and with a circular groove, for the track R, as shown in cross-section in Figure 3. The shuttle is also provided with notches, as shown in fig. 1, *n n′*.

The shuttle may be made of wood, vulcanite, metal, or other suitable material, but I prefer vulcanite.

The shuttle S is moved by means of arms or carriers *c c′*. The carriers are provided with springs *s s′*, which actuate the projecting pins or teeth *t t′*. These teeth engage the shuttle in the notches *n n′*. The carrier *c* acts upon the shuttle by means of its tooth *t* during one-half of its traverse, and the carrier *c′* through its tooth *t′*, engaged in the notch *n′*, during the remainder of the stroke. The shuttle can be readily removed by withdrawing the engaging-tooth or teeth or pins of the carriers, and sliding the shuttle to the opening in the front of the track or shuttle-race.

The shuttle or weft-carriers *c c′* are operated about a vertical axis, *a*, fig. 2, having a central position in relation to the curve of the shuttle-race or path of the shuttle or weft.

The carriers are disengaged from the shuttle, while it is in motion, by their teeth *t t′* being thrown out of their respective notches in the shuttle by means of the wedge-shaped projections *p p′*.

The shuttle-carriers obtain their motion from cams on the main shaft M. These cams act upon the carrier-levers *l l′*, and through them and the connecting-rods *r r′*, they transmit motion directly to the weft or shuttle-carriers, the connection being made on the carrier-studs K K′.

To insure certainty of action of the shuttle, and of its being accurately and certainly delivered from the control of one carrier to that of the other, the carriers are constructed so that for a certain distance in the middle part of the stroke of the shuttle, both proceed together with the shuttle for a period of time and distance sufficient to insure certain engagement of the tooth of the receiving-carrier, before the tooth of the delivering-carrier is fully disengaged.

The peculiar construction of the shuttle-carriers, which compels them to start at the instant the shuttle is delivered to either of them by the other, is seen near their common axis at the jogs *g g'*, fig. 1, which come into contact with each other, and promptly start the receiving-carrier by an impulse from the delivering-carrier. Meanwhile the engagement and disengagement of the tooth are taking place; the position and shape of the cams on the main shaft, which operate the carriers, being adjusted to correspond to the motion desired.

When the shuttle is under the control of one carrier only, the other carrier is at rest at the projection *p* or *p'*.

The lay-motion is derived from the main shaft M, from the action of a cam fixed upon it. The motion is transmitted from the cam to the lay L, through the cam-lever *l''*, and the connecting-rod *r''*, from the lever to the lay. The connecting-rod to the lay is formed with a vertical opening through it, to allow the harness *h h'* to have its proper central position directly behind the reed and lay.

The harness *h h'* is operated in its proper reciprocal motion also by a lever, *l'''*, and cam-motion, shown in fig. 2.

All the cams acting upon the harness, lay, and carrier-levers are upon the main shaft M, and all the cam levers are hinged upon centres at the rear of and below the level of the main shaft, as shown in fig. 2.

One motion of the harness-lever or levers and one motion of the carrier-levers may be obtained by the action of a spring or springs, s^5 s^2 s^3, fig. 2, or all the motions of the levers may be made positive from the cams alone.

The mechanism for obtaining and graduating the take-up motion is shown particularly in fig. 2, and may be described as a friction-wheel, D, with a flange, *d*, acted upon by a jointed lever, *l''''*. One end of this lever is hung concentrically with the friction-wheel D. In the middle part of the lever, not far from the position of the joint *j*, there is a groove cut, which is of sufficient size and depth to allow the flange of the wheel to move freely in it whenever the lever remains straight at the joint *j*, but whenever the lever becomes bent at the joint, the groove cramps itself or becomes pinched or locked upon the flange of the wheel D, so that when such bending of the lever takes place, the wheel is carried along with the lever and in the same direction.

On the face of the friction-wheel D rests a hold-fast or pawl, shown in dotted lines *g'''*, which is held by a spring against it, in such a manner as to prevent the whole from moving backward.

Fixed into the side of the lay is a stud or pin, *p''*, which comes into contact with the free end of the jointed lever *l''''*, at each stroke of the lay. This causes the friction-wheel to revolve by minute increments. The extent of the motion of the lever and friction-wheel D is adjustable by the stop-screw *z*. Upon the shaft of the friction-wheel D is also fixed a small cylinder, *c''*, dotted, which revolves with the friction-wheel. Against this cylinder there is held, by force of a spring, a small pressing-roller, *i*, covered with rubber or some other elastic substance. Between the roller and cylinder the fabric being woven is made to pass, which is gradually drawn through between them, as the projecting pin *p''* of the lay acts upon the end of the jointed lever. The jointed lever is drawn up, to be ready for a fresh action of the pin, by the spring s^4.

The common-shaped weft-bobbin or spool can be used, but the form of weft-bobbin which I prefer is that represented at *b*, in the shuttle S, figs. 1, 2, and 3. It has its axis perpendicular to the plane of motion of the shuttle. This allows the weft to be delivered from the bobbin at nearly a constant angle, whether the bobbin be quite full or nearly exhausted. This secures an even tension of the filling.

The curvilinear motion of the shuttle insures the gradual and uniform winding of the weft from the bobbin, and avoids the sudden strain or jerking of the thread usual in looms in which the weft is laid by a shuttle or needle having a direct rectilinear reciprocating motion.

The uniform unwinding or delivery of the weft, and nearly unvarying gentle strain it is subject to in a bobbin of this construction, when used with my improvements aforesaid, enable the manufacturer to use the finest threads, and at the same time to run the loom at an unusually high rate of speed.

An important object accomplished by the use of the curved path and my improvements aforesaid, is the delivery of the filling from the shuttle, in such a manner that the thread from the bobbin is unwound with a uniform motion and gradually, so that the sudden strain or jerking of the thread usual in shuttles acting in a rectilinear direction is avoided.

Another object of importance in weaving, which is accomplished by my said improvements, is that the tension of the weft-thread is readily and easily adjusted as it leaves the bobbin or shuttle, and so insures a more uniform selvedge and texture than can be made where the tension is very variable.

The uniform unwinding of the filling from the weft-bobbin, spool, or cop, results mainly from the curvilinear motion of the shuttle or weft.

The uniform tension of the filling is partly due to the large and slightly-varying angle which the direction of the filling-thread makes with the axis of the weft-bobbin as it leaves the bobbin.

Any additional amount of uniform tension may be obtained in various ways, by producing a certain degree of friction on the weft-thread or weft-bobbin. A simple and effective way is to cause the thread to pass, as it leaves the weft-bobbin, through small holes, or between pins or fingers fixed in the shuttle.

Another desired object of importance obtained in the use of my said shuttle-race or curved path for the weft, is that the filling, at the moment it is being beaten up in the web by the reed, is stretched straight across and at nearly or exact right angles to the direction of the warp.

But by far the most striking result which is obtained from my improvements is the greatly increased rapidity with which the weft is thrown backward and forward.

I do not confine my invention to the precise form of shuttle and race shown in the drawings, as any curved track or way which will permit the shuttle to move freely may be employed instead of those described, as, for instance, the shuttle may be guided upon a curved rod passing through a hole in the shuttle.

I do not confine my invention to the use of cams for giving the proper motion to the shuttle-carriers or lay, as such motion may be obtained from the employment of cranks, tappets, or any equivalent device known to mechanics; neither do I confine my improvements to any particular kind of loom.

Claims.

What I claim as my invention, and desire to secure by Letters Patent, is as follows:

1. The combination of the lay and the pivoted and vibratory shuttle-carriers with connecting-rods and levers, receiving and imparting their movement from a single revolving cam-shaft directly to said lay and shuttle-carriers, substantially as herein shown and described.

2. The construction of the two shuttle-carriers, vibrating on an axis common to both, when the same are provided with shoulders or jogs, acting in the manner and for the purpose set forth.

New York, June 27, 1867.

JOHN P. HUMASTON.

Witnesses:

EDMUND N. WIGGIN,

JOHN MARTIN.