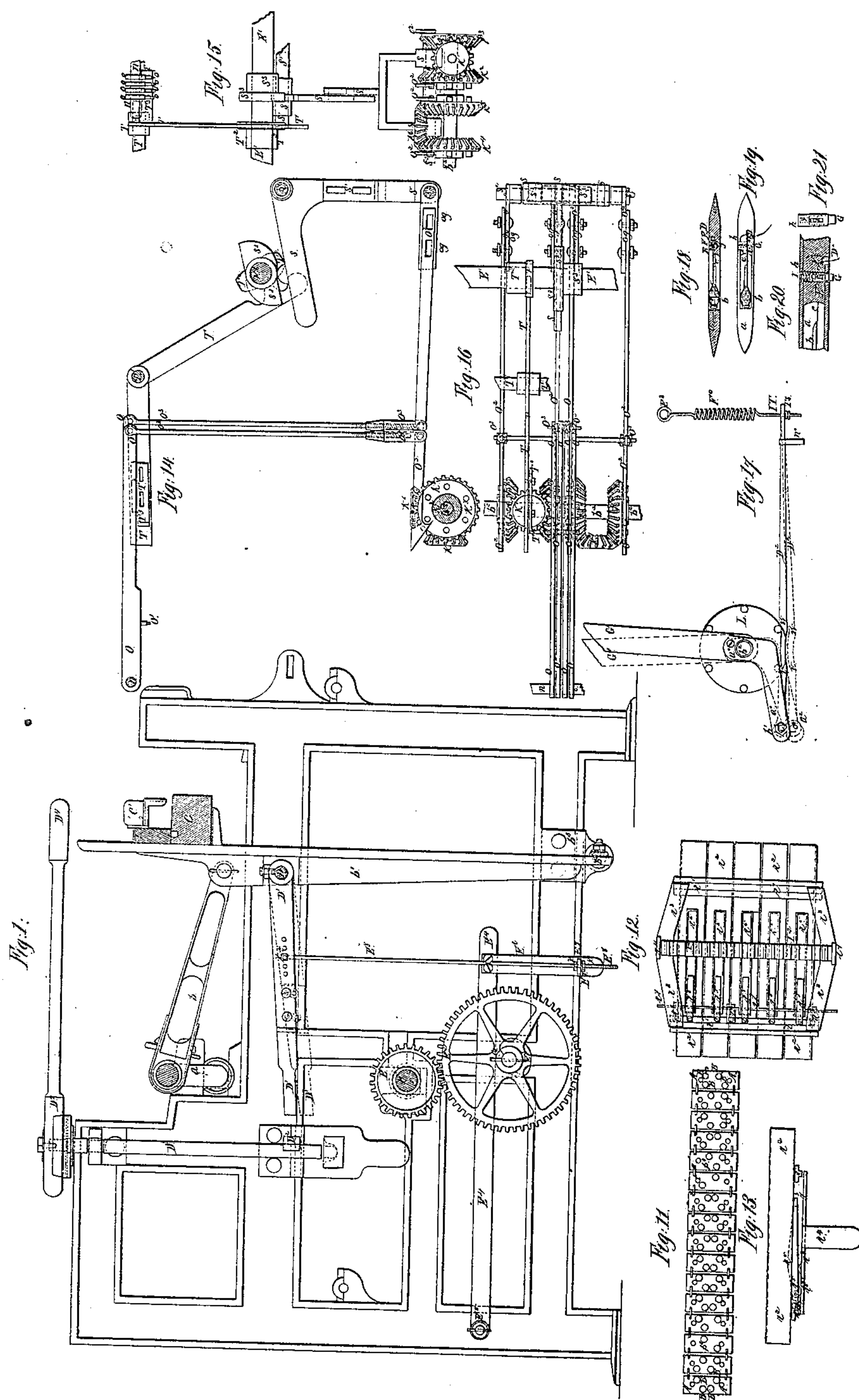


Patented Mar. 5, 1850.

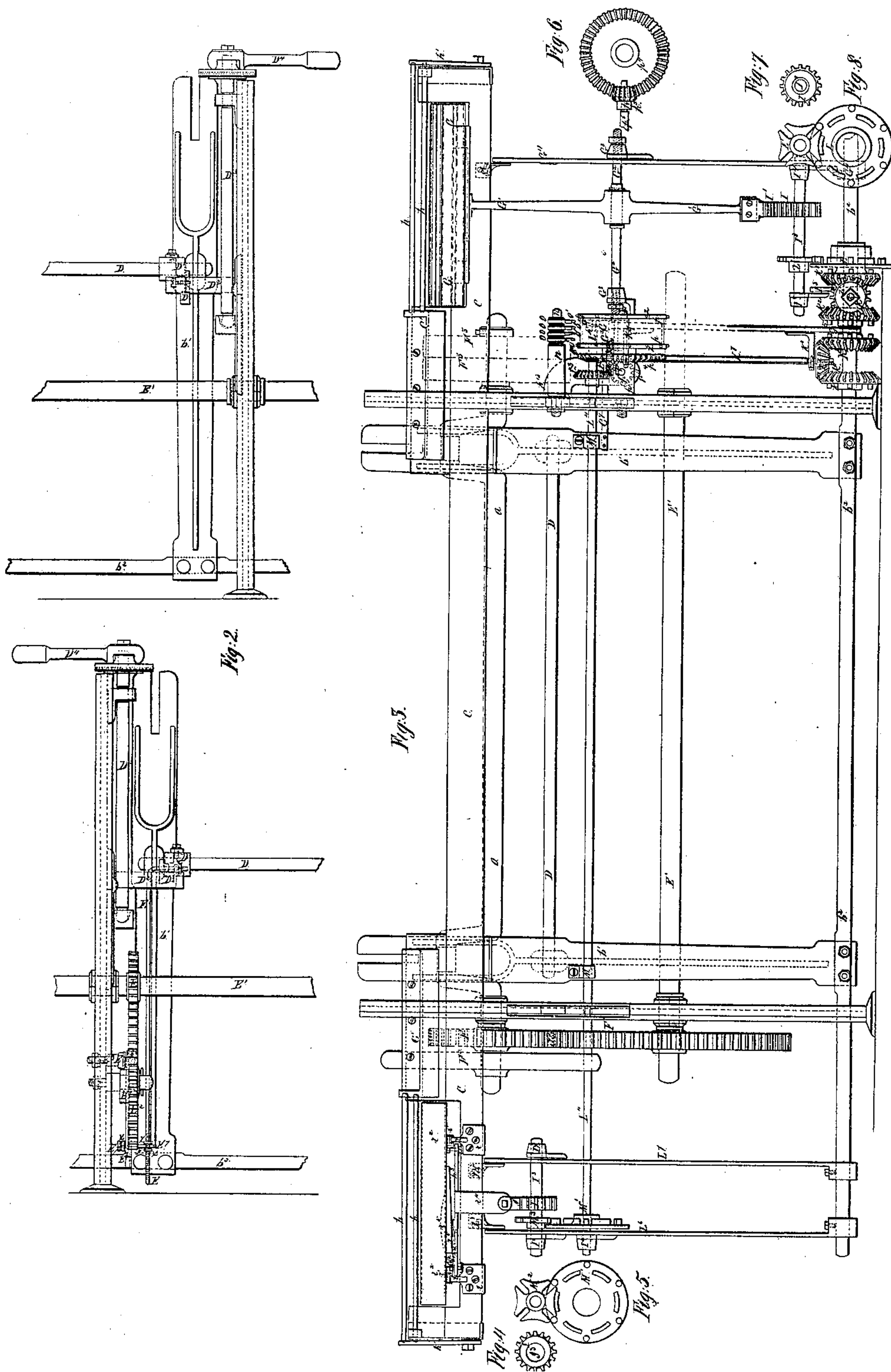


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Loom.

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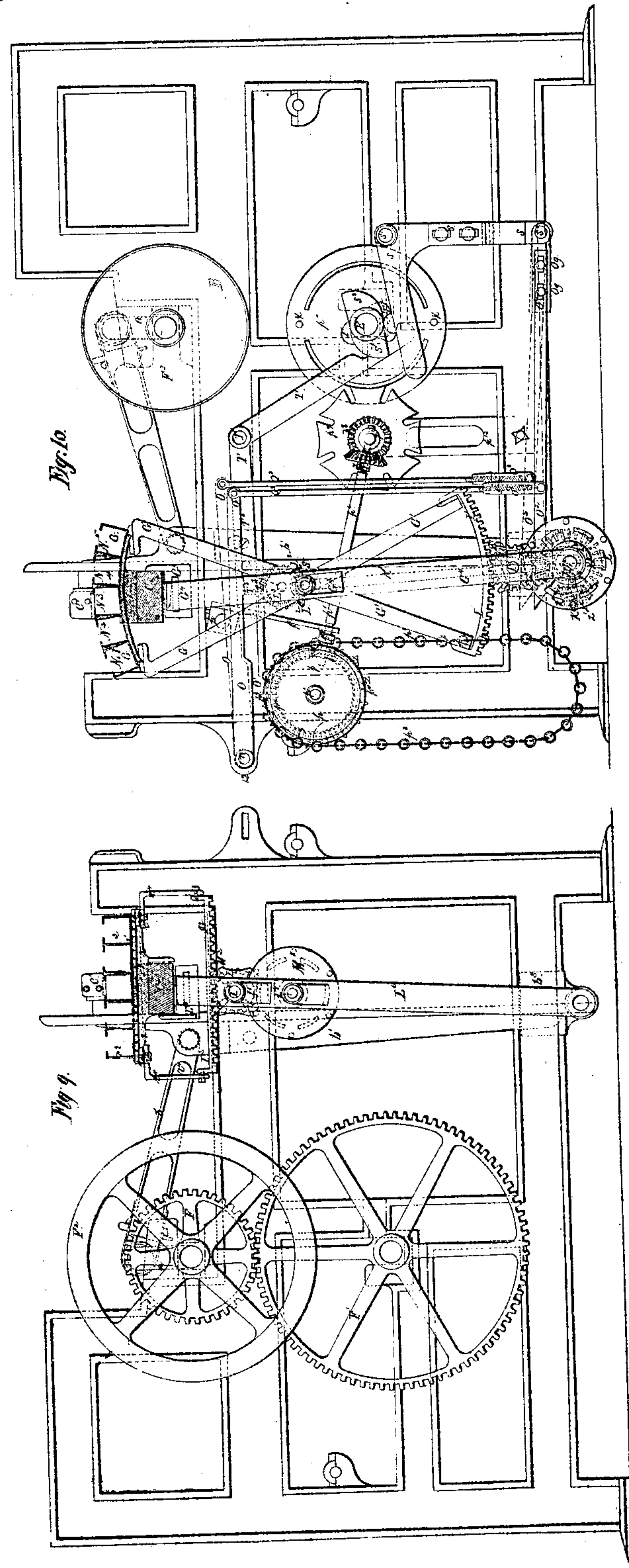


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UNITED STATES PATENT OFFICE.

SAMUEL ECCLES, OF KENSINGTON, PENNSYLVANIA.

IMPROVEMENT IN LOOMS FOR FIGURED FABRICS.

Specification forming part of Letters Patent No. 7,137, dated March 5, 1850; antedated December 22, 1849.

To all whom it may concern:

Be it known that I, SAMUEL ECCLES, of Kensington, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Power-Looms for Weaving Plain and Figured Fabrics; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a vertical transverse section of the loom, showing the improved picking-motion; Fig. 2, a back elevation of part of the loom, also showing the improved picking-motion; Fig. 3, a front elevation of the loom; Figs. 4 and 7, the two pinions I, fixed on the star-shaft I³ for moving boxes. Figs. 5 and 8 show the position of the star-wheel M² and star-driver M', also of star-wheel L' and star-driver L. Fig. 6 represents the bevel-cog gearing p⁴ and p⁵. Fig. 9 is a left side elevation of the loom. Fig. 10 is a right side elevation thereof. Fig. 11 is a plan of the pattern-plates. Fig. 12 represents the under side and Fig. 13 the front of the sliding box complete. Fig. 14 is an end elevation of the tappet-shaft E' and fiddle-stick b², showing the position of the pattern-levers o, &c.; Fig. 15, a front elevation of the foregoing, a portion only of which being shown in Fig. 3 to avoid complication. Fig. 16 is a plan of Figs. 14 and 15. Fig. 17 represents the adjusting-lever G⁴ with the parts immediately connected with it.

The loom-framing, driving-pulleys, fly-wheel, crank, crank-wheel, tappet-shaft, cloth-beam, yarn-beam, and such other parts as are the same as in common looms (although represented in the drawings) are in this specification mentioned only when their connection with the improvements claimed requires it.

A Jacquard machine or any other apparatus for working the shed may be used; but not having any connection with the improvements no further mention is made of them.

Corresponding letters of reference are used in the different parts of the loom represented on the drawings.

The first part of my improvement consists in the mode of working the picking-motion, Figs. 1 and 2. a represents the crank; b, the crank-arms connected with the lay-swords b',

hung upon fiddle-stick b², riding in carriers b³. c is the lay-bottom. D is the shaft, which reaches from lay-sword to lay-sword, wherein it has its bearings. On the shaft D are fixed the two picking-fingers D', just inside of each lay-sword, the one on the right-hand side of loom being placed with its point opposite to D². D² are fingers projecting from the picking-shaft D³, on the top of which are fixed the picking-sticks D⁴, to the end of which latter the picker is attached in the usual manner. The picking-finger D' on the left-hand side of the loom is placed with its point below the finger D², as shown by dotted lines in Fig. 1. E is a pinion on the tappet-shaft E', working in wheel E², on the hub of which is placed the cam E³. E⁴ is a lever on stud E⁵, resting at the point a^c, Fig. 1, on the surface of the aforesaid cam. E⁶ is an arm extending downward from near the end of the lever E⁴, the swivel-plate E⁷ acting as carrier (and joint also) for the oscillating rod E⁸, which connects the picking-fingers D' with the lever E⁴ by being passed through the swivel-plate E⁷, being adjusted by the nuts x. The following explanation will show the operation of the above: When the crank is approaching its back center, the picking-finger D' will strike the finger D², thereby throwing the shuttle out of the box by means of the picker being connected to picking-stick D⁴, as in other looms, and so long as the lever E⁴ remains in that position the loom will pick from the same side; but as soon as the lever E⁴ is raised by the cam E³ the picking-finger D' (on the left-hand side of the loom) will be raised opposite the corresponding finger D² and the picking-finger D' (on the right-hand side) will be raised above the corresponding finger D², and will strike and pick the same as before. The number of picks from a side is regulated by the cam E³. A plate-tappet may be substituted for the latter, so as to pick any given number of picks from a side, (provided the number of boxes being corresponding,) or it may be varied in such a manner as to suit the goods required to be manufactured. The improvements in this picking-motion, to any other heretofore in use where the picking is direct from the lay, will be obvious to any person experienced in power-looms: first, being so arranged that it may be easily applied to ordinary power-looms where the lay is supported

from below, as shown in drawings; secondly, enabling the weaver to change the number of picks from a side by changing the cam on the wheel E^2 , as hereinbefore described, without deranging any other part of the loom.

The second part of my invention consists of a series of small plates, in combination with the motions that act with them, for the purpose of determining the movement of the shuttle-boxes. p^3 are a series of flat plates, perforated near the outer edges A (but in the center thereof) to receive the pins in the cylinder p , by which the said plates are progressively actuated. The plates p^3 are also perforated at different intervals to admit of the pins o' in pattern-levers o to enter; but in no case can more than two pins enter the plates at one and the same time, one for each series of shuttle-boxes. There is also a small hole at the corners of each plate, through which a wire ring is fixed, which connects or binds them together, thereby forming an endless chain. The number of plates forming a chain is regulated by the length of the pattern and may be varied by the holes B and B' (or blanks may be introduced) to suit the pattern or device required to be woven. The first pattern-lever o is attached by the rod o^3 to the first pulling-catch o^2 , hereinafter described, and the said catch acting upon the bevel k^3 moves the segment circular shuttle-boxes backward. The second pattern-lever with its connections act upon bevel k^2 , thereby moving the segment circular shuttle-boxes forward by the intermediate bevel k' , connecting the bevels k^2 and k^3 , as will be more fully described hereinafter. (See Fig. 16.) The above-mentioned pattern-levers are acted upon by the holes B' in pattern-plates p^3 . The two holes B on the left-hand side of plate act upon the pattern-levers that are connected to bevels k^4 and k^5 , and, by the connection hereinafter described, causes the series of sliding shuttle-boxes at the left-hand side of loom to be moved backward and forward. T is a lever placed on the stud T', and is worked by the cam T² on the tappet-shaft E'. Underneath pattern-levers o , fixed to said lever T, is a projecting plate T³ for the purpose of lifting pattern-levers o , so that the pins o' will be raised above the surface of the plates p^3 . p is a cylinder working on stud p' , having two flanges or rims in which are fixed the small studs or pins z . The said pins enter into the pattern-plates p^3 at the small holes A, whereby the said plates are brought forward and held in their proper places. On the hub of the cylinder p is fastened the bevel-wheel p^4 , receiving motion from the small bevel p^5 on shaft p^6 . p^{13} is a bracket that carries shaft p^6 . A collar is fixed on stud p^{10} , which, being bored, serves as foot-step to shaft p^6 . On the other end of shaft p^6 is placed the miter-wheel p^7 , fastened by set-screws, whereby to regulate the exact position of the holes B and B' in the pattern-plates p^3 . p^{11} is a plate which I call a "star-driver," (fastened

on the shaft E',) on the side of which is a rim. Two parts of the said rim are cut away to allow the points of the star-plate p^9 , which works loose on stud p^{10} , to pass. p^9 is a star-plate carefully divided into eight parts, the surface of which works on the rim of star-driver p^{11} . Eight slots are also cut in said plate to receive the pins x in said star-driver. There are two pins x securely placed in star-driver p^{11} . When the surface of the star is on the rim of the star-driver, the said star or anything attached thereto cannot possibly move; but when the pins x in the star-driver enter into the slots in star p^9 , the said star moves one-eighth of a revolution, and by the connection of miter-wheel p^8 , which is keyed on the hub of star p^9 with the hereinbefore-mentioned miter-wheel p^7 , the cylinder p is moved one thirty-second part of a revolution, thereby bringing another set of holes in plates p^3 under the pins o' . o are four pattern-levers, Figs. 3, 10, 14, 15, and 16, working on stud u , in each of which is fixed a small steel pin o' , that enter into the holes B and B' of pattern-plates p^3 . o^3 are four connecting-rods attached to the end of pattern-levers o , and also to the pulling-catches o^2 , and are adjusted by screw and socket-nut, as shown in the drawings. It will be perceived that when there is a blank plate under the pins o' the pins in pattern-levers o rest on the surface of said plate, as shown by dotted lines in Fig. 10, in consequence whereof the pulling-catches o^2 are prevented from acting on bevels k^2 , k^3 , k^4 , and k^5 , and of course the shuttle-boxes remain stationary.

The third part of my invention consists in the apparatus hereinafter described by which the boxes are moved and are held in their respective positions while the pick is being made. G represents a segment circular box; G', the arms of segment fixed on shaft G², riding in carriers G³, which are bolted to uprights G⁴ and G⁵, which said uprights are fixed on fiddle-stick or rocking rail b^2 . G⁴ is carried up to near the lay-bottom c , adjusted and held in its position by foot G⁶, which is bolted to lay-bottom c . G⁵ is only carried up to point o s, (see Fig. 3,) adjusted and held by plate G⁷, which is permanently fixed to lay-sword b' . I are two pinions, one of which works in the segment-wheel I' and the other works in the straight rack I² beneath the sliding boxes r^2 . I³ are two small shafts revolving in carriers I⁴, I⁵, I⁶, and I⁷. The said carrier I⁴ is bolted to upright G⁴, and the carrier I⁵ is bolted to another carrier I⁸, fixed on fiddle-stick b^2 . The stud k , that carries the bevel-wheel k' , is also fixed in the carrier I⁸. k^2 and k^3 are bevels working in bevel k' , and are loose upon the fiddle-stick b^2 . k^4 and k^5 are two other bevels, same as k^2 and k^3 , which work in the small bevel k^6 , keyed on the shaft k^7 . This shaft is held by the carriers k^8 and k^9 , which are bolted to upright G⁵. The bevels k^2 , k^3 , k^4 , and k^5 have on the outside six pins each at regular intervals, upon which

the catches o^2 act, as seen in Figs. 10, 14, 15, and 16. A star-driver L is fixed on the hub of bevel k^3 , which gives motion to star L' , which is keyed on small shaft I^3 , together with the pinion I, that works in the segment-wheel, thereby giving direct action to the series of shuttle-boxes G. L^2 is a miter-wheel keyed on shaft k^7 , working in miter L^3 , which is keyed on shaft L^4 , the said shaft extending across the loom, and revolves in carriers M, which are bolted to the lay-swords b' . The star-driver M' is fastened to shaft L^4 , and star-plate M^2 is fastened on small shaft I^3 , upon which is placed pinion I. This pinion works in the straight rack I^2 , and thereby moves the sliding boxes r^2 . The connection between the bevels k^4 and k^5 and the sliding boxes will be clearly understood by a careful examination of Figs. 3, 9, and 12, together with the foregoing specification. s is the bell-crank lever placed on stud s' . s^2 is a long stud or pin through the lower end of said lever, on which stud or pin are placed the pulling-catches o^2 , which are adjustable at the point o^0 . (See Fig. 16.) The bell-crank lever s is worked by the double cam or tappet s^3 , fastened by set-screws to the tappet-shaft E' . A lever of the third order may be applied as a substitute for the bell-crank lever, one end working on stud in frame at the point marked B, Fig. 10, the cam acting on the middle and the other end attached to pulling-catches, as above. Supposing that there was one hole B' in pattern-plate p^3 (and the boxes in the position as shown in Fig. 10) directly under the first pattern-lever o , then the pin o' in said pattern-lever (by the action of the apparatus hereinbefore described) would enter, thereby causing the other end to sink, and by the connecting-rod o^3 being connected to the said pattern-lever and also to the pulling-catch o^2 (see Fig. 14) the said pulling-catch would rest on the pin in bevel k^3 , and when by the revolving of the tappet-shaft, the cam s^3 acting upon the bell-crank lever s , the aforementioned bevel k^3 is turned one-sixth of a revolution, and, by the star-driver L being fixed to said bevel k^3 , the motion is communicated to star-plate L' and the pinion I, and the said pinion being in gear with the segment-wheel I' brings No. 2 of the series of segment circular shuttle-boxes in line with the race-board. The series of sliding shuttle-boxes are acted upon in precisely the same manner as the segment circular shuttle-boxes by the mechanism hereinbefore described.

The fourth part of my invention will be clearly understood by referring to Fig. 17 and the following specification: D^0 is a rod or lever, with its appurtenances, for adjusting the position of the pins in bevels k^2 , k^3 , k^4 , and k^5 or any of them, or star-driver L. a^0 is a bracket or carrier on the end of fiddle-stick b^2 , fastened to the upright G^4 , said upright vibrating with the lay. In this carrier is fixed the shaft c^0 by means of the nut b' , on which shaft is placed the adjusting rod or lever D^0 . E^0 is a

stud fixed in the loom-framing, to which is hooked the spiral spring I^0 , on the lower end of which is attached (by means of a set-nut I^5) one end of the lever D^0 , the height of which is regulated by said set-nut and the plate n^0 , the plate not allowing it to rise too high and the spring keeping it up. The object of this motion is to hold the bevels, (or the star-driver L,) and consequently the series of shuttle-boxes connected therewith, in a certain position after the pulling-catches o^2 have acted upon said bevels and to set the said bevels and star-driver L perfectly at liberty when the pulling-catches act upon the said bevels and star-driver L. When the boxes are being moved, the lay is forward and the upright G^4 , the carrier or bracket a^0 , and the rod or lever D^0 are in the position shown by the dotted lines in Fig. 17, thereby clearing the pins in star-driver L; but when the lay goes back the shaft c^0 , and also the end of the rod D^0 , rises, whereby the points v and u are brought against the pins of the bevel k^3 or star-driver L, so that the pulling-catches o^2 always find the pins in bevels in one position. The lever D^0 is kept in this position until after the pick has been made, when, by the lay coming forward, the shaft c^0 is depressed (together with that end of the lever fixed on it) and brought into its former position. In Fig. 17 one lever D^0 is only shown. Another lever, of precisely the same description and attached to the same rod c^0 , is fixed so as to act on the pins in bevel k^4 , as before described. The same motions are applicable to the moving of revolving shuttle-boxes or drop shuttle-boxes, or to boxes that are detached from the lay, or any other description of movable shuttle-boxes used in looms for weaving plain or figured fabrics. It will be perceived that all the above motions act independent of the Jacquard machine, and all the said motions may be regulated as to time of action to the greatest nicety, and the loom can thereby be worked with greater ease and quicker speed.

Having now described the nature of my improvements and their mode of operation, I claim as my invention, and desire to secure by Letters Patent, the following, viz:

1. Obtaining the picking-motion or (otherwise expressed) giving action to the picking-shaft by means of the shaft D, carrying the picking-fingers D' , oscillating with the lay, in combination with the mode of raising and depressing the fingers D' by the combination of the cam a^c and lever e^4 , the said cam being detached from the other parts of the loom, thereby enabling it to be easily changed, in the manner and for the purpose above specified.

2. The pattern-plates p^3 , made and worked in the manner and for the purpose herein fully made known, in combination with the pattern-levers o , with the pins o' fixed in them, the lever T and cam T^2 for the purposes of lifting said pattern-levers o , the star-driver p^{11} , and the star-plate p^9 , the miter-wheel p^7

and p^8 , shaft p^6 , and bevel-wheel p^4 and p^5 , in connection with cylinder p , the respective motions herein referred to being carried on or effected substantially in the manner and for the purpose herein fully made known.

3. The combination formed by the mechanism for moving the shuttle-boxes—that is to say, the cam s^3 , lever s , and pulling-catches o^2 , together with the bevel-wheels k^2 , k^3 , k^4 , and k^5 , and the intermediate bevels k' and k^6 , together with the star-driver L and star-plate L' and pinion I , and the shaft k^7 , bevels L^2 and L^3 , and shaft L^4 , together with the star-driver M' and star-plate M^2 , said bevels, shaft, star-drivers, and stars oscillating with the lay and acting from the same center, so that the connection between the shuttle-boxes and bevels is never broken or detached, the whole being constructed and arranged in the manner and for the purpose herein fully described. I do not limit my claim to the precise arrange-

ment herein set forth, nor to the moving of any particular description of shuttle-boxes; but I do claim my combination of motions used for the purpose of moving shuttle-boxes of any description when such arrangements and combinations are substantially the same with that herein described.

4. The apparatus for holding the pins in star-driver L or the pins in the bevels k^2 , k^3 , k^4 , and k^5 , and consequently the shuttle-boxes connected therewith, in a proper position, or, more particularly, the lever D^2 and rod c^0 connected to the bracket or carrier a^0 , and the action to said lever being given by the oscillation of the lay, in the manner and for the purpose herein specified.

SAMUEL ECCLES.

Witnesses:

GEORGE A. CLARKE,
WILLIAM ECCLES.