

A. Allen. Shuttle Box.

N^o 14,644.

Patented Apr. 15, 1856.

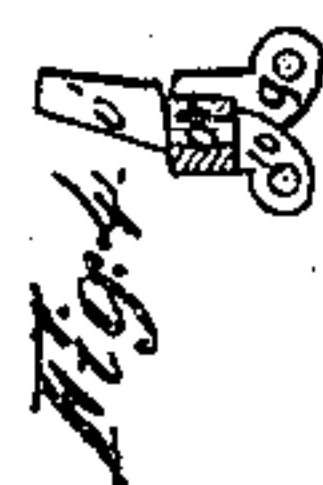
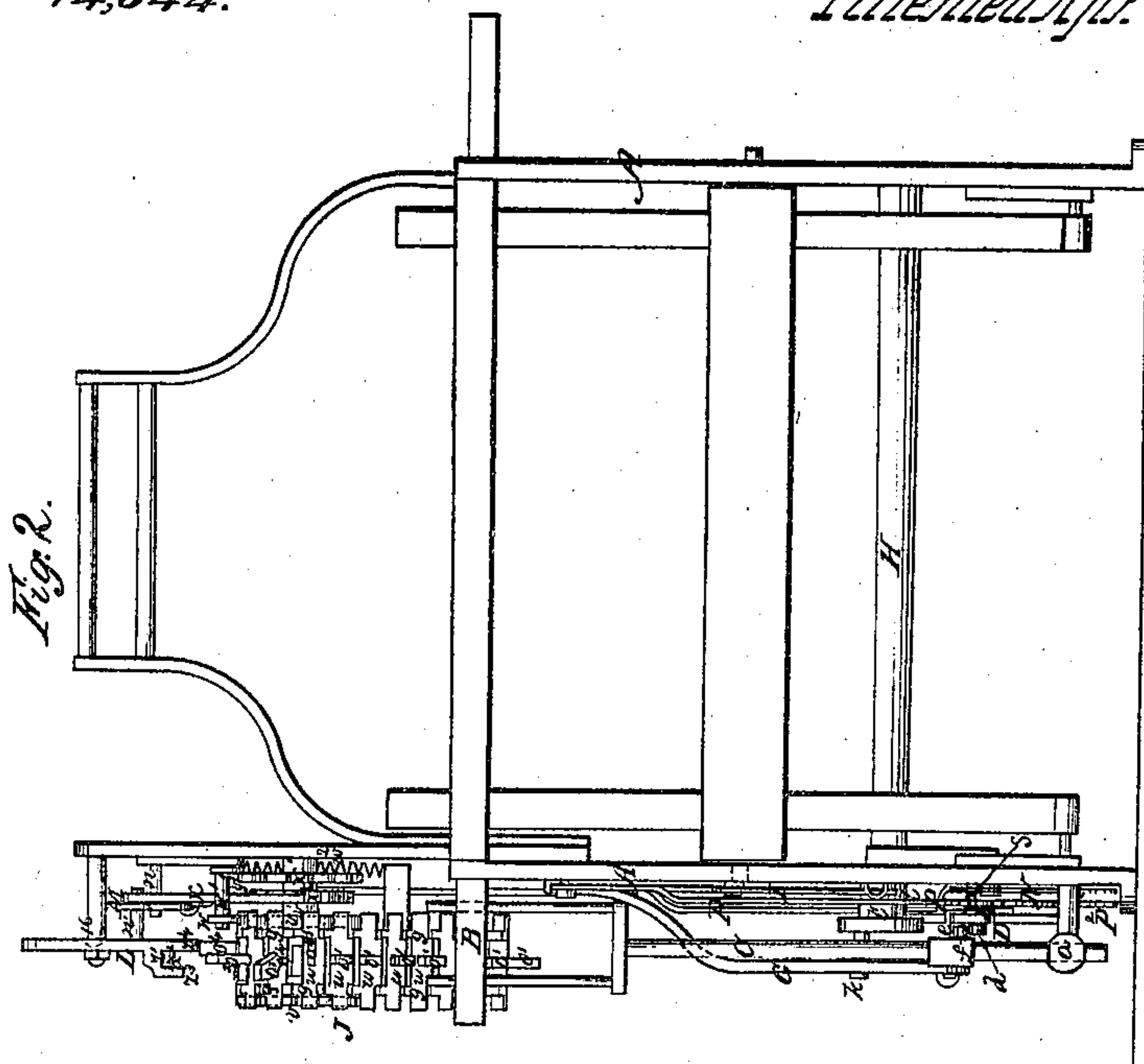


Fig. 5.

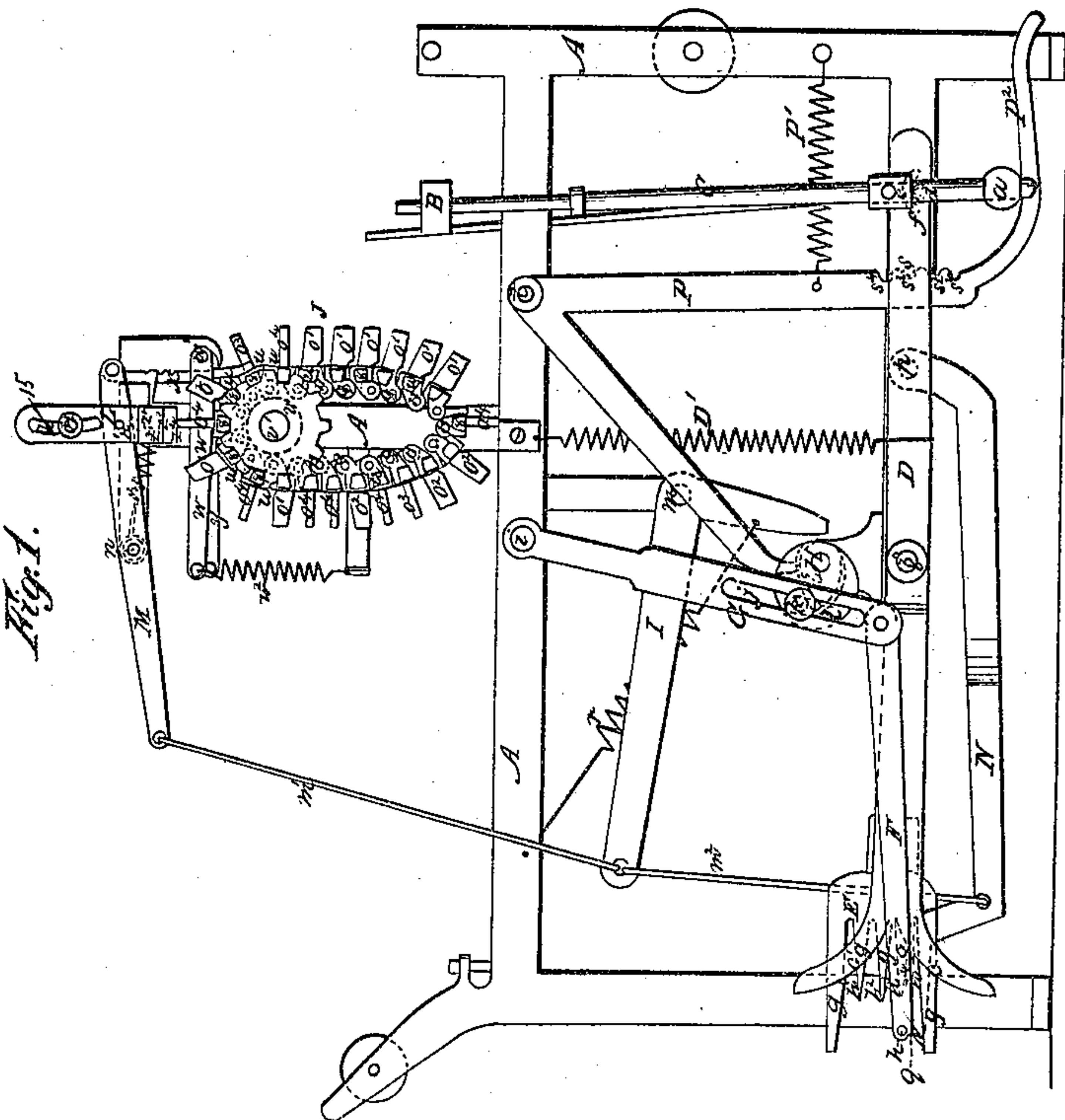


Fig. 6.

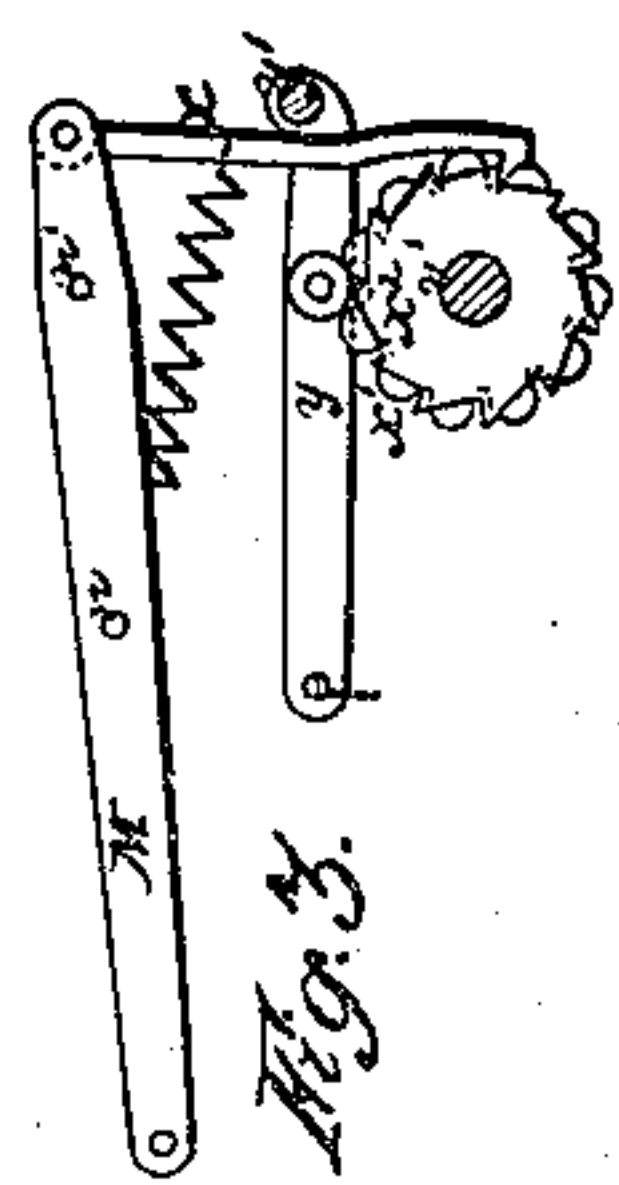


Fig. 3.

UNITED STATES PATENT OFFICE.

ANDREW ALLEN, OF WILMINGTON, DELAWARE.

POWER-LOOM.

Specification of Letters Patent No. 14,644, dated April 15, 1856.

To all whom it may concern:

Be it known that I, ANDREW ALLEN, of Wilmington, in the county of Newcastle and State of Delaware, have invented certain
5 new and useful Improvements in Power-Looms; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of
10 this specification, in which—

Figure 1 is a side elevation of a loom with my improvements, all the parts not necessary to explain the invention being omitted. Fig. 2, is a front elevation of the
15 same. Figs. 3, 4, 5, 6, 7 are detail views of portions of the same.

Similar letters of reference indicate corresponding parts in the several figures.

These improvements are applicable to the
20 weaving of gingham or other fabrics in which filling threads of different colors are employed. They relate to the mechanism by which the lifting and dropping of the shuttle boxes for the purpose of changing
25 the shuttles to change the color of the filling is effected.

To enable those skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

30 A, A, is the framing of the loom.

B, is the lay and C, is the upright rod commonly employed at one end of the lay to lift and drop the boxes, the upper part of the said rod being guided in the end of
35 the lay sole and the lower part being guided by a guide *a*, attached to one of the rockers.

The shuttle boxes, being the usual kind of drop boxes do not require to be shown or described.

40 D, is a lever working on a fulcrum *b*, secured outside the loom framing for the purpose of raising and lowering the rod C. This lever has at its front end a stud *d*, and a lip *e*, between which is received a tongue
45 *f*, see Figs. 1 and 2, which is secured to the lifting rod C, the said tongue fitting easily between the said stud and lip and being of such curved form as to admit of the vibration of the lifting rod C, with the lay. The
50 rear end of the said lever is furnished with a fork *e*, *e'*, see Fig. 1, which works close to a device which I term a "hand", from its resemblance to the human hand. This hand
55 E, Fig. 1, consists of a stationary metal plate attached to the loom framing close to the rear end of the lever D, having five

taper fingers, *g*, *g*, *g*, *g*, *g*, and four spaces *h*¹, *h*², *h*³, *h*⁴, between the said fingers, the said spaces corresponding always in number with the number of shuttle boxes and
60 being severally for the purpose of receiving and guiding a pin *h*, which acts upon the curved inside faces of the prongs *e*, *e'*, of the fork of the lever D, for the purpose of depressing or elevating the forked end of
65 the lever and thereby raising or dropping the lifting rod C. This pin *h*, is secured near one end of a rod F, the other end of which is connected loosely with a lever G, of the third order, which hangs on a fulcrum
70 pin *i*, and which is furnished with a slot *j*, to receive an eccentric wrist *k*, which is secured to the extremity of the treading shaft H, of the loom. This wrist *k*, gives the rod
75 F, with its pin *h*, a movement forth and back during every revolution of the treading shaft, causing the pin *h*, to advance into and retreat from one of the spaces *h*¹, *h*²,
80 *h*³, *h*⁴, between the fingers of the hand E, and by that means either to raise or lower or to leave stationary the lifting rod C, according to which space the pin enters and to the previous position of the lever D. To
85 illustrate this action, suppose, for instance, the lever D, to be in the position shown in Fig. 1; the center of its fork *e*, *e'*, is opposite the space *h*³, and suppose the pin *h*, at its next advance to enter the lowest space
90 *h*⁴, it will act on the lower prong *e*, of the fork of the lever D, and depress the forked end of the lever, one step, elevating the lifting rod C, one step, or suppose the pin to advance into the space *h*³, no action on the lever D will take place and the lifting rod
95 will remain stationary, but suppose the pin *h*, to advance into the space *h*², or *h*¹, it will act on the upper prong *e'*, of the fork and elevate the forked end of the lever, in the former case one, and in the latter case two
100 steps, depressing the lifting rod C, and dropping the shuttle boxes one or two steps.

The elevation of the pin *h*, previously to its advance, is controlled by a pattern chain J, operating on what I call an "indicator"
105 L, which is suspended by a pin *w'*, from one arm of a lever M, of the first order which works on a fixed fulcrum *n*, on the top framing of the loom. The opposite arm of the lever M, is connected by a rod *m'*, with the
110 longer arm of an elbow lever I which is hung on a fixed fulcrum *m*, whose shorter arm is operated upon in such a manner as

to raise the indicator L from the studs o^1 , o^2 , o^3 , o^4 of the pattern chain, by means of a cam l , on the shaft H, shown in dotted outline in Fig. 1, and in separate view, Fig. 6, the long arm of the lever I, is also connected by a rod m^2 , with a lever V, of the third order, which works on a fixed fulcrum p , secured to the loom framing, and this lever is formed with a straight edge g , near its extremity to support the pin h , when the said pin works out of the interstices between the fingers of the hand—the action of the cam l , on the lever I, at the same time that it raises the indicator L, off the pattern chain, depresses the lever N, to bring the edge g , below the lowest interstice h^4 , the said depression of the lever N, taking place at a time when the said pin is in one of the interstices of the hand, but this depression is only momentary as the long arm of the lever I, is raised again by the action of a spring r , on its short arm, and this raises the lever N, in time to catch the pin h , as it drops, by reason of the weight of the rod F, on leaving the interstice between the fingers of the hand in its retreating movement, at the same time operating on the lever M, to depress the indicator L. The height to which the said lever N, is raised is controlled by the arrangement of the studs o^1 , o^2 , o^3 , o^4 , in the pattern chain a new stud being brought under the indicator L, every time the indicator is lifted off the chain and the said studs stopping the descent of the indicator at a certain point according to its position relatively to the said indicator. The indicator stops, by means of the connections of the levers M, I and N, the ascent of the lever N, the stoppage of the said ascent always taking place with the edge g , upon which the pin h , rests, in a position for the said pin in its next advance to slide along the said edge into one or other of the interstices h^1 , h^2 , h^3 , h^4 , according to the arrangement of the studs in the chain with a view to the required position of the shuttle boxes at the time of the next picking movement.

When the shuttle boxes have been adjusted by the action of the pin h , upon the lever D, the lever D, is immediately and before the retreat of the pin h , locked by means of one of a series of notches s^1 , s^2 , s^3 , s^4 , in one arm of an elbow lever P, which works upon a fixed fulcrum t , catching a pin s , attached to the said lever D, the said lever P, being thrown into operation by a spring P'. The lever D, remains locked as shown in Fig. 1, during the whole time of the retreat of the pin h , and during the picking operation which takes place at the same time, after which it is unlocked by the action of a cam l' , on the shaft H, (shown in dotted outline in Fig. 1, and represented separately in Fig. 7) upon the other arm

of the lever and remains unlocked until the next operation of the pin h , has taken place. A strong spring D' is applied to the lever D in such a manner as to support as nearly as possible, the weight of the shuttle boxes and lifting rod, so that when the lever is unlocked, the front end of the lever may not drop suddenly.

The pattern chain J, and its studs o' , o^2 , o^3 , o^4 , which I employ are of a different construction to those commonly employed in looms. The construction of the chain is such as to bring it into a very compact form and enable it to work over small driving wheels. The links u , u , of the chain consist each of a stout bar of metal having its ends, 8, 8, so formed as to be received in flat bottomed recesses in the peripheries of two wheels v , v , which are both arranged upon the same shaft v' . Each has on one side, two lugs 9, 9, which fit snugly between the two wheels v , v , and prevent lateral movement of the chain, and on the other side it has two lugs 10, 10, which enter between the lugs 9, 9, of its next neighbor. Long pins 11, 11, passed through the lugs 9, 9, and 10, 10, attach the several links together. The outer faces of the links are made flat, either all across or at one end, in order that each link as it arrives in its uppermost position, which is the operative position may be held firmly and rigidly in the flat bottomed recesses of the wheels v , v , by the edge of a straight lever w , which is fitted to a stationary fulcrum pin w' , on the framing and held down tightly upon the flat part of the outer face of the link, by a spring w^2 . The wheels v , v , are moved to move the chain a distance equal to the width of one link every time the lever I, is operated upon and the indicator L, raised by means of a spring dog x , which is suspended from the lever M, and operates upon a ratchet wheel x^2 , on the shaft v' , and the chain is stopped exactly in the right place by means of a roller pawl y , hung on the pin w' , so as to engage with a toothed wheel x on the shaft u' as shown in Fig. 3.

The studs o^1 , o^2 , o^3 , o^4 , of the pattern chain are so constructed as, with a proper construction of the indicator L, to be severally capable of adjustment in four different operative positions. Their construction is best shown in Figs. 4 and 5, the former of which is a side view and the latter is a top view showing the four positions in outlines of a different character. It is visible in those figures as it is also in Figs. 1 and 2, that the head of each stud leans all to one side of the pivot o^* , by which it is attached to its respective link of the chain. The pivot o^* is fitted tightly enough into the hole made in the link to receive it, to prevent it dropping out, or it may, if necessary, be furnished with a screw to receive a nut

at the back of the link. Of the four operative positions take the first o' , is shown in Fig. 4, and in black outlines in Fig. 5, the head being turned toward the front side of the link; the second o^2 , is shown in dotted outline in Fig. 5, being exactly opposite to the first; the third o^3 , is shown in full red outline in Fig. 5, being turned toward the outer end of the link, *i. e.*, the end farthest from the side of the loom, and the fourth o^4 , is shown in red dotted outline in Fig. 5, being exactly opposite to the third. The studs are also shown in these several positions in Figs. 1 and 2. The lower part of the indicator L, is made in the form of a fork as shown in Fig. 2, of which the inner prong z^4 which hangs lower than the outer prong z^3 , and of which the space within the prongs is formed with two steps z^2 and z^1 , the faces of the said steps z^1 , and z^2 , and the extremity of the prongs z^3 and z^4 , forming four steps one above another at equal distances apart. A stud in the position o^1 , catches the step z^1 , of the indicator and brings the pin h , opposite the interstice h^1 , of the hand—one in the position o^2 , catches the step z^1 , and brings the pin h , opposite the interstice h^2 , and so on according to the respective numbers of the positions of the studs, of the steps of the indicator and of the interstices of the hand, hence it is evident that by varying the positions of the studs, o^1 , o^2 , o^3 , o^4 , without removing them from the chain, the pattern as produced by changing the shuttles may be varied at pleasure. This method of constructing and applying the pattern studs, employed in combination with the step formed indicator L, enables the pattern to be changed with greater facility and rapidity than any construction of a pattern

chain heretofore employed. To insure the movement of the indicator in a proper line and keep it in a rigid condition, it is provided with a curved slot 15, to work on a fixed stud 16, on the framing.

To afford the necessary facility for placing a new shuttle in the loom, when the thread of any one gives out, or for mending a thread in case one breaks, the lever P, is furnished with a foot piece P^2 , which projects to the front of the loom for the weaver or attendant, to place his foot or her foot upon it to press back the said lever to unlock the lever D, to enable either shutter box to be raised by hand to a convenient position for the removal of the empty shuttle and introduction of the full one or for the joining of the broken thread, and by removing the foot, the lever P, is again brought forward, and locks the lever and shuttle boxes in the said position. After this operation, even though the attendant may neglect to replace the shuttle boxes in their proper position, as soon as the loom is started they will resume their proper positions in accordance with the pattern and this they cannot fail to do, and hence the liability of making a wrong pattern which is so frequent in other drop box looms, is rendered impossible.

What I claim as my invention and desire to secure by Letters Patent, is,

The combination of the fork c , c' , on the lifting lever D, the stationary hand E, and the sliding pin h , or its equivalent, the whole operating substantially as herein described.

ANDREW ALLEN.

Witnesses:

D. C. WILSON,
JACOB B. VANDEVER.