

J. H. Clifton. Loom.

N^o 28,453.

Patented May 29, 1860.

Fig. 6.

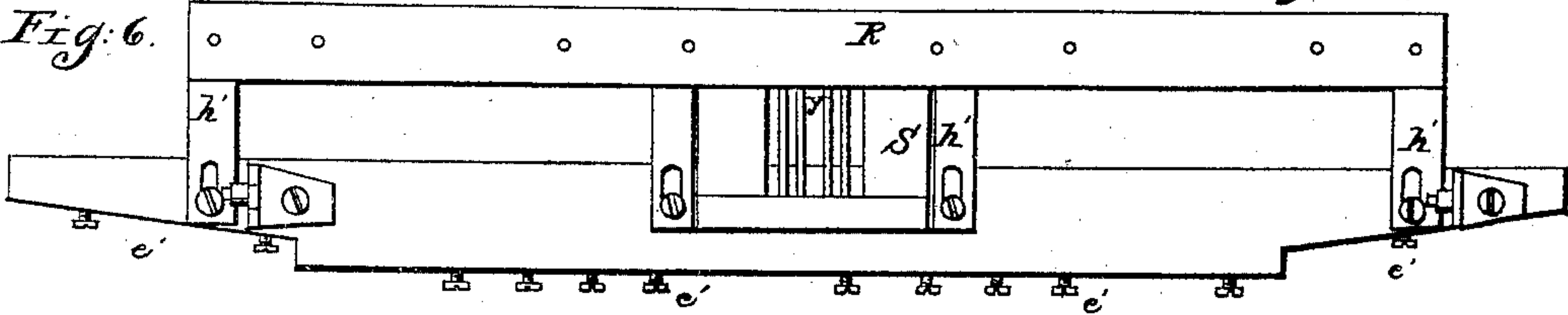
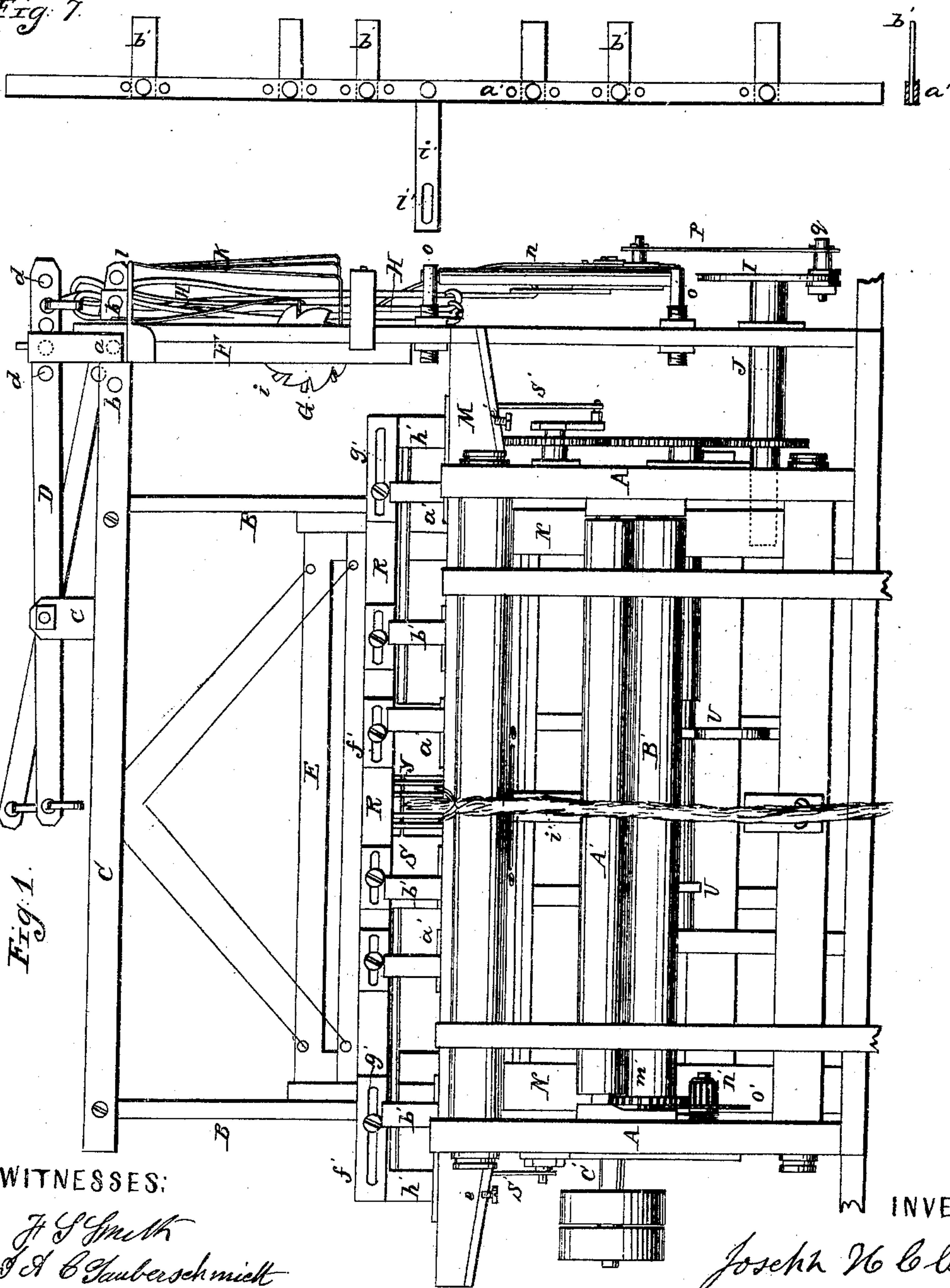


Fig. 7.



WITNESSES:

J. S. Smith
J. A. Claiborne

INVENTOR:

Joseph H. Clifton

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Fig. 2.

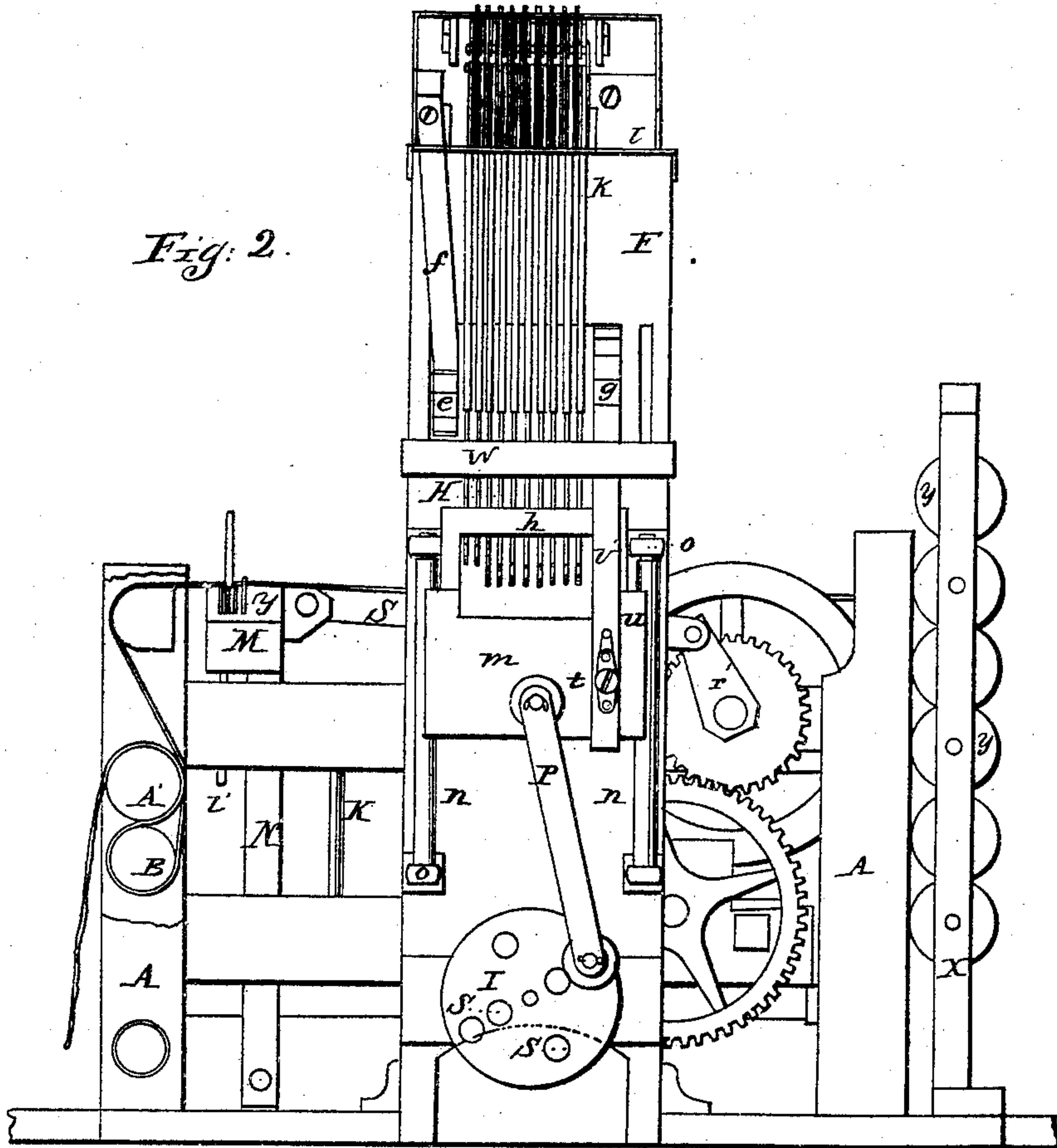
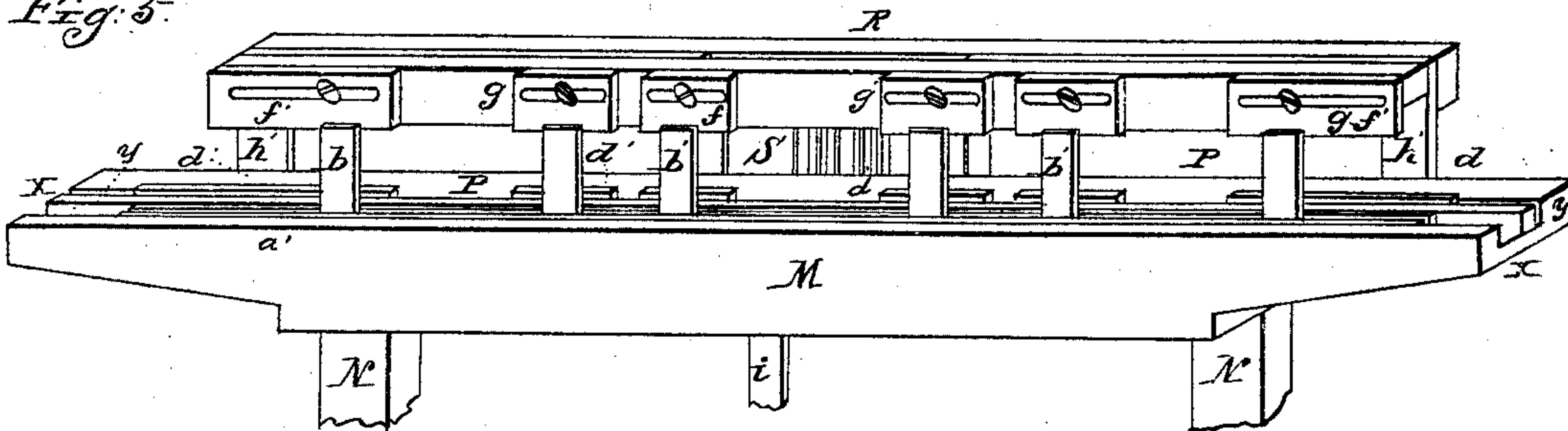


Fig. 5.



WITNESSES:

H. S. Gault
J. A. C. Tanberschmidt

INVENTOR:

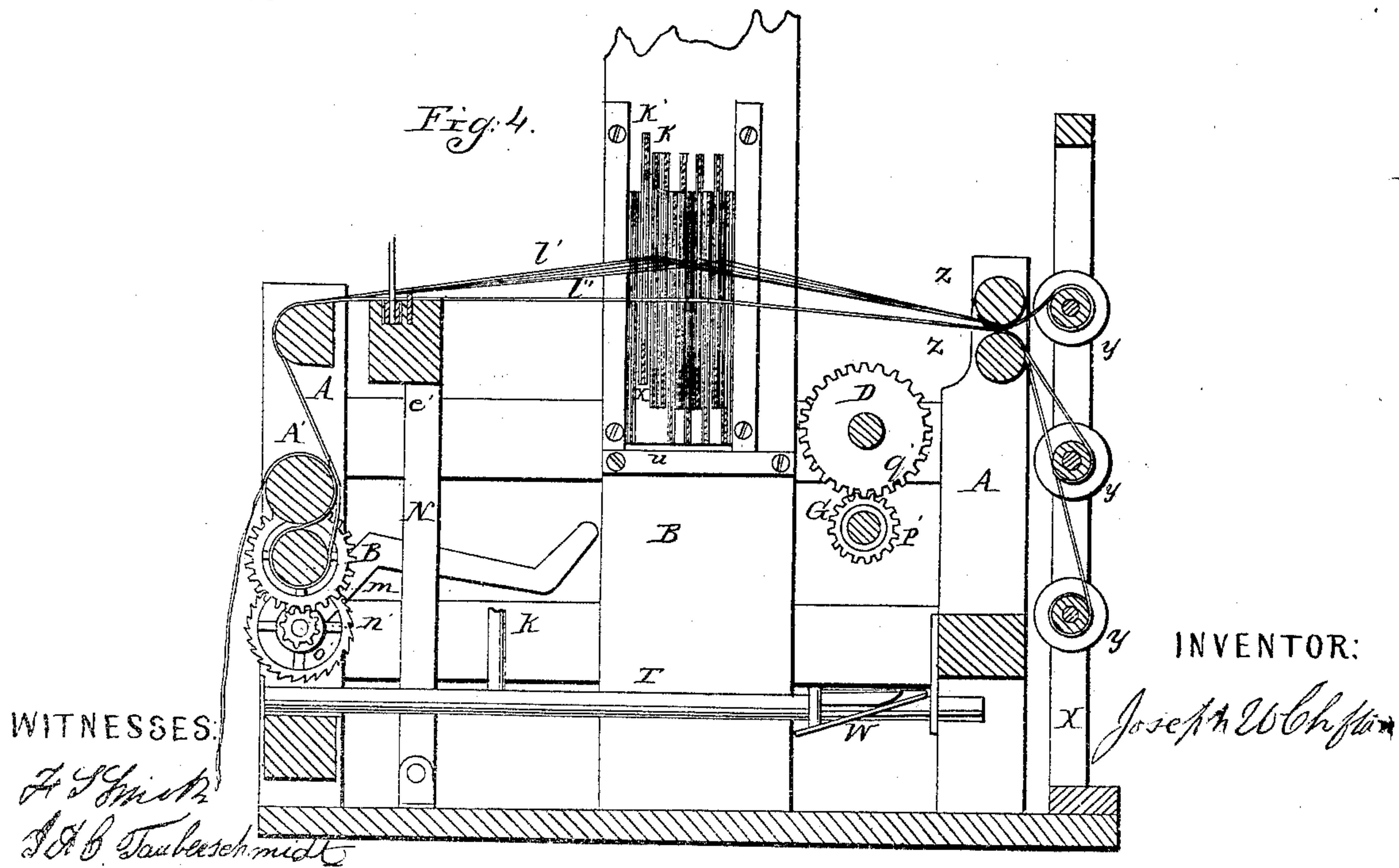
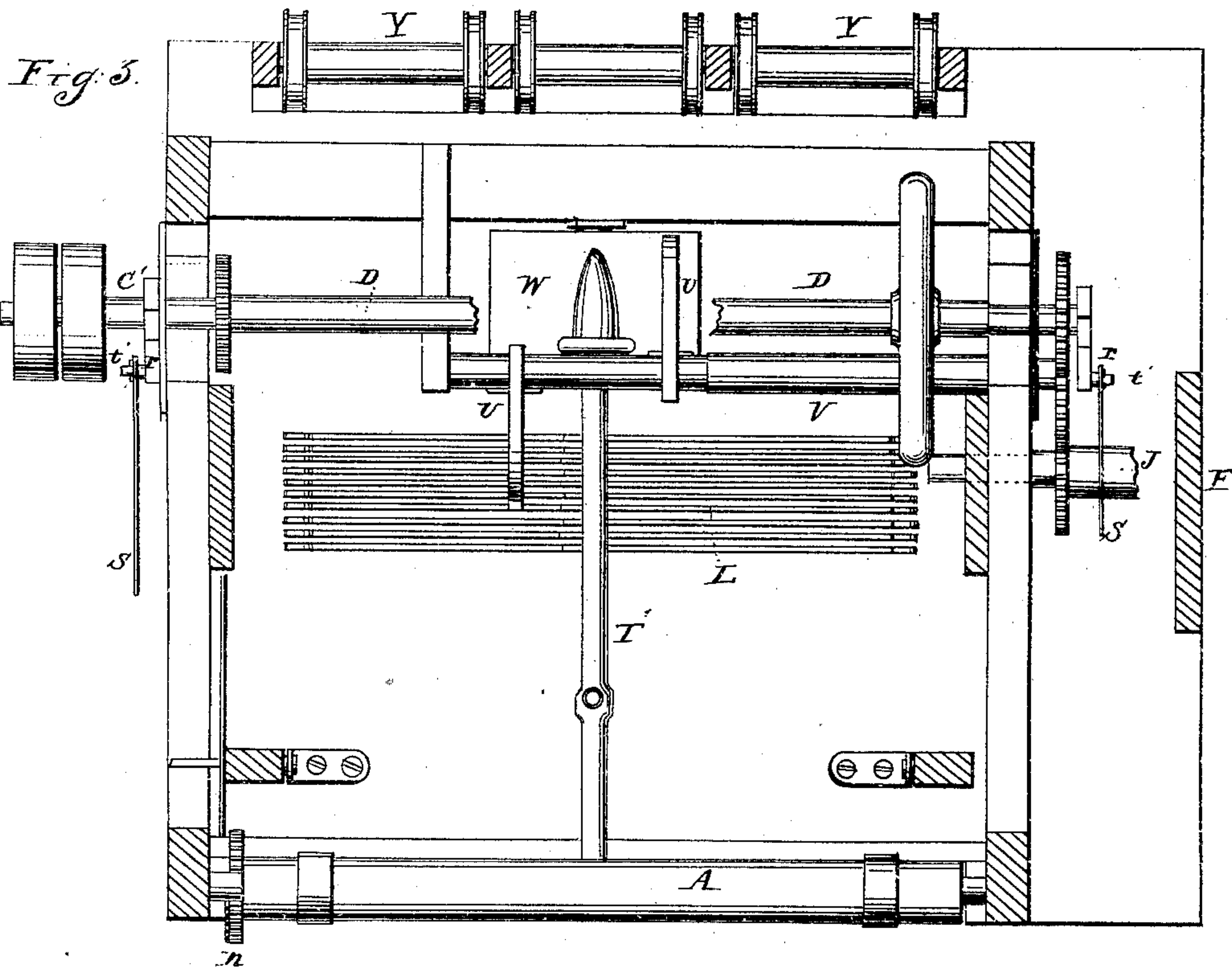
Joseph H. Clifton

J. H. Clifton. Loom.

Sheet 3-3 Sheets.

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Patented May 29, 1860.



UNITED STATES PATENT OFFICE.

JOSEPH H. CLIFTON, OF NEW CASTLE, PENNSYLVANIA.

LOOM.

Specification of Letters Patent No. 28,453, dated May 29, 1860.

To all whom it may concern:

Be it known that I, JOSEPH H. CLIFTON, of New Castle, county of Lawrence, State of Pennsylvania, have invented certain new and useful Improvements in Looms, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents a front elevation of a loom embracing my improvements; Fig. 2 represents a side elevation of the same showing the arrangement of a lock hook, and mechanism for raising and turning the pattern cylinder. Fig. 3 represents a horizontal section of the loom below the lay. Fig. 4 represents a longitudinal sectional elevation. Fig. 5 represents a perspective view of the lay removed from the loom. Fig. 6 represents a back elevation of the lay. Fig. 7 represents the shuttle carrier removed from the lay.

My invention consists first, in arranging the mechanism for drawing down the hooks, so that their range of motion may be varied when required to open the shed a greater or less distance for work varying in thickness; second, in arranging the mechanism for giving motion to the shuttle carrier, so as to throw the shuttle a greater or less distance, as required in weaving cloth of various width, in the same loom; third, in communicating motion to two or more shuttles at the same time by means of a vibrating shuttle carrier, arranged with independent adjustable arms, whose distance apart, may be varied as required in order to carry the shuttle through webs of different widths; fourth, in arranging the race-rods forming the guides for the shuttle on either side of the webs so that their distance apart may be varied for different widths of webs; and also so that their height above the race-board may be varied in order to receive the lower webs when the shed is open, and allow the shuttle to pass over without interfering with them; fifth, in arranging the material covered by the warp and woof threads, and connecting it with the heddles so that it is raised with the upper leaf of the shed, when the shot of woof passes through the shed of warps covering the under side of the material, and is depressed by the heddles so as to form the under leaf of the shed, when the woof passes between the warps, covering the upper surface of the material.

In the accompanying drawings is represented a loom embracing my improvements; which consist of a frame (A) of wood or metal, of the proper form to support the moving and stationary parts. Posts (B) extend upward from the sides of the frame and are connected at the top by a double longitudinal cap (C) which gives support to a series of jack levers (D) to which a series of harnesses (E) are attached in the usual manner. The posts are made of sufficient width to accommodate fifteen or twenty sets of harnesses; and the caps are so arranged that they may be brought nearer to, or carried farther from, each other, to receive between them a greater or less number of jacks.

At one end of the loom and outside of its frame, is a secondary frame (F) carrying a pattern cylinder (G) and the mechanism for drawing down the jacks, and turning the pattern cylinder. This frame is connected with the loom frame, through the cap (C) which extends beyond the side of the loom for this purpose; and is fastened by a bolt (a) to the top of the secondary frame.

The position of the pattern frame, in relation to the side of the loom, may be varied and brought nearer to, or carried farther from it by releasing the frame from the bed plate at the foot, and from the cap at the top and then sliding it out or in, and again fastening it to the bed plate and cap.

The jacks (D) are pivoted to brackets (c) attached to the cap (C) and extend to the center of the loom on one side and beyond the pattern frame, on the other. To the outer end of the jacks are attached jack hooks (H) and several holes (d) are made in the outer end of the jacks, to which the hooks may be attached, in order to change their position, as the position of the frame (F) is changed, and thus vary the length of leverage of the jacks as required in weaving heavy or light fabrics, and in using a greater or less number of harnesses.

A pattern wheel (G) is supported in bearings in the sides of the pattern frame, and at each end is a ratchet wheel, the one (e) for a catch pawl (f) to hold the wheel from turning backward, and the other (g) for a turning pawl or bar (i') which gives motion to the wheel.

On the surface of the pattern wheel are projecting movable plugs (i) arranged in the usual manner for operating the jack

hooks and throwing them out, so as to be caught by the jack hook lifter. A light spring (*h*) attached at one end to a project-plate (*l*) presses on the jack hook, below the pattern wheel and throws it back when released from the lifter. The jack hook lifter consists of a straight bar (*h*) of metal attached to a slide (*m*) which traverses in adjustable ways (*n*) confined to the frame by set screws (*o*) and receives its motion through a link (*r*) attached at one end, to the jack lifter, and at the other end to a crank pin (*q*) in a face plate (*I*) on the end of a shaft (*J*) extending from the frame of the loom and passing through the pattern frame. In this face plate are a series of holes (*s*) for the crank pin, at different distances from its center, so that by varying the position of the crank pin on the face plate, the range of motion of the jack lifters may be varied, and consequently the range of motion of the jack hooks and jacks, and the shed opened a greater or less distance.

The pawl (*i'*) operating the pattern wheel, is attached to the jack lifter by a bolt (*t*) passing through a slot (*u*) in its lower end, which admits of the pawl being adjusted, as the range of motion of the jack lifter is changed. As the jack hooks (*H*) are thrown out by the points on the pattern wheel, striking the jacks opposite to them they are caught and drawn down by the jack hook lifter, on its downward motion which raises the harness and opens the shed. When the jack hooks are released from the lifter, by the turning of the pattern wheel, those harnesses previously raised are drawn back by means of springs (*L*) attached to the floor and connected at each end by means of cords (—) to the bottom of the harnesses. When the harnesses are at rest they are supported by brackets (*w*) on the inside of the post (*B*).

In front of the harnesses, is a lay (*M*) the swords (*N*) of which, are hinged in the usual manner, so that the lay may vibrate backward and forward. The race board (*P*) of the lay has two longitudinal grooves (*x*) (*y*) in its upper surface. In the groove (*x*) is a reciprocating frame (*a'*) for throwing the shuttles; and projecting upward from it, are arms (*b'*) which, as the frame moves backward and forward strike the ends of the shuttles and throw them through the open shed. This frame is provided with two or more sets of these arms, or as many as there are pieces of cloth woven at the same time in the loom; and these arms are connected with the frame, so that they may be adjusted the proper distance apart to carry the shuttle through webs of different widths.

The groove (*y*) carries a series of adjustable race rods or shuttle guides (*d'*) arranged on either side of the web, and made to slide in the groove, so that their distance

apart may be changed for various width of webs. These slides are also arranged so that they may be raised and lowered by means of adjusting screws (*e'*), passing through the bottom of the race board, in order to raise the shuttle (in weaving heavy fabrics) above the warp threads in the lower leaf of the shed, and prevent its striking the web as it passes through, while at the same time the lower leaf is supported by the race board.

Above the race board and in the same plane as the lower guides to the shuttles, are upper guides (*f'*) which are attached by a screw passing through a slot (*g*) in the guide to the frame (*r*) carrying the reed (*s*). This slot admits of the guide being adjusted longitudinally and it is raised and lowered by raising and lowering the reed frame, which is attached to the lay by slotted bars (*i'*).

An arm (*i'*) projects from the underside of the shuttle driver frame (*a'*) and passes through a slot in the bottom of the lay. This driver receive a reciprocating movement from a rock shaft (*T*) which turns in bearings on the loom frame, and extending from the rock shaft is an adjustable lever (*k'*) passing through an eye (*l'*) in the arm of the shuttle driver. Motion is given to the rock shaft (*T*) by means of cams (*U*) attached to a cross shaft (*V*) and these cams are arranged to strike a cam plate (*W*) attached to the rock shaft and extending outward on either side, alternately, first on one side and then on the other, of the rock shaft, and thus give to it a rocking movement. In order to vary the range of motion of the shuttle driver, the cams are moved nearer to, or farther from, a plane passing through the center of motion of the rock shaft the movement of the rock shaft decreasing as the cams are carried outward.

At the back of the loom is a frame (*X*) to hold the yarn beams (*Y*). In the present instance this frame carries three sets of beams but this number may be varied, with the number of pieces of cloth that are woven at the same time in the loom. Three or more beams are contained in each set, and one of these beams which carries the tee warps is weighted heavier than the other beam. The warps pass from the yarn beams between a pair of guide rollers (*Z*), thence through the heddles and reed and over the top of the lay, resting on the race board between the lower shuttle guides. The cloth after it is woven, instead of being wound on a cloth beam, passes around a take up roller (*B'*) and thence over a roller (*A'*) resting on the first roller from whence it drops on the floor. On the end of the take up roller (*B'*) is a toothed wheel (*m'*) which meshes into a toothed pinion (*n'*) carrying a ratchet wheel (*O'*), to which

motion is communicated by means of a take up lever operated by the lay in the usual manner.

Motion is communicated to the loom through a driving shaft (C') and on this shaft is a toothed pinion (p) which gears into a toothed wheel (q') attached to shaft (D'), extending across the loom, and projecting beyond the frame, to the outer end of this shaft (D') cranks (r') are attached which give motion to the lay through a link (s') pivoted at one end to the lay, and at the other to a crank pin (t') in the end of the crank. The jack lifter shaft derives its motion directly from the shaft (D') through a train of gearing, and this gearing is so arranged, that two beats are made by the lay to each opening of the shed by the jack lifter in order to beat up the filling closer and give greater compactness to the fabric.

This loom is adapted to weave light or heavy fabrics as well as plain or figured. In weaving fabrics requiring several sets of harness, such as heavy banding or hose, or covering cords or rope the jack lifter hooks (w') operating the heddles (x') carrying the binding warps are made shorter than the other hooks, so that the shed formed with the binding warps is opened wider than the shed of the other warps, and as these warps are under a heavier tension, the yarn being more heavily weighted, and as they are raised to a greater height they serve to drive the filling home and draw the different plies closer together and render the fabric more compact than it would otherwise be.

In using this loom to cover cords or other material with a woven fabric, an open space (y) is left in the reed for the cord to pass through, and the cord is attached to a separate heddle (h') operated by the jack so as to be alternately in the upper leaf (i) of the shed of warps covering the underside of the cord, and in the lower leaf (i') of the shed of warps covering the upper side of the cord. Thus the cord is surrounded with a woven fabric. In weaving pipe for hose, formed with two or more plies, two sets of binding warps are required, one, for the upper part of the tube, and the other for the under, in which case four short jack hooks are necessary to operate the four sets of heddles used with the binding warps.

In changing the loom from several narrow fabrics to weave a single wide fabric the central arms in the shuttle driver, are taken out, as well as the central race rods and the cams operating the rock shaft (T) are adjusted to give the required length of throw to the shuttle, to carry it through the wide shed.

It will be seen from the arrangement of the frame containing the pattern wheel and jack hook lifter and its connection with the lever frame that greater or less length of lev-

erage may be given to the jacks, for different descriptions of work, and also that greater or less range of motion may be given to the heddles which renders this loom peculiarly well adapted to weave light or heavy work as well as plain or figured work; and moreover, from the arrangement of the race rod, shuttle driver and mechanism for driving the shuttle it is equally well adapted to weave, either several pieces of narrow material at the same time, or one piece of wide material without any loss of power in throwing the shuttle a greater distance than is necessary to carry it through the shed.

I do not confine myself to the precise construction and arrangement of the parts as herein described, as the construction and arrangement of many of the parts may be varied without departing from the spirit of my invention.

The pawl or bar used to turn the pattern wheel instead of being attached to the jack hook lifter may be suspended from the pattern frame in front and made to slide in a groove, so that on the upward motion of the lifter it will be raised and cause the wheel to turn, and then drop by its own weight on the downward movement of the jack hook lifter.

Having thus described my improvement in looms, what I claim therein as new and desire to secure by Letters Patent is—

1. The combination of the jack hook lifter with an adjustable mechanism for imparting to it a reciprocating motion arranged substantially as described so that the range of motion of the heddle may be changed as required to vary the opening of the shed.

2. The combination of a rock shaft and cam plate, with adjustable cams, so arranged that by varying their distance from the center of the rock shaft the range of motion of the rock shaft is changed and the shuttle thrown a greater or less distance as required.

3. The combination of the lay with a vibrating shuttle carrier arranged substantially as described, so that the distance between the arms of the carrier, may be varied to correspond with the distance the shuttle is thrown, in passing through webs of different widths substantially in the manner described.

4. The combination of the lay with adjustable guide rods, for the shuttle, so arranged that their distance apart may be varied as required in weaving fabrics of different widths at the same time; and also so that their height above the race boards may be changed for fabrics varying in thickness substantially as described.

5. Arranging a cord or other material, which is to be covered with a woven fabric between the warps and connecting it to an independent heddle which is so arranged and

operated as to raise the cord with the upper
leaf of the shed while the woof thread is
passing between the warp covering the under
side, and depress it with the lower leaf of
5 the shed while the woof is passing between
the warps covering the upper side of the
cord substantially as described.

In testimony whereof I have subscribed
my name.

JOSEPH H. CLIFTON.

Witnesses:

JOHN S. HOLLINGSHEAD,
F. G. SMITH.