

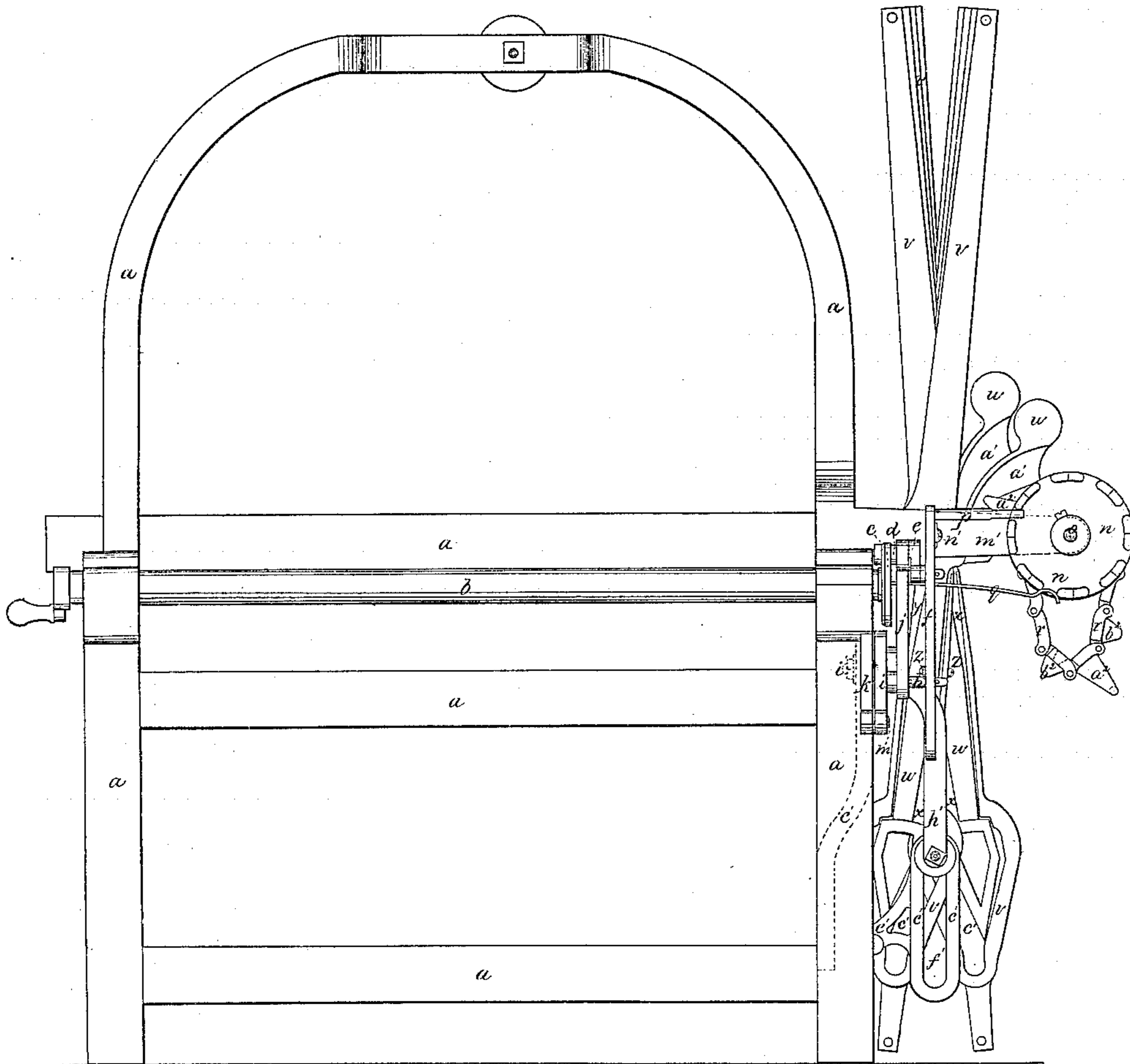
*B. F. Rice.*  
*Loom.*

*Sheet 1-2 Sheets.*

*N<sup>o</sup> 10,138.*

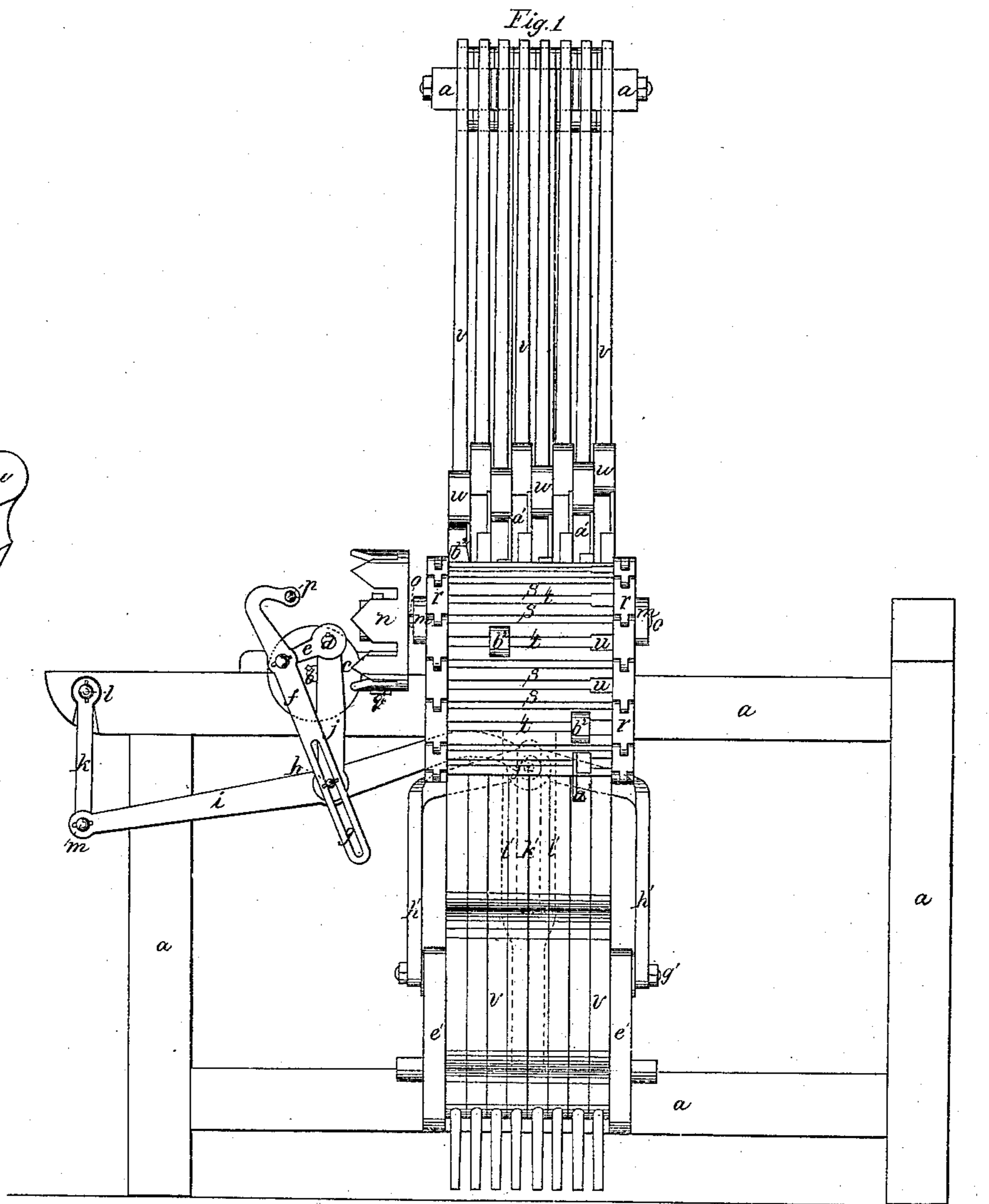
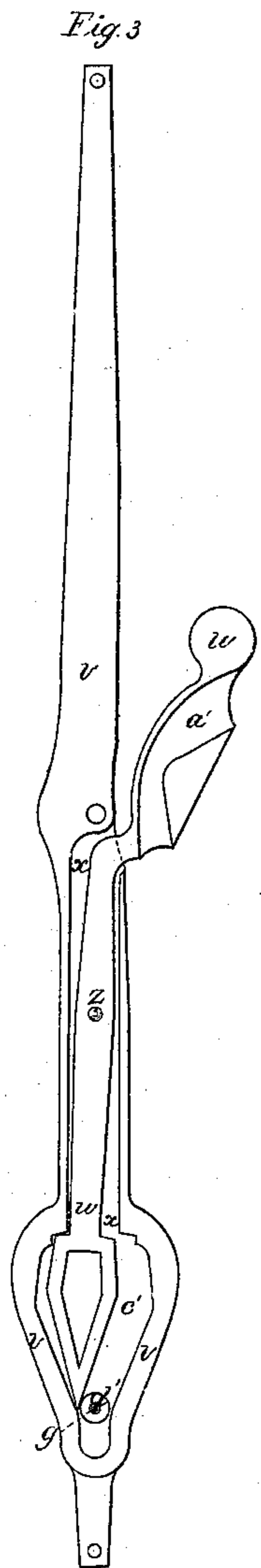
*Patented Oct. 18, 1853.*

*Fig. 2*



B. F. Rice.  
Loom.

*Patented Oct. 18, 1853.*



# UNITED STATES PATENT OFFICE.

BENJ. F. RICE, OF CLINTON, MASSACHUSETTS.

## LOOM FOR WEAVING FANCY GOODS.

Specification of Letters Patent No. 10,138, dated October 18, 1853.

*To all whom it may concern:*

Be it known that I, BENJAMIN F. RICE, of Clinton, in the county of Worcester and Commonwealth of Massachusetts, have invented a new and Improved Mode of Working Harnesses in Power-Looms for Weaving Fancy Goods; 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 accompanying drawings, making a part of this specification, in which—

Figure 1 is a left hand end elevation of so much of the loom as is necessary to exemplify my improvements. Fig. 2 is a back view taken looking to the front of the loom. Fig. 3 is a detached view of a compound lever. The same letters indicate like parts in all the figures.

The nature of my invention consists, first, in employing levers formed of two or more parts, one part of said levers being so constructed as to oscillate within the other part by the action of hooks and pins set in the grooves of a figuring chain, said hooks and pins acting upon the upper portion of the oscillating part of said levers, thereby causing the lower portion of the aforesaid oscillating part to move to and fro within the outer and larger part of said levers, thus forming a groove in which a vibrating roller is made to act upon the outer and larger part of said levers, which operation raises and depresses the harnesses in the manner hereafter to be described, whereby I am enabled to give a more positive action to the levers which act upon the harnesses when run at an unusual speed, and also to produce a uniform shed.

The second part of my invention consists in giving motion to the figuring chain by the use of a crown wheel turned by the action of a finger projecting from a vibrating lever and working in the openings of the crown wheel, said vibrating lever receiving its motion from a crank connected to a disk wheel on the outer end of the main or crank shaft, thereby giving a positive motion to the figuring chain which carries the hooks and pins, and also to reverse the motion of the chain without the loss of the figure when the main or crank shaft is reversed.

The third part of my invention consists in constructing the bars which connect the

links of the figuring chain in such a manner as to admit of the insertion of hooks or pins, the lower part of which are made in the form of an inverted wedge, said bars are also provided with a slot or opening at one end, large enough to admit easily the insertion of the hooks or pins. The advantage thereby obtained is that the hooks or pins are more easily adjusted and also held more firmly in their position when placed.

Having partially explained the construction and operation and pointed out some of the advantages to be obtained by my invention, I will now proceed to describe more fully its several parts.

(*a a a*) represents the frame of the loom, (*b*) the main or crank shaft and (*c*) the disk wheel on the outer end of the main or crank shaft (*b*).

(*d*) represents a stud which connects the crank (*e*) with the vibrating lever (*f*). The vibrating lever (*f*) is provided with a slot or opening (*g*) at its lower extremity in which works the stud (*h*), which is attached to the vibrating lever (*i*). The vibrating lever (*i*) is also connected with the stud (*d*) by the connecting rod (*j*).

(*k*) represents a vibrating bar the upper end of which is connected to the frame of the loom by the stud (*l*) while the lower end is connected to the end of the vibrating lever (*i*) by the stud (*m*).

(*n*) represents a crown wheel on the end of the shaft (*o*) (which carries the figuring chain) and is formed with pointed segments which project horizontally from its outer edge, forming slots or openings in which works the rod or finger (*p*) which is attached to the upper end of the vibrating lever (*f*). It will be obvious that at each revolution of the main or crank shaft (*b*) the crank (*e*) is made to act upon the vibrating lever (*f*) in such a manner as to cause the rod or finger (*p*) to enter the slots or openings in the crown wheel (*n*) and turn the same.

(*q*) represents a spring one end of which is fastened to the top of the frame (*a, a, a*) while the other end presses against the bottom of the crown wheel (*n*), to prevent its turning unless acted upon by the rod or finger (*p*).

(*r, r*) represents the links of the figuring chain and (*s, s*) the rods or bars which connect the links (*r, r*).

(*t*, *t*) represent the grooves or slots through the rods or bars (*s*, *s*) which are made beveling so as to admit the end of the hooks or pins (*a*<sup>2</sup>, *a*<sup>2</sup> and *b*<sup>2</sup>, *b*<sup>2</sup>) which are made in the form of an inverted wedge, thereby dovetailing as it were the hooks or pins (*a*<sup>2</sup>, *a*<sup>2</sup>, and *b*<sup>2</sup>, *b*<sup>2</sup>) with the bars (*s*, *s*) and holding them securely in their position when placed.

(*u*, *u*) represent slots or openings through the bars (*s*, *s*) which are made large enough to admit readily the insertion of the hooks or pins (*a*<sup>2</sup>, *a*<sup>2</sup> and *b*<sup>2</sup>, *b*<sup>2</sup>). The hooks and pins (*a*<sup>2</sup>, *a*<sup>2</sup> and *b*<sup>2</sup>, *b*<sup>2</sup>) are kept from moving laterally by screws passing through the links (*r*, *r*) and pressing against the last hook or pin inserted. The figuring chain is carried around by spur wheels attached to the shaft (*o*), the teeth of which engage with the bars (*s*, *s*) in the usual way. The upright levers which raise and depress the harnesses (by means of cords passing over pulleys) are composed of two parts, one of said parts being made to oscillate within the other.

(*v*, *v*) represents the outer and larger portion of the aforesaid upright levers and (*w*, *w*) the smaller portion which oscillates within the outer and larger portion (*v*, *v*). The outer and larger portion (*v*, *v*) of the upright levers is formed of a flat bar of metal, having its lower part shaped somewhat in the form of an inverted section of a cone with its inner portion cut out as shown by Fig. 3.

(*x*) represents a groove in the outer and larger portion (*v*, *v*) so formed as to allow the smaller portion (*w*, *w*) to vibrate within it.

(*z*) represents a stud which connects the smaller portion (*w*, *w*) of the upright levers with the outer and larger portion (*v*, *v*).

(*a*') represents a groove in the upper part of the smaller portion (*w*, *w*) so formed as to admit of the action of the hooks (*a*<sup>2</sup>, *a*<sup>2</sup>) set in the figuring chain. The lower extremity of the smaller portion (*w*, *w*) of the upright levers is shaped somewhat in the form of a dart and vibrates within the conic shaped part of the outer and larger portion (*v*, *v*) of the upright levers, and when thrown to either side forms a groove (*c*') of uniform width in which the vibrating roller (*d*', *d*') move and act upon the outer and larger portion (*v*, *v*) of the upright levers to raise and depress the harnesses, (*e*', *e*') represent stands fastened to the frame (*a*, *a*, *a*) and are provided with slots (*f*', *f*') in which vibrate roller on the vibrating shaft (*g*').

(*h*') represents a bar bent so as to connect the vibrating lever (*i*) with the ends of the vibrating shaft (*g*') by the stud (*r*') The stud (*r*') carries a roller (*j*') which moves in the slot (*h*') in the stand (*l*') by which

means the bent connecting bar (*h*') is made to move vertically.

(*m*') represents a stand fastened to the frame (*a*, *a*, *a*) which supports the shaft (*o*), and also supports a shaft (*n*') on which the upright levers vibrate.

It will be seen by inspection of the drawings that when the main or crank shaft (*b*) is made to rotate, the disk wheel (*c*) which carries the stud (*d*) will act upon the vibrating lever (*i*) through the connecting rod (*j*) in such a manner as to cause the bent connecting bar (*h*') which carries roller (*d*', *d*') on the vibrating shaft (*g*') to descend, which brings the roller (*d*', *d*') to the bottom of the inverted conic shaped cam. Then when the figuring chain is turned in the manner before described, the hooks (*a*<sup>2</sup>, *a*<sup>2</sup>) are carried into the grooves (*a*', *a*') bringing forward the upper part of the oscillating portion (*w*, *w*) and throwing back the lower part forming a groove (*c*') in which the roller on the vibrating shaft (*g*') enter when the vibrating shaft (*g*') ascends, by which means the top of the outer and larger portion (*v*, *v*) of the upright levers is thrown from the loom and the harness raised which is attached to the same; when the pins (*b*<sup>2</sup>, *b*<sup>2</sup>) are brought into action with the top of the oscillating part (*w*, *w*) of the upright levers, the dart like shaped portion at the lower extremity of the oscillating part (*w*, *w*) is brought forward just far enough to make the groove (*c*') on the side toward the loom, opposite to that formed by the hooks (*a*<sup>2</sup>, *a*<sup>2</sup>), when the vibrating rollers (*d*', *d*') on the shaft (*g*') are carried upward to the top of the groove (*c*') as shown in Fig. 3 the outer and larger portion (*v*, *v*) of the upright levers is thrown back toward the loom, causing the harness attached to the same to descend. The reverse motion is given to the lower portion of the outer and larger part (*v*, *v*) of the upright levers by the action of the hooks or pins (*a*<sup>2</sup>, *a*<sup>2</sup> and *b*<sup>2</sup>, *b*<sup>2</sup>). It will be obvious that by increasing the width of the outer and larger portion (*v*, *v*) and keeping the oscillating portion (*w*, *w*) in a proportionate increase the angle formed by the same is rendered more obtuse and the action produced upon the outer and larger part (*v*, *v*) by the vibrating rollers (*d*', *d*') is such as to increase the space traveled through by the upright levers, thereby raising and depressing in the same proportion the harness attached to the same. It will be seen that by arranging the upright levers (formed as above described) so that they will increase in width from the front, an increased uniform shed will be produced. I would here remark, that I do not intend to confine myself to the precise form and application of the upright levers before described, as I intend to apply the same prin-

ciple to levers working in a horizontal position by making the inverted conic shaped cam to act on vertical rods provided with slots at each end in which work roller attached to stands fastened to the frame of the loom, said vertical rods working horizontal levers to which the harnesses are attached.

Having described the construction and operation of my invention and pointed out its modification, what I claim as new and desire to secure by Letters Patent is—

1. The application of compound levers constructed substantially as herein described to the raising and depressing of harnesses

or heddles, in the manner substantially as set forth.

2. I also claim employing a finger attached to the vibrating lever (f) operating substantially as described in combination with the crown wheel to move the figuring chain, substantially as specified.

3. I also claim forming a groove in the bars of the figuring chain for the insertion of hooks or pins, or their equivalents in the manner substantially as specified.

BENJAMIN F. RICE.

Witnesses:

E. K. GIBBS,

CHAS G. STEVENS.