Field & Duxbury.
Loom.

No. 2,574. Patented Apr. 21, 1842.

Fig. 4

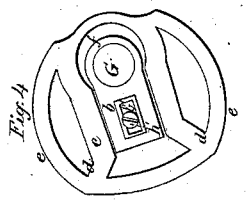


Fig. 3

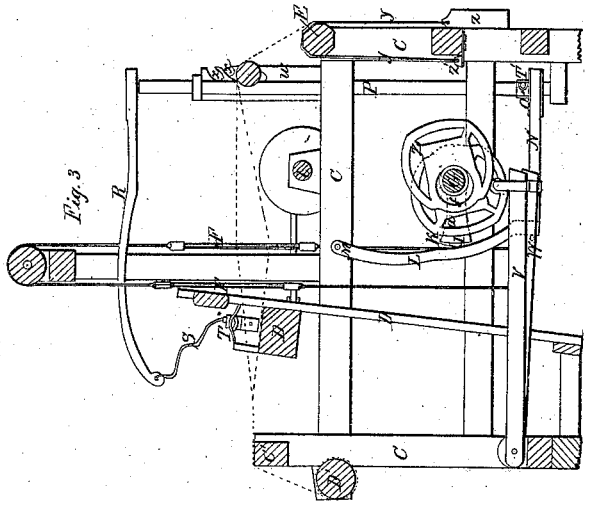


Fig. 5

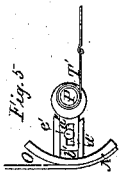


Fig. 6

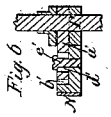


Fig. 1

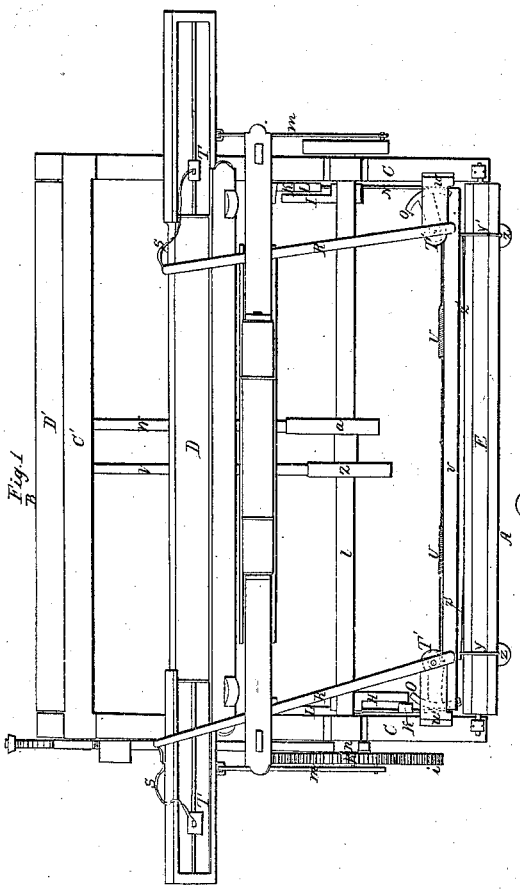


Fig. 7

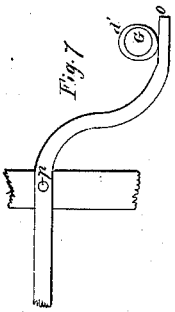
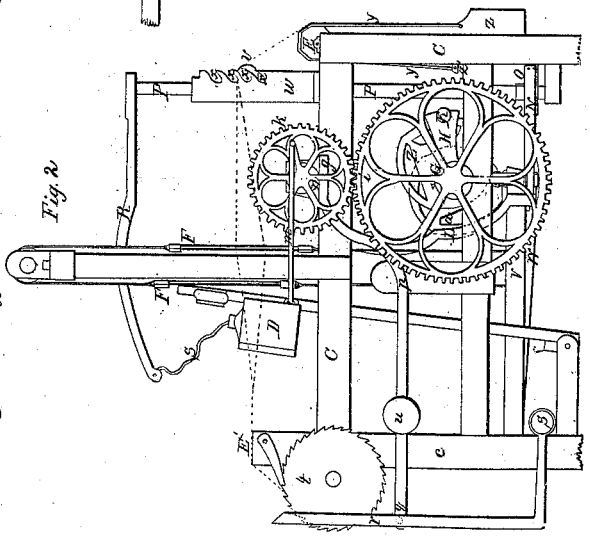


Fig. 2



UNITED STATES PATENT OFFICE.

CALEB DUXBURY AND JAMES NIELD, OF TAUNTON, MASSACHUSETTS.

POWER-LOOM.

Specification of Letters Patent No. 2,574, dated April 21, 1842.

To all whom it may concern:

Be it known that we, CALEB DUXBURY, a citizen of the United States of America, and JAMES NEILD, a subject of Victoria, Queen of Great Britain, residing in the town of Taunton, in the State of Massachusetts, have invented new and useful Improvements in Power-Looms for Weaving Different Fabrics, of which the following description, taken in connection with the accompanying drawings, therein referred to, form a full and exact specification.

In said specification we have set forth the nature and principles of our improvements, by which they may be distinguished from others of a like character, together with such parts or combinations of the same as we claim and for which we solicit Letters Patent.

Of the drawings above mentioned, Figure 1, represents a top view of a loom constructed with our improvements. Fig. 2 is an elevation of the right hand end of the same, and Fig. 3 is a vertical transverse section of the loom, taken at a little distance on one side of a plane passing through its center, or, on a line from A to B, Fig. 1. The remaining figures are detailed representations, and will be hereinafter described.

The first of our improvements consists in the method of throwing the shuttle from one shuttle box to the other, and vice versa, which we accomplish by a different arrangement from that of the common picker levers.

The cast iron or wooden frame (as the case may be) of the loom is denoted by C in Figs. 1, 2, 3, and is suitably adapted to the support of the operative parts thereto attached. D is the lay. C′ the breast beam. E is the warp roller, and D′ is the cloth roller, or that upon which the fabric is wound progressively as woven. F, F, are the heddles.

G, Figs. 2, 3, is the main or driving shaft, extending across the framework from end to end and supported and driven in the usual manner. This shaft has two arms H, I, arranged upon it, each being situated just in rear of the inner side of the end of the frame work adjacent to it, as seen in Fig. 1. The arm H projects from the side of the shaft, directly opposite to that on which the arm I is situated; and each arm has a small wooden roller K, Figs. 1, 2, turning upon a pin, or other suitable contrivance, passing through and fitted into the arm—the position of each of said rollers being as seen in Fig. 1. The arm I with its roller is represented in Fig. 3, by dotted lines.

As the main shaft is revolved, the circumference of the roller K, comes in contact with a bent pendulous lever L, Figs. 1, 2, 3, whose upper end is suspended and turns upon a pin M, Fig. 3. As the machinery, which intervenes between the driving shaft and the pickers, is similarly arranged for moving each picker, it will only be necessary to describe that which operates one of them. A strap or band N, Fig. 1, passes from the lower end of the lever L to the outer surface of a sector or quadrant arm O, Fig. 1, arranged upon the lower part of a vertical shaft P, the lower end of said shaft resting and turning in a suitable step or bearing, while the upper part is also properly held in position, and permitted to turn horizontally as will be hereinafter described.

An arm R, bent as seen in Fig. 3, is fixed at one end on the top of the upright shaft P, and extends forward at right angles to the shaft, so that its other extremity shall be directly over the picker. A string S connects this latter end to the arm R with the picker T.

Now as the main shaft revolves, the roll K comes in contact with the pendulous lever L and forces the same forward, and at the same time by means of the strap N and the quadrant O, imparts a quick horizontal movement to the shaft P and arm R, which jerks or throws the picker and shuttle forward, the shuttle being returned by the action of the machinery of the same kind on the opposite end of the loom, and in a similar manner.

A small belt T′ having one end attached to the upright shaft P just above the quadrant O, is wound around or partly around the shaft, and is connected at its other end to a helical or other suitable spring U, which latter retracts the picker arm R after it has performed its office of throwing forward the shuttle.

The quadrant or sector O is represented in top view in Fig. 5, and in longitudinal and vertical section in Fig. 6, wherein the shaft P is represented as having a flat arm a' attached to and projecting from it at right angles and passing into a corresponding groove b' formed in the rear or projecting part c' of the quadrant. An elongated slot

d' is formed through the arm a', through which a set screw e' passes and is screwed into the rear of the quadrant. By these means the quadrant may be extended from the shaft and its position regulated at pleasure.

Our second improvement consists in a new treadle tappet or cam, by which the "shade," or opening between the threads of the warp for the passage of the shuttle to and fro, can be increased or diminished at pleasure, without the necessity of removing the tappet or cam from the shaft.

V, W, Figs. 1, 3, represent the treadles or levers to which the heddles or harness frames F, F, are connected and by which they are raised and depressed during the operation of weaving. Z, a, are the eccentrics usually arranged on the main shaft and by which the treadles are moved. These eccentrics or tappets are constructed and applied to the shaft in the following manner.

Fig. 4, is a side view of one of the eccentrics as detached from the shaft. The main shaft G has a flat arm, or piece of metal b, projecting from it; this piece of metal being inserted so as to slide in a corresponding space formed in the side or eye of the cam or that part c, of it, from which the arms d, d, d, extend to the curved periphery e, as seen in the drawing. The main shaft passes through a circular or other proper opening f formed through the eye c,—which opening is cut considerably larger in its diameter than the diameter of the main shaft. An elongated slot g is formed through the slide b, through which slot a screw h passes into the cam, and by which, the cam may be moved at any time and confined in any desirable position on the slide or shaft, so as to increase or diminish the depression of the treadles and consequently the opening or "shade" of the warp.

Our third improvement is in the machinery by which the cloth is gradually wound upon the cloth roller as the weaving progresses, said machinery ceasing to operate whenever the filling thread breaks.

A cogged wheel i, placed on one extremity of the main shaft, engages with another cogged wheel k on the end of another and similar shaft l, arranged over and parallel to the main shaft. The lay is vibrated by a connecting rod m extending from it to the side of the cogged wheel k, the other end of the lay being similarly connected with the shaft l.

A small eccentric n, represented in Fig. 2, is applied to the shaft l, in rear of the cogged wheel k or between it and the main framework. This eccentric depresses the end of a crooked lever o p q, whose fulcrum is at p, and whose other end is jointed to a weighted pawl r shaped as seen in Fig. 2, the lower part of said pawl being bent at right angles and having a weight s thereon by the gravitating power of which, the upper part of the pawl is pressed into contact with the teeth of a ratchet wheel t fixed on one end of the cloth roller. A weight u is fixed on the arm p q of the lever o p q by which said lever is kept against the eccentric n.

Now when the lay is driven forward against the filling, it causes the woven cloth to recede a distance equal to the width of the filling thread and the gravitating power of the weighted pawl r, acting on the teeth of the ratchet wheel, causes the cloth roller to take up the cloth, as it is woven, and driven forward by the action of the lay. But whenever the filling thread breaks, and the shuttle passes through the shade, without carrying the thread with it, the lay will not beat forward the cloth; consequently there can be no movement of the cloth roller until the filling thread is mended and the reed of the lay beats it again into the warp. From the above, it will be seen, that the object of the eccentric n is to elevate the weighted pawl r to such a position upon the ratchet wheel of the cloth roller as to cause said cloth roller to turn upon its journals and to take up the cloth as the weaving process progresses.

Our next improvement consists in arranging the journals of the yarn roller v in vertical racks w, w, (Figs. 1, 2, 3,) or standards erected upon the main framework, and which are bent over at right angles at their tops so as to sustain the picker arm shaft P, in position. Each of these vertical standards has successive bearings x, x, x, formed one above the other as seen in the drawing into which the journals of the yarn roller are placed and revolve and may be changed from a higher to a lower horizontal position as occasion may require.

The succeeding improvement consists in connecting that end of each of the cords or bands y, y, (which cords are usually wound about the warp roller and have a weight z attached at their opposite ends, by which friction is obtained to retard the warp roller and thus produce sufficient strain on the warp to cause it to be delivered as required), which is generally secured to a stationary stud or hook driven into some convenient part of the frame, to the extremity of a long horizontal or other suitable spring z' Figs. 1, and 3. By this means the warp roller is permitted to move slightly on its axis or in its bearings, when the threads of the warp are crossed by the action of the harnesses; and thus when all the threads of the warp approach each other or come into one and the same plane, the strain on the warp is diminished, but by attaching the friction cords to the spring as before mentioned, the warp roller is permitted to move

a little and thus accommodate itself to the warp, so as to produce an equal strain upon it during the action of the harnesses.

By the above improvements a loom may be operated by a small quantity of power and with great ease and perfection of motion and at a greater speed than ordinary looms, the increase being for a seven eighths machine about one hundred and fifty threads and to a five quarter machine about one hundred and thirty threads per minute.

The arm *o p q*, may have its curved pad *o p* reversed or bent down as seen in Fig. 7, and may be operated by an elliptical cam *d'* arranged on the main shaft G.

Having thus described our improvements we shall claim—

1. The combination and arrangement of parts forming the connection between the main shaft G and the horizontal curved arms R, R, by which combination the requisite motions are given to the pickers, all as herein before described.

2. Also, connecting the eccentrics or treadle tappets Z, *a* through which the main shaft passes to an arm from said shaft by a screw or screws passing through an elongated slot of said arm in the manner as set forth, in order that said cams or eccentrics may be adjusted at any time upon said shaft as to produce such a depression of the treadles by which the harnesses are operated as may be necessary for the required opening or shade of the warp.

3. Also, causing the cloth roller to take up the cloth as it is progressively woven, and to stop when the filling thread breaks, by the combined action of the weighted pawl *r* and the lay; the said weighted pawl acting on the ratchet wheel of the cloth roller and being elevated therein by a lever *o p q* and an eccentric *n*, the whole being constructed and operating substantially as described.

In testimony that the foregoing is a true description of our said invention and improvements we have hereto set our signatures this 6th (sixth) day of April in the year eighteen hundred and forty two.

CALEB DUXBURY.
JAMES NIELD.

Witnesses:
ROBERT PLANT,
JAMES CLERK.