2 Sheets, Sheet 1.

L. Stone.

Loom.

No. 97,826. Patented Dec. 14, 1869.

Fig. 1.

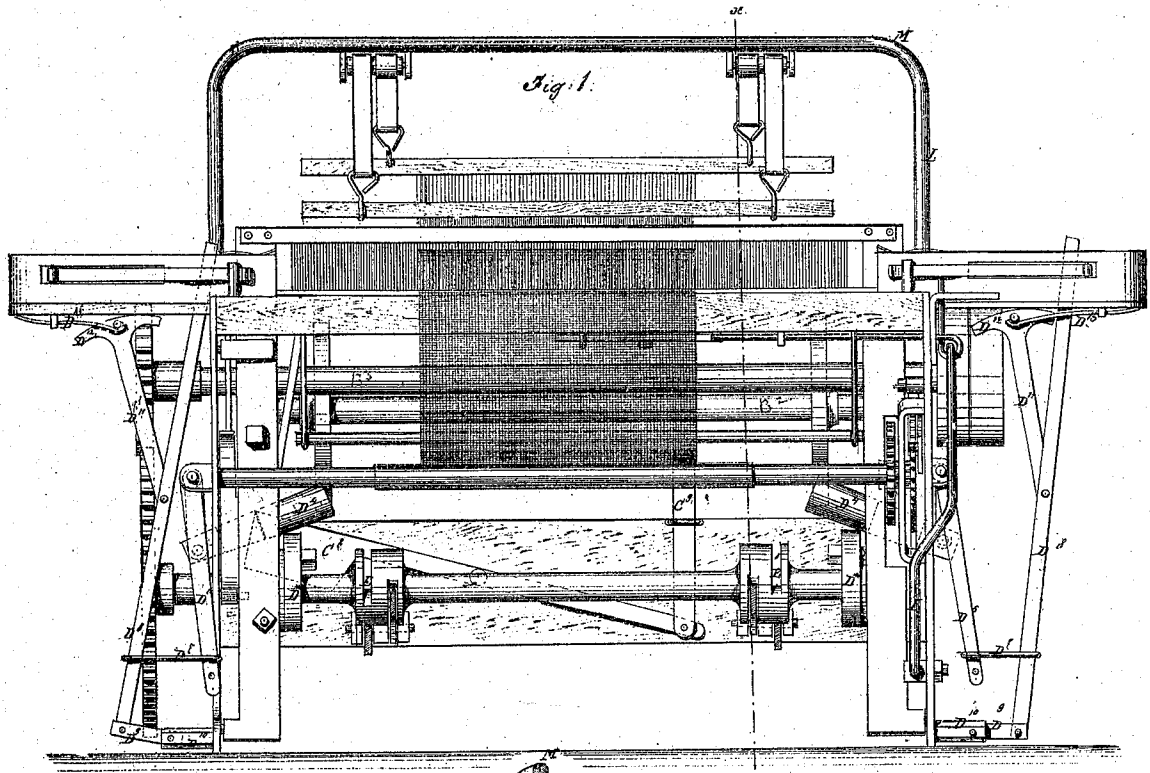
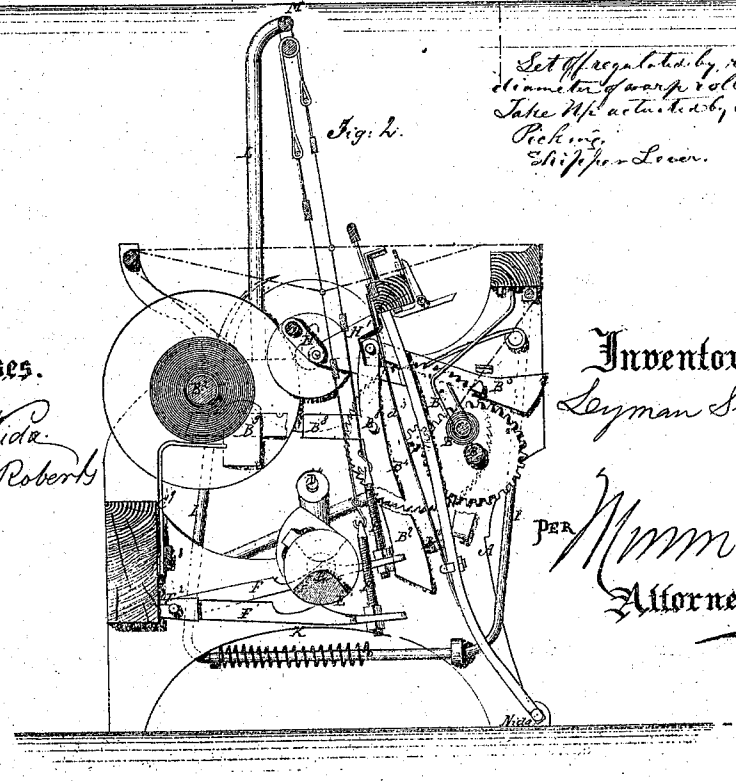


Fig. 2.



Set Motion regulated by reed & by diameter of warp roll
Take Up actuated by weight (not in patent)
Picking
Shipper Lever

Witnesses.

Chas. Nida
Alex F. Roberts

Inventor.

Leyman Stone

per Munn & Co

Attorneys.

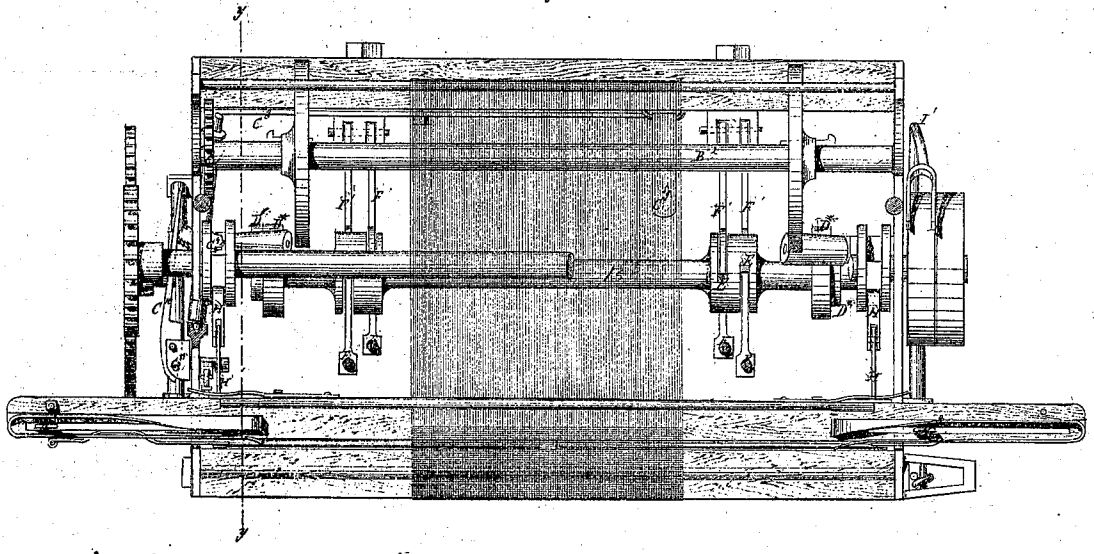
2 Sheets, Sheet 2.

L. Stone.

Loom.

No. 97,826. Patented Dec. 14, 1869.

Fig: 3



Witnesses.

Chas. Nida

Alex F. Roberts

Inventor.

Leyman Stone

per Munn & Co

Attorneys.

Fig: 4

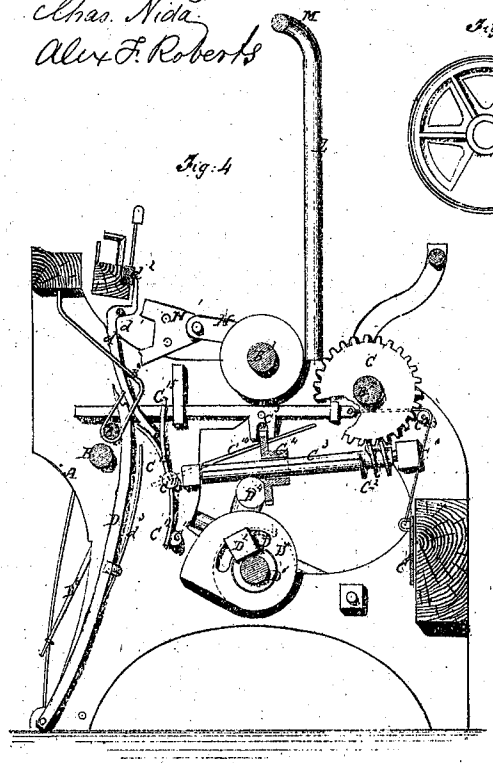


Fig: 6.

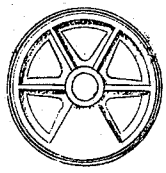
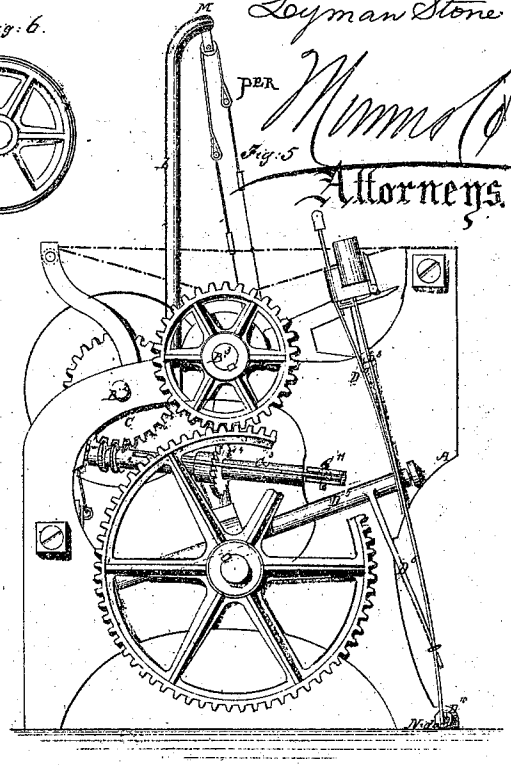


Fig: 5



United States Patent Office.

LYMAN STONE, OF NELSON, NEW HAMPSHIRE.

Letters Patent No. 97,826, *dated December* 14, 1869.

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, LYMAN STONE, of Nelson, in the county of Cheshire, and State of New Hampshire, have invented a new and useful Improvement in Looms; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

This invention relates to improvements in power-looms, and has for its principal object to provide an arrangement and construction of the same, calculated to furnish looms of equal or greater efficiency than those now in use, but occupying very much less space, so as to economize materially in room, where large numbers are used on a floor, as is the case in factories, not only in respect of the space occupied by the loom itself, but also in respect of the space required for the passages or aisles between the rows of looms.

The invention also relates to an improved let-off mechanism.

Also, an improved picker-motion.

Also, an improved construction and arrangement of the shipper-lever.

Figure 1 represents a front elevation of my improved loom;

Figure 2, a transverse sectional elevation, taken on the line $x\ x$ of fig. 1;

Figure 3, a plan view;

Figure 4, a section on the line $y\ y$ of fig. 3;

Figure 5, an end view; and

Figure 6 an elevation of the fixed pulley of the crank-shaft.

Similar letters of reference indicate corresponding parts.

C represents a gear-wheel on the yarn-beam B^2, which is operated by a worm-wheel, C^2, on a shaft, C^3, lying transversely of the frame, and slightly inclined from a right angle with the yarn-beam, the inclination being such that the bearing-face of the worm is nearly parallel with the faces of the teeth of the wheel C, on which it acts, whereby the tendency of the wheel C to overrun the worm, or to turn it, caused by the intermittent strains of the yarn thereon, due to the striking of the reed in beating up, is greatly obviated, and whereby the necessity for a friction-strap on the worm-shaft C^3 is removed.

This shaft C^3 carries a ratchet-wheel, C^4, capable of sliding to and fro on it, and feathered to it, so as to turn the said shaft.

A crotched sliding bar, C^5, engages this wheel, so as to control its position.

A cord, C^6, connects the said slide-bar with the weighted end of a lever, C^8, passing over a guide-pulley, C^7.

The long arm of this lever supports a presser, C^9, constantly borne against the yarn-beam by the weighted end of the said lever.

As the roll of yarn on the yarn-beam becomes smaller, the presser allows the heavy end of the lever to go down, by which the wheel C^1 is drawn toward the worm C^2 by the cord C^6.

This ratchet-wheel is operated by a lever-pawl, C^{10}, vibrating on an axis, C^{11}, to which axis, arms C^{12} and C^{13} are connected.

The arm C^{12} plays between the stud C^{14} and the sword-arm D of the lay, and prevents the pawl-arm from rising too high or falling too low. The other arm, C^{13}, is provided with a branch, C^{15}, against which the sword-arm D strikes, when moving back, forcing the pawl-arm down upon the ratchet-wheel, turning it, and thereby the yarn-beam, for letting off the yarn. The other part of the arm C^{13} bends forward toward the front of the lay, and is acted upon by a lever, d, pivoted at d^1, and rising up behind the reed-beam, d^2, which is arranged to rest in a rebate in the rear of the lathe, and held in the said rebate by springs d^3, rising up from near the bottom of the sword-arms, so as to yield when beating up, according to the resistance encountered by the reed.

This yielding of the reed throws the lower end of the lever d forward against the end of the arm C^{13}, thereby pressing it back, and raising the pawl-arm.

This pawl-arm will therefore be raised higher or lower, according to the resistance encountered by the reed, and the movement of the yarn-beam will be varied accordingly. Hence the warp will be let off faster or slower as the weft is woven in, and if the weft varies in size, or if it breaks, and is not fed in at all, no thin places will be made in the cloth, as is the case when the letting off continues, irrespective of the condition of the weft.

As the wheel C^4 is moved from the axis of the pawl-arm, as the warp-roll becomes smaller, it receives a greater movement by the pawl-arm C^{10}, the movement of which increases as the distance from its axis increases.

When one warp-beam has been exhausted and a new one is put in, the ratchet-wheel C^4 is shoved back on the shaft, and the presser-arm C^9 adjusted against the yarn-beam.

When finer yarn is used for the weft, and the warp is consequently worked up slower, the cord C^6 will be lengthened, and the ratchet-wheel moved nearer toward the axis of the pawl-arm at the commencement; and when the weft is coarser, and the warp worked up faster, the said wheel will be adjusted relatively to the said pawl in the other direction.

If the lever C^8 be pivoted centrally between the connection of the cord and the presser, the variation

in the motion imparted to the ratchet-wheel and that of the yarn-beam will be in exact proportion, and the tension will thereby be always the same.

In order to further economize space in front of the loom, I arrange the auxiliary roll B^1, resting on the beam B, in slotted bearings B^*, inclining backward to the centre of the space it will fill when full. The cloth is wound on to the roll, which rises in the slotted bearings as the roll increases. The said roll B^1 is turned by the frictional contact of beam B, which is covered by sand-paper, or otherwise coated with any substance which, acting upon the cloth, will have sufficient friction to turn it.

This beam B gears with a ratchet-wheel, B^4, worked by a pawl, B^5, pivoted at B^6, and provided with a pendent arm, B^7, a horizontal arm, B^8, and a weight, B^9.

The pawl B^5 is retracted by the striking of the sword-arm, or a pin or projection, B^{10}, thereon, against the pendent arm B^7, which throws up the weight at the same time. This weight, acting on the ratchet-wheel, and through the gearing with the beam B, impels the latter to turn the auxiliary roll B^1, but the beam will not be turned when the tension of the cloth is greater than the force of the weight, which will then remain suspended until the tension of the cloth allows it to act.

The cams D^*, operating the picker-staves, are connected to collars D^1, keyed to the shaft, so as to be adjusted along the said shafts, as required, by resting on tubular extensions of the said collars, and by bolts D^2, passing through curved slots in the cams, into the sides of the said collars. This arrangement admits of adjusting the cams both along the shaft and around the same.

D^4 represents projecting arms of rock-shafts D^5, at each end of the loom, working on the cams D^*, and provided with friction-rollers.

These rock-shafts have arms D^6, connected, by rods D^7, to the picker-staves D^8.

The latter are connected, by links D^9, to their fixed supports D^{10}, at the bottom of the frame, and at about the centre, lengthwise, they are jointed to pendent arms D^{11}, having rocker-ends D^{12}, and suspended from the under side of the beam of the lay by springs D^{13}, in such a manner that the force of the springs is brought into action to arrest the movement of the picker-staves when moving either way.

The raising of the arms D^4 by the cams moves the picker-staves in the direction to throw the shuttle. The opposite movement of these arms, to retract the staves, is effected by the weight of the said arms and long friction-rollers, which sets the picker-staves in position to receive the shuttle, and yield against the springs D^{13} with such ease that the slackest and softest weft can be used without waste.

This arrangement of the picker-staves serves also to impart a horizontal or parallel motion to the picker.

The treadle-cams are formed on the lower shaft of the loom, so that the operating-faces begin at the axis of the shaft, as shown at E, which has the distance of the said working-faces from the centre, and thereby the movement of the levers.

These cams have the advantage of greater safety to the operator, as being less liable to catch the hands between them and the treadles, and in which grooves the treadles work, being guarded by the periphery of the cylinder, which has a tendency to throw off anything which, in the old arrangement, might be caught between the face of the cams and the treadles.

F represents adjustable rods, rising up from the ends of the treadles F^1, pivoted to the rear beam at F^2. The harness-cords are connected to these rods by hooks, and may by them be adjusted to any required degree of tension.

These rods have the effect to carry the harness forward slightly with the warp, when the downward movement of the harness is made, whereby the wear on the warp is considerably lessened.

The connection of the crank-shaft with the lathe is made by short rods or links H, pivoted to rigid projections H′, and but slightly longer than the cranks, and the projections H′ are so arranged that the pivot-joints of the links H therewith work on a circle, which, struck from the axis of the sword-arms, would pass through the axis of the crank-shaft. This arrangement has the effect to cause a dwell of the lathe in the rearmost position during nearly the time of one-third of a revolution of the crank-shaft, at which time the shuttle is thrown with less power, and more accurately than can be done when the lathe is in motion.

As a greater protection for the operator against the danger of injury by the hand getting caught by the cranks and connecting-links, I have substituted circular disks for the ordinary cranks, having only narrow spaces between them for the links, and so operating as to have a tendency to throw off anything coming into contact with the peripheries of the said disks.

The belt-shipping lever I is made of one rod of metal, bent into the required form, and extending down from the end of the breast-beam to near the bottom of the frame, thence along under the driving-pulley, and up at the rear thereof, at I′, where it is suitably crotched to act on both edges of the belt.

A coiled spring, K, is wound around the horizontal part thereof, to throw it out when disengaged from the catch.

The harness-suspending yoke L is bent forward, as shown at M, to suspend the harness further forward, to permit the operator to reach in from the end of the loom more easily for uniting broken threads.

The disks of the yarn-beam are made adjustable along the same, so that the space between them can be widened or narrowed, as required. For weaving goods of various width, I have weighted the driving-pulley, and arranged the same relatively to the cranks and link-connections with the lathe, to prevent the stopping of the same on the centres, whereby I can take hold of the lathe and move it forward or backward, so that I can place the harness in the required position to mend the warp-threads, without the necessity of going to the pulley or gear to turn them by hand.

Having thus described my invention,

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination of sliding bar C^5, cord C^6, weighted lever C^8, having presser C^9 thereon, with the yarn-beam, all being arranged as described, for the purpose of automatically sliding the ratchet-wheel C^4.

2. The worm C^2, wheel C^4, and pawl C^{10}, in combination with a branched lever, the stud 14, arm D, lever d, and spring d^3, all arranged as and for the purpose set forth.

3. The arrangement of the sliding ratchet-wheel C^4, shaft C^3, and vibrating pawl C^{10}, substantially as specified.

4. The combination of cams D, arms D^4, rock-shafts D^5, arms D^6, and rods D^7, with the arms D^{11}, rocker-ends D^{12}, and springs D^{13}, as and for the purpose specified.

5. The shipper-lever I, constructed from a single rod, bent as described, and arranged with the spring K, as specified.

LYMAN STONE.

Witnesses:

J. PARKER SNOW,

ALEX. F. ROBERTS.