Sheet 1, 3 Sheets.

H. Elliott.

Picker Motion.

No. 56,913. Patented Aug. 7, 1866.

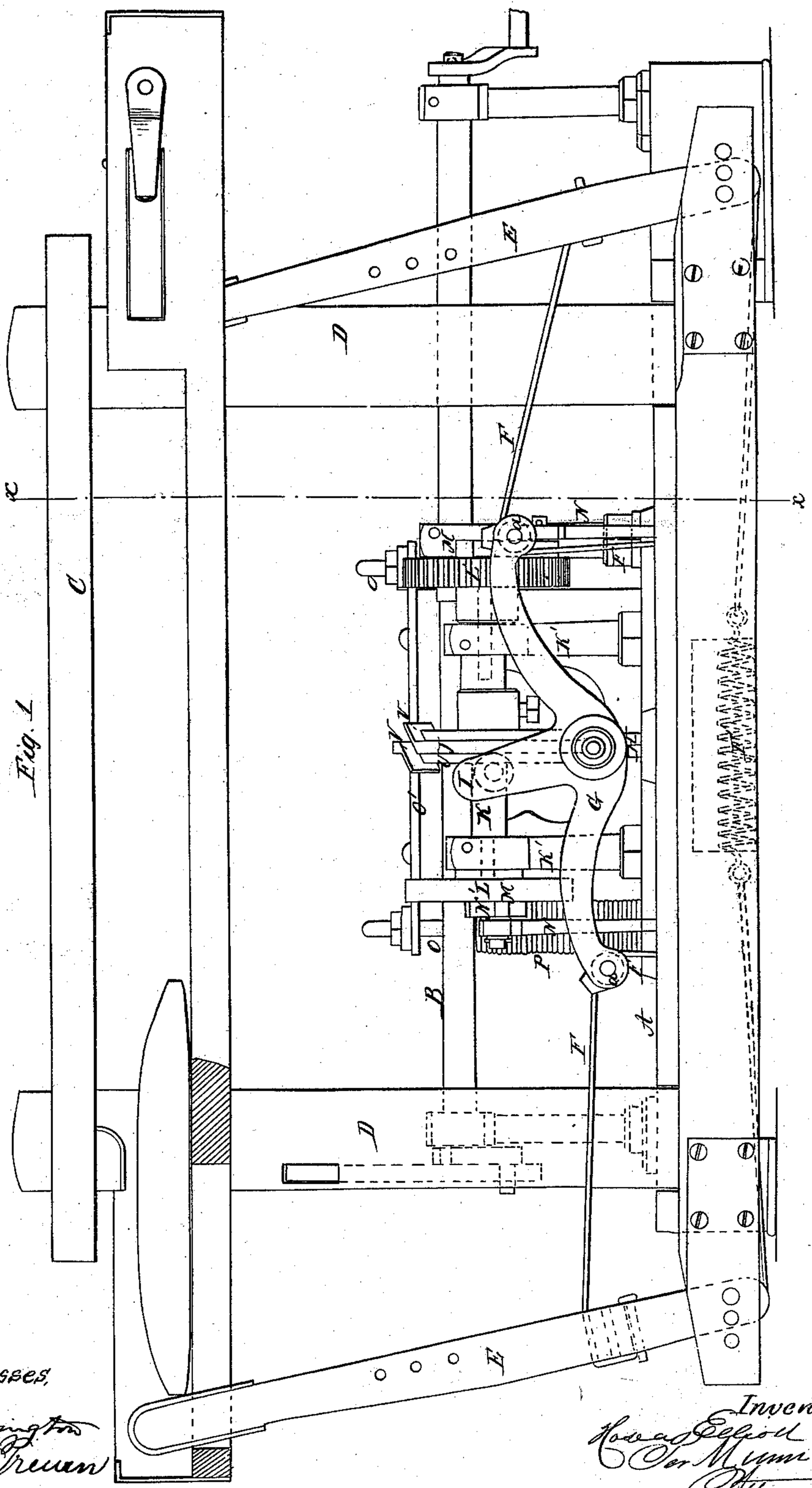

Fig. 1.

Witnesses,
Wm. B. Lovington
Wm. Freeman

Inventor,
Horace Elliott
per Munn & Co
Attorneys

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

Sheet 2, 3 Sheets.

H. Elliott.

Picker Motion.

No. 56,913. Patented Aug. 7, 1866

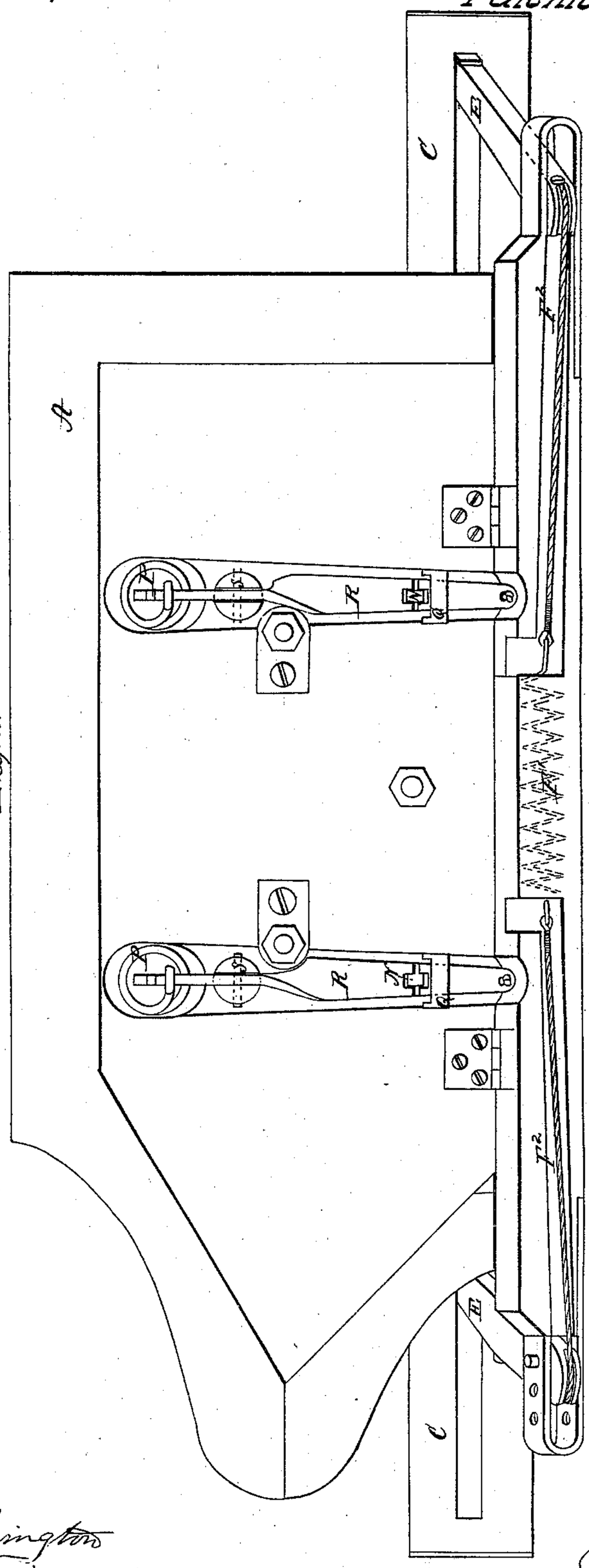

Fig. 2.

Witnesses,
J. R. Harrington
Wm. Treiwn

Inventor,
Hosea Elliott
per Munn & Co Attorneys

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

Sheet 2, 3 Sheets.

H. Elliott.

Picker Motion.

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Fig. 4.

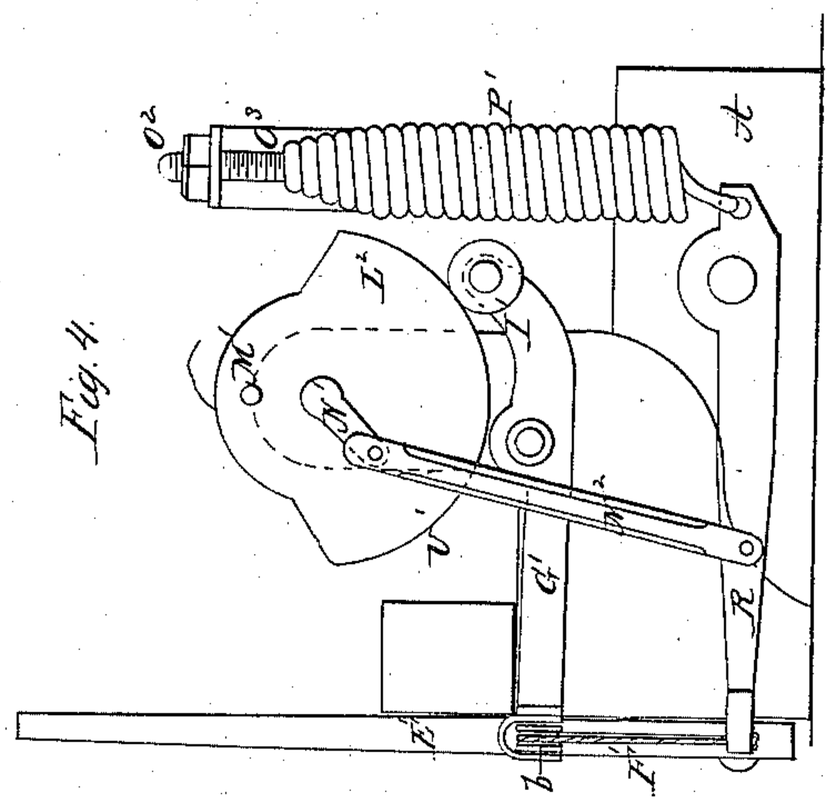
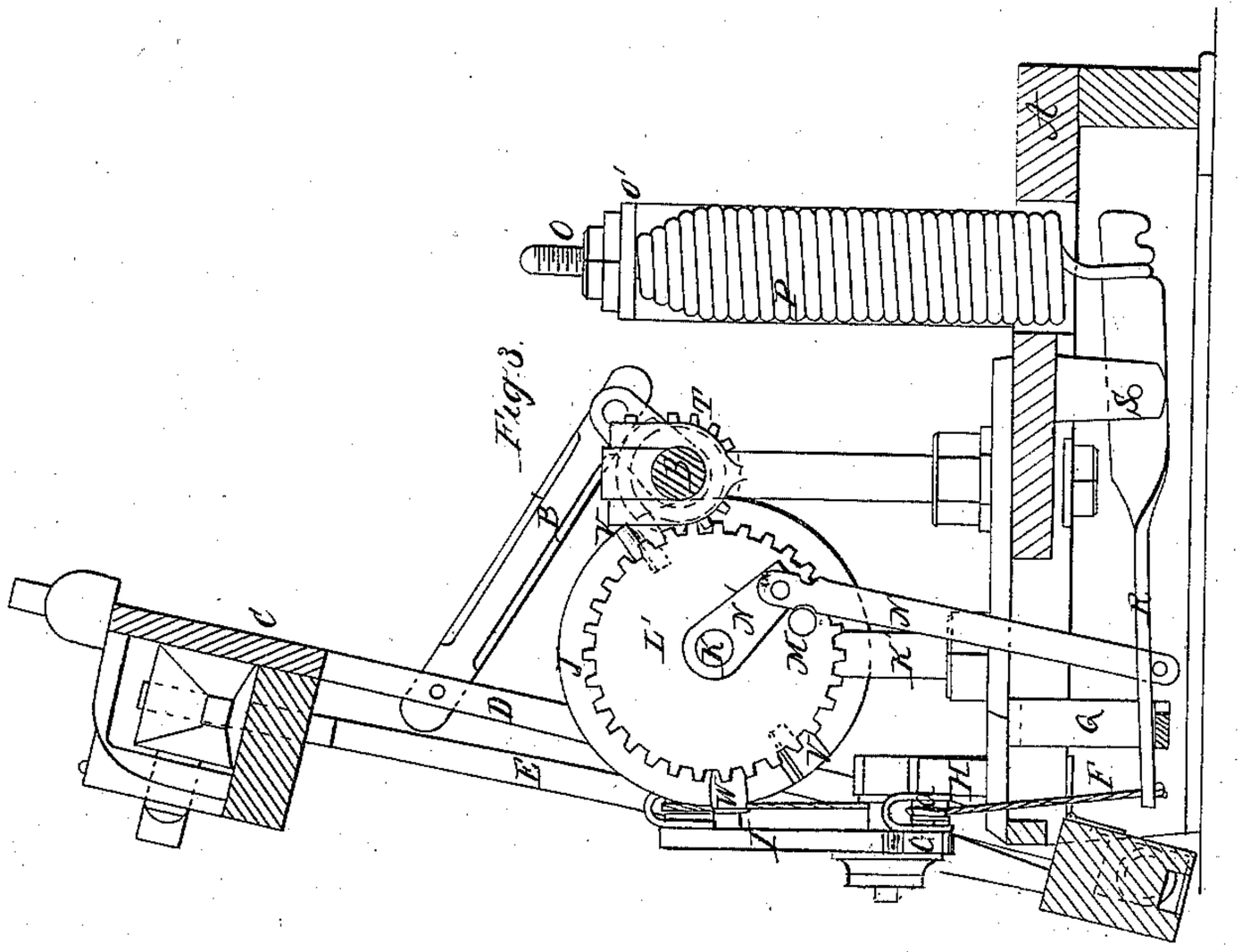


Fig. 3.



Witnesses,
J. P. Lovejoy
Wm. Treadwell

Inventor,
Rosea Elliott
by Munn & Co
Attorneys

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

HOSEA ELLIOTT, OF GLOBE VILLAGE, MASSACHUSETTS.

IMPROVEMENT IN PICKER-MOTIONS FOR POWER-LOOMS.

Specification forming part of Letters Patent No. **56,913,** dated August 7, 1866.

To all whom it may concern:

Be it known that I, HOSEA ELLIOTT, of Globe Village, Worcester county, State of Massachusetts, have invented a new and useful Improvement in Picker-Motions for Looms; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1, Sheet 1, is a front elevation of so much of a loom as it is necessary to show in order to illustrate my invention. Fig. 2, Sheet 2, is an under-side view thereof. Fig. 3, Sheet 3, is a cross-section in the plane of the line *x* in Fig. 1. Fig. 4 is a side view of a modification.

Similar letters of reference indicate like parts.

This invention relates more especially to power-looms; and it consists, principally, in throwing the shuttle independent of the cam-shaft, so as to secure a uniform pick-motion, whatever the speed of the shaft may be. The cord of the picker-staff runs over a pulley on the end of a vibrating lever, which is placed between the swords of the lay, and is made to vibrate by a cam that acts on an arm extending from the lever. The said cord is attached to the longer end of another lever placed on the lower part of the loom at right angles to its ordinary cam-shaft, the shorter end of said last-mentioned lever being connected with a spring that tends always to depress its longer end, which is raised at certain times during the revolution of the ordinary cam-shaft by means of a lifting-crank which falls rapidly through a portion of its revolution, and allows the springs to depress the longer end of said lever, and thereby move the picker-staff inward against the shuttle. The staff is kept at the inner end of the shuttle-box after it has driven out a shuttle until the shuttle is ready to return, when the staff is brought back to the outer end of the box, thereby preventing the weaver from boxing two shuttles at the same time.

The motions for both picker-staffs may be combined, or they may be separated. In the former case the vibrating lever may have a double arm, one for the cord of each staff, and a central arm, which rests on a cam-wheel whose revolution vibrates the lever so as to raise and lower the ends of the arms which carry the cords of the picker-staffs. When the motions are required to be separated, as in the case of wide looms, the staffs are operated from separate cams.

The letter A designates a platform which sustains the devices about to be described. C is the lay of a loom, and B the shaft, usually called the "crank-shaft." The lay is hinged at its lower end, as usual, and is vibrated from the shaft B by a crank and pitman-rod, B′, connected to one of its swords D. The picker-staffs may be connected to the lay by any suitable devices for sending the shuttle with a true aim; but in this example I have connected the staffs to the lay simply by pins, on which they vibrate without rising during their motions. The boxes which receive the shuttles at the ends of the shuttle-race may be made in any suitable way.

In front of the main shaft B are placed two standards, K′ K′, which carry a short shaft, K, that is turned from shaft B by means of a pinion, T, on the latter, which engages with the teeth of a gear-wheel, L′, fixed on the right-hand end of shaft K. A pin, M, is fixed on the outer face of gear-wheel L′, the object of which is to provide means for lifting crank N′, as hereinafter explained. The other end of shaft K has a plain disk, L, fixed on it, and its outer face has a like pin, M, that lifts a like crank, N′, such pins, however, being so arranged that they are on opposite sides of their respective cranks, although they are not in the same diametrical line, their distances apart being such that, soon after one pin has carried its crank past its center, the other is almost ready to commence lifting its crank. The ends of shaft K are hollow to receive the axes or spindles of the cranks N′, which are allowed to turn loosely therein, but are not free to move endwise. The cranks may be connected with shaft K in any other way, so long as they are free to turn loosely. The free ends of the cranks have pins, on which are suspended sweeps N N, that are connected to horizontal levers R R below by passing their lower ends through slots in such levers and securing them by pins. The levers R R are pivoted, in this example, below the platform A, to studs S, the shorter ends of each lever being attached respectively to the lower

ends of springs P P, which are suspended by means of screw-bolts O O from the ends of the plate O′. The tension of the springs is regulated by means of nuts placed on the bolts O above the plate O′, said nuts serving at the same time to hold the springs in place. The longer ends of levers R pass through loops Q Q, which limit their motions downward, and to their extremities are fastened the picker-staff cords F, as shown in Fig. 2.

On the shaft K, at the middle of its length, is a cam-wheel, whose cam U is formed on opposite sides (one part on one side and one part on the other side) of a flange, J, that projects from the periphery of said wheel, said flange being interrupted or broken away at opposite points in its course to permit the cam to be changed in its course from one side to the other of the flange. Each break in the flange has guards V V, two of which are seen in Fig. 1, the other two being on the edge of the wheel, which is concealed from view in that figure. The guards consist of parallel plates set at an angle across the track of the cam, being joined to the ends of the divisions of the flange J, from which they extend in opposite directions. The cam U receives a friction-roller that extends from the inner face of a short central arm, I, which projects upward from the center of a lever, G, that is pivoted to the top of a low standard which is placed on platform A, in front of the shaft K. The lever G is pivoted at about the middle of its length, its two ends extending toward the swords D of the lay, and having each a pulley, *a*, in its extremity, over which the cords F F respectively are conducted on their way from the staffs E to the levers R. To the bottom of each staff is attached a cord, F^2, which is conducted in a groove made in the bottom of the lay toward the middle part of its length, where each cord is connected to one end of a spiral spring, F′, placed in the bottom of the lay. The office of the spring F′ is to return the picker-staffs to the outer ends of the shuttle-boxes at the proper times.

The operation of the devices is as follows: Motion being given to the main shaft B, the shaft K will be put in rotation therefrom, their relative rates of speed being determined by the relative proportions of the gear-wheels T and L′. As the gear-wheel L′ is rotated its pin M comes against the crank N′ and carries it along, thereby lifting the sweep N and lever R until the crank has got past its center, when, being loose, as above explained, it leaves the pin and is pulled suddenly downward by the spring P, acting through the lever R and sweep N. The action of the spring P′ in the short end of the lever R throws down with great force its longer end, thereby causing the top of the staff E on that side of the loom to be suddenly drawn inward by the pull of that lever on the cord F, which action throws the shuttle to the opposite box. While the crank and the parts connected with it are being operated, as just set forth, the cam U will have vibrated the lever G so as to raise its right-hand end, as shown in Fig. 1, in which position it remains until the crank on wheel L at the left has been brought near to its center, when the cam U again vibrates the lever G, lowering its right-hand end to a position like that occupied by the left-hand end in Fig. 1.

It will be observed that while the right-hand end of lever G is elevated it takes up the slack of cord F, and consequently the staff is kept in its advanced position, closing the inner end of the shuttle-box; but when said right-hand end is lowered the cord F is slackened and the spring F′ is allowed to swing the staff upon its fulcrum and bring its upper end to the outer end of the shuttle-box. The like movements occur with the picker-staff at the left-hand side of the loom through the operation of similar devices. By keeping the staffs near to the entrances of the shuttle-boxes until the devices which return the proper shuttle are nearly ready to act I prevent the weaver from carelessly boxing two shuttles at the same time, and thereby save the loom from damage, and also save delay. The cam U is, in this example, divided into two equal lengths by equally dividing the flange J into semicircular divisions; but, if desired, the divisions may be made of less extent than half-circles without departing from the principle of my invention, providing that the staff be not thrown outward too soon.

When it is desirable, as in wide looms, to have a separate cam for operating the picker-staffs, the modification shown in Fig. 4 may be used. In this modification the lever R is attached at one end to the picker-staff cord F, and at the other to the spring P′, held to a frame, O^3, by an adjusting-nut screwed onto a screw-rod, O^2, whose lower end is fixed to the upper end of the spring.

The ordinary cam-shaft of the loom has near its end a plate, L^2, whose periphery is cut away to form a cam, U, which acts on the shorter arm I′ of a transverse lever, G′, whose longer end projects toward the front of the loom and carries a pulley, *b*, over which the cord F proceeds on its way from lever R to the staff.

The plate L^2 revolves with the cam-shaft, and has on its face a lifting-pin, M, which lifts a crank, N′, that turns loosely on the end of the cam-shaft, said crank being connected by a sweep or pitman-rod, N, with the lever R. The lifting of the lever R by the crank strains the spring, which, when the crank falls, exerts its force through lever R and cord F to send the picker-staff against the shuttle independently of the cam-shaft, whose only office is, as in the case of the devices shown in Fig. 1, to furnish power to lift the lever R. The cam U meanwhile acts on the lever G, and causes the slack of the cord F to be taken up and given out at the proper time, as explained above in reference to the example shown in Fig. 1.

Instead of springs P P′, weights may be used for operating the levers R, if desired.

By means of my invention I am able to sim-

plify the power-loom in its construction and to make its operation more certain and uniform.

One of the advantages derived from the invention is, that a variation in the speed of the main or cam shaft does not affect the pick. Its uniformity is the same under all degrees of speed, from three to three hundred picks a minute, the power with which the staff is sent against the shuttle being always the same, while the spring is not impaired.

With the old methods of picking, if the speed of the driving-shaft is increased twenty or thirty turns a minute, the force and speed with which the pick is made increase in a greater ratio, and if the speed is lessened the power that produces the pick is lessened in a greater ratio than the ratio of decrease in the speed of the loom. Hence arises one of the most serious imperfections in the operations of the power-loom, it being not uncommon, when the speed is increased twenty picks a minute, more or less, to find the cop broken on the spindle and the filling thrown off, thereby producing much waste. Again, the wear and tear of the old method of picking is so great that the majority of the repairs required on a loom is expended in and about the picking devices. Again, when the speed of the picker-motion is unduly increased, the shuttle is apt to recoil in the box and slacken the thread and cause the filling-fork to be operated and the loom to stop; or the shuttle may recoil in one box, and slam up in the opposite box, exposing the stop-motion and other parts to the liability of becoming broken, and consequently exposing the warp to injury.

My invention enables the weaver to produce more cloth, while less power is required to run the loom and less labor in keeping it in order.

I claim as new and desire to secure by Letters Patent—

1. In combination, the loose crank N′, sweep N, the lever R, and the spring P, for giving motion to the picker-staff, substantially as described.

2. Operating the picker-staff of a loom by means of the appliances that act independently of the driving-shaft, substantially as described.

3. In combination, the cam U, the arm G, and the cord F, for drawing the picker-staff inward, substantially as described.

HOSEA ELLIOTT.

Witnesses:
A. J. BARTHOLOMEW,
JOHN ECCLES.