

# S. C. Mendenhall. Hand Loom.

N<sup>o</sup> 16,392.

Patented Jan. 13, 1857.

Fig. 2.

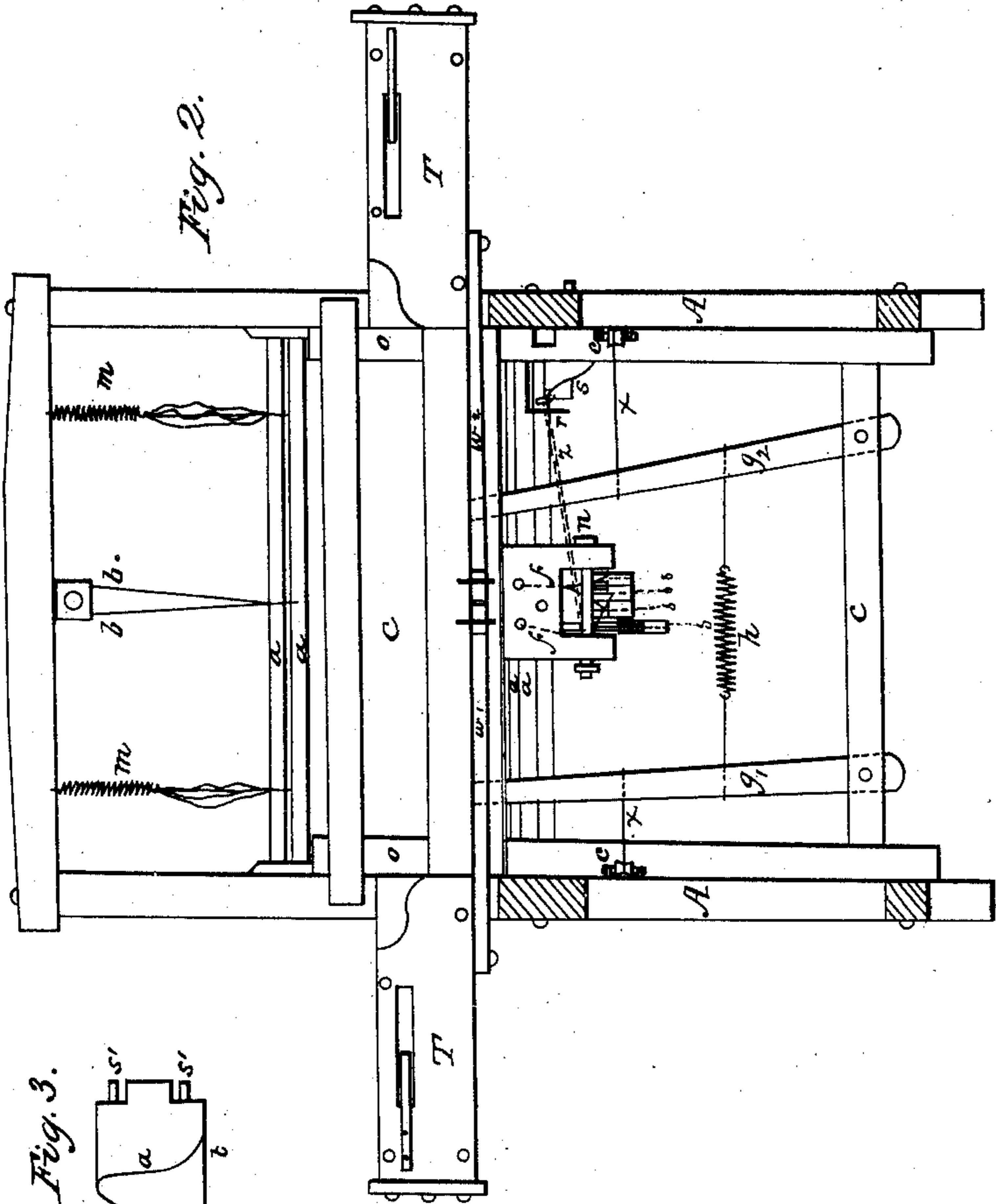


Fig. 3.

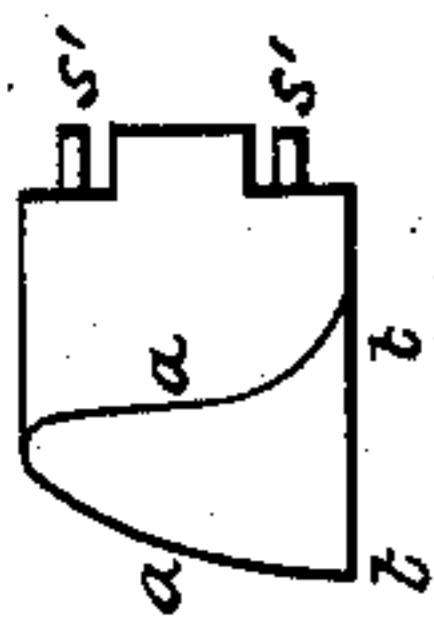


Fig. 4.

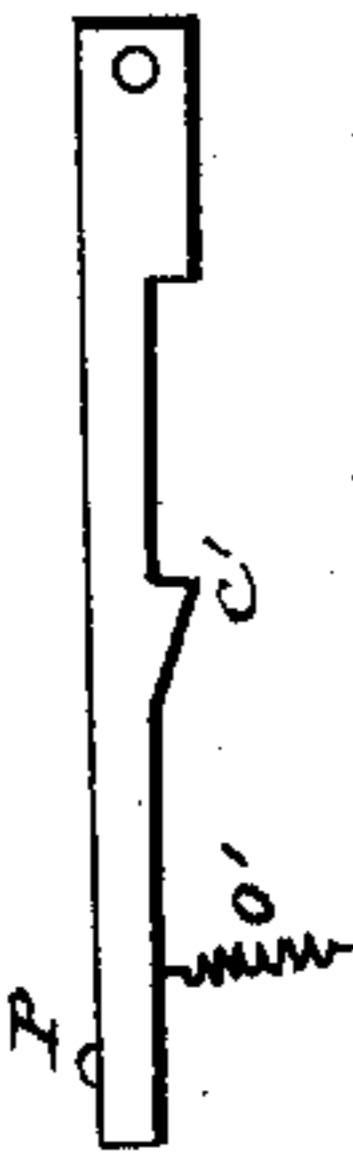
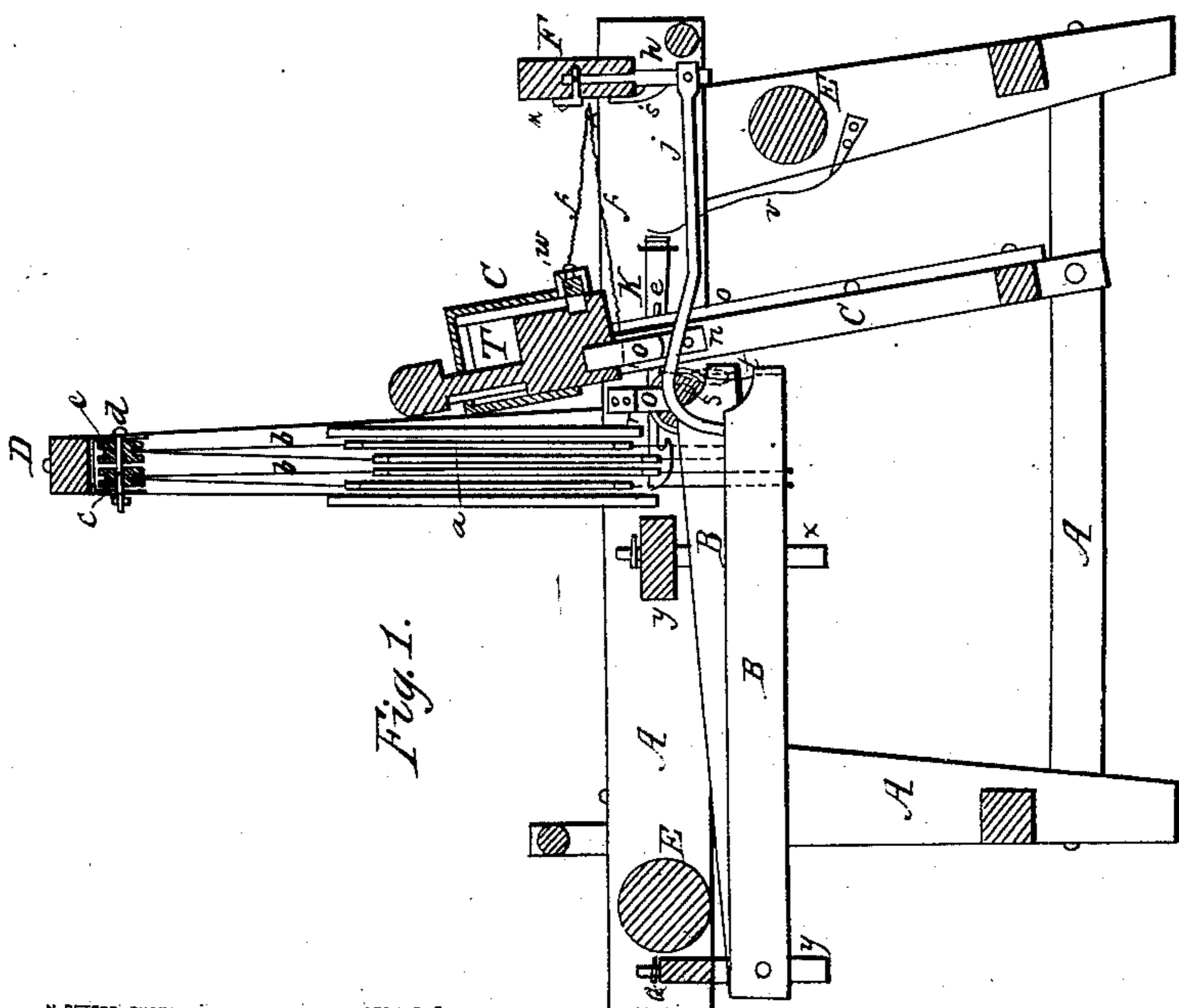


Fig. 1.



*Sheet 2 - 2 Sheets.*

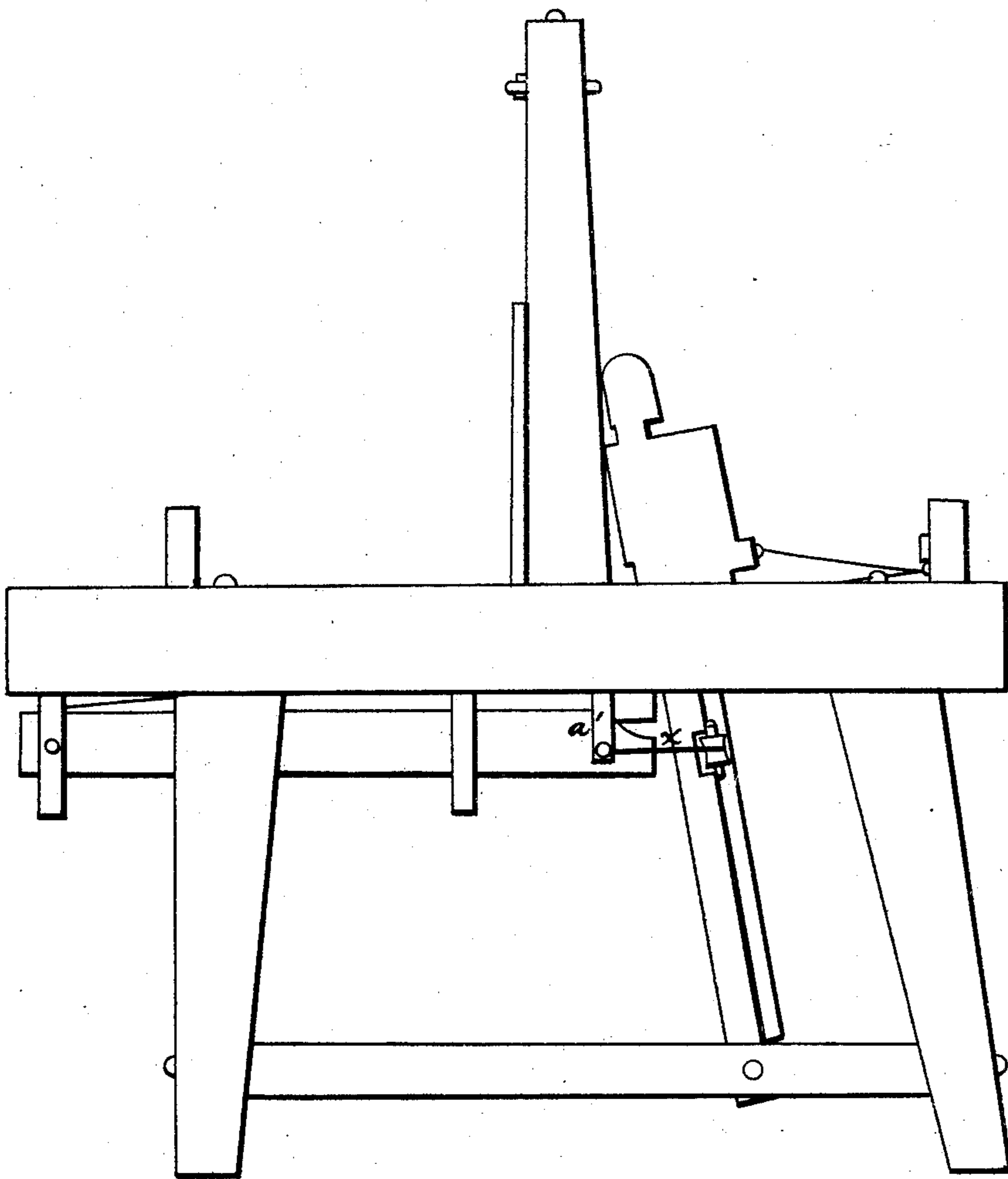
*S. C. Mendenhall.*

*Hand Loom.*

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*Fig. 5.*



# UNITED STATES PATENT OFFICE.

STEPHEN C. MENDENHALL, OF RICHMOND, INDIANA.

## HAND-LOOM.

Specification of Letters Patent No. 16,392, dated January 13, 1857.

*To all whom it may concern:*

Be it known that I, STEPHEN C. MENDENHALL, of Richmond, in the county of Wayne and State of Indiana, have invented a new and useful Mode of Operating the Harness and Throwing the Shuttle in Hand-Looms; and I do hereby declare that the following is a full and exact description thereof, reference being made to the accompanying drawings and letters of reference marked thereon.

The nature of my improvement consists first, in a universal crane-necked treadle cam, operated in its vertical action by the lay or batten, and in its lateral motion in one direction by the action of a rotary cam wheel, which is moved by a hook by the action of the lay, and in the opposite direction by a spring. By this combination of mechanism any number of treadles may be operated, and various kinds of goods woven on the same warp, and the change from one to the other is easy and simple. Second. The manner of operating a spring for the purpose of throwing the shuttle back and forth through the loom.

Of these drawings Figure 1 is a transverse vertical section in the length of the machine, showing the treadle cam, depressing one of the treadles to its full extent. Fig. 2 is a transverse vertical section, through the width of the loom, showing the action of the spring (*h*) which operates the shuttle. Fig. 3, is a side view of the rotary cam wheel, and Fig. 4, is a plain view of the trigger, which holds, and releases the spring (*h*). Fig. 5 is a side view of the frame, showing the action of the cord (*x*), which expands the spring (*h*) by the forward action of the lay.

A, A, A, in Fig. 1, is a side frame, connected together by the breast beam F, and other cross-ties, which are constructed of such form, and size as are suitable to support and sustain the moving portions of the machinery. (*c c*) is the lay, and T the shuttle box in the same. B B, are the treadles. J, the crane-necked treadle cam; O, the stationary cam in the lay, which gives downward action to the treadle cam and N, a pin which supports it; S S, the rotary cam wheel which gives lateral motion to the treadle cam. K, is a hook for moving the cam wheel; (*a*) a pin in the lay frame which strikes against the hook on the forward motion of the lay.

In Fig. 2, the action of the cam wheel is more fully shown. S is the cam wheel, and *z*, is a rod which connects the action of the cam wheel to the treadle cam. One end of the rod is hinged to the treadle cam, while the other end is allowed to move freely on the periphery of the cam wheel, and is supported by a plate *r*, through which it passes. The treadle cam is so hinged to the breast-beam F, as to allow it to move freely in a vertical or lateral direction. (*h*) is a shaft to which the treadle cam is secured, and which passes up into the breast-beam, and is fastened to its place in such a manner by a piece marked (*w*) as to allow it to turn freely, and be secure in its position; and a spring (*i*) connected with the breast-beam, and a shaft *h'*, gives a reversed action to the treadle cam, after it has been thrown out to its full extent by the cam wheel. (*a a a a*) are the frames in which the harness is hung. They are supported by springs (*m m*), and cords (*b b*).

In the backward motion of the lay, the cam O acts on the treadle cam J which depresses one of the treadles to its full extent, and by a combination of cords and pulleys connected with the treadle, the shed in the warp is produced. The pin (*e*) on the forward motion of the lay impinges a projection on the hook K, and moves it forward, and its action on the cam wheel (S) causes it to revolve a sufficient distance to extend the rod *z*, which is hinged to the treadle cam *j*, far enough to carry it to the next treadle, then the lay on its backward motion again will force down the second treadle, and so on in this manner until the fourth or last treadle has been acted upon; then the next movement of the cam wheel S, allows the rod (*z*) to pass the corner (*t*) and fall back to the starting point. This arrangement has a great advantage over all other hand-loom in three points; 1st, the machinery is more simple; 2nd, it is more durable in its construction; 3rd, it operates to a better mechanical advantage, and the treadle cam is so gradual in its action, that it gives great power in operating the harness.

My simple device for throwing the shuttle back and forth, through the loom, when the web is shed by mechanism connected with the shedding of the web, operates by the action of a spring which is expanded at each forward motion of the lay,

and released by means of cords connected with the treadles at each backward motion of the same. ( $h'$ ) is a spiral spring connecting the arms ( $g' g^2$ ) which are hinged at their lower ends to the lay piece ( $c$ ), their upper ends playing freely in slots on the under side of the lay-beam, and these give motion to the shuttle. ( $x x$ ) are cords attached to the arms ( $g' g^2$ ), and pass over pulleys ( $c c$ ) and are fastened to the side frame A, A, as more fully shown in Fig. 5, where the cord ( $x$ ) is shown secured to the pin ( $a'$ ).

( $w w$ ) in Fig. 2, are triggers which hold the arms ( $g' g^2$ ), and Fig. 4, is a detached view of the same in which ( $c'$ ) is the corner against which the arm impinges, and O' a spring which secures the trigger to its place, and P, a fastening for the cord ( $f$ ). The arm  $g^2$  is shown in the position it occupies after having thrown the shuttle, through the loom, and on the forward motion of the lay, the cord ( $x$ ) will pull the arm  $g^2$  back until it will impinge against the corner  $c'$  of the trigger  $w^2$ , and on the backward motion of the lay, the cord ( $f$ ) will act on the trigger ( $w'$ ) and cause it to release the arm ( $g'$ ), and throw the shuttle back to the other end of the lay. By this alternate motion of the arms ( $g' g^2$ ) the shuttle is thrown with great ease and certainty back and forth through the loom.

I am aware that in this loom some of the parts which operate the shuttle are the same as those contained in a patent granted me on the 9th day of November 1852; but the present combination is a great improvement on that, being more simple, cheaper,

less liable to get out of order, and will operate with one third the power—a very important consideration, in a machine which is operated wholly by hand. In the present loom it will be seen that the spring which throws the shuttle is expended without any loss of power in its application, and with but little friction, but in the loom referred to, there is a mechanical loss of power of about 40 per cent., owing to the manner in which it is applied, the cams having to slide up inclined planes at an angle of 35 degrees from the line of motion of the lay and in addition to this a great deal of friction has to be overcome.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. The universal treadle cam  $j$ , cam  $o$ , shaft ( $h$ ) spring  $s$ , and hinge  $u$ , in combination with the revolving cam wheel S, connecting rod  $z$ , brace  $r$ , hook  $k$ , pin  $u$ , and spring  $v$ , or their mechanical equivalents, substantially for the purpose set forth.

2. I do not claim the arms ( $g g$ ) or the triggers ( $w w$ ) but what I do claim is:—the cords ( $x x$ ) and pulleys ( $c c$ ) in combination with the spring ( $h$ ) arms ( $g' g^2$ ) triggers ( $w' w^2$ ) and cords ( $f f$ ) for the purpose of throwing the shuttle back and forth through the loom as described and set forth.

In testimony whereof I have hereunto subscribed my name in the presence of two witnesses.

S. C. MENDENHALL.

Witnesses:

JOHN FINLEY,  
W. C. SCOTT.