H. Halvorson.

Loom.

No. 7,682. Patented Oct. 1, 1850.

Fig. 8.

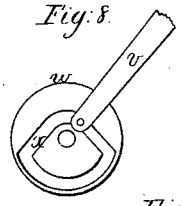


Fig. 6.

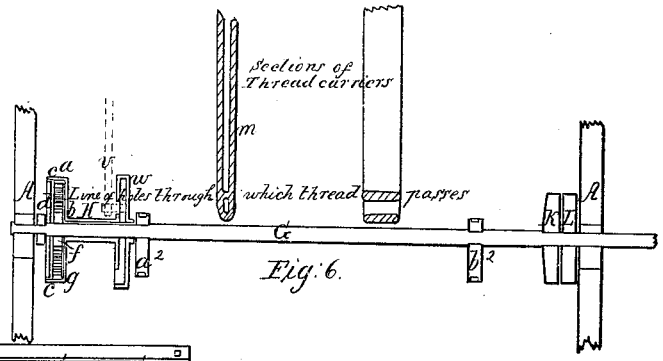


Fig. 7.

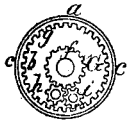


Fig. 9.

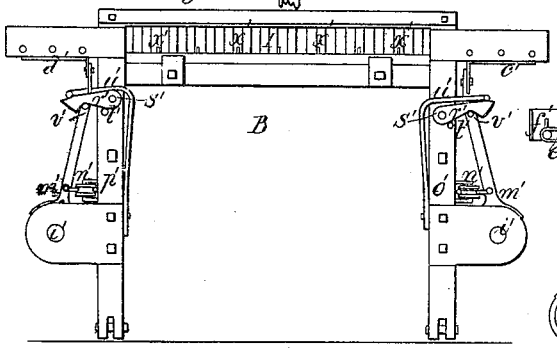


Fig. 5.

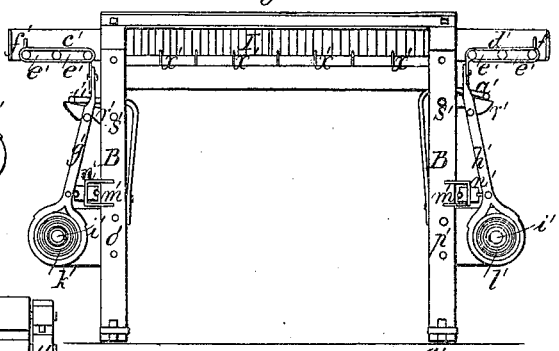


Fig. 1.

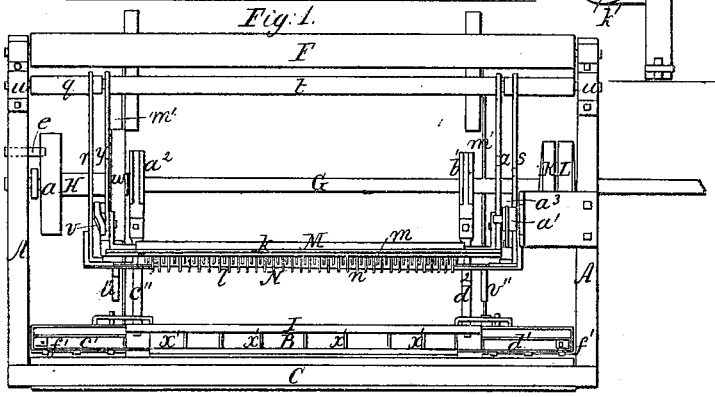


Fig. 4.

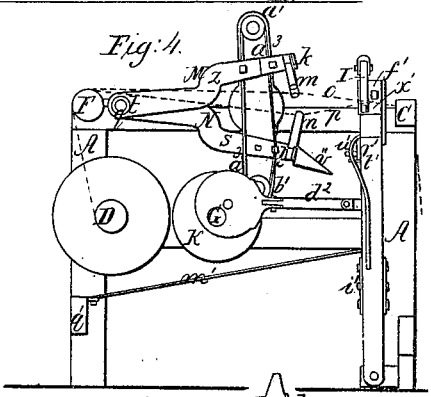


Fig. 2.

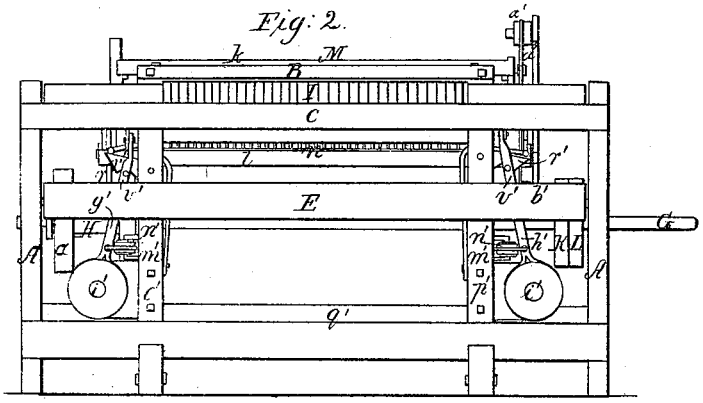
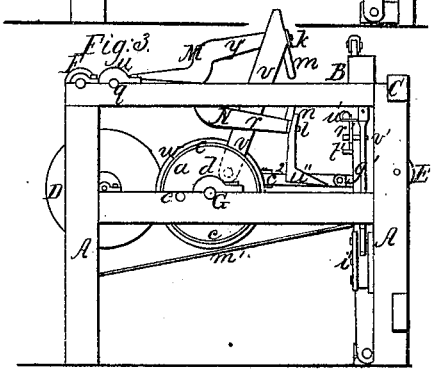


Fig. 3.



UNITED STATES PATENT OFFICE.

H. HALVORSON, OF NORTHAMPTON, MASSACHUSETTS.

LOOM.

Specification of Letters Patent No. 7,682, dated October 1, 1850.

To all whom it may concern:

Be it known that I, HALVOR HALVORSON, of Northampton, in the county of Hampshire and State of Massachusetts, have invented a new and useful or Improved Loom for Weaving; and I do hereby declare that the same is fully described and represented in the following specification and accompanying drawings, figures, letters, and references thereof.

Of the said drawings, Figure 1, denotes a top view of my improved loom. Fig. 2, a front elevation of it. Fig. 3, an end elevation. Fig. 4, a central, vertical, and transverse section of it. Fig. 5, a longitudinal section of the lay. Fig. 6, a longitudinal section of the driving shaft, tubular cam, and gear shaft. Fig. 7, is a vertical section of the gears, and gear case, of the tubular cam shaft, the said section being taken transversely of the driving shaft. Fig. 8, is a side view of the cam for operating the upper harness frame.

In the construction of my improved loom, I have so endeavored to arrange its frame, and operative mechanism, that none of it, or at least a very little of it should project beyond the exterior of the frame, and this for various reasons.

In the said drawings, A, represents the frame of the loom. B, the lay. C, the breast beam. D, the warp beam. E, the cloth beam. F, the guide beam of the warps. G, the main driving shaft. H, the cam shaft, which in this case is a short tubular shaft, placed on the main shaft. I, is the reed. K, is the driving or fast pulley of the driving shaft. L, the loose pulley. All of which I have arranged with respect to one another as seen in the drawings.

Affixed to the tubular shaft, and concentric with it, is a circular box, *a*, the said box being composed of a circular plate *b*, and a circular hoop, ring, or flanch *c*, united together at their edges, the rim or flanch projecting from the side of the plate *b*, which is made fast to the tubular shaft. Within this flanch is another circular plate *d*, which is kept stationary in position on the main shaft, by a pin or stud *e*, which projects from it, and enters the main frame. A gear wheel *f*, is fixed on the main shaft, and is made to connect with an internal gear *g*, fixed around and within the flanch *c*, by means of two small gears *h*, and *i*, which are supported in position by having their axles sustained on and by the plate *d*. Thus when the main shaft is revolved, motion is communicated by such gearing to the tubular cam shaft H.

M, and N, are the harness frames, or frames for producing the alternate crossing or decussation of the warp threads. Instead of using harness as commonly employed, I employ such contrivances, each of which consists of a horizontal bar *k*, or *l*, and a series of thread carriers (*m*, *m*, or *n*, *n*,) as seen in the drawings, the said thread carriers being made to extend from their respective bars, and to be severally so arranged that during their movements to produce decussation of the warps, those of one of the bars *k*, or *l*, may pass between the threads of those of the other; each thread carrier being made with a small hole or passage through its outer end, and in the direction and for the reception of the warp thread which passes through it. Each of the warp threads, in its passage from the warp beam to the cloth beam, is passed through one of these carriers. In Fig. 4, the warp threads are seen at *o*, and *p*. While the bar *l*, is connected with a rocker shaft *q*, by means of two arms *r*, *s*, the bar *k*, by means of two other arms *y*, *z*, is connected with a tubular shaft *t*, which turns freely on the said rocker shaft, which latter has its journals supported by bearings or boxes at *u*, *u*. From the upper harness frame, (M) an arm *v*, extends downward toward and by one side of a grooved cam *w*, fixed on the tubular shaft H. From the side of the arm *v*, a pin or stud is made to pass into the groove *x*, of the cam, (see Fig. 8) the said groove being so formed as to produce the proper movements, and rests, of the upper harness frame. To the arm *l*, an endless chain a^3, is fastened. This endless chain, passes around supporting pulleys *a'*, *b'*, and is also fastened to the lower frame (N,) at a distance from the place of its connection with the frame M, equal to one half its (the chain's) length. Thus it will be seen that every upward or downward movement of the superior harness frame, is made by means of such chain and fastenings, to produce a corresponding movement of the inferior frame (N,) in an opposite direction.

Within each shuttle box of the lay, an endless band or belt *c'*, or *d'*, is arranged, so that the top surface of the belt shall compose the bottom of the shuttle box, the said

belt being supported by, and made to travel round any suitable number of rollers e', e', e'. Each endless belt c', or d', besides having a projection f', extended from its upper surface, is connected at its lower surface to the top of one of two picker staves g', h'. Each of the picker staves is connected to a stationary axle, or pin i', by means of one of two spiral springs k', or l', which so acts against the shaft as to press its top in a direction toward the adjacent end of the main frame. To each picker staff a cord m', is attached at one end, and made to pass around a small pulley n', fixed to the adjacent sword o', or p', of the lay, and from thence to be led toward, and fastened at its opposite end to the connecting bar q', of the main frame.

Above the pulley n', and to the inner side of the sword of the lay, a hook r', is made to turn up and down upon a pin s', inserted through it, and into the sword of the lay, as seen in Fig. 9, which denotes an inner side elevation of the lay. The hook is pressed downward upon a rest pin t', by a spring u'. This hook operates in connection with a pin v', which projects from the inner side of the adjacent picker staff.

When the lay moves in a direction toward the breast beam the pulleys n', n', are so pressed against their respective cords m', m', as to draw both picker staves inward or toward one another, and until their pins t', t', pass under, lift, and are caught by the catch hooks r', r'. These movements of the picker staves, so move the endless belts of the two shuttle boxes, as to carry their respective projections f', f', to the outer extremity of the shuttle boxes. Two inclined planes or cams u'', v'', are so affixed to the lower harness frame N, as to come into contact with the catch hooks during the movements of the lay, and release them, or lift them above the projections of the picker staves, at the times necessary for the throw of the shuttle. The shuttle is to be placed on one of the endless belts, and with one nose of it against the projection of the belt. As soon as the catch hook is raised off the pin of the picker staff, the latter becomes released, so as to enable the spiral spring at its foot, to so act by its retractable force, as to suddenly throw it outward, or toward the adjacent end of the loom, and thereby cause the endless belt of the shuttle box, to so move on its supporting rollers, as to impel the shuttle across the race beam, and into the opposite shuttle box.

The top surface of the race beam, is provided with a series of thin plates x', x', x', which extend across it transversely, rise a short distance above its surface, and have all their upper edges in the plane of the top surfaces of the endless belts, or bottoms of the shuttle boxes. The top edges of these plates x', x', of the whole series, thus form the path for the shuttle to travel over, and they are made to extend sufficiently above the race beam, to pass between and above the warp threads which lay upon it. Thus it will be seen they protect them from friction of the shuttle, and thereby prevent wear of them. The reciprocating movements of the lay, are produced by two eccentrics a^2, b^2, placed on the driving shaft, and acting in connection with the rods c^2, d^2, jointed to the lay, or such movements may be effected by bell and cranks instead of eccentrics.

I claim—

1. The combination of the stationary circular plate d, the gears f, g, h, and i, the circular box a, with the tubular shaft H, and the main shaft, the same being for the purpose of effecting the rotations of the cam shaft H, without any such exposure of gears, as is customary in most other looms, and which are not only often productive of accidents to attendants, or workmen, but often destroy or injure the shuttles when thrown out of the lay by the action of the pickers.

2. I also claim the combination of mechanism for operating the harnesses, when they are constructed substantially as specified, the said combination consisting of the supporting or radial bars r, s, y, z, of the harness frames M, M, the rocker shaft q, and tubular shaft t, the arm v, and its pin or stud which enters the groove of the cam w, and the endless chain a^3, and fixed pulleys a', b', the whole being applied together, and made to operate essentially as above described.

3. I also claim the mode of constructing each of the harness frames, viz, of a combination of a bar, and thread carriers, as applied together and made to operate in the manner as above described.

4. I also claim the combination of an endless belt c', or d', and its projection or picker f', with each shuttle box, and its picker staff, so as to constitute the floor or bottom of the shuttle box, and operate, and be operated in manner as described. This mode of constructing the shuttle box, in consequence of the belt moving with the shuttle reduces the friction of the shuttle, in its passage out of the box.

5. I also claim the combination of mechanism for operating each picker staff, the same consisting of the cord and pulley attached to it and the main frame, the spring of the foot of the picker staff, the spring latch on the lay, and the discharging cam or plane, affixed to one of the harness frames, the whole being as above described.

6. I also claim the above described mode of making the race beam, viz, with elevations or plates x', x', x', to extend above it, and between and above the lower warp

threads, and so as to constitute a support for the shuttle in its passage over the race beam; the same enabling me to protect the yarns from injury from the shuttle, and to run the loom at a greater velocity than it would be safe to operate it with a race beam constructed in the ordinary manner.

In testimony whereof I have hereto set my signature this eighteenth day of April A. D. 1850.

HALVOR HALVORSON.

Witnesses:

GEO. W. BENSON,

A. H. BULLEN.