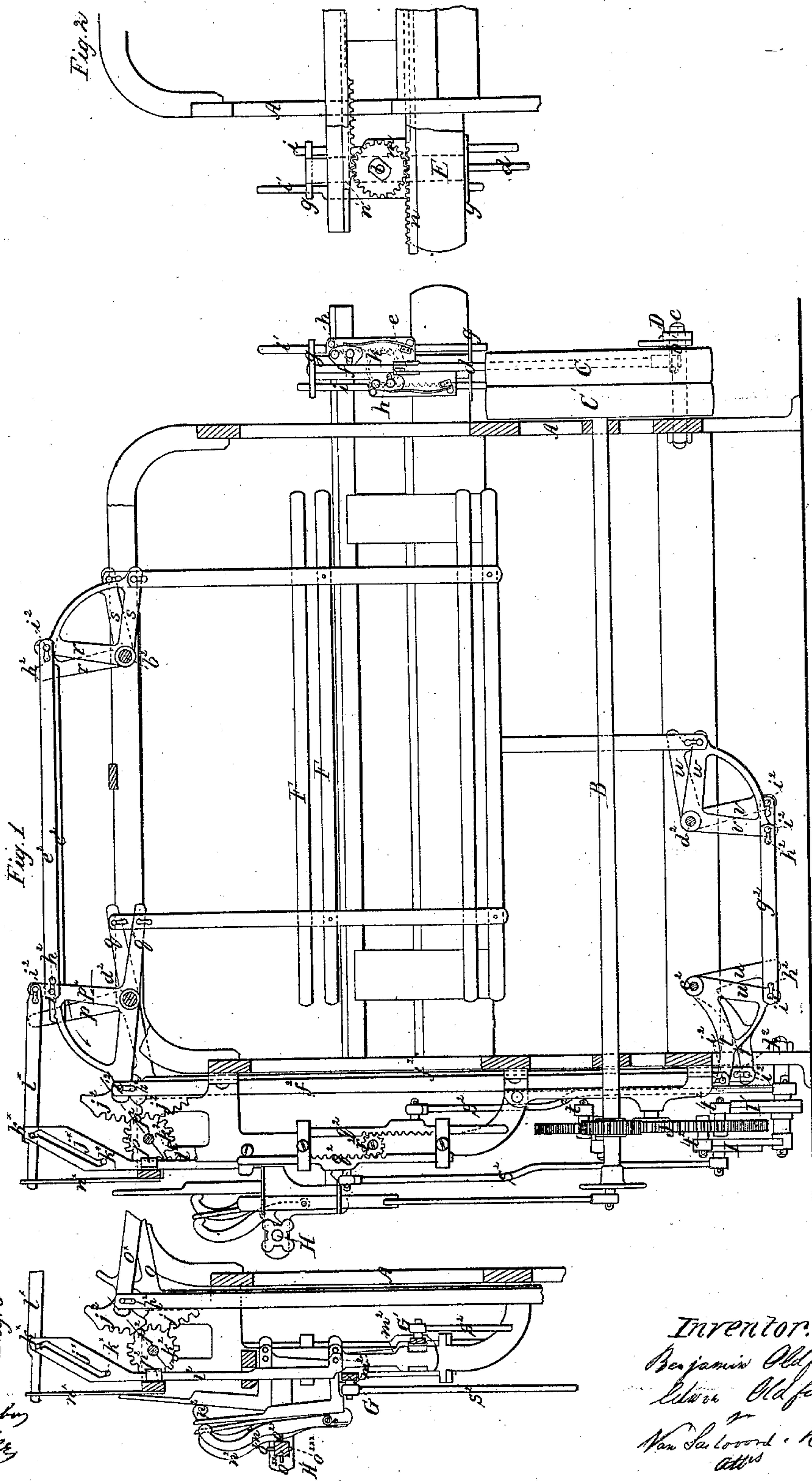


B. & E. Oldfield Loom.

N^o 88,503.

Patented Mar. 30, 1869.



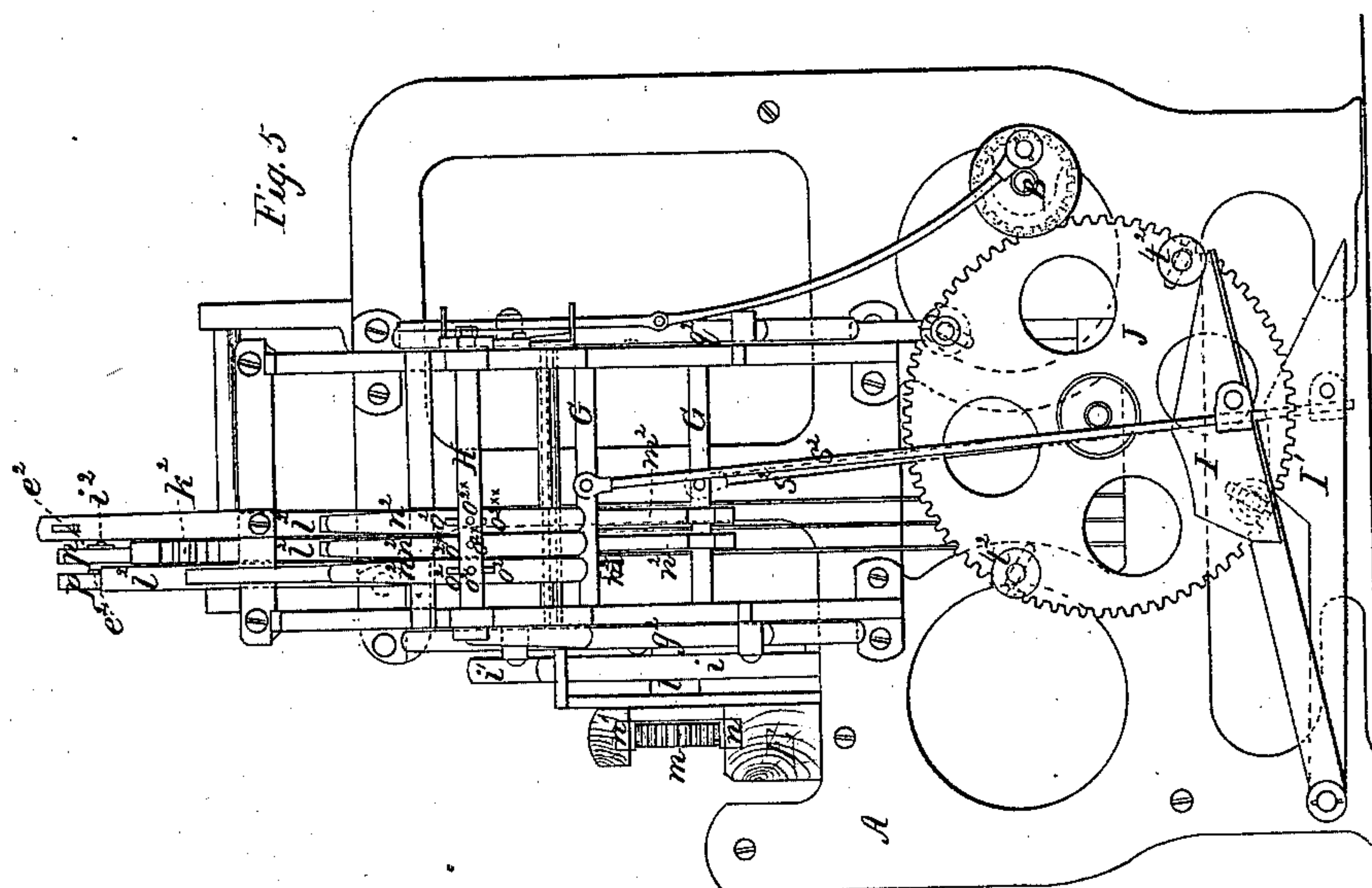
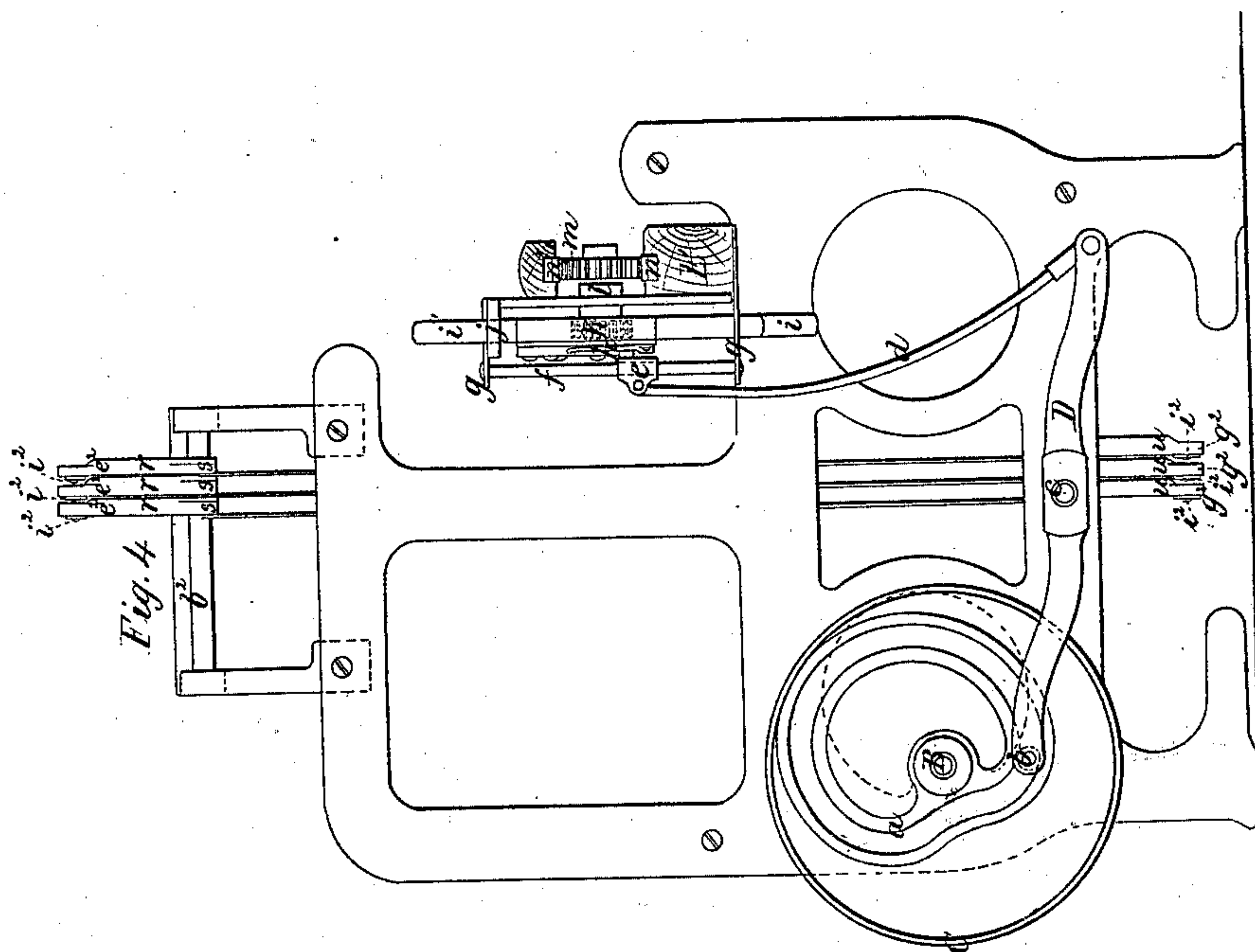
Witnesses:
E. T. Huston
J. C. Patten

Inventor:
Benjamin Oldfield
Elmer Oldfield
Van Santvoord & Knapp
attys

B. & E. Oldfield.
Loom.

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Witnesses,
C F Kastenhuber
J C Raley

Inventor:
Benjamin Oldfield
Oder Oldfield
per
Van Sautvoord & Hauff

United States Patent Office.

BENJAMIN OLDFIELD AND EDWIN OLDFIELD, OF NORWICH, CONNECTICUT.

Letters Patent No. 88,503, dated March 30, 1869.

IMPROVEMENT IN LOOM.

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

To all whom it may concern:

Be it known that we, BENJAMIN OLDFIELD and EDWIN OLDFIELD, of Norwich, in the county of New London, in the State of Connecticut, have invented a new and useful Improvement in Looms; and we do hereby declare the following to be a full, clear, and exact description thereof, enabling those skilled in the art to make and use the same, reference being had to the accompanying drawing, forming part of this specification, in which drawing—

Figure 1 represents a sectional rear elevation of this invention.

Figure 2 is a front elevation of the shuttle-actuating mechanism detached.

Figure 3 is a longitudinal section of the harness-mechanism.

Figure 4 is an end view of the loom, showing the shuttle-mechanism.

Figure 5 is an end view of the loom, showing the harness-mechanism.

Similar letters indicate corresponding parts.

This invention consists in the arrangement of two racks, which are placed in a vertical position, and to which a rising-and-falling motion is imparted by suitable connections with the main shaft of the loom, in combination with a pinion, or cog-wheel, which is in gear with both racks, and mounted on a shaft, on which is also mounted a second pinion, or cog-wheel, which gears into the shuttle-rack or racks, in such a manner that a double shuttle-batten can be driven by one gear; and furthermore, the motion of the shuttles is produced by racks and pinions, in place of the cords and pulleys generally used for this purpose, and the throw of the shuttles can be easily regulated by changing the relative proportion of the two pinions.

The invention consists further in connecting the lifter, which imparts motion to the geared slide-rods, with the main shaft by means of a cam and lever, or other equivalent means, in such a manner that three-fifths or more of the entire revolution of the shaft are taken up in raising the lifter, and two-fifths or less in depressing the same, and consequently the motion of the shuttles is rendered comparatively slow, and the strain on the weft-threads, and the danger of breaking the same, are materially reduced.

The invention consists further in a harness-motion, which is composed of bell-crank levers, provided with toothed segments, which gear in pinions, or cog-wheels, to which a reciprocating revolving motion is imparted by toothed slide-rods. The pinions, which gear in the toothed segments of the bell-crank levers, are provided with stops, which, whenever said pinions arrive at the extreme ends of their strokes, bear against the ends of the toothed segments, and lock the heddle-frames up or down for any number of picks, as the pattern-chain may demand. The toothed segments and pinions may, however, be replaced by an oblique cam-slot,

secured to a slide-rod, and acting on a stud, which projects from a rod, one end of which connects with the vertical arm of a bell-crank lever, while its other end is guided in a slotted standard, in such a manner, that by the rising-and-falling motion of the slide-rod with the cam-slot, the required oscillating motion is imparted to the bell-crank lever, and, as the stud drops into the ends of the cam-slot, the heddle-frame is locked up or down for any desired number of picks. The bell-crank levers on top connect with those at the bottom by suitable rods, and the rods which connect the several sets of bell-crank levers on top and bottom are provided with pear-shaped slots, which catch over buttons projecting from the bell-crank levers, in such a manner that the relative position of the bell-crank levers toward each other is clearly defined, and the loom can be mounted level without much loss of time.

The vibrators and hooks, by means of which the slide-rods are operated, are pivoted to said slide-rods, and they are acted on by the pattern-chain, so that said hooks and slide-rods are capable of being thrown in or out of gear with the knives either at top or bottom, as the pattern-chain may require.

Two knives are used, which alternate, and which are both lifters and depressers, and they are connected by gears and racks, whereby the alternating-motion is effected. The pattern-chain is composed of studs of various length, in such a manner, that when a long stud comes opposite to one of the vibrating hooks, said hook is thrown in gear with the outer knife, and, if one of the shortest studs comes opposite to one of the hooks, said hook is allowed to drop in gear with the rear knife, and, if one of the studs of medium length comes opposite to one of the hooks, said hook is held, in a central position, clear of both knives. The motion of the knives commences a little in advance of that of the pattern-chain, so that the hooks are relieved from the strain of the knives before they are acted on by the pattern-chain.

The treadles, and eccentric-studs acting thereon, or any equivalent mechanism which may be substituted therefor, are so arranged that more than one-half of the revolution of the shaft is consumed in lifting or depressing the heddles, allowing of the threads being beaten up while the shed is open. In a close-shed loom, one treadle only is used, and operated by an eccentric-crank motion, the two knives being geared together, and one being connected to the treadle.

A represents a frame, which is made of wood or metal, or both combined, in the proper form or shape.

This frame forms the bearing of the main shaft B, to which a revolving motion is imparted by a belt, running on a fast and loose pulley, C C'.

In the side of pulley C, or of a disk mounted on the shaft B, is a cam-groove, *a*, which engages with a stud, *b*, projecting from the end of a lever, D. This lever is best seen in fig. 4.

It has its fulcrum on a stud, c , which projects from the end of the frame A , and from its loose end extends a rod, d , which connects, by a hinge-joint, with the lifter e .

This lifter moves up and down on a rod, f , which is fastened between suitable brackets g , secured to the batten E , and said lifter acts alternately on spring-hooks h , which are pivoted to the slide-rods i i' .

These slide-rods move up and down in suitable guide-pieces j , secured to the batten, and they are provided with cogs, and so placed that they can gear, from opposite sides, into a pinion, or cog-wheel, k , which is mounted on a shaft, l , which has its bearing in a bracket secured to the batten, best seen in fig. 5.

On this shaft is also mounted a pinion, m , which meshes directly into one or two shuttle-racks n n' .

In the drawing, we have shown a double shuttle-batten, with two shuttle-racks gearing into the pinion m from opposite sides, as shown in fig. 2, and, in this case, the shuttles are driven through the sheds in opposite directions once for every revolution of the main shaft. In a single shuttle-batten, only one shuttle-rack is used, to which the required motion is imparted by the pinions m k , geared slide-rods i i' , lifter e , and cam a .

This cam is so shaped that three-fifths or more of the revolution of the main shaft are taken up in propelling the shuttle or shuttles through the shed or sheds, and only two-fifths or less of said revolution are required to return the lifter to its lowest position, ready for the next motion. By these means, the motion of the shuttle or shuttles is rendered comparatively slow, the strain on the weft-thread or threads is reduced, and the number of picks can be increased in a corresponding ratio.

If desired, the cam a can be attached to a shaft, which is geared with the main shaft, so that it makes only one revolution for every two of the main shaft; and, in this case, the lifter-rod d will be connected directly to one of the slide-rods i i' , and the hooks h will be dispensed with. By these means, the motion imparted to the shuttle or shuttles will be the same as that produced by the mechanism shown in drawings. The harness-motion is composed chiefly of a series of bell-crank levers, o p q r s t u v w .

The bell-crank levers o p q r s have their bearings on axles a^2 b^2 , secured in the top rails of the frame A , and the bell-crank levers t u v w have their bearings on axles c^2 d^2 , secured in the bottom part of said frame, and the several bell-crank levers connect with each other, and with the heddle-frame F , as follows:

The arms p of the bell-crank levers o p q , connect with the arms r of the levers r s , and the arms q and s connect with the heddle-frames.

The arms o of the levers o p q connect with the arms t of the levers t u , and the arms u of these last-named levers connect with the arms v of the levers v w , the arms w of which connect with the heddle-frames. If one of the bell-crank levers o p q is tilted in the direction of arrow 1, fig. 1, the appropriate heddle-frame is raised, and if the bell-crank lever is tilted in the direction of arrow 2, the appropriate heddle-frame is depressed.

The rods e^2 , f^2 , and g^2 , which form the connections between the several bell-crank levers, are flat bars, with pear-shaped slots h^2 , near both ends.

These slots catch over studs i^2 , projecting from the arms of the bell-crank levers, and, by the use of such rods, the loom can be mounted level, with little loss of time.

Usually, the connection between the bell-crank levers is effected by means of stiff wires, the ends of which pass through holes in the levers.

In mounting the loom, the weaver has much trouble to bend the wires exactly at the proper places, and it takes a long time to mount the loom properly.

It is obvious that our rods e^2 f^2 g^2 , instead of being

provided with pear-shaped slots, might be provided with studs, to catch in pear-shaped slots in the bell-crank levers, and, in practice, this last-named arrangement will probably be preferable.

The arms o , of the bell-crank levers o p q , are provided with toothed segments j^2 , which gear in cog-wheels k^2 , to which a reciprocating revolving motion is imparted, by toothed slide-rods l^2 .

To the lower ends of the slide-rods are hinged the vibrating hooks m^2 , the bottom ends of which are provided with notches in each edge, so that the same can be thrown in gear with either of the knives G G' .

The upper ends, or shanks of the vibrating hooks extend up in front, or outside of the slide-rods, and they are acted on by the pattern-chain H , either direct or through the intermediate tappets n^2 .

The pattern-chain is composed of a cylinder, to which an intermittent rotary motion is imparted, by a hook-catch and catch-wheel, in the usual manner.

Over this cylinder pass the leaves of the pattern-chain, and from these leaves project a series of pins, o^2 o^{2*} o^{2**} , of different lengths.

If one of the long pins is brought up against the corresponding tappet n^2 , the vibrating hook m^2 , belonging to said tappet, is turned out and brought in such a position that it engages with the outer knife G ; but, if one of the short pins, o^{2**} , comes opposite the corresponding tappet, the appropriate hook assumes, by its inherent gravity, such a position, that it engages with the inner knife G' .

By the pins o^{2*} , of medium length, the appropriate hooks are thrown in such a position that they stand clear of both knives. The length of the shortest pins may be reduced to nothing.

If one of the hooks is thrown in gear with one of the knives, the appropriate hook is moved up or down, and, by the action of the cog-wheel k^2 and toothed segments j^2 , the appropriate heddle-frame is raised or depressed, according to the direction in which the knife moves.

The cog-wheels k^2 are provided with extra-sized teeth, or stops p^2 , which are so situated that they bear against the ends of their toothed segments, and lock the same in their extreme positions.

In order to effect this purpose without fail, the distance between the stops p^2 , and the proportion between the cog-wheels k^2 and segments j^2 , must be such, that when one of the segments has arrived at either of the extreme ends of its stroke, it bears on the stops of its cog-wheel in a radial direction, as indicated by a red line in fig. 1, and, consequently, the strain exerted by the warp on the heddle-frame is not able to turn said cog-wheel, and to change the position of the belt, crank-levers, or heddle-frame spontaneously, or before the cog-wheel is turned by its appropriate slide-rod. In fact, the greater the strain of the warp, the stronger the lock will be.

By this arrangement, either one of the heddle-frames can be locked up or down, for any number of picks, as the pattern-chain may demand.

As a mechanical equivalent for the cog-wheels k , with their stops, and for the segments j^2 , we have shown, in fig. 1, a cam-slot, j^* , which is secured to the top end of one of the slide-rods, and which straddles a pin, k^* , secured in a rod, l^* , which extends from the arm p^* of the bell-crank lever o^* p^* q^* , through a guide-bracket, n^* , the slide-rod being operated by the knives and hooks, as previously described.

The cam-slot is composed of an oblique portion, with vertical ends, and as the slide-rod rises, the bell-crank lever o^* p^* q^* turns in the direction of the arrow marked thereon, in fig. 1, and the appropriate heddle-frame is raised.

When the slide-rod, with the cam-slot, reaches its highest position, the pin k drops into the lower vertical portion of said cam-slot, the heddle-frame is locked up, and, if the slide-rod is lowered, and the pin k^* catches

into the upper vertical end of the cam-slot, the heddle-frame is locked down.

It will be noticed that, in this case, the vertical parts of the cam-slot form the mechanical equivalent for the stops p^2 .

The knives G G' are secured in racks q^2 , which move up and down in suitable guides, and which are geared together by intermediate pinions r^2 .

From the knives extend shackle-bars s^2 , to the treadles I I' , which are situated on the opposite side of a cog-wheel, J , in the sides of which are secured the roller-studs t^2 , one or more for each treadle.

As the cog-wheel revolves, the studs t^2 act alternately on their treadles, and the knives are moved simultaneously in opposite directions, one up, when the other goes down, and *vice versa*.

The form of the tappets on the treadles is such that the knives are depressed during two-thirds, more or less, of the revolution of the main shaft, and then allowed to "dwell," or remain stationary during the remaining one-third, less or more, of said revolution, the main shaft being geared, together with the cog-wheel J , in such a manner that each knife is raised during one revolution of the main shaft, and depressed during the next revolution.

At the same time, the roller-studs t^2 , and the tappets on the treadles, are arranged in such relation to each other, that the knives begin to rise very little before the pattern-chain acts on the hooks m^2 , so that said hooks will be relieved from the strain of the knives, and that the pattern-chain can throw the hooks in the required position, without requiring much power.

In order to effect this purpose, the notches, which form the hooks, and which admit the knives, must be somewhat higher than the width of the knives, so as to allow the knives to rise or descend a very short distance, as previously stated.

In applying our harness-motion to a close-shed loom, we dispense with one of the treadles, and operate the remaining treadle by an eccentric, or crank-motion.

The two knives are geared together, and one of them connects with the treadle in such a manner, that by the action of this treadle, an alternating reciprocating motion is imparted to the knives, one knife being moved directly from the treadle, and the other through the racks and pinions, which gear the same together.

Our means for locking the heddle-frame up or down,

can also be applied to a loom with a drop-box, the cog-wheels and stops, or their equivalents, being used for locking said drop-box up or down, for any number of picks, as indicated by the pattern-chain.

Having thus described our invention,

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

1. The reciprocating head e , hooks h h^1 , and toothed slide-rods i i^1 , in combination with cog-wheels m k and shuttle-rack n , of a batten, E , combined and operating substantially as and for the purpose set forth.

2. The toothed slide-rods l^2 , in combination with the toothed bell-crank levers o p q and gear-wheels k^2 , substantially as and for the purpose described.

3. The stop p^2 , on the cog-wheel k^2 , to act in combination with the bell-crank levers o p q , substantially as and for the purpose described.

4. The slide-rods, provided with oblique cam-slots j^* , in combination with the heddle-frames F , and their connecting-mechanism, substantially as and for the purpose set forth.

5. The combination, with bell-crank levers o p q , r s , t u , v w , of rods e^2 f^2 g^2 , provided with slots h^2 , to catch over studs i^2 , which project from the arms of the bell-crank levers, or with studs which catch in suitable slots in the arms of said bell-crank levers, substantially as and for the purpose set forth.

6. The vibrating hooks m^2 , pivoted to the slide-rods l^2 , and acting, in combination with the pattern-chain and knife, or knives, substantially as and for the purpose described.

7. The combination, with the reciprocating knives G G' , and one or more treadles I , of racks q^2 , and pinions r^2 , arranged and operating substantially as and for the purpose set forth.

8. The cog-wheel J , having adjustable roller-studs t^2 , in combination with the treadles I I' , knives G G' , their connecting-devices, and the pattern-chain, substantially as and for the purpose described.

This specification signed by us, this 28th day of February, 1868.

BENJAMIN OLDFIELD.
EDWIN OLDFIELD.

Witnesses:

S. T. HOLBROOK,
C. B. ROGERS.