3 Sheets, Sheet. 1.

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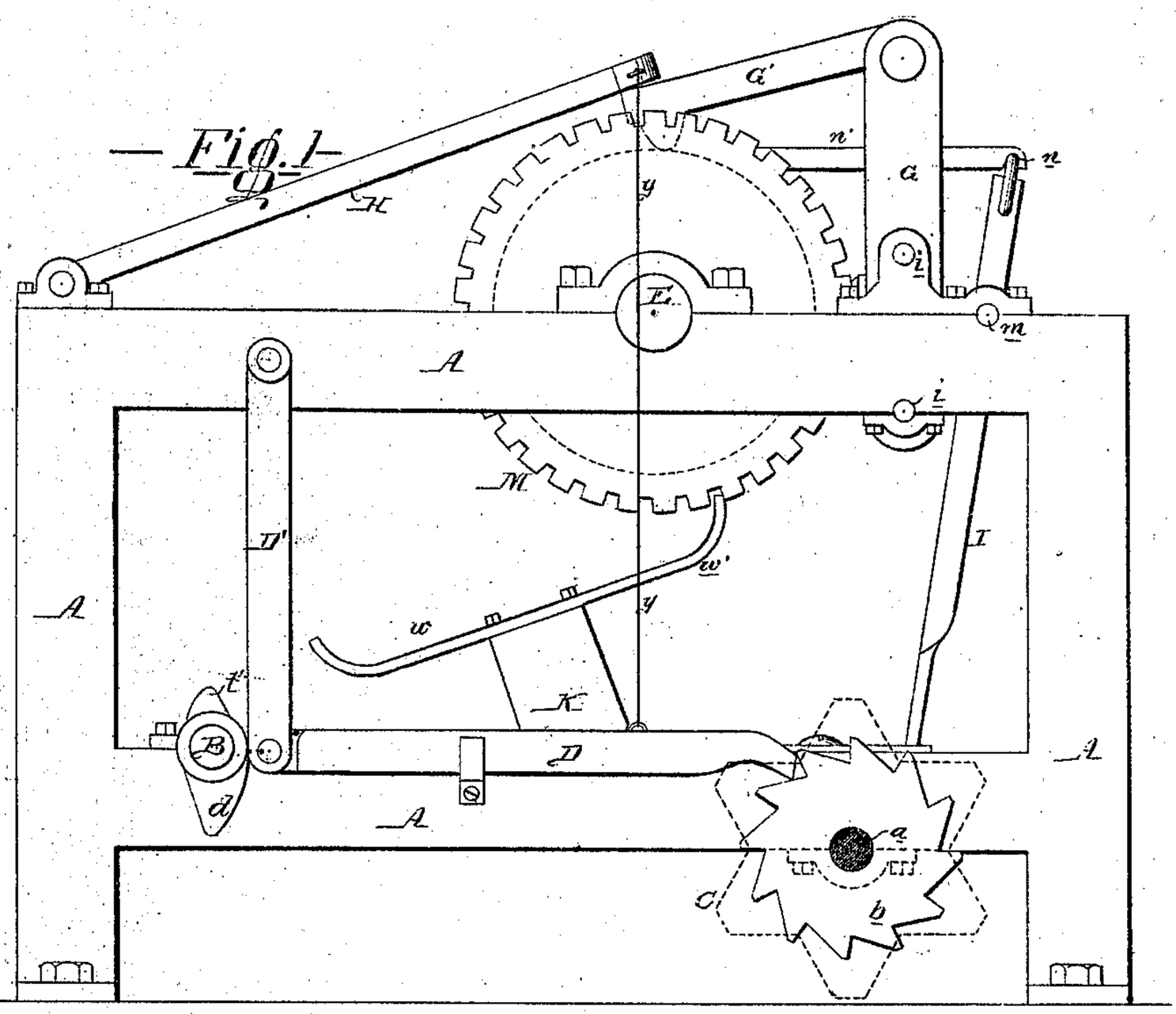
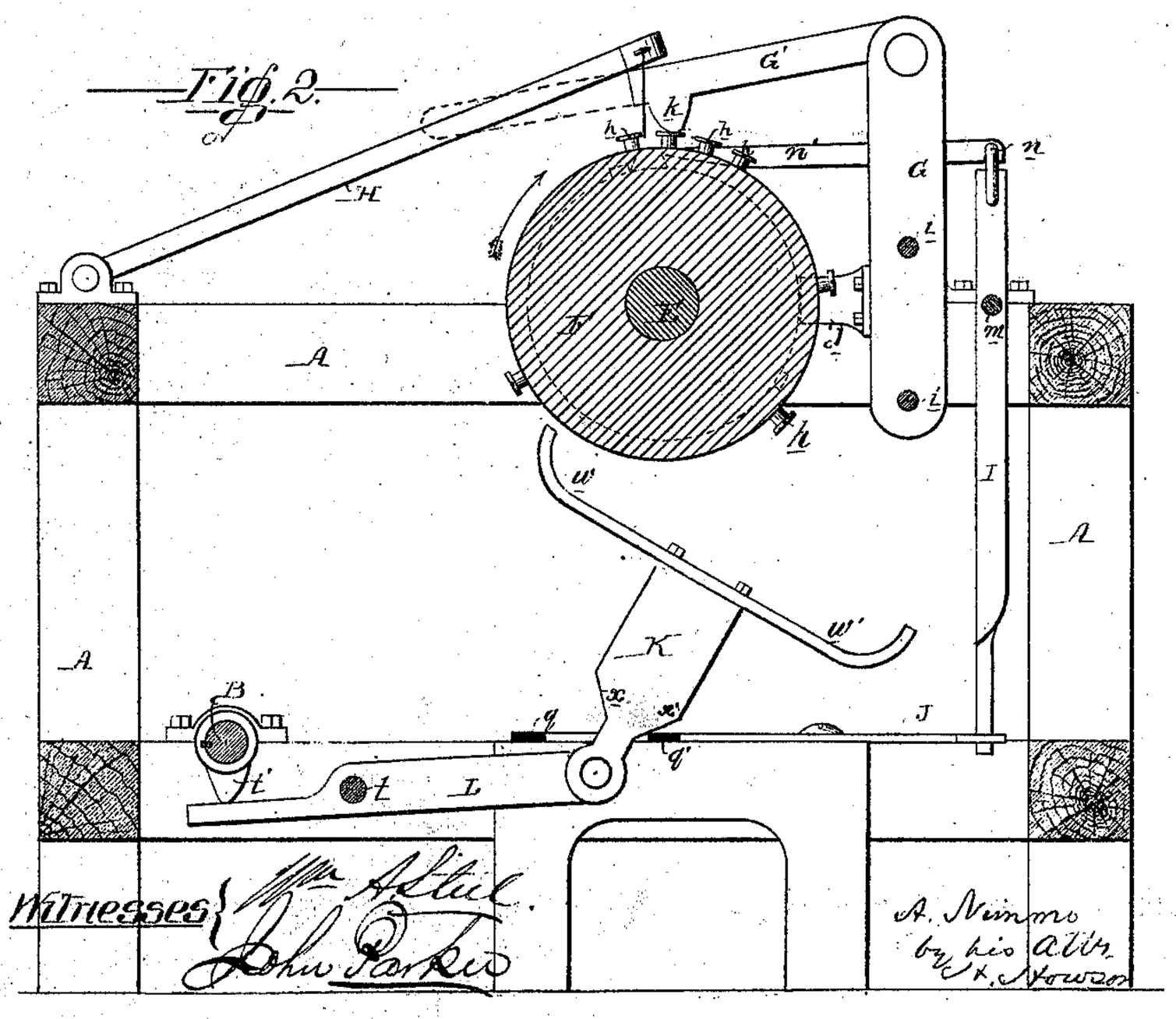
Loom.

No. 97,679. Patented Dec. 7. 1869

— Fig. 1 —



— Fig. 2. —



Witnesses { Wm. A. Lindsay. John Parker

A. Nimmo by his Attys. C. A. Howson

3 Sheets, Sheet 2.

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Loom.

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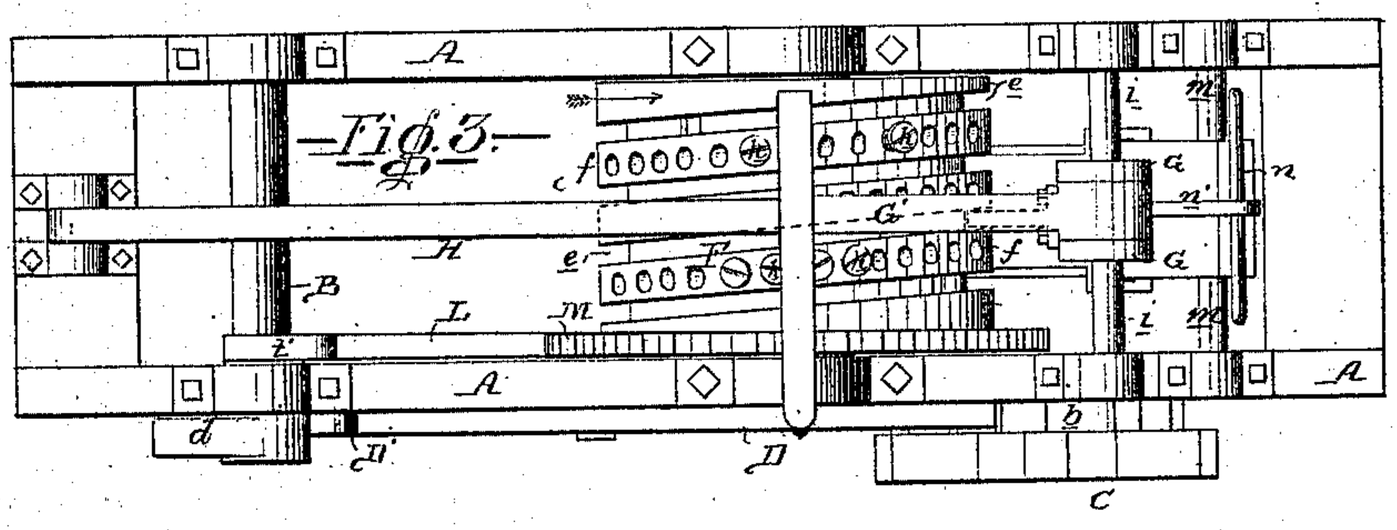
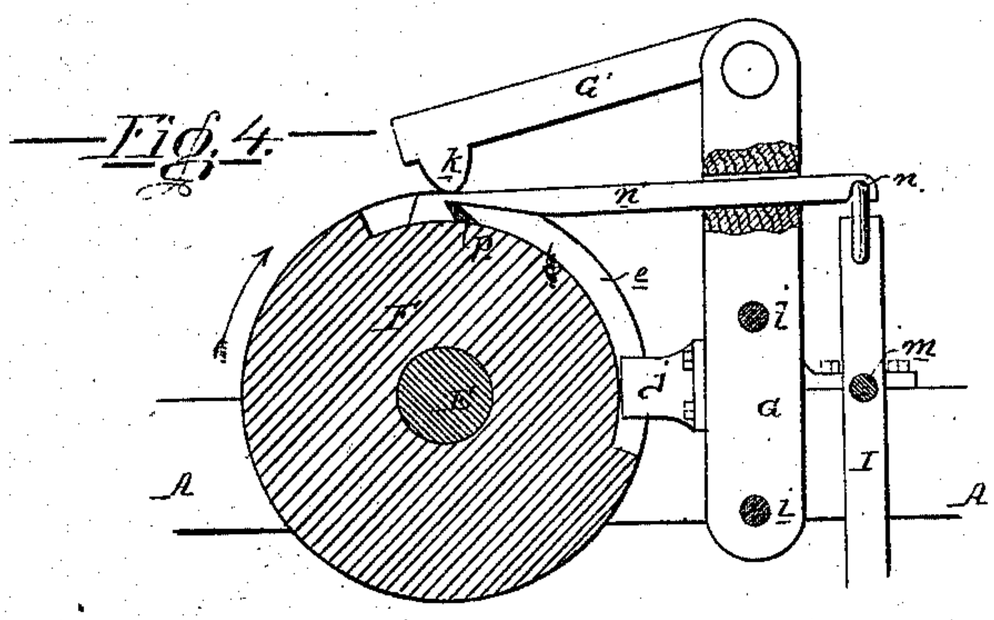
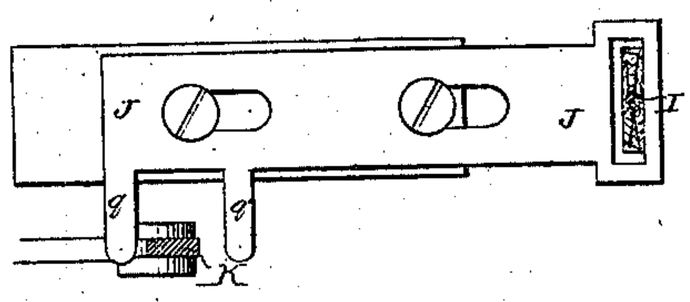
—Fig. 3.—



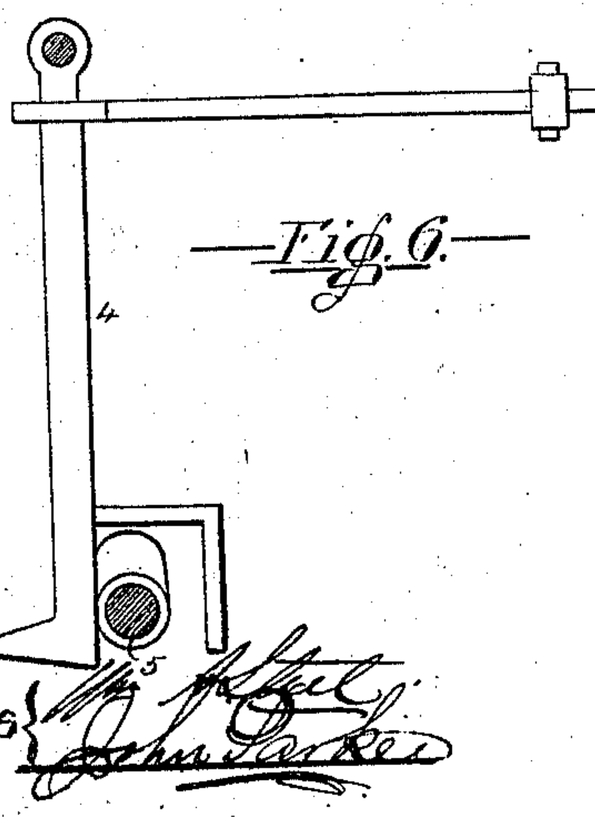
—Fig. 4.—



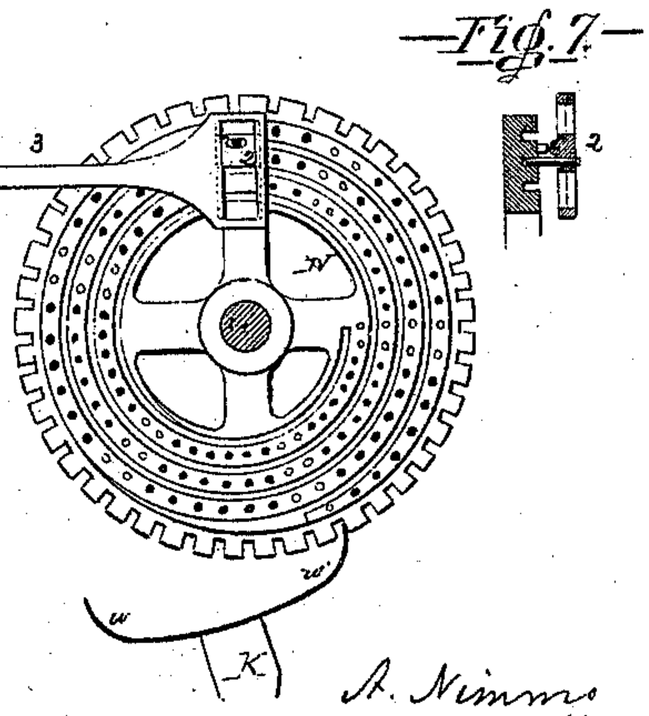
—Fig. 5.—



—Fig. 6.—



—Fig. 7.—



Witnesses { [illegible] / John Parker }

A. Nimmo
by his Attys
H. Howson & Son

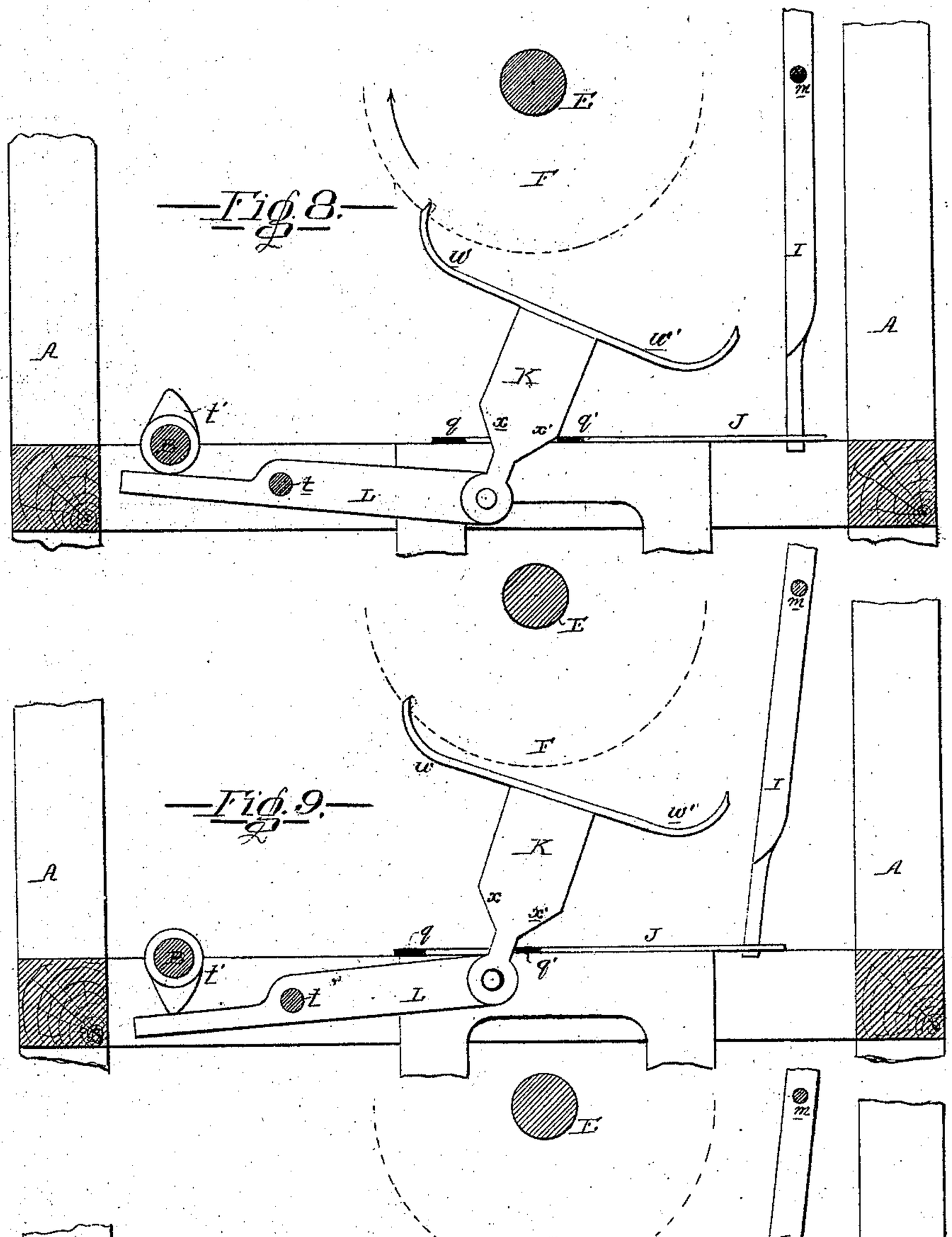
3 Sheets. Sheet. 3.

A. Nimmo,

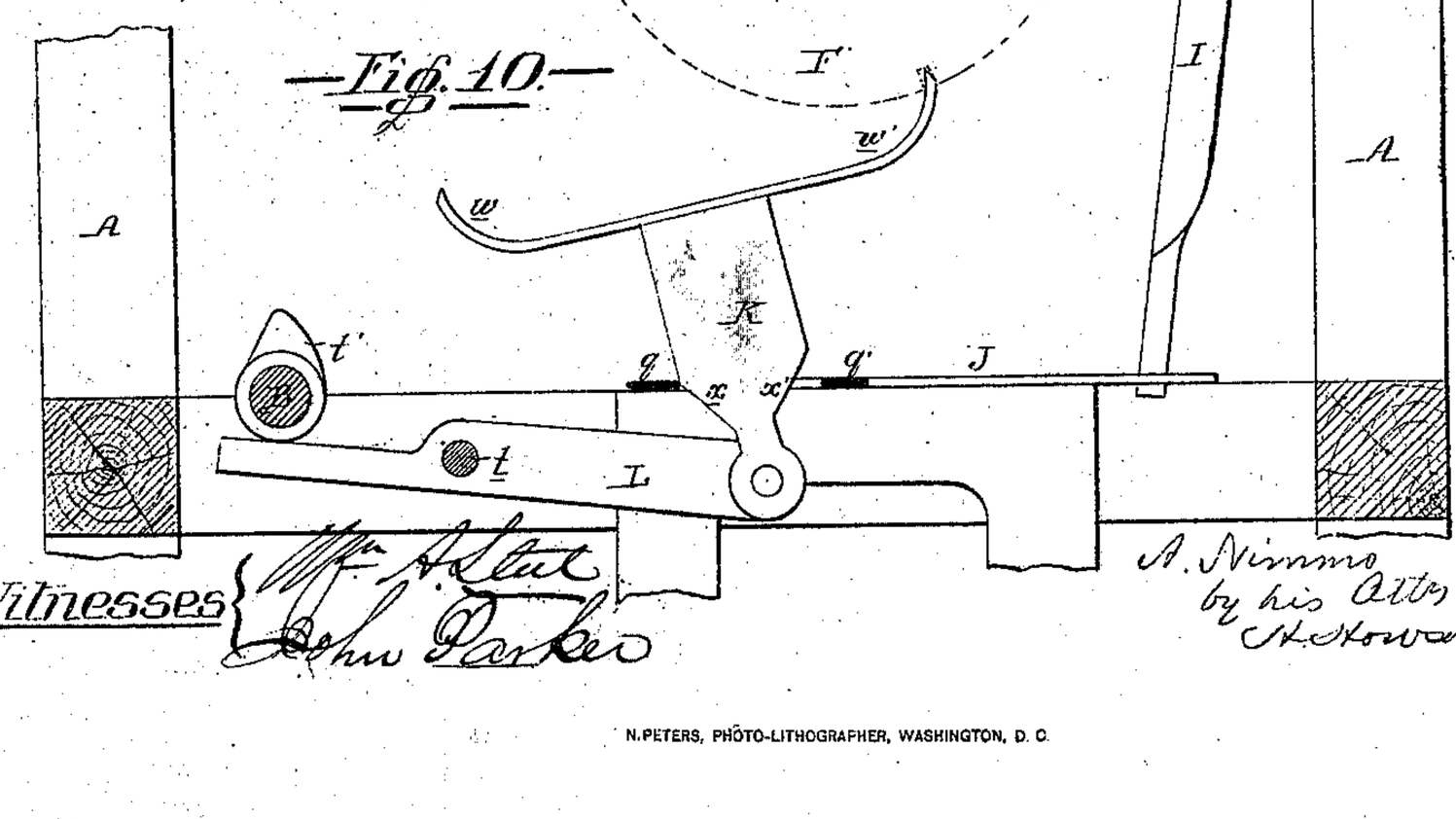
Loom.

No. 97,679. Patented Dec. 7. 1869.

—Fig. 8.—



—Fig. 9.—



—Fig. 10.—

Witnesses { Wm. A. Clark
John Parker

A. Nimmo
by his Attys
A. Howson.

United States Patent Office.

ARCHIBALD NIMMO, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO HIMSELF AND THOMAS MORAN, OF SAME PLACE.

Letters Patent No. 97,679, *dated December* 7, 1869.

IMPROVEMENT IN MECHANISM FOR OPERATING THE SHUTTLE-BOXES IN LOOMS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, ARCHIBALD NIMMO, of Philadelphia, Pennsylvania, have invented certain Improvements in Drop-Box Looms; and I do hereby declare the following to be a full, clear, and exact description of the same.

My invention consists of certain mechanism, described hereafter, to be applied to drop-box looms, for the purpose of producing long patterns.

In order to enable others skilled in the art to make and use my invention, I will now proceed to describe its construction and operation, reference being had to the accompanying drawing, which forms a part of this specification, and in which—

Figure 1, sheet 1, is a side view of part of the frame of a loom, or of a frame adjacent to that of the loom, with my improvements;

Figure 2, a sectional view;

Figure 3, sheet 2, a plan view of fig. 1;

Figures 4 and 5, detached views, illustrating parts of my invention;

Figures 6 and 7, views, illustrating a modification of my invention; and

Figures 8, 9, and 10, sheet 3, diagrams, illustrating the operation of a certain reversible pawl, referred to hereafter.

In figs. 1, 2, 3, 4, and 5, I have illustrated my invention as connected with the most simple drop-box-mechanism, that is, the ordinary star-wheel C, figs. 1 and 3, the action of which, in raising a drop-box for two shuttles, and permitting the same to fall, is too well understood by those skilled in the art to need description.

It should be understood in the outset, however, that my invention can be applied to any drop-box mechanism, and, in fact can be made to act on the boxes directly, as will be more fully explained hereafter, the star-wheel being introduced for the purpose of illustrating my invention, and not as forming part of the same.

This star-wheel is hung, as usual, to a pin, *a*, fig. 1, projecting from the frame A, and on the back of the wheel is a ratchet-wheel, *b*, to the teeth of which is adapted the point of a pawl, D, hinged to a pendulous arm, D′, and actuated by a cam, *d*, on the driving-shaft B of the loom.

To suitable bearings on the frame, are adapted the journals of a shaft, E, carrying a cylinder, F, in which is cut a spiral groove, *e*, so as to form a spiral thread, *f*, in which is a series of holes for receiving detachable pins *h*.

A block or carrier, G, is arranged to slide on stationary pins *i i*, or other suitable guides, attached to the frame, and this carrier has a projection, *j*, fitting in the spiral groove of the cylinder F.

An arm, G′, is hinged to the top of the carrier G, and a projection, *k*, on this arm, is arranged to bear on the pins projecting from the spiral thread *f* of the cylinder, the arm, as the cylinder revolves, following the course of the thread, owing to the aforesaid projection *j*, of the carrier, fitting in the groove between the threads.

This arm G′ may be connected directly to the pawl D by a cord or wire, or the pawl may be connected, by a cord, *y*, to an arm *h*, hinged, at one end, to the frame, and resting, at the other end, on the said arm G′, as seen in fig. 1 of the drawing.

A vibrating lever, I, has a pin, *m*, adapted to suitable bearings in the frame A, and to the upper short arm of this lever is secured a horizontal pin, *n*, to which is hung and on which can traverse an arm, *n′*, which passes through the block or carrier G, and projects into the groove between the threads *f* of the cylinder F.

Near the outer end this arm *n′* is a hook, as best observed on reference to fig. 4, sheet 2, the hook being adapted to a stop, *p*, so fitted in the groove *e* of the cylinder as to be adjustable therein.

There is another stop in the groove of the cylinder, for acting against the end of the arm *n′*, and one stop is situated at or near the termination of the spiral groove at one end of the cylinder, and may be permanently secured there, while the other stop may be secured at the termination of the groove at the other end of the cylinder, or may be adjusted to any position in the groove, nearer to or further from the other stop.

The long lower arm of the lever I passes through a slot in a plate, J, so secured to any permanent part of the frame that it can be moved to and fro therein to a limited extent, (see fig. 5,) and this plate has two projections, *q* and *q′*, between which passes a plate, K, hinged loosely to a lever, L, which is arranged to vibrate on a pin, *t*, and which is actuated by a cam, *t′*, on the driving-shaft B of the loom.

From the upper end of the plate K project, in contrary directions, two arms, *w* and *w′*, each so bent at the end as to be adapted to the teeth of a wheel, M, secured to the shaft E adjacent to the cylinder F.

It will be observed, that the plate K has two inclinations, *x* and *x′*, the purport of which will be rendered apparent hereafter.

This plate K, with its arms *w* and *w′*, I term the double reversible pawl.

As the shaft B revolves, a regular and intermittent rotary motion will be imparted to the star-wheel C.

As long as the pawl D remains depressed, and in a proper position for action on the ratchet-wheel *b* at the back of the star-wheel, and as long as this regular movement of the latter continues, the drop-boxes will

rise and fall regularly, precisely as in ordinary drop-box looms for weaving small uniform checks.

If the pawl D, however, be elevated, at irregular intervals, clear of the ratchet-wheel, then the movement of the boxes will be irregular, and the pattern will have a corresponding irregularity.

The devices, which I have described above, have been designed for the purpose of controlling this star-wheel, or other drop-box mechanism, in a manner which I will now proceed to describe.

The pins are arranged on the spiral thread *f* of the cylinder, at such points as the pattern of the fabric to be produced may determine.

As seen in figs. 2 and 3, the cylinder F has an intermittent revolving motion imparted to it by the rotating cam *t*, through the medium of the lever L, and double pawl, the arm *w* of the latter acting on the teeth of the wheel M.

As the cylinder thus revolves intermittently, the pins *h* on the spiral thread will, whenever they come in contact with the projection *k* of the arm G′, elevate the pawl D clear of the ratchet-wheel at the back of the star-wheel, when the latter will remain quiescent, until, as the cylinder revolves, a vacancy occurs between the pins, when the pawl will fall, and operate the star-wheel, as before. Hence, it will be seen that the time during which one shuttle remains in operation will depend upon the disposition of the pins on the spiral thread of the cylinder, or, rather, on the presence or absence of these pins.

As the block or carrier G is controlled by the spiral groove of the cylinder, the arm G′ must follow the course of the spirally-arranged pins, so that the latter will continue to act on the arm, and consequently, on the pawl D.

When the cylinder has been so far turned in the direction of the arrow, that one of its stops comes in contact with the end of the arm *n′*, fig. 4, the pawl which actuates the cylinder will be reversed, as will also the movement of the cylinder itself, in a manner which will be best observed by reference to the diagram on sheet 3.

In fig. 3, the cylinder F is still being turned in the direction of the arrow, but when the stop pushes the arm *n′*, the latter will, through the medium of the lever I, move the plate J from the position shown in fig. 8 to that seen in fig. 9, and this is all the duty which the stop on the cylinder performs, as regards the reversing of the pawl.

This movement of the plate J by the stop is effected while the double pawl is approaching the limit of its upward movement, so that the relative positions of the plate and the pawl, when the latter has reached its highest point, will be those seen in fig. 9, on reference to which, it will be observed that the inclination *x′* of the pawl is directly above the projection *q′* of the plate J, so that on the descent of the pawl, this inclined portion *x* will strike the projection *q′*, and the latter will be the means of tilting the pawl over to the position shown in fig. 10, thus completing what the stop had begun, namely, the reversal of the pawl, and the consequent reversal of the movement of the cylinder.

As the cylinder revolves in a contrary direction to that pointed out by the arrow, the pins will again act on the arm G′, and control the pawl D, as before, until the other stop in the groove of the spiral cylinder, acting on the hooked end of the arm *n′*, as seen in fig. 4, pulls the latter, moves the plate J, and causes the double pawl to be tilted back to its original position, and the cylinder, consequently, be turned in the first direction pointed out by the arrow.

When we take into account the fact that the pins control the pattern, and when we consider the length of the thread on which the pins are arranged, and the fact that one-half only of the pattern is completed during the revolution of the cylinder in one direction, the other half being completed during the revolution of the cylinder in the contrary direction, the capacity of the cylinder as a means of producing long patterns will be understood.

Although, by way of illustration, I have shown my invention as applied to the controlling of a common star-wheel for operating drop-boxes, it will be evident, to those familiar with the construction of looms of this class, that the reversible cylinder, with its spirally-arranged pins, may be readily applied to other drop-box mechanism.

The cylinder, with its spirally-arranged pins, or the equivalents of the pins, may even be used as a direct box-operator.

This will be readily understood by reference to fig. 2, and by supposing the arm G to be continued outward, as shown by dotted lines, and connected at its outer end, by suitable appliances, to the drop-boxes.

The modification of my invention, illustrated in figs. 6 and 7, is adapted to a special loom known as Jenks' wedge-loom.

In this case, the pins, instead of being arranged spirally on a cylinder, are arranged spirally on a disk or annular wheel, N, to which a revolving motion is imparted, first in one direction and then in the other.

The pins on the face of this wheel act on a projection on a small block, 2, which can slide in an opening at the end of one arm of a lever, 3, the block being controlled by the spiral groove between the spiral ribs, into which the pins are fitted.

The long arm of the lever 3 is connected to a pendulous arm, 4, so that the pins on the wheel will, through the lever, impart a lateral motion to the said arm, to which a vibrating motion is imparted by a cam on the driving-shaft 5.

The wedge 6, at the end of this arm, operates the drop-boxes of the loom in question, and the lateral position of the arm determines the manner in which they shall be operated.

Claims.

I claim—

1. A cylinder, on which spirally-arranged pins are combined with a spiral groove, or spiral projecting rib, for laterally controlling the lever, or its equivalent, actuated by the pins.

2. The disk, with its pins arranged on a spiral line, in combination with a lever or its equivalent, operating in connection with the drop-boxes, substantially as set forth.

3. The combination of the said disk and pins with a groove or rib arranged on the disk, for controlling the lever, (or a sliding projection on the latter,) actuated by the pins.

4. The combination of the cylinder, its spirally-arranged pins, rib, and cog-wheel, with the double pawl, which is caused to operate in the manner set forth, by the mechanism herein described, or its equivalent.

5. The said double pawl, in combination with the sliding plate J and its projections *q q′*.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

ARCHIBALD NIMMO.

Witnesses:
W. W. DOUGHERTY,
HARRY SMITH.